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Wealth fluctuations and investment in risky assets: The UK micro evidence on households asset allocation

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ABSTRACT

This paper is the first to examine whether UK households exhibit constant or time-varying relative risk aversion within a microdata panel framework. We analyse whether portfolio allocations in risky assets change in response to fluctuations in wealth. Our set of controls for background wealth is comprehensive, and include, as a novelty in this type of studies, pension wealth. The inference about the risk profile of British households depends upon the relevant measure of background wealth. We do not find support for decreasing relative risk aversion (DRRA). Constant relative risk aversion (CRRA) prevails for the case of liquid wealth, but for the broadest definitions —those including home equity and pensions— the evidence favours increasing relative risk aversion (IRRA).

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1. Introduction

There is a vast theoretical literature in economics about the importance of risk aversion for the analysis of decision making under risk and uncertainty. The majority of studies that employ utility functions for modelling or calibration purposes assume a particular functional specification. Although the original work of Pratt (1964) and Arrow (1965) suggested that relative risk aversion increases with wealth (IRRA),[1] the most commonly used utility specification is constant relative risk aversion (CRRA). This property implies that all agents, regardless of their level of wealth, will allocate the same proportion of their wealth to risky assets. However, empirical work that estimates the shape of risk preferences with actual financial and wealth variables, and how those preferences evolve over time, is very limited and there has been no consensus. Empirical studies have provided evidence for all three hypotheses about individual risk aversion: increasing relative risk aversion (IRRA) (Arrow, 1965; Siegel and Hoban, 1982), decreasing relative risk aversion (DRRA) (Bellante and Green, 2004; Cohn et al., 1975; Morin and Suarez, 1983) and constant relative risk aversion (CRRA) (Friend and Blume, 1975).

Most empirical studies have been based on cross-sectional data (Arrow, 1965; Bellante and Green, 2004; Cohn et al., 1975; Friend and Blume, 1975; Morin and Suarez, 1983; Siegel and Hoban, 1982). This empirical framework cannot, however, identify whether the observed distribution of the risky-asset share across heterogeneous agents comes exclusively from a common form

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[1] In an earlier paper, Markowitz (1952) proposed a value function over changes in wealth that exhibits loss aversion, and that is convex over small gains but concave over larger ones.

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of individual preferences or from different risk aversion parameters conditional on wealth levels.[2] The evidence gathered by cross-sectional analysis would only be informative of the shape of preferences if risk aversion was independent of wealth.[3] Work using panel data, on the other hand, does not need to build in such an assumption because it removes the time-invariant unobserved heterogeneity using first differences. This method allows the researcher to distinguish between individual preferences and the variation of risk aversion with wealth.

Two prominent papers in this area are Brunnermeier and Nagel (2008) (BN) in a study of the US, and Chiappori and Paiella (2011) (CP) in a study about Italian households. The latter paper is based on a standard two-period portfolio choice model that uses a first-order Taylor series expansion to maximize end-of-period expected utility. Under this set-up the share of risky assets in the portfolio will be constant as long as the coefficient of relative risk aversion remains constant. CP use panel data for Italian Households (SHIW) from 1989 to 2004. They do not find statistically significant elasticity of the risky-asset share, which does not reject the CRRA hypothesis.

While both CP and BN share the same null hypothesis in their empirical analyses –CRRA– BN are more specific about the alternative hypothesis defined as the habit model of consumption. They are the first ones to investigate the standard portfolio allocation model with habits using household panel data.[4] In their model, agents' welfare depends not only on the absolute consumption level but also on the difference between their consumption and their reference level (Becker and Murphy, 1988) and this generates time-varying relative risk aversion. As a result of this, agents have to invest in risk-free assets to provide sufficient financial resources to ensure that future consumption can always be kept above the level of the habit, which in turn, tie the optimal demand for riskless assets to the slow-moving habit level. Thus, when liquid wealth fluctuates, the optimal risky-asset share should adjust accordingly. In particular, when liquid wealth increases the utility maximization share of risky assets increases, and vice versa. Effectively, relative risk aversion varies with wealth.

