

Interest Rates, Household Cash Flow, and Consumer Expenditures

The recent expansion of adjustable-rate lending has made consumer debt payments more sensitive to changes in interest rates than before. At the same time, however, the growth in money market mutual funds and the deregulation of small time deposit rates have made household interest receipts more responsive to interest rate movements. In a period when interest rates are changing significantly, these developments prompt concern about the role played by household cash flows in the transmission of monetary policy.¹

This article develops a methodology for estimating the effect of rising interest rates on household cash flow and the resulting impact on consumption. Cash flow is shown to be proportionately more responsive to movements in interest rates at present than it was in the late 1960s, although slightly less responsive than in the late 1970s. Sensitivity has risen over the whole period because households increased their stocks of floating-rate and rapidly repricing assets more than their debts with these characteristics, in the last decade, however, this sensitivity has diminished somewhat as floating-rate debt has grown more rapidly than floating-rate assets.

The household cash flow effect on aggregate consumption depends not only on the magnitude of the

change in net interest receipts, but also on the impact of the associated redistribution of income from debtors to creditors. Microeconomic data presented in this article suggest that households that make debt service payments have spending propensities similar to those of interest income recipients. The effect of rising interest rates on net cash flow and subsequently on consumption is probably positive, although perhaps somewhat less important quantitatively than a decade ago.

Rising interest rates do tend to reduce household expenditures through effects on the cost of borrowing, the reward for savings, and household wealth. This article, however, focuses more narrowly on the household cash flow effect. The analysis concludes with an exercise that projects the impact on cash flow and consumption of a 300 basis point rise in interest rates.² The calculations suggest that such an increase would raise household after-tax cash flow by about \$15 billion and raise consumption by about \$10 billion over a 12-month period.³

The direct effects of higher interest rates on consumption

A rise in interest rates has a theoretically ambiguous

¹Valuable discussion of some of these issues may be found in John L. Goodman, Charles A. Lockett, and David W. Wilcox, "Interest Rates and Household Cash Flow," Federal Reserve Board, December 1988, mimeographed. See also Stephen S. Roach, "The Interest Rate Connection," *Economic Perspectives*, Morgan Stanley, February 1989, Jason Benderly and Edward McKelvey, "Consumer Debt Buried Alive?" Goldman Sachs, February 1989, and Roger H. Fulton and R. Scott Brown, "Will Variable-Rate Mortgages Doom the Economic Boom?" A. Gary Shilling and Company, March 1989.

²Short-term interest rates rose by about 300 basis points between March 1988 and March 1989, but short-term rates have fallen about 100 basis points since then.

³The estimates presented here are based on a partial equilibrium analysis in which household spending patterns, national income and prices, and debt and asset compositions are assumed constant. It is also assumed that associated changes in the interest incomes of the business sector, the government, or financial intermediaries do not affect consumption.

effect on consumption. On the one hand, consumers may delay expenditures, substituting future consumption for present consumption, in response to higher returns to saving and increased costs of borrowing. On the other hand, the aggregate household sector is a net lender and receives more interest income on its assets as interest rates rise. Since higher interest receipts make possible increased consumption over time, consumers may choose to increase current as well as future expenditures.⁴

The cash flow effect of changing interest rates is the real world counterpart to the income effect described in microeconomic theory. Net cash flow rises (falls) with interest rates if households hold more (less) floating-rate or rapidly repricing assets than debts. The aggregate effect on consumption also depends on the propensities to consume of those households that receive interest income relative to those that make debt payments.

The substitution and income effects are not the only channels by which interest rates affect aggregate consumption in the real economy. First, a rise in interest rates may be accompanied by a reduction in credit availability, causing liquidity-constrained households to reduce their expenditures more than the simple intertemporal substitution effect would suggest. Second, most household assets, such as corporate equity, corporate and government bonds, home equity, and human capital, provide income payments that are largely independent of market interest rates. When long-term interest rates rise, present value calculations discounting future dividends, coupon payments, housing services, and wages cause the market value of these assets to fall. For consumers who intend to borrow against future income or to finance expenditures by stock, bond, or home sales, an increase in long-term rates not only reduces their wealth but also reduces their ability to spend. In response to such capital losses, consumers may increase their savings to restore their desired stocks of wealth.

