How Has the Financial Crisis Affected the Finances of Older Households?

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This *brief* considers the impact of recent declines in stock prices and nominal interest rates on older households. Between October 2007 and March 2009, the S&P 500 index declined by more than 50 percent, and in August 2011 remains 24 percent below its October 2007 peak. But dividends on stocks fell by only 10.6 percent between October 2007 and June 2011.[1] Short-term nominal interest rates have fallen close to zero, and seem likely to remain at depressed levels for an extended period.

The *brief* first examines the effect of the crisis on the financial wealth of older households. It shows that high-wealth households hold larger proportions of their financial assets in stocks and therefore experienced the largest percentage declines in financial wealth.

It then examines the impact of the financial crisis on the investment and total incomes of retired households. High-wealth households experienced the smallest percentage declines in investment income, reflecting the smaller proportions of their financial assets held in short-term deposits. But investment income represents a larger share of the total income of the wealthy, and these households therefore experienced larger percentage declines in total income.

This *brief* then considers the impact of the financial crisis on lifetime consumption. It calculates the amounts retired households should optimally consume from their financial assets, assuming that, in accordance with the life-cycle model of savings behavior, they not only consume interest and dividends, but also draw down their capital. We consider two scenarios: 1) a recovery scenario in which interest rates recover and companies sustain their recent increases in profitability and, 2) a pessimistic scenario in which the

[1] Shiller, Robert J. (2011)

economy remains mired in recession. Under both scenarios, the reductions in optimal consumption are substantially less than the reductions in current income, so that calculations that focus exclusively on current income overstate the effects of the crisis.

The remainder of this *brief* is organized as follows. The first section documents the impact of the financial crisis on stock prices and interest rates. The second section calculates the impact of the crisis on the value of household portfolios and the income generated by those portfolios. The third section evaluates the prospects for stock returns and the likely duration of low interest rates. The fourth section calculates the impact of the financial crisis on the amounts retired households should optimally decumulate from their financial assets. The fifth section concludes.

The impact of the financial crisis on stock prices and interest rates

The financial crisis resulted in a dramatic decline in stock prices as measured by the S&P 500 index. Figure 1 shows the performance of this index from January 2000 to August 2011. The index fell by 57 percent between its peak in October 2007 and trough in March 2011, and in August 2011 remains 24 percent below that peak.[2]

The financial crisis also resulted in unprecedented declines in short-term interest rates. The solid line in Figure 2 shows the short-term rate of interest for the period 1960-2010, as measured by the one-year Treasury Bond. This rate has declined since the 1980s, hitting record lows during the Great Recession. But what matters for households is not the nominal interest rate but the real interest rate, after deducting inflation. We therefore show with the dotted line the real short-term interest rate, after deducting the anticipated 12-month rate of inflation. Real short-term interest rates fell to less than zero in early

[2] The decline is not unprecedented. Between March 2000 and October 2002, the market fell by 48 percent in nominal terms. Between 1973 and 1974, a period of rapid inflation, the market fell by 48 percent in nominal terms, and 61 percent in real terms.

2008, and have remained at less than zero for more than three years, an unprecedented length of time.[3]

The financial crisis had little effect on bond prices. Between October 2007 and August 2011, the prices of investment-grade bonds increased by 5 percent and those of high-yield bonds fell by 5 percent.[4]

The impact of the financial crisis on household financial wealth and income

Table 1 shows the October 2007 distribution of financial wealth of older households by age group and wealth quintile and the decline in wealth from October 2007 to July 2011.[5] The 80th percentile of the distribution of financial assets is approximately $250,000, so many of the households in the top wealth quintile are by no means rich. Households in the bottom two quintiles have almost no financial assets and were largely unscathed by the market meltdown. High-wealth households with substantial financial assets hold larger proportions in stocks and smaller proportions in short-term deposits. Neither wealth nor asset allocations vary substantially with age.[6]

High-wealth households experienced larger percentage declines in financial wealth during the above period, reflecting their greater exposure to the stock market. The declines in wealth for the top three quintiles were 4-9 percent. Although these declines are, at first sight, relatively modest, they reflect a substantial shortfall relative to expectations based on a continued increase in stock prices.[7]

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[3] The dramatic decline in short-term interest rates highlights the risks involved in relying on variable interest investments to finance post-retirement consumption. For a discussion, see Campbell and Viceira (2001).

