



# Saving and the long shadow of macroeconomic shocks<sup>☆</sup>



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## ABSTRACT

The global crisis of 2008 raises many questions regarding the long-term response to crises. We know that households that lost access to credit, for example, were forced to adjust and increase saving. But, will households keep on saving more than they would have done otherwise had the global financial crisis not occurred? And for how long will this increased saving persist? Here, we study the degree to which past adverse income shocks increase the saving rates of affected households. We find evidence consistent with history-dependent dynamics: more experience of past crises tends to increase household saving. We follow up with an investigation of the importance of historical exposure for current account dynamics, but find no strong indication that our measure of past exposure is important to the current account's determination. We conclude by estimating the likely impact of the 2008 GFC on future saving.

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## 1. Introduction

The global financial crisis raises many intriguing questions regarding the long-term response of the economies adversely impacted by the crisis. Households that lost access to credit, for example, were forced to adjust and increase saving. It is not clear, however, whether that forced transition will last; will households remain higher savers than they would have been had the global financial meltdown not occurred? For how long will this increase in saving last? Will it have any aggregate perceptible impact in the decades to come?

Here, we study the degree to which past catastrophic aggregate income shocks affect the saving rates of households in impacted countries. Public discussions and cursory observations frequently lead to speculation that painful past experience increases the demand for precautionary saving, and widens the spread of 'neither a borrower nor a lender be' attitudes; especially in the generation that grew up during the Great Depression. Our results here are consistent with this history-dependent dynamics; we find macroeconomic evidence that the actual past occurrence of crises that were experienced by a given population tends to increase the aggregate household saving rate. We follow up on these findings with an investigation of the importance of historical exposure for current account dynamics, but find no strong indication that our measure of past exposure is important to the current account's determination.

[Section 2](#) discusses the behavioral literature on tail events and the limited relevant literature that ties this to economic magnitudes and dynamics; [Section 3](#) details our construction of an index measuring past exposure, and [Section 4](#) focuses on the

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empirical results. We close with a discussion of limitations, policy ramifications, and an assessment of the potential long-term impact of the recent global financial crisis.

## 2. Literature on history and saving behavior

The theory on the ways households react, in the long-term, to adverse shocks does not lead to clear-cut predictions. Two important questions are of special relevance: whether previous shocks (adverse low-probability high-impact events) have any effect on the households' perceptions of the future probability of these events occurring, and whether the households then translate this perceived probability into a rational expectations framework or through a probability weighting function that places additional weight on low probability events.<sup>1</sup> The 'cumulative prospect theory' of [Tversky and Kahneman \(1992\)](#) posits that it will be the extreme events (fat-tails) that will change preferences not because they will shift the underlying assigned probabilities, but because the probability weighting function places more weight on these. Importantly, in earlier work [Tversky and Kahneman \(1974\)](#) argue that the assignment of probabilities is dependent on 'availability heuristics', whereby the likelihood of an event is assessed based on a person's ability to recall past instances of this event occurring.

Here, we are not able to distinguish whether the patterns we observe below, in the aggregate data, are a result of 'availability heuristics' changing the assigned likelihood of low-probability fat-tail events, or whether the experience of past events changes the probability weighting function, by placing higher weight on these low-probability events. In any case, we argue that an income shock that occurred even decades ago is important in that it will lead, *ceteris paribus*, to a higher saving rate in either framework (whether the event changed the probability assessment or the probability weighting function).<sup>2</sup>