This article, however, abstracts from wealth, credit rationing, and substitution effects, focusing instead on the income effects of changing interest rates. The approach is not so restrictive in its empirical application as it first appears. The recent rise in short-term interest rates was not accompanied by a significant rise in long-term rates or a reduction in credit availability.⁵ Moreover, some evidence suggests that the negative substitution effect on nondurables and services

consumption, though compelling in theory, may not be quantitatively important.⁶ The apparently limited amount of credit rationing and household wealth reduction accompanying the current rise in interest rates raises the possibility that the household cash-flow channel is relatively more important today than in previous episodes of monetary tightening.

The historical relationship between interest rates and net monetary interest

The basic data on interest paid and received by the household sector is recorded in the Commerce Department's National Income and Product Accounts. A breakdown of the data for the years 1987 and 1988 appears in Table 1. In 1988, households received directly \$343 billion in monetary interest, they paid out \$272 billion, of which about two-thirds went to mortgage interest payments.⁷

The National Income Accounts' definition of personal income includes, in addition to monetary interest,

⁶A rise in interest rates may, nonetheless, reduce expenditures on durable goods because their relative desirability as savings vehicles declines. The intertemporal elasticity of consumption for nondurables and services is estimated to be approximately zero in Robert E. Hall, "Intertemporal Substitution in Consumption," *Journal of Political Economy*, vol. 96, no. 2 (1988), pp. 339-57, and in John Y. Campbell and N. Gregory Mankiw, "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence," Princeton University, April 1989.

⁷As defined in this article, the household sector includes nonprofit institutions and foundations. Goodman, Luckett, and Wilcox, in "Interest Rates and Household Cash Flow," estimate that these entities account for perhaps 10 to 15 percent of assets and 5 to 10 percent of the debts of the household sector. Noncapital expenditures by nonprofit institutions are included in the National Income Accounts' definition of private consumption and may be sensitive to variations in their cash flows.

Table 1
Interest Paid and Received by Households
(In Billions of Dollars)

	1987	1988
Monetary interest received	313	343
Monetary interest paid	253	272
Nonmortgage interest	92	99
Mortgage interest	161	173
Net monetary interest	60	71
Memo items		
Imputed interest received†	214	233
Disposable income	3210	3464

Sources: Federal Reserve Bank of New York staff estimates and data from U.S. Commerce Department.

†Imputed interest income consists of interest earned by life insurance companies and pension funds and the undistributed interest income of other financial intermediaries, mainly banks.

⁴The associated changes in noninterest income, exchange rates, and relative prices of course indirectly affect consumption as well.

⁵Recent surveys of senior bank loan officers do not indicate a significant reduction in their "willingness to lend" to consumers.

imputed interest income, that is, the undistributed interest income earned by pension funds, insurance companies, and other financial intermediaries. This totaled \$233 billion in 1988. Since these funds are generally not available to be spent directly, the rest of the article assumes that households do not alter their consumption in response to changes in the level of imputed interest. This assumption imparts a bias toward finding that rising interest rates exert a negative effect on household spending because some consumers can borrow more or will save less as imputed income rises.

A historical perspective is provided by Chart 1, which displays interest paid and received over time as fractions of disposable income. Imputed interest is given by the gap between the lines representing total interest received and monetary interest received. Imputed interest has been growing in relative importance in the 1980s.