[4] The changes in bond prices reflect the price component of the FINRA-Bloomberg active U.S. corporate bond indexes for investment-grade and high-yield bonds.

[5] We use data from the 2008 wave of the *Health and Retirement Study*, and restate stock market wealth to October 2007, assuming that households earned the average return on the Wilshire 5000 stock index and the FINRA-Bloomberg active U.S. corporate bond index between October 2007 and the date of the 2008 interview.

[6] Coile and Milligan (2009) reported similar portfolio allocations. The apparent absence of a decline in wealth or a shift to more portfolio allocations may reflect lower mortality rates among the wealthy.

[7] Had households in the top wealth quintile experienced a 5.5 percent capital return on stocks, a reasonable expectation given 2007 price-earnings ratios, dividend yields, and inflation rates, their wealth would have increased by 16 percent by July 2011.

Table 2 shows the impact of the financial crisis on the investment incomes of older households. During the period October 2007 to June 2011, dividends on stocks declined by only 10.6 percent.[8] But interest rates on short-term deposits declined to close to zero. In all quintiles, the percentage declines in income were greater than the percentage declines in wealth. In contrast to the pattern of financial losses shown in Table 1, the wealthy experienced smaller percentage declines in investment income, reflecting their smaller portfolio allocations to short-term deposits. Among households ages 60-69, those in the top quintile experienced a 31-percent decline in their investment income, compared to 59 percent for those in the middle quintile. But income and investments represent a larger proportion of the income of wealthy retirees, and households in the top wealth quintile experienced larger percentage declines in total income from all sources, 15 percent, compared to 7 percent for those in the middle quintile.[9] If the economy recovers, these declines will be reversed over the next few years. If it remains mired in recession, it may be many years before investment income recovers to pre-recession levels.

The prospects for stock returns and the likely duration of low interest rates

Although many retired households follow a strategy of spending their interest and dividends while preserving their capital, it is only by chance that such a strategy will be optimal. According to the life-cycle model of savings behavior, households should gradually decumulate their wealth during retirement. When deciding how much to consume each period, households should consider not only the current market value of their financial assets and current interest and dividend income, but also prospective income and capital returns over the course of their retirement.

The prospects for stock returns

Corporate profits plunged during the Great Recession, but have now nearly recovered their previous peaks.[10] The decline in stock prices therefore primarily reflects not a

[8] Calculations based on data from Shiller, Robert J. (2011)

[9] When making the above calculation, we exclude households still in receipt of labor market earnings.

[10] Standard & Poor's (2011), index earnings for the S&P 500. See also Bureau of Economic Analysis, National Income and Product Accounts, Table 1.14, ratio of profits after tax with inventory valuation and capital consumption adjustments (line 13) to gross value-added of corporate business (line 1), 1947-II to 2010-III. Operating earnings, after taxes, which fell from 11.5 percent of corporations' output in the fall of

decline in profits, but a decline in the price the market is willing to pay for a dollar of earnings. In 2007, stocks traded at price-earnings ratios of around 20, equivalent to a prospective real return of about 5 percent.[11] Provided corporations maintain their profitability, July 2011 stock prices and forecasts for corporate profits equate to a prospective real return of about 6.5 percent, close to the post-war average.[12] A prospective real return of only 5 percent would require a substantial and long-lasting decline in corporate profits such as might occur if we entered a second Great Recession.[13]

The prospects for short-term interest rates

Short-term interest rates currently are depressed as a result of the weak economic recovery that has followed the financial crisis. As households and businesses attempt to rebuild their wealth, they are less willing to take new loans while they have increased their saving. Real interest rates remain near zero as the supply of credit remains ample compared to the demand for credit.

