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# Risk and the Consumption, Saving, and Portfolio Choices of American Households

Jonathan A. Parker\*

In the past few years, U.S. households have faced an enormous amount of macroeconomic uncertainty. The financial crisis, the Great Recession, and the European debt crisis together have caused large changes in asset prices and incomes, increases in market volatility, and significant uncertainty about government policies. My research considers how consumption and saving behaviors respond to risk and to government policies, as well as how the risks that households face are evolving. Here I discuss four topics more specifically: How do households allocate their savings in response to different risks across different stocks? How do households (mis) perceive risk and how does this affect their behavior? How effective was the government stabilization policy of distributing tax rebates at generating household spending? And how have changes in the labor market and increasing inequality in particular changed which households bear macroeconomic risks?

## Saving, Portfolios, and Risk

Different types of stocks traded on the U.S. stock market can exhibit quite different average returns over long periods, differences that persist out of sample, are highly statistically significant, and can be as much as 10 percent per year. Such differences ought to be understandable from the saving and portfolio choices of households, choices which in turn presumably are determined by differences in the riskiness of different stocks. That is,

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people should pay less for stocks that are more risky, and we should observe risky stocks on average earning higher rates of return. But then the key issue becomes how we measure riskiness.

The central view in economics is that people save to support future consumption, which implies that we should be able to explain differences in expected returns across stocks by the risk that each investment poses for future consumption, or equivalently by the extent to which people's spending on consumption drops when the return is low and rises when the return is high. Such risky stocks are said to have high "consumption betas." Unfortunately, this theory does not work well in many dimensions. Groups of stocks with quite different average returns have similar consumption risk (betas). And the average returns on the stock market as a whole (relative to safe, short-term interest rates) are too large to be justified by its consumption risk, unless households are assumed to be implausibly risk averse.

My own work argues that in evaluating this theoretical insight—that consumption risk determines how attractive an asset is and thus its price and average return—it makes more sense to measure ultimate consumption risk rather than the usual contemporaneous consumption risk. I find that ultimate consumption risk largely does explain expected returns on stocks. The argument is that when a stock declines, measured consumer spending may take a while to fall for reasons that range from delay in measurement to hard-to-adjust commitments to spend to inattention or near rationality. The finding starts by defining ultimate consumption risk as the change in consumption over a three-year horizon that includes and follows a return that occurs over three months. Three years seems the right bal-

ance between the increased signal about consumption risk from a longer horizon and the greater mis-measurement of consumption risk that comes from overlapping data and unexpected movements of consumption following an asset return.

I show that measures of the ultimate consumption risk of the stock market come closer to making the consumption-based understanding of portfolio choice consistent with observed total stock market returns. I find that the ultimate consumption risk of the stock market is about six times what was previously measured by contemporaneous consumption risk.<sup>1</sup> Furthermore, considering only the ultimate consumption risk of those households that actually participate in the stock market yields an even higher measure of consumption risk.<sup>2</sup> Finally, market returns are higher following periods in which ultimate consumption risk is higher, although that relationship is statistically weak.<sup>3</sup>

Returning to the wide differences in average returns across different stocks, Christian Julliard and I show that ultimate consumption betas do a good job of explaining the differences in expected returns across stocks.<sup>4</sup> Differences in ultimate consumption risk (a single factor) line up well with differences in average returns across the Fama and French 25 portfolios and explain as much of the variation as the Fama-French (three) factor model constructed from these returns to price these portfolios.<sup>5</sup> This finding implies that the differences in average returns known as the value premium and the size premium are actually largely consistent with portfolio choice following from ultimate consumption risk, with one exception. The exception is that the risk aversion implied by this exercise still remains too large to satisfactorily explain differences in returns from

portfolio choices in the canonical consumption-based model. Thus, it seems the theory has some truth to its model — consumption risk matters — but maybe not enough.

Research on asset pricing is continuing by developing more complex models of how consumption maps into riskiness. In these models, the marginal value of consumption in a state of the world, or the state price, is not based only on consumption in that state of the world, but also on other factors, such as anxiety in that state of the world about risk to future consumption.<sup>6</sup>

## Perceptions of Risk and Reactions to Risk

My own work has focused not on modeling how anxiety varies across states of the world but instead on how people's optimism varies and how this in turn affects (among other things) portfolio choices and asset prices. My co-authors and I build an economic model of situational biases in beliefs and explore its behavioral implications.<sup>7</sup> We assume that people have a natural bias towards optimism because it provides a straightforward way for them to raise their expected discounted value of utility. This optimism however is tempered by the severity of the mistakes to which it would lead, leading to an equilibrium bias in beliefs that affects their behavior.