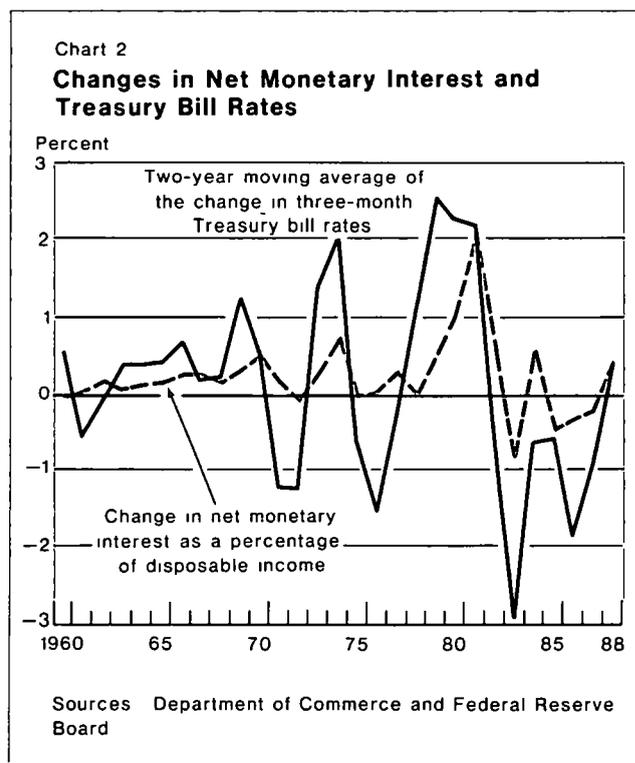
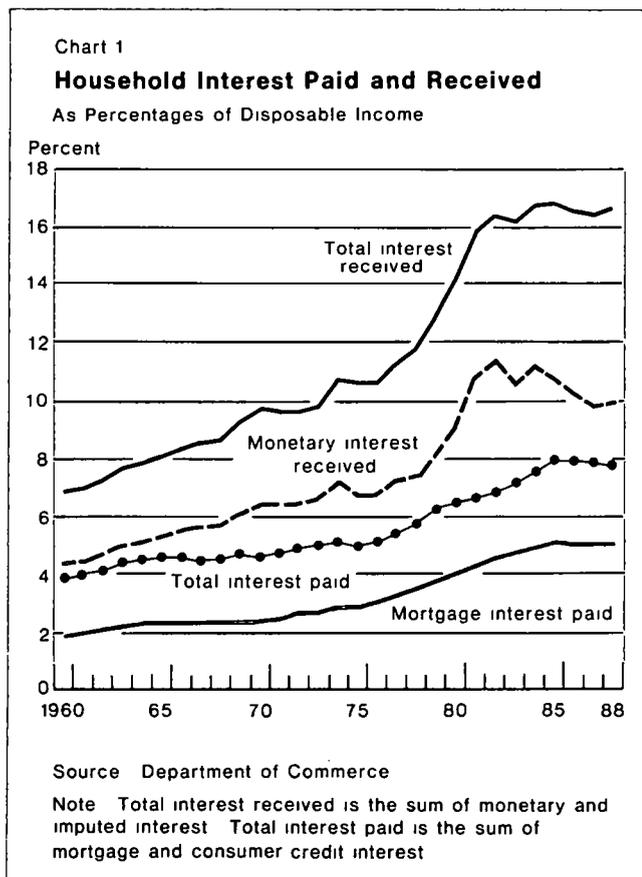
The difference between total interest paid and mortgage interest is interest paid on consumer installment credit and other consumer debt. While mortgage interest payments have been rising, nonmortgage interest

payments have remained a fairly constant percentage of income. The gap between monetary interest received and total interest paid is net monetary interest. Household net interest has always been positive, but its relative share of income has been falling in the last few years. The most volatile series on this chart is monetary interest received, which increased dramatically during the run-up in interest rates in 1979 and 1980 and fell with the level of interest rates in the early 1980s.

Chart 2 compares changes in net monetary interest with a two-year moving average of changes in the three-month Treasury bill rate and shows a generally positive correlation. When interest rates have been rising, net monetary interest has risen with a lag of one or two years. In 1979, 1980, and 1981, interest rates rose about 200 basis points each year, and net monetary interest rose by 1 or 2 percent of disposable income each year.

The composition of household assets and debts and the sensitivity of net monetary interest to changes in market rates

We can draw few inferences about the current sensitivity of household cash flow to market interest rates from historical data. Over the last decade, consumer



deposit rates have been deregulated, the available menu of money market savings instruments has expanded, and variable-rate lending has grown dramatically⁸

Table 2 details the composition of interest-bearing assets of the household sector 20 years ago, 10 years ago, and today. Although the total financial assets of the household sector are today about 12 trillion dollars, only about a third of these assets provide interest income directly to households. The rest of the household sector's financial assets consists of corporate equity, noncorporate equity, IRA and Keogh Plan deposits, pension fund reserves, and insurance company reserves.

Interest-earning assets differ substantially in the responsiveness of their returns to market rates. The yields earned on NOW account deposits (\$282 billion) and passbook savings balances (\$420 billion) adjust only modestly to changes in market rates. But the yields on money market deposit account balances (\$489 billion) are likely to reflect about half of a sustained increase in the Treasury bill rate within a year⁹.