Investors generally expect nominal short-term interest rates to remain historically low for the next several years, before rising sufficiently to provide a more normal real rate of return.[14] The current prices of Treasury securities imply that the interest rates on bills with maturities of one year or less will remain below 1 percent until 2014. Subsequently, these yields will rise more rapidly to surpass 4 percent by the end of 2017. At that time, the real interest rate on bills will stabilize near 2 percent if the rate of inflation averages about 2.5 percent in the future, as many professional forecasters expect.[15]

2006, had risen to 10.2 percent of output in the fall of 2010. Earnings relative to GDP have recovered to 5.7 percent, which exceeds its historical average of 5 percent.

[11] The earnings yield on stocks, which is the reciprocal of the price-earnings ratio, is the real return that shareholders expect to earn from buying and holding stocks, unless they expect the rate of return on shareholders' capital to increase or they expect shareholders to accept lower real returns on stocks (leading to higher price-earnings ratios) in the future.

[12] The earnings yield, the reciprocal of the price-earnings ratio, is the earnings that a shareholder currently receives per dollar of investment. The price-earnings ratio for the S&P 500 was near 20 in October 2007 and its earnings yield was about 5 percent. Since the 1940s the average price-earnings ratio for the S&P 500 is near 15, which produces an average earnings yield near 6.7 percent.

[13] It would require an approximately 23 percent permanent reduction in profits.

[14] This pattern of forward short-term interest rates is derived from the shape of the current yield curve in credit markets and the prices of U.S. Treasury coupon strips.

[15] The mean forecast for inflation over the coming 10 years from the Survey of Professional Forecasters is between 2 and 2.5 percent.

This view of future interest rates expects the currently sluggish economic expansion to build momentum over the next six years. If the recovery should remain too weak to approach full employment over this time, rates of interest likely could remain low and the real rate of interest on Treasury bills could stay near or below zero.

The impact of the crisis on the optimal consumption of retired households

To measure the impact of the financial crisis on optimal consumption, we first calculate optimal decumulation plans, given the 2007 expectations regarding asset returns, discussed in the previous section. These plans specify the percentages of remaining financial assets that should be consumed each period, given the household's risk preferences. We calculate the amounts households would have consumed each period, had asset returns matched expectations. This provides a baseline against which we can evaluate the impact of the crisis.

We then calculate the effects of the financial crisis relative to the above baseline. We assume that in 2008, 2009, and 2010, the household adheres to its original plan. Consumption declines, reflecting the declines in financial wealth. In 2011, the household updates its beliefs regarding asset returns and revises its optimal decumulation plan. Under the recovery scenario, the household assumes that companies will maintain their profits and short-term interest rates will eventually recover. Under the pessimistic scenario, the household assumes that corporate profits will relapse and short-term interest rates will remain near or below zero for many years. Given the unprecedented economic environment, it is difficult to estimate what probabilities the household should assign to these, and indeed other possible scenarios. For each of the above scenarios, we calculate 2011 optimal consumption, and project consumption for 2012 onward, assuming that asset returns match the household's updated expectations. We compare actual consumption for 2007-2011 and projected consumption for 2012 onward with our baseline projection.

Figure 3 illustrates the impact of the financial crisis on optimal consumption for a household with a typical portfolio allocation. The solid line shows baseline annual consumption from initial wealth of $100,000, this amount being chosen to facilitate interpretation.[16] The dotted and dashed lines show actual consumption for 2007-2011 and projected consumption for 2012 onward, assuming that the household revises its optimal plan in 2011, under the recovery and pessimistic recovery scenarios, respectively. The impact of the crisis on optimal consumption is reflected in the vertical distance between the solid line and the dotted or dashed line.

Had the household's expectations for returns from 2007 to 2010 been realized, consumption from financial assets would have declined from about $7,000 at age 65, to $6,000 at age 75, and $4,000 at age 85, as shown by the solid line. The decline reflects a preference for greater consumption at younger ages when the household is more likely to be alive to enjoy it. Total consumption would have equaled the sum of this spending and its receipts from Social Security and defined benefit pensions.