Consistent with much experimental evidence on probability assessments, our assumptions imply that optimism is pervasive because a small bias in beliefs typically leads to first-order gains attributable to increased anticipatory utility, and only to second-order costs attributable to distorted behavior. Our model implies that biases in expectations are situational. They are less rational when biases have little cost in realized outcomes, or when biases have large benefits in terms of expected future happiness. Markus Brunnermier, Filippos Papakonstantinou, and I show that this approach is consistent with observed optimism concerning task completion and evidence on how environmental factors mitigate this prob-

lem and lead to better task completion.<sup>8</sup>

Our general approach also provides insights into a number of sometimes puzzling patterns of observed household investment choices and the risks and returns of assets.<sup>9</sup> In a general equilibrium model with complete markets, 1) because the cost of biased beliefs are second-order, investors hold biased assessments of probabilities and so are not perfectly diversified according to objective metrics; 2) because the costs of biased beliefs temper these biases, the ex post costs of the lack of diversification are limited; 3) because there is a complementarity between believing a circumstance more likely and purchasing more of the asset that pays off in that circumstance, investors over-invest in assets that pay off in one future state of the world and otherwise insure their consumption well; 4) because different households can settle on different states of the world to be optimistic about, optimal portfolios of ex ante identical investors can be heterogeneous; 5) because low-price and low-probability outcomes are the cheapest to gamble on, optimism about these states distorts consumption the least in the rest of the states, so that investors tend to overinvest only in the most positively skewed securities; 6) finally, because investors have higher demand for more skewed assets, more skewed assets can have lower average returns.

While our theory is probably not ready for quantitative prediction, some of its insights are consistent with more recent analyses of what asset markets tell us about how households respond to risk.<sup>10</sup>

## Saving, Spending, and Fiscal Stabilization Policy

Switching gears from how risk affects the way people allocate their savings to how much people choose to consume and save, my co-authors and I have studied how spending responds to changes in tax policy that induce large predictable changes in people's after tax incomes. This issue has generated a lot of interest lately, as the U.S. government has recently lowered taxes and distributed stimulus

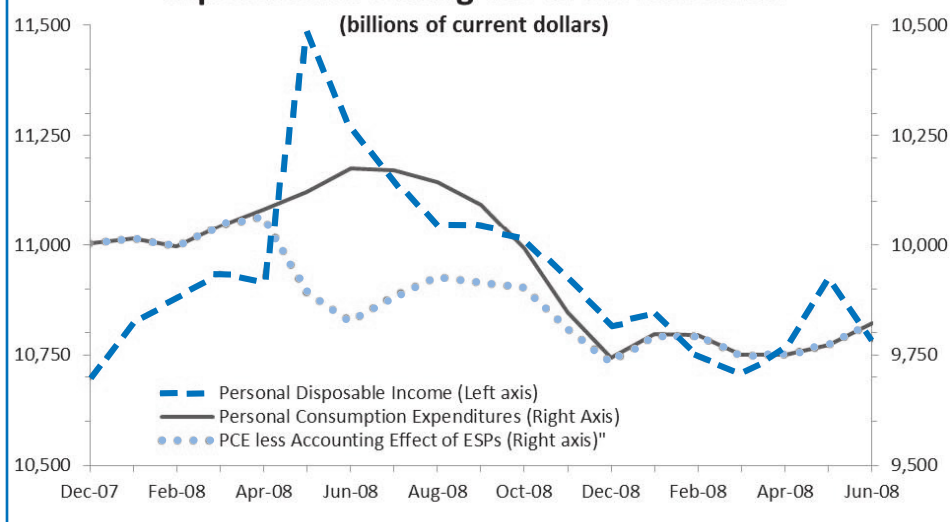
payments with the intention of raising consumer demand.

In theory, these types of policies might be futile. Tax changes that lead to offsetting increases in future taxes, or reductions in future benefits, have little effect on people's lifetime incomes and so might lead to little adjustment in spending. And pre-announced temporary tax changes that do not change tax distortions might lead only to small persistent adjustments to spending upon announcement and no changes when the funds are distributed. In practice, however households do seem to respond significantly to some tax changes that lead to predictable, temporary changes in after tax income. Using variation in the timing of when households hit the Social Security tax cap during a calendar year, I find large spending increases around the time of the income increases.<sup>11</sup>

But the bigger question is the size of spending responses to policies specifically designed to stimulate spending in recessions. In both the summer of 2001 and the spring-summer of 2008, the Federal government sent out billions of dollars of tax rebates or economic stimulus payments in the hopes of stimulating aggregate demand. In each instance, the timing of the distribution of the payments was based on the second-to-last digit of the Social Security number of the tax filer who received it, a digit that is effectively randomly assigned. The policy experiment provided by the randomized mailing dates allows my co-authors and me to identify the causal effect of the receipt of a rebate on household spending by comparing the expenditures of households who received rebates at different times. Of course to do this, one has to have information on household expenditures, and we worked with the Bureau of Labor Statistics and other government agencies which did commendable work adding survey modules about the stimulus payments on short notice to their existing survey of household expenditures.<sup>12</sup>