Of the small time deposits (\$991 billion), more than half have maturities of one year or less, and about half

of the longer maturities are likely to roll over within a year¹⁰. Three-fourths of small time deposits, therefore, will reprice at market rates within a year. The money market mutual funds (\$302 billion) and large time deposits (\$109 billion) are, of course, extremely responsive to short-term money market rates.

Information about the average maturities of the household sector's holdings of other financial instruments is less precise. Of the negotiable Treasury securities (\$466 billion), perhaps 45 percent reprice in response to short-term interest rates and 5 percent reprice in response to long-term rates after a year¹¹. Although little is known about the maturity structure of the household sector's holdings of other credit market instruments (\$824 billion), a conservative estimate is that 10 percent respond to short-term rates and 10 percent respond to long-term rates within a year¹².

Table 3 displays the composition of consumer debt for the same three dates cited in Table 2. Almost half of consumer debt arises from fixed-rate mortgages (\$1410 billion), perhaps 10 percent of these mortgages are

⁸The historical relationship between changes in interest rates and net monetary interest is statistically dominated by the interest volatility of the late 1970s and early 1980s. Over this same period, the characteristics and composition of household assets were rapidly changing. Current inferences based on data from this period may be highly inaccurate.

⁹The ways in which banks adjust consumer deposit rates under deregulation are explored by John Wenninger in "Responsiveness of Interest Rate Spreads and Deposit Flows to Changes in Market Rates," this *Quarterly Review*, Autumn 1986, pp. 1-10.

¹⁰These estimates were obtained from the Board of Governors of the Federal Reserve System, Monthly Survey of Selected Deposits and Other Accounts, December 28, 1988 and January 25, 1989, H 6 Statistical Release.

¹¹Of the total marketable interest-bearing public debt securities outstanding at the end of 1988, about one-third mature in less than 1 year, one-third mature in 1 to 5 years, and the rest have an average maturity of about 10 years (Table B-85, *Economic Report of the President*, 1989).

¹²The classification "other credit market instruments" consists of mortgages, corporate and foreign bonds, tax-exempt obligations, open-market paper, savings bonds, and agency issues.

Table 2

Interest-bearing Assets of the Household Sector
(Seasonally Adjusted)

	December 1968		December 1978		December 1988	
	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total
NOW accounts	0.0	0.0	8.5	0.6	282.3	7.3
Passbook savings	266.3	45.8	474.3	31.9	419.3	10.8
Money market deposit accounts	0.0	0.0	0.0	0.0	488.7	12.6
Small time accounts†	99.6	17.1	512.5	34.5	990.7	25.5
Money market mutual funds	0.0	0.0	9.4	0.6	301.5	7.8
Large time accounts	8.4	1.4	64.2	4.3	108.5	2.8
Treasury bills, notes, and bonds	39.1	6.7	79.2	5.3	466.4	12.0
Other credit market instruments‡	167.9	28.9	347.2	23.3	823.8	21.2
Total	581.3	100.0	1486.2	100.0	3881.2	100.0

Sources: Flow of Funds data from the Federal Reserve Board, Federal Reserve Bank of New York estimates.

†Excludes IRA and Keogh Plan deposits totaling \$0.4 billion, \$11.6 billion, and \$216.5 billion in 1968, 1978, and 1988, respectively.

‡Includes U.S. savings bonds, agency securities, tax-exempt obligations, mortgages, corporate bonds, foreign bonds, and open-market paper.

repriced in response to a change in long-term interest rates after about a year. Adjustable-rate mortgages (\$585 billion), however, respond almost fully to short-term interest rate changes within a year.¹³ The interest rate charged on home equity lines of credit (\$75 billion) adjusts rapidly, often within a month, to market rates.¹⁴

Of the nonmortgage consumer debt (\$746 billion), about 15 percent is at a variable interest rate, tied either to the Treasury bill rate or the prime rate. Most of the remaining debt is of relatively short maturity. Banks report an average liquidation period of about three years for auto loans, two years for personal loans, and four years for other loans.¹⁵ Although interest rates on revolving credit balances could in principle vary closely with market rates, in practice they are not responsive.

Table 4 compares the amount of household debts

¹³The amount of adjustable-rate mortgages outstanding is inferred from a model developed by Lynn Paquette and maintained at the Federal Reserve Bank of New York. The model tracks the historical issuance and estimated prepayments of fixed-rate and adjustable-rate mortgages. For further detail, see Lynn Paquette, "Estimating Household Debt Service Payments," this *Quarterly Review*, Summer 1986, pp 12-23.