The financial crisis resulted in a dramatic 25-percent decrease in optimal consumption from financial assets in 2009.[17] Consumption recovered slightly in 2010 and was only 15 percent below original expectations as a result of the recovery of stock prices.

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[16] We assume: 1) The household has population average mortality. 2) The household's rate of time preference is 3 percent. 3) The husband's utility function is of the following form: $C_{t.m} = \frac{(C_{t.m} + \lambda C_{t.f})^{1-\gamma}}{1-\gamma}$, where γ is the coefficient of risk aversion and λ measures the complementarity of consumption between husband and wife. The wife's utility function is symmetrical, and we assume that λ =one. A similar utility function was adopted in Brown and Poterba (2000). We further assume that gamma equals two, within the range of estimates of risk aversion (Chetty, 2003). At this coefficient of risk-aversion, optimal asset allocation closely matches the average asset allocation of households in the top three wealth quintiles. Our model does not include health care costs, which may affect the optimal decumulation path (DeNardi, French, and Jones, 2010). 4) Social Security benefits are used to finance basic living expenses that do not contribute to utility, so that consumption is proportional to wealth and a household with (say) $500,000 in financial assets would spend five times the above amoumts. 5) A 0.8 percent real return on short-term deposits, the average for the 5-year period ending October 2007. 6) A 3 percent real return on bonds - from 1997 to 2007, the yield on 20-year U.S Treasury bonds averaged 5.5 percent and inflation expectations averaged 2.5 percent. 7) The fixed income share of household portfolios is allocated 2/3 to short-term deposits and 1/3 to bonds, the average allocation for older households.

[17] This reflects the 43-percent decline in stock prices January 2007 to January 2009, and the 54 percent of 2007 wealth invested in stocks. In our model, we assume that each year's consumption is determined on 1 January, given investment returns over the previous year.

In 2011, the household reassesses its optimal strategy.[18] Its remaining wealth is less than expected, leading to a reduction in consumption. Under the recovery scenario, higher prospective returns permit the household to enjoy greater consumption, both now and in the future, per dollar of financial wealth, partially offsetting the impact of the decline in wealth. But these higher prospective returns also increase the cost of current consumption, measured in terms of future consumption foregone, and the household responds by choosing a smaller age-related decrease in consumption.[19] Together, the drop in wealth and higher expected returns cause the household to consume 11 percent less from financial assets in 2011 than it would have in the absence of the financial crisis. If the average return on wealth matches the household's expectations, consumption steadily converges to, and by age 84 surpasses, the amount that it had expected to spend before the financial crisis, reflecting the reduction of the age-related decline in consumption. In present value terms, remaining lifetime consumption declines by approximately 8 percent.[20]

Under the pessimistic recovery scenario, the household consumes 14 percent less from financial assets in 2011 than it would have in the absence of the financial crisis.[21] Relative to the recovery scenario, the household anticipates lower prospective returns and has less incentive to postpone consumption. As a result, the percentage age-related decline in consumption from 2011 onward more closely resembles that anticipated before the onset of the financial crisis.

Table 3 extends the above analysis to show the percentage declines in optimal consumption by age and wealth quintile, under the "recovery" and "pessimistic" scenarios.[22] We show the percentage decline in optimal consumption from investments

[18] The household also should rebalance its portfolio, but the illustrations in this *brief* do not alter the allocation of assets in order to highlight the direct effect of the crisis on retirees' wealth.
[19] Economists refer to these as the income and substitution effects.
[20] Assuming a 3 percent discount rate.
[21] The pessimistic scenario assumes an average 5 percent real return in stocks, and an average 1 percent real return on bonds and short-term deposits.
[22] For each wealth quintile, we choose a coefficient of risk aversion that results in households optimally choosing the average 2007 portfolio allocation for households in that wealth quintile. So low-wealth

in 2011, relative to the consumption it would have enjoyed that year, had it earned the returns it anticipated in 2007. Most households depend on investment income and decumulation of financial assets for only a small part of consumption. We therefore also show the percentage decline in total optimal consumption, inclusive of consumption financed by employer pensions and Social Security.