We find that in both 2001 and 2008, households spent roughly a quarter of their rebate payments on a broad measure of nondurable spending. The cir-

## Disposable Income and Consumption Expenditures During the Great Recession



cumstances in each recession were different however, and other features of the responses were less similar. For example, in the summer of 2008, gas prices had just risen significantly, and we find that more than a third of the stimulus payments were spent on purchases of new cars, whereas no significant amount was spent on cars in 2001.

Our research does not allow us to infer how the economy would have behaved without the payments, but it does measure the initial change in aggregate demand for consumption caused by the distribution of the payments. The household-level spending response estimated in our work implies that the aggregate change was large, around 2 percent of personal consumption expenditures (PCE) in the peak quarter. The figure above shows monthly disposable personal income, PCE, and PCE-less-our-estimated-initial-demand-effect of the 2008 economic stimulus payments. The vertical axes each span a trillion dollars, so income and consumption scales are comparable. The increase in disposable income from the stimulus payments in May, June, and July is clearly visible (dashed line). Our estimates imply that the spending response to the payments was not immediate but, as the difference between the solid and dotted lines shows, the policy was a substantial contributor to

strong consumption demand in the summer of 2008. While our research does not quantify the general equilibrium impact of the stimulus payment program—the size of the multiplier and the ultimate magnitude of its impact on GDP and employment for example—in other work I argue for using experiments like this to increase the accuracy of macroeconomic models of such policies. Our results can help researchers to better model steps in the causal chain from policy to the economy, critical components of any model of macroeconomic policy, which are often only weakly identified in current empirical investigations.<sup>13</sup>

### The Rising Risk of High Incomes

The recession of 2008–9 was deep and unexpected, and in recent work Annette Vissing-Jorgensen and I investigate how it affected the incomes of high-income households relative to middle-income households. We find that the business cycle exposure of the income of the top 1 percent of households has changed in fundamental ways. Further, this change seems closely related to recent increases in inequality and thus is potentially illuminating about why economic inequality in our society is rising.

We know from previous research that

since the early 1980s there has been a large increase in the share of aggregate income received by households at the very top of the income distribution.<sup>14</sup> We show that at the same time, the business-cycle exposure of the earnings of these high-income households has risen dramatically.<sup>15</sup> Since the early 1980s, the income of those in the top 1 percent of the income distribution has averaged 14 times average income and been 2.4 times *more* cyclical; prior to the early 1980s, the income of the top 1 percent averaged nine times average income and was slightly *less* cyclical than that of the average household. Thus, top incomes now rise much more than average in booms and fall much more in recessions, where prior to 1980, they rose and fell less than average.

One interesting question is whether high-income households use other assets to insure this higher level of income risk. We show that they do not. Looking at spending instead of income, we also find higher exposure for the *spending* of high income households (as best we can measure it). Thus it is likely that high-income households now bear a greater share of macroeconomic risk than they used to. Analogous to the use of the term “high-beta” to describe stocks that have high exposure to risk (as discussed above), our findings have spawned the term the “high-beta rich” to describe the new high exposure of high-income households to macroeconomic risk.<sup>16</sup>

Why have the incomes of high-income households become more exposed to macroeconomic risk? While the field is far from a definitive answer, our research suggests a link between this increase in exposure to macroeconomic risk and the increase in the share of income earned by the top 1 percent. The rise in the exposure of top incomes to booms and recessions not only starts at the same time as the rise in the top’s share of total income, but we also show that greater top-income share is associated with greater top-income exposure across decades, across subgroups of top incomes, and, in changes, across countries. This close relationship suggests a common cause and does not directly support the

idea that the increase in inequality comes from slowly changing social norms about pay, or from the idea that lower income tax rates have caused a boom in top earnings. We put forward the possibility that information and communication technologies have caused both changes by increasing the optimal production scale of the most talented and increasing the exposure of profits from these activities to macroeconomic fluctuations.

Note that neither this theory nor our findings imply that high-income households suffer more in recessions, nor do they imply that the disproportionately higher incomes of the top 1 percent are associated solely with greater production of socially valuable output.

In conclusion, my research on the ways in which households respond to risk, to government transfers in recessions, and to income risks give us clues to the determinants of asset returns, how effective anti-recessionary policies are, and what is driving recent increases in income inequality.