¹⁴The \$75 billion estimate of debt outstanding on home equity lines of credit is from Glenn B. Canner, Charles Luckett, and Thomas A. Durkin, "Home Equity Lending," *Federal Reserve Bulletin*, May 1989, pp 333-44. These authors estimate that traditional home equity loans, that is, second mortgages, total \$135 billion to \$190 billion, 16 percent of these loans have adjustable rates.

¹⁵Average liquidation periods are less than average maturities for loans because of prepayments. The characteristics of consumer installment debt outstanding in December 1987 can be found in American Bankers Association, *Installment Credit Report 1988*.

and assets, weighted by the extent of variable-rate adjustment or frequency of market-rate repricing within a year. The excess of such interest-sensitivity-adjusted assets over debts has grown from \$74 billion in 1968 to \$410 billion in 1978 to \$768 billion in 1988, expressed as a percentage of disposable income, the excess has risen from 12 percent in 1968 to 25 percent in 1978, and fallen to 21 percent in 1988. Table 4 provides evidence for this article's main conclusion: the effect of a change in interest rates on household cash flow is positive. Expressed as a percentage of disposable income, the effect is much stronger than it was in 1968 and somewhat less strong than it was in 1978.

Since long-term interest rates have been basically flat and short-term rates rose about 300 basis points between March 1988 and March 1989, the data in Table 4 imply that over 12 months this degree of monetary tightening would increase net monetary interest by \$24.1 billion.¹⁶ This sort of calculation abstracts from any shifts in asset and debt composition that are caused by rising interest rates. In the previous run-up in interest rates in the late 1970s, funds were shifted out of passbook savings accounts into money market mutual funds and time accounts with unregulated interest rates. No analogous rapid portfolio shift to reduce debt service burdens is possible, however. The working assumption, that the composition of debts and assets does not change as rates rise, imparts a bias toward

¹⁶This number is obtained by multiplying 0.03 times the difference shown in Table 4 between assets and debts that reprice in response to changes in short rates.

Table 3

Debts of the Household Sector
(Seasonally Adjusted)

	December 1968		December 1978		December 1988	
	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total
Consumer installment credit†	90.1	23.9	262.0	25.2	666.2	23.7
Revolving credit	2.0	0.5	45.2	4.3	185.8	6.6
Auto loans	34.4	9.1	98.7	9.5	289.8	10.3
Other installment credit‡	53.7	14.2	118.1	11.4	190.6	6.8
Other consumer credit§	29.3	7.7	50.3	4.8	80.0	2.8
Mortgage debt	257.7	68.3	727.7	70.0	2070.3	73.5
Home equity lines of credit	0.0	0.0	0.0	0.0	75.0	2.7
Adjustable-rate mortgages	0.0	0.0	0.0	0.0	585.0	20.8
Fixed-rate mortgages	257.7	68.3	727.7	70.0	1410.3	50.1
Total household debt	377.1	100.0	1040.0	100.0	2816.5	100.0

Sources: Federal Reserve Board, Statistical Release G-19 and Flow of Funds data, Federal Reserve Bank of New York estimates.

†Data were collected in May 1989 and are subject to subsequent revisions.

‡Includes personal loans and mobile home loans.

§Includes single-payment loans, charge account balances, service credit, and installment credit of nonprofit institutions.

Table 4

The Amount of Variable-Rate or Annually Repriced Interest-earning Assets and Debts

(In Billions of Dollars)

	December 1968	December 1978	December 1988
Total interest-bearing assets	581 3	1486 2	3881 2
Assets responding to market rates after one year	136 3	567 0	1795 4
Responding to short-term rates†	117 5	528 3	1689 7
Responding to long-term rates‡	18 8	38 7	105 7
Total interest-bearing debt	377 1	1040 0	2816 5
Debt responding to market rates after one year	62 1	156 9	1027 6
Responding to short-term rates§	36 3	84 1	886 6
Responding to long-term rates	25 8	72 8	141 0
Net assets responding to market rates after one year	74 2	410 1	767 8
Memo Disposable income	628 7	1637 3	3599 5
Net assets responding to market rates after one year as a percentage of disposable income	11 8 percent	25 0 percent	21 3 percent