The reductions are in all cases smaller than the corresponding reduction in Table 2 – contrast the 7 and 9 percent reductions in total optimal consumption for households aged 60-69 in the top wealth quintile, under the recovery and pessimistic scenarios, respectively, with the 15 percent reduction in total income reported in Table 2. This mainly reflects the fact that wealth declined by less than income. In the recovery scenario, it also reflects an increase in prospective investment returns.

In contrast to the pattern of the percentage declines in investment income reported in Table 2, the declines in optimal consumption from investments are larger for households in higher wealth quintiles, reflecting their greater exposure to the stock market. Even if stockholders earn higher returns per dollar of current market value, this is insufficient to offset the substantial reduction in market value.

Conclusions

The financial crisis has resulted in a precipitous decline in interest rates on short-term deposits. It follows that households of modest means, who typically hold larger proportions of their financial assets in short-term deposits, have experienced the largest percentage declines in investment income. But retirees in the top wealth quintile are relatively more dependent on investment income and have experienced considerably larger percentage declines in total income, averaging 15 percent.

According to the life-cycle model of savings behavior, households should gradually decumulate their financial assets during the course of retirement. The financial crisis had

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households who hold larger proportions of their portfolios in short-term deposits are assumed to be more risk-averse.

a smaller effect on the dollar amounts households adhering to the life-cycle model should optimally decumulate than on their current income. It is debatable whether and to what extent the life-cycle model accurately describes patterns of wealth decumulation by the elderly, many of whom may follow rules-of-thumb. To the extent that households adhere to the life-cycle model, the financial crisis has reduced the amounts that households should optimally consume by at most 7-9 percent.

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Tables

Table 1: October 2007 Financial Wealth and Loss of Wealth 2007-2011

Wealth quintile	1	2	3	4	5
	Age 60-69				
	Financial Assets ($)				
Stocks	0	512	14,505	93,407	647,185
Bonds	0	151	4,010	20,242	118,404
Cash	31	2,255	15,361	48,203	137,624
Total	31	2,918	33,876	161,852	903,213
	Asset Allocation (%)				
Stocks	0	18	43	58	72
Bonds	0	5	12	13	13
Cash	100	77	45	30	15
Total	100	100	100	100	100
Percentage loss of wealth	0	2	5	7	9
	Age 70-79				
	Financial Assets ($)				
Stocks	0	144	10,026	83,539	689,532
Bonds	0	41	1,671	9,221	88,730
Cash	20	1,974	17,517	60,410	186,545
Total	20	2,158	29,214	153,169	964,806
	Asset Allocation (%)				
Stocks	0	7	34	55	71
Bonds	0	2	6	6	9
Cash	100	91	60	39	19
Total	100	100	100	100	100
Percentage loss of wealth	0	1	4	7	9
	Age 80+				
	Financial Assets ($)				
Stocks	0	169	8,791	63,496	708,028
Bonds	0	30	1,059	6,328	89,519
Cash	42	2,630	20,524	77,453	216,531
Total	42	2,829	30,375	147,276	1,014,078
	Asset Allocation (%)				
Stocks	0	6	29	43	70
Bonds	0	1	3	4	9
Cash	100	93	68	53	21
Total	100	100	100	100	100
Percentage loss of wealth	0	1	4	6	9

Notes: *Health and Retirement Study* sample weights. Percentage loss of wealth assumes no withdrawals from or additions to capital.