Despite the relatively successful role of habit formation in explaining dynamic asset pricing phenomena and macroeconomic stylised facts[5] the micro evidence supporting the habit formation consumption model is mixed, and the micro-data evidence that supports the prediction about time varying relative risk aversion is scarce.[6] BN employ data from the Panel Study of Income Dynamics (PSID) and fail to find a significant positive relationship between wealth and the share of risky assets, concluding against habit formation.

Our paper extends the existing literature on this topic in several aspects. We will, for the first time, use UK household panel data to examine how individuals distribute their portfolio holdings between risky and riskless assets. Our analysis of the elasticity of the risky asset share to total financial wealth will employ the most comprehensive measure of background wealth used in this type of studies. Pension wealth is one of the largest components of wealth and, as a novelty, we will include it, together with home equity, equity in private business and liquid wealth, in one of our measures of total wealth.[7] While we will initially assume that pension wealth is overall a safe investment, we will also examine households' elasticity of the risky asset share to wealth when it is assumed that pension wealth is part of the risky-asset portfolio. This is particularly relevant given the current tendency for employer-sponsored pension plans to rely more on defined contributions instead of defined benefits, and because of the widespread use of individually managed retirement funds (see Post et al., 2014). The choice of country and time period is also unique as it is the first paper to analyse the nature of households' utility function using panel data for the UK for a sample period that includes episodes of economic and financial turbulence such as the great recession.

Our empirical analysis provides evidence on the specific form of households' preferences for a wide range of assumptions about what is the relevant background wealth investors consider in formulating their investment decisions, from liquid wealth only to liquid wealth in addition to equity in private business, home equity, and pension wealth. Our results are in general consistent with the evidence provided by BN and CP. We do not find support for the thesis that positive changes in wealth increase the share invested in risky assets.

Support for CRRA or IRRA depends crucially on the measure of wealth and on the classification of pension as either risky or risk free. If the definition of wealth is restricted to liquid wealth, the marginal effect of wealth changes on the risky asset share is nil, and households would be characterised as exhibiting CRRA. This is also the case when the broadest definiton of wealth is used and pension is characterised as a risky investment. On the other hand, if pension wealth is considered to be risk free, our results support IRRA, implying that a marginal increase in wealth induces households, on average, to rebalance their portfolio proportionately more towards safer assets.

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[2] This point is formally verified in Chiappori and Paiella (2011) (Section 2).

[3] Recent attempts to infer risk profiles within the population have been done using laboratory or field experiments, as well as surveys. See e.g. Vieider et al. (2015) for an international analysis of incentivised as well as survey measures of risk and uncertainty, and how those different measures correlate within contexts and methods, as well as between countries.

[4] Other papers have examined household portfolio composition in a cross-sectional framework, for instance, Blake (1996), and Guiso and Paiella (2008). However, the time variation of panel data allows the analysis to separate household preferences and the joint distribution of risk aversion and wealth.

[5] For instance, the equity premium puzzle (Campbell and Cochrane, 1999; Constantinides, 1990), the equity home bias (Shore and White, 2002), the hump-shaped response of aggregate variables to monetary shocks (Fuhrer, 2000), or countercyclical markups (Ravn et al., 2006).

[6] One of the earliest attempts to test the habit model of consumption was Dynan (2000). He employed household data for the US from the Panel Study of Income Dynamics (PSID) and found no support for the model. A more positive result is found in a study by Ravina (2005) that tests for internal and external habit motives in consumption using the Credit Card Panel for California. Studies that use aggregate data rather than micro data have also found evidence to support the habit model of consumption (e.g. Korniotis, 2010).

[7] As it will become apparent in Section 3 below for the case of the UK, while pension is for many households, especially those towards the high end of the distribution, the largest component of wealth, home equity is the largest factor for the majority of households.

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