†These assets consist of the weighted sum (weights given parenthetically) of savings and NOW accounts (0 0), MMDAs (0 5), small time accounts (0 75), MMMFs and large time accounts (1 0), federal securities (0 45), and other securities (0 1)

‡These assets consist of the weighted sum of federal securities (0 05) and other securities (0 1)

§This debt consists of the weighted sum of revolving credit, fixed-rate auto loans, and other consumer installment credit (.33), other consumer debt (0 25), and variable rate consumer installment credit, home equity lines of credit, and adjustable rate mortgage loans (1 0). Fifteen percent of auto loans and other consumer installment credit had variable rates in 1988, none had variable rates in 1968 and 1978

||This debt consists of 10 percent of fixed-rate mortgage debt

finding a negative effect of higher interest rates on cash flow.¹⁷

Distributional considerations

If the individuals who received interest income were the same as those who made debt payments, then the cash flow effect of a rise in interest rates would undoubtedly be stimulative to consumption. More generally, if the propensity of creditors to consume were as great as that of debtors, then again the cash flow effect would be stimulative.

The individuals who benefit from higher interest receipts are, however, different from those who make higher interest payments. Rising adjustable-rate mortgage payments undoubtedly require significant consumption cutbacks for many borrowers. The vast majority of adjustable-rate mortgage holders do not have nearly enough adjustable-rate assets to offset their rising mortgage payments directly.¹⁸ The crucial

¹⁷Households probably still shift funds to high-yield accounts out of low-interest liquid deposit accounts. For example, since yields on money market deposit accounts adjust to market rates relatively slowly, the balances in these accounts have recently been falling while money market funds have been growing.

¹⁸Goodman, Luckett, and Wilcox, "Interest Rates and Household Cash Flow," report that 80 percent of adjustable-rate mortgage holders have mortgage debts that are at least four times their holdings of floating-rate or rapidly repricing assets.

Table 5

Disposable Income and Consumer Expenditures in 1985 by Income Quintile

Income Quintile	Mean Disposable Income (Dollars)	Mean Expenditures (Dollars)	Expenditures' Share of Disposable Income (Percent)
Lowest 20 percent	3,462	11,006	318
Second 20 percent	10,338	14,131	137
Third 20 percent	18,041	19,183	113
Fourth 20 percent	28,178	25,932	92
Highest 20 percent	54,215	42,374	78
Mean	22,887	22,217	97

Source: Data from U.S. Bureau of Labor Statistics, reported in *Statistical Abstract of the United States 1988*, Table no. 688.

issue, however, is whether the recipients of interest incomes have significantly lower propensities to spend than those who make interest payments that are sensitive to market rates.

Aggregate consumption would be more sensitive to interest paid than interest received if interest-earning assets were concentrated among high-income households with low propensities to spend. Table 5 shows that the top income quintile's average propensity to

consume is, in fact, lower than the overall average.¹⁹ Since nonlabor income is more concentrated than labor income, the propensity to consume out of interest income may be less than that out of labor income.

Most debt, however, is owed by households with fairly high incomes. Two-thirds of all consumer installment debt and three-fourths of all home mortgages are held by the top two income quintiles of the population.²⁰ Moreover, some debtors, such as borrowers with home equity lines of credit, are clearly not liquidity constrained and are not forced to reduce consumption in response to higher interest payments. Surveys show that these borrowers have large unused balances on their lines of credit.²¹ Those that make large debt service payments do not appear to have higher than average propensities to consume.

There is also little evidence that the recipients of interest income have low propensities to consume. In order to preserve their capital and guarantee a sizable interest cash flow, many households maintain large balances in money market deposit accounts, money market mutual funds, and small time accounts rather than invest in corporate equity. Holdings of these interest-

earning assets are spread much more evenly across income classes than are holdings of corporate equity, and they are likely to be held by people with fairly high propensities to consume, such as the elderly.

Almost all interest received by households is taxable.²² Table 6 shows that the tax returns of those with moderate incomes, say, those reporting under \$40,000 of adjustable gross income, earn over half of all interest income. The argument that only the rich receive interest while the poor pay it out is therefore unfounded.