Table 2: Reductions in Investment Income 2007-2011

Wealth quintile	1	2	3	4	5
	Age 60-69				
Dollars	3	89	634	2,099	6,864
As percent of 2007 investment income	95	85	59	43	31
As percent of 2007 total income	0	1	7	9	15
Investment income as a percent of total income	0%	1%	12%	20%	49%
	Age 70-79				
Dollars	3	77	708	2,553	8,874
As percent of 2007 investment income	95	92	72	54	39
As percent of 2007 total income	0	0	3	9	17
Investment income as a percent of total income	0%	0%	5%	17%	44%
	Age 80+				
Dollars	5	103	823	3,174	10,089
As percent of 2007 investment income	95	93	77	66	43
As percent of 2007 total income	0	1	5	12	22
Investment income as a percent of total income	0%	1%	7%	19%	52%

Notes: *Health and Retirement Study* sample weights. We assumed that cash and short-term deposits earned the interest rate on the one year Treasury bond, and that dividend yields on stocks equaled that on the S&P 500. When calculating percentage declines in total income, we exclude households that have not yet retired.

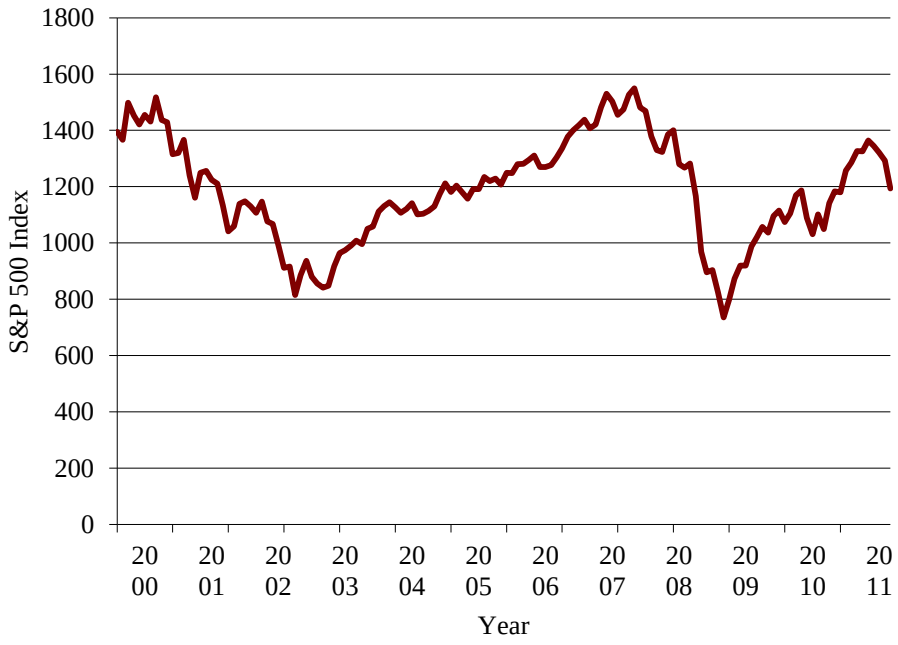
Table 3: Percentage Reductions in Optimal Consumption in 2011

Wealth quintile	1	2	3	4	5
	Recovery Scenario				
	Age 60-69				
As Percent of:					
Optimal consumption from investments	6	5	9	13	15
Total optimal consumption	0	0	0	0	0
	Age 70-79				
Optimal consumption from investments	6	7	9	13	16
Total optimal consumption	0	0	0	2	7
	Age 80+				
Optimal consumption from investments	7	7	10	12	16
Total optimal consumption	0	0	1	2	8
	Pessimistic Scenario				
	Age 60-69				
Optimal consumption from investments	9	7	12	16	18
Total optimal consumption	0	0	0	0	0
	Age 70-79				
Optimal consumption from investments	6	7	9	13	16
Total optimal consumption	0	0	0	2	7
	Age 80+				
Optimal consumption from investments	8	9	11	13	17
Total optimal consumption	0	0	1	2	9

