



## **Twin Picks: Disentangling the Determinants of Risk-Taking in Household Portfolios**

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### *Abstract*

Using a unique database on the finances of 20,000 Swedish twins, we study how households take risk when they invest in financial markets. The use of twin data allows for unbiased estimation of the effects of household characteristics on financial risk taking. We confirm the predictions of financial theory on the role of human capital, income risk, background risk, residential and commercial real estate. We find strong evidence for portfolio risk taking being affected by household consumption commitments and past habits. Financial wealth is the most relevant determinant of portfolio risk taking with a strong positive effect that fades as households become richer. Our findings have profound implications for optimal portfolio choice and asset pricing theories.

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<sup>1</sup> The *Journal of Finance* is the journal of the American Finance Association and is the leading journal in Financial Economics. In 2011, it was ranked third for number of cites among all journals in Economics and Finance. In 2011, the journal accepted 68 papers out of 1,253 submissions.

## *Executive Summary*

How does the asset allocation of individual investors depend on their main financial and demographic characteristics? Does household investment behavior correspond to the recommendations of optimal portfolio selection theories? Is it possible to identify which financial risk preferences households have?

These basic and fundamental questions of financial economics are extremely difficult to answer. We can identify two primary reasons. First, they require the availability of high quality, detailed and comprehensive data on the investment decisions of a representative sample of households. Such data is rarely collected or is difficult to access (Campbell, 2006; Guiso and Sodini, forthcoming). Second, even when the data is available, the researcher needs to find a suitable empirical strategy to reliably and cleanly measure how household circumstances impact financial risk taking. The main difficulty lies on the fact that some of the crucial determinants of risk taking are typically not observable and thus confuse the measurement of the impact of the observable variables. Let us clarify with an example.

Consider the issue of measuring how wealth affects household investment decisions in risky financial assets, such as stocks or equity funds. We cannot conclude much by simply comparing the portfolios of poor and wealthy households. Portfolio choices are not only driven by wealth but also by personal risk attitudes, which are not typically observable and are shaped by complex unobservable determinants, such as personal past experiences, upbringing and genes. Hence it becomes impossible to disentangle how much financial risk taking is purely driven by wealth and how much is driven by the unobservable determinants. In other words, if we were to observe that Zlatan Ibrahimović invests massively in risky assets, we could not conclude that it is only because Zlatan is rich. It could also be that Zlatan is very risk tolerant and this personal attitude is the main driver of his financial choices, not his wealth. In fact, it could well be that Zlatan's became wealthy because he was willing to take risky chances in his life (such as a professional career as a soccer player) in the first place.

The issue of purely measuring the effect of wealth on financial risk taking is of primary import. If wealth itself pushes investors to take more risk, we should expect stronger demand for risky securities as the world becomes richer. This, in turn, will drive up security prices and lower risk premia over time.

In this paper, we use data on the characteristics and the finances of a large sample of Swedish twins. The data is obtained by merging the wealth and income data registers available from Statistics Sweden (SCB) with the Karolinska Swedish Twin registry (see Calvet, Campbell and Sodini, 2007, and Lichtenstein et al., 2006, for a detailed description of the two datasets). The richness of the data allows us to build a comprehensive set of observable characteristics - such as real estate, human capital, education and family composition - and study how it affects financial risk taking within twin pairs. We can identify identical and fraternal twins and have information on how often siblings meet or communicate with each other.

Comparing the effect of observable characteristics between twin siblings is a true ad tried method used in other areas of economics (e.g. Ashenfelter and Krueger, 1994). Because twins are much more closely related than random individuals in the population,

the twin methodology allows to control for all the unobservable characteristics that are common to both twin siblings, such as attitudes toward risk, ability, genes, shared background, and expected inheritance, among others.

We find that financial wealth has a strong positive effect on household financial risk taking. The effect is remarkably stable across empirical tests. It holds among fraternal and identical twins and across various levels of communication. For example, even when identical twins meet in person at least twice a week and interact by mail, phone or e-mail at least five times a week, the wealthier twin selects a significantly higher risky share than its poorer sibling, whether or not one controls for a large set of observable characteristics. The magnitude of the average effect is also robust across specifications. If wealth doubles, households will increase the share of financial wealth invested in risky assets by almost a quarter, on average.

We additionally find that the effect of wealth is not uniform across all households, but it is highly heterogeneous in the population. It vanishes for wealthy household with relatively modest habits or consumption commitments, and it is instead strong for households that have expensive lifestyles compared to their means. This provides support for habit formation preferences (Campbell and Cochrane, 1999) and consumption commitment theories of portfolio choice (Chetty and Szeidl, 2007).

The richness of the data allows us to investigate whether other predictions of optimal portfolio selection theories are validated in the data. We provide the first empirical confirmation that human capital has a positive impact on risk taking, controlling for cohort and market wide effects. We also can study the effect of real estate wealth on financial risk taking. Theoretically, it is not straightforward to sign the impact of real estate ownership. On the one hand, real estate is a risky asset and crowds out investment in risky financial securities (Flavin and Yamashita, 2002). On the other, home ownership represents a hedge against fluctuations of real estate prices, and thus encourages financial risk taking (Cocco, 2004, and Yao and Zhang, 2005). Consistent with these predictions, we find that residential real estate does not affect risk taking, but commercial real estate, which cannot act as a hedge, reduces investment in risky financial assets. Finally, income risk, background risk, and leverage, all discourage financial risk taking as predicted by theory (Gomes and Michaelides, 2005; Heaton and Lucas, 2000; Guiso, Jappelli and Terlizzese, 1996).

Overall, the paper confirms the theoretical predictions on how human capital, real estate, leverage, income and background risk affect household portfolio risk taking. It finds support for habit and consumption commitment financial risk preferences. Most notably, the paper provides strong evidence that financial wealth has a positive impact on the portfolio share households invest in financial risky securities. This effect fades for the richest investors who do not respond significantly to wealth shocks, a finding that has important consequences for asset prices. If security prices are primarily set by the demand of the wealthiest, financial market risk premia will not be affected by changes in wealth. If, instead, the portfolio choices of the middle class are reflected in security prices, wealth fluctuations, due for example to government policies and changes in productivity, might impact risk premia considerably.

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