Table 7 shows that those over the age of 65 hold about 47 percent of all interest-earning assets at financial institutions and about 42 percent of all open market interest-earning financial instruments. Table 8 shows that the elderly consume a higher percentage of their incomes than the rest of the population. Although there is no reliable estimate of the marginal propensity to consume of the elderly (particularly those who receive large amounts of interest income), some economists have found empirical evidence that the elderly do have higher than average marginal propensities to consume.²³

¹⁹Some households are placed in the highest income quintile because they have experienced temporary windfalls, and they are likely to save much of this increased income. The variation in average expenditure shares in Table 5, therefore, overstates differences in marginal propensities to consume across income classes defined in terms of permanent income.

²⁰See Goodman, Lockett, and Wilson, "Interest Rates and Household Cash Flow," p. 9.

²¹In their discussion of a survey conducted in the second half of 1988, Canner, Lockett, and Durkin, "Home Equity Lending," report that the median home equity line of credit debtor owes \$10,000 and that the median available line of credit is \$31,250.

²²The flow of funds data collected by the Federal Reserve Board suggest that about \$270 billion, or less than 7 percent, of all interest-earning assets of households were tax exempt in December 1988. Most of these securities have fixed interest rates and long maturities and are hence unimportant when estimating the sensitivity of interest income to changes in short-term interest rates.

²³See, for example, papers by Michael Hurd, "Savings of the Elderly and Desired Bequests," *American Economic Review*, vol. 77, no. 3.

Table 6

Distribution of Tax Returns and Interest Income in 1985

Adjusted Gross Income (Dollars)	Share of Total Tax Returns (Percent)	Share of Reported Interest Income (Percent)
9,999 and less	19.2	8.6
10,000-19,999	29.5	19.5
20,000-29,999	19.6	14.9
30,000-39,999	13.9	12.3
40,000-49,999	8.1	9.8
50,000-99,999	8.3	19.3
100,000 and above	1.5	15.6
Total	100.0	100.0

Source: Data from U.S. Internal Revenue Service, reported in *Statistical Abstract of the United States 1988*, Table no. 492.

Table 7

Distribution of Ownership of Interest-earning Assets in 1984

Age of Head of Household	Share of Total Households (Percent)	Share of Assets at Financial Institutions† (Percent)	Share of Open Market Instruments‡ (Percent)
Under 35	29.6	6.8	4.2
35-44	20.0	10.4	13.3
45-54	14.5	12.8	11.0
55-64	14.9	22.5	28.4
65-74	12.3	26.6	25.8
75 and over	8.6	20.9	16.9
Total	100.0	100.0	100.0

Source: Data from U.S. Bureau of Census, reported in *Statistical Abstract of the United States 1988*, Table no. 728.

†Includes passbook accounts, money market deposit accounts, certificates of deposit, and interest-earning checking accounts.

‡Includes money market funds, U.S. government securities, municipal and corporate bonds, and other interest-bearing assets.

Implications of recent interest rate changes for household after-tax cash flow and consumption expenditures

The direct impact of a sustained 300 basis point increase in short-term interest rates on interest paid and received can be inferred from Table 4. After 12 months, interest received would be \$50.7 billion greater and interest paid would be \$26.6 billion greater than if interest rates were unchanged.

If one assumes that the representative interest income recipient faces a 30 percent combined state and federal marginal tax rate,²⁴ then the increase in interest rates would cause a \$35.4 billion increase in after-tax income over the next 12 months. The interest paid on ordinary mortgages and home equity loans is fully deductible, but only a small portion of the interest paid on nonmortgage debt is deductible (20 percent in 1989 and zero thereafter) and some households do not itemize their returns. When mortgage interest is treated as fully deductible and nonmortgage interest is treated as not deductible at all, a 30 percent marginal tax rate

implies an increase in after-tax interest paid of \$20.7 billion owing to the increase in rates. After-tax net interest would therefore rise \$14.7 billion over the next year because of a 300 basis point increase in interest rates.

Table 9 shows the effects of these changes in after-tax income paid and received under alternative assumptions about relative propensities to consume. Standard macroeconomic models suggest a marginal propensity to consume out of wage income of about 0.7.²⁵ Applying this fraction to both interest paid and received implies a \$10.3 billion increase in consumption over the next 12 months from a sustained 300 basis point rise in short-term rates. Since total consumption spending is now about \$3.4 trillion a year, the household cash flow effect would therefore be an increase in consumption of one-third of 1 percent.