Note: Authors' calculations

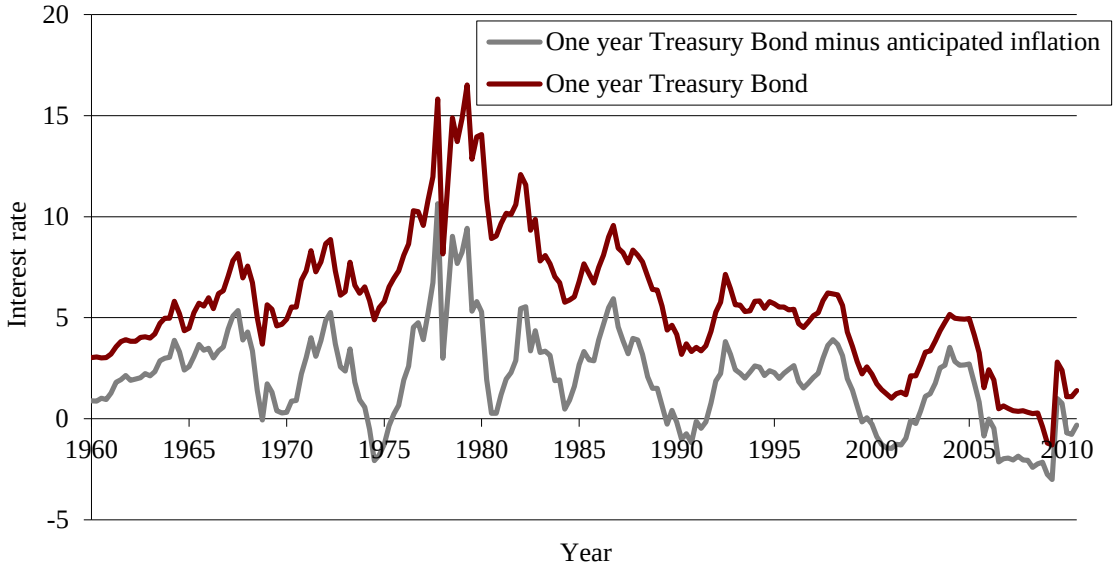
Figures

Figure 1: S&P 500 Index 2000-2011



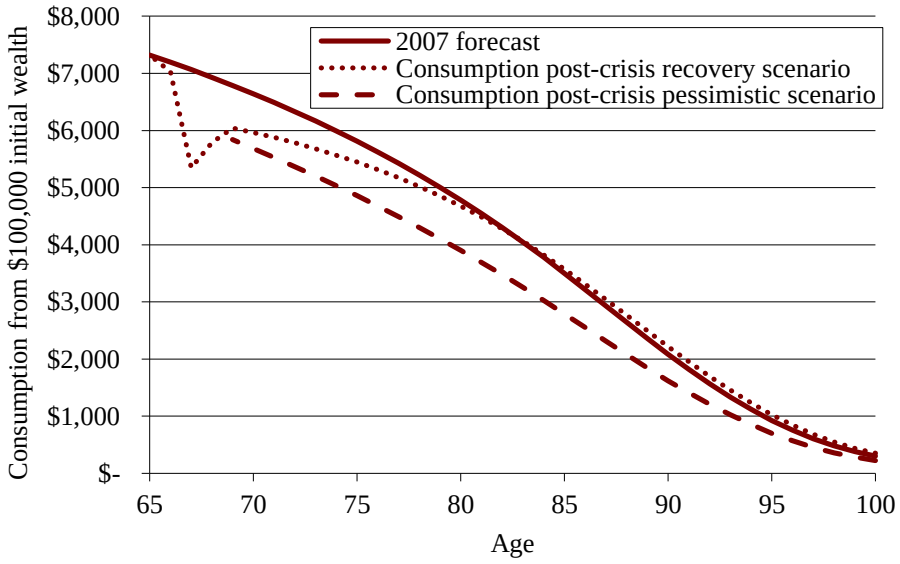
Source: Standard and Poor's www.standardandpoors.com

Figure 2: Real and nominal short-term interest rates 1960-2011



Source: One Year Treasury Constant Maturity Rate, Federal Reserve Bank of St Louis. Consumer Price Index for All Urban Consumers, Bureau of Labor Statistics

Figure 3: Comparison of Optimal Consumption Pre-and Post Crisis – Household Aged 65 in 2007



Source: Authors' calculations.