The more general literature on uncertainty and saving behavior is extensive, with early theoretical contributions by, for example, [Levhari and Srinivasan \(1969\)](#) and [Sandmo \(1970\)](#).<sup>3</sup> At the aggregate macroeconomic level, a spate of recent papers starting from [Barro \(2006\)](#), has looked at various implications of the probability of large catastrophic income shocks for macroeconomic variables, with a particular emphasis on pricing in asset markets.<sup>4</sup> More recently, [Gurio \(2012\)](#) shows how, in a real business cycle framework, a shift in disaster risk can change macroeconomic dynamics and lead to business cycles that are not related to shifts in productivity. An increase in disaster risk, in his model, leads to more precautionary saving and a movement toward safer assets, and ultimately to declines in employment and income. In [Nakamura et al. \(2013\)](#), the persistence of the income shock leads households to increase saving for a longer period of time; and this increased saving dampen the effect of the shock on asset prices. These last two papers, however, while focusing on disaster risk, posit different mechanisms than the one we propose. In their model, it is the persistence of the probability itself, or of the income shock, that generates prolonged impacts. In our case, we are focusing on disasters that have occurred decades earlier. We argue that it is the individuals assessed probabilities (driven by 'availability heuristics') or their probability weighting functions that have changed as a result of the direct experience of these historical shocks, and not the underlying risk itself.

Previous empirical research on the determinants of saving behavior focuses almost exclusively at the household level, but these do not examine the importance of long-ago shocks in determining saving behavior.<sup>5</sup> Given our interest in the importance of aggregate country-level historical experiences and the implications for macroeconomic dynamics, we prefer to investigate this using aggregate countrywide data. Recent evidence also suggests that individuals respond to peer pressure in making financial decision, so that our aggregate macro approach may also be more relevant than a micro/household one as it allows us to account for these peer effects.

Several recent papers have shown that personal experiences matter for individuals when making other types of financial decisions. [Malmendier and Nagel \(2011, 2014\)](#) examined the impact of exposure to a history of stock-market returns on household actual risk-taking in investment, and the impact of inflation experience on the formation of expectations of future inflation, respectively; while [Malmendier et al. \(2011\)](#) investigated the impact of the Great Depression on the behavior of Chief Executive Officers who grew up in the 1930s. In all these papers, the results emphasized the importance of long-ago life experiences in shaping current economic decision-making. Similarly, [Giuliano and Spilimbergo \(2014\)](#) show that people's beliefs regarding the merits of individual efforts and government interventions are affected by exposure to recessions over their lifetime.<sup>6, 7</sup>

<sup>1</sup> [Barberis \(2013\)](#) discusses this distinction between the setting of beliefs, and the translation of these beliefs into preferences.

<sup>2</sup> [Russett and Slemrod \(1993\)](#) raise an intriguing possibility. In their work, the perception of an increased likelihood of a future catastrophe (Nuclear Armageddon), actually lowers the propensity to save for individuals (as the survival probability is assessed to be lower). Income shocks in high-income countries have not been associated with a major increase in mortality since 1945, so we hypothesize that this causal link most likely does not apply for our investigation.

<sup>3</sup> See [Browning and Lusardi \(1996\)](#) for overview of the micro theories and empirical regularities of household savings.

<sup>4</sup> See also [Barro \(2009\)](#), [Gabaix \(2012\)](#) and [Barro and Jin \(2011\)](#).

<sup>5</sup> The literature on the determinants of saving behavior at the micro level (for households or individuals) is much too extensive for us to discuss here. A few projects examine aggregate macro-economic data at the local/regional level within a country (e.g., [Horioka and Wan \(2007\)](#), is an investigation of Chinese saving rates at the provincial level).

<sup>6</sup> Instead of relying on market-wide exposure, [Kaustia and Knüpfer \(2008\)](#) and [Choi et al. \(2009\)](#) show that individuals' past experiences with investment decisions affects their consequent investment decision-making.

<sup>7</sup> [Schrooten and Stephan \(2005\)](#) observe that saving rates increased significantly in the 1990s in the transition countries, following a few years of dramatic economic decline (and declining saving rates). While they examine different reasons for that, our hypothesis seems consistent with this observation. Households increased their saving after they were exposed to significant negative economic shocks, and this effect degenerates over time. Similarly, [Mody et al. \(2012\)](#) observation of a large increase in saving following the 2008 global financial crisis, and their examination of its dependence on labor market uncertainty, is also consistent with our premise.

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