Alternative cases shown in Table 9 reveal the sensitivity of the results to different parameter values. If we retain the assumption that the propensity to consume out of interest income is fairly high—say, 0.7—but assume that all those who must pay more interest are

Footnote 23 (continued)

(June 1987), pp. 298-312, and David W. Wilcox, "Social Security Benefits, Consumption Expenditures, and the Life Cycle Hypothesis," *Journal of Political Economy*, vol. 97, no. 2 (April 1989), pp. 288-304.

²⁴As Table 6 shows, about half of all household interest income in 1985 was received by households reporting less than \$40,000 in adjustable gross income. Marginal federal tax rates are either 15 percent, 28 percent, or 33 percent depending on adjustable gross income and filing status. Marginal state tax rates range from zero to about 9 percent, but interest earned on Treasury securities is exempt from state taxes. Securities exempt from federal taxes are ignored since the amount held by households is relatively small (see footnote 22).

²⁵Model estimates of the propensity to consume out of interest income are usually lower, but these estimates are based on definitions of interest income that include imputations bound to be consumed in small proportion. Since this article considers only monetary interest paid, the appropriate spending propensity could be quite high.

Table 8

Disposable Income and Consumer Expenditures in 1985 by Head of Household

Age	Mean Disposable Income (Dollars)	Mean Expenditures (Dollars)	Expenditures' Share of Disposable Income (Percent)
Less than 25	11,088	12,964	117
25 to 34	23,025	21,977	95
35 to 44	29,643	28,063	95
45 to 54	30,354	29,146	96
55 to 64	24,649	23,390	95
65 to 74	17,170	17,000	99
75 and over	11,553	12,347	107
Mean	22,887	22,217	97

Source: Data from U.S. Bureau of Labor Statistics, reported in *Statistical Abstract of the United States 1988*, Table no. 688.

Table 9

Twelve-Month Change in Income and Consumption Due to a 300 Basis Point Rise in Interest Rates

(In Billions of Dollars)

Changes in Income			
Change in Interest Received	Change in Interest Paid	Change in Interest Received after Taxes	Change in Interest Paid after Taxes
50.7	26.6	35.4	20.7
Changes in Aggregate Consumption			
Creditors' Marginal Propensity to Consume Equals 0.7		Debtors' Marginal Propensity to Consume Equals 1.0	
10.3		4.1	
Creditors' Marginal Propensity to Consume Equals 0.2		Debtors' Marginal Propensity to Consume Equals 1.0	
-7.4		-13.6	

Sources: Table 4 and adjustments described in the text.

liquidity constrained so that every dollar of increased interest paid comes out of consumption, the higher interest rates would still cause consumption to rise by about \$4.1 billion. If, however, we assume a very low propensity to consume out of interest income (0.2) and a high propensity to cut back in response to increased interest payments (0.7), we find that interest rates have a negative cash flow effect on consumption totaling -\$7.4 billion. The more extreme assumption that all debtors are liquidity constrained and their marginal propensity to consume is 1.0 implies a consumption decline of -\$13.6 billion, about two-fifths of 1 percent of total consumption.

Conclusion

The excess of household assets over household debts that have floating rates or that reprice rapidly in response to market rates increased from 11 percent to 25 percent of disposable income between 1968 and 1978. Over the past decade, floating-rate debt has increased more rapidly than similar assets, and the excess is now 21 percent. Household cash flow, therefore, continues to rise with interest rates, though somewhat less than 10 years ago. The estimates reported in this article suggest that a 300 basis point rise in interest rates would, if sustained, raise after-tax cash flow by about \$15 billion over the next 12 months.

There is little reason to expect the marginal propensity to consume out of interest received to be signifi-

cantly lower than the propensity to consume out of interest paid. The typical debtor household has fairly high income. Interest-earning assets, moreover, are spread more evenly across income classes than other forms of wealth and are particularly concentrated among elderly households that may have higher than average propensities to spend.

Ignoring any wealth, substitution, or credit-rationing effects of the recent monetary tightening, if the rise in short-term interest rates of roughly 300 basis points between March 1988 and March 1989 had continued, the household cash flow effect would likely have increased aggregate consumption by about a third of 1 percent over a 12-month period. The effect could have been a reduction, to be sure, but such a result would hold only in the unlikely event that the propensity to consume of interest payers greatly exceeded that of interest recipients. These results were derived under the assumptions that households do not alter the composition of their assets in response to higher interest rates and that consumers do not increase their spending as imputed interest income rises. More realistic assumptions would likely imply that rising interest rates have a larger positive cash flow effect on household consumption.

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