*of Expected Returns,” NBER Working Paper No. 9538, March 2003, and Journal of Political Economy, 113(1), February 2005, pp. 185–222.*

<sup>5</sup> See E. F. Fama and K. R. French, “The Cross-Section of Expected Stock Returns,” *The Journal of Finance*, 47, 1992, pp. 427–65.

<sup>6</sup> See for example R. Bansal, D. Kiku, and A. Yaron, “An Empirical Evaluation of the Long-Run Risks Model for Asset Prices,” NBER Working Paper No. 15504, November 2009; J. Beeler and J. Y. Campbell, “The Long-Run Risks Model and Aggregate Asset Prices: An Empirical Assessment,” NBER Working Paper No. 14788, March 2009; and R. Jagannathan and S. Marakani, “Long Run Risks & Price/Dividend Ratio Factors,” NBER Working Paper No. 17484, October 2011.

<sup>7</sup> M. K. Brunnermeier and J.A. Parker, “Optimal Expectations,” NBER Working Paper No. 10707, August 2004 and *American Economic Review*, 95(4), September 2005, pp. 1092–118.

<sup>8</sup> M. K. Brunnermeier, F. Papakonstantinou, and J.A. Parker, “An Economic Model of the Planning Fallacy,” NBER Working Paper No. 14228, August 2008.

<sup>9</sup> M. K. Brunnermeier, C. Gollier, and J. A. Parker, “Optimal Beliefs, Asset Prices, and the Preference for Skewed Returns,” NBER Working Paper 12940, February 2007 and *American Economic Review*, 97(2), May 2007, pp. 159–65.

<sup>10</sup> See for example T. G. Bali, N. Cakici, and R. Whitelaw, “Maxing Out: Stocks as Lotteries and the Cross-Section of Expected Returns,” NBER Working Paper 14804, March 2009.

<sup>11</sup> J.A. Parker, “The Reaction of Household Consumption to Predictable Changes in Social Security Taxes,” *American Economic Review*, 89(4), September 1999, pp. 959–73. See also N. Souleles, “The Response of Household

Consumption to Income Tax Refunds,” *American Economic Review*, 89(4), September, 1999, pp. 947–58, and the literature review in D. S. Johnson, J.A. Parker, and N. S. Souleles, “Household Expenditure and the Income Tax Rebates of 2001,” NBER Working Paper No. 10784, September 2004, and *American Economic Review*, 96(5), December 2006, pp. 1589–610.

<sup>12</sup> J.A. Parker, N. S. Souleles, D. S. Johnson, and R. McClelland, “Consumer Spending and the Economic Stimulus Payments of 2008,” NBER Working Paper No. 16684, January 2011, and D. S. Johnson et al., “Household Expenditure and the Income Tax Rebates of 2001,” *op cit*.

<sup>13</sup> J.A. Parker, “On Measuring the Effects of Fiscal Policy in Recessions,” NBER Working Paper No. 17240, July 2011, and *Journal of Economic Literature*, 49(3), September 2011, pp. 703–18.

<sup>14</sup> See T. Piketty and E. Saez, “Income Inequality in the United States, 1913–1998,” NBER Working Paper No. 8467, September 2001, and *Quarterly Journal of Economics*, 118(1), February 2003, pp. 1–39.

<sup>15</sup> J.A. Parker and A. Vissing-Jorgensen, “The Increase in Income Cyclicalities of High-Income Households and its Relation to the Rise in Top Income Shares,” NBER Working Paper No. 16577, December 2010, and *Brookings Papers on Economic Activity*, 41(2), Fall 2010, pp. 1–55, and J.A. Parker and A. Vissing-Jorgensen, “Who Bears Aggregate Fluctuations and How?” NBER Working Paper No. 14665, January 2009, and *American Economic Review*, 99(2), May 2009, pp. 399–405.

<sup>16</sup> Coined by Robert Frank in R. Frank, *The High-Beta Rich: How the Manic Wealthy Will Take Us to the Next Boom, Bubble, and Bust*, Random House, New York NY, 2011.

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<sup>1</sup> J.A. Parker, “The Consumption Risk of the Stock Market,” *Brookings Papers on Economic Activity*, 2, 2001, pp. 279–348.

<sup>2</sup> This is found both in Parker (2001) and in Y. Ait-Sahalia, J.A. Parker, and M. Yogo, “Luxury Goods and the Equity Premium” NBER Working Paper No. 8417, August 2001, and *Journal of Finance*, 59(6), December 2004, pp. 2959–3004.

<sup>3</sup> J.A. Parker, “Consumption Risk and Expected Stock Returns,” NBER Working Paper No. 9548, March 2003, and *American Economic Review*, 93(2), May 2003, pp. 376–382.

<sup>4</sup> J.A. Parker and C. Julliard, “Consumption Risk and the Cross-Section