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Income hedging and portfolio decisions ☆

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ABSTRACT

We examine whether the decision to participate in the stock market and other related portfolio decisions are influenced by income hedging motives. Economic theory predicts that the market participation propensity should increase as the correlation between income growth and stock market returns decreases. Surprisingly, empirical studies find limited support for the income hedging motive. Using a rich, unique Dutch data set and the National Longitudinal Survey of the Youth (NLSY) from the United States, we show that when the income-return correlation is low, individuals exhibit a greater propensity to participate in the market and allocate a larger proportion of their wealth to risky assets. Even when the income risk is high, individuals exhibit a higher propensity to participate in the market when the hedging potential is high. These findings suggest that income hedging is an important determinant of stock market participation and asset allocation decisions.

1. Introduction

One of the key risks that most households face is income risk. Standard economic theory posits that unless income risk is uninsurable and non diversifiable, the stock market participation decisions should depend upon the correlation between income risk and stock market returns (e.g., Heaton and Lucas, 1996, 2000b; Campbell and Viceira, 2002; Haliassos and Michaelides, 2003; Cocco, Gomes, and Maenhout, 2005; and Gomes and Michaelides, 2005). If the income-return correlation is low, then stocks can serve as a good hedge against income risk, which should induce individuals to participate in the market. Consequently, market participation should increase as the correlation between income growth and stock market return decreases.

Because this is an intuitive conjecture, it is puzzling that previous empirical studies find limited support for income hedging motives in market participation and asset allocation decisions, especially because some previous studies also demonstrate that a considerable part of income risk can be hedged using financial assets (e.g., Davis and Willen, 2000a, 2000b). For example, Heaton and Lucas (2000a) find only weak evidence in support of the hedging motive, perhaps because they use imputed measures of stock market participation.[1] Similarly, Vissing-Jorgensen (2002) finds no evidence that the correlation

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[1] Heaton and Lucas (2000a) use tax return data that include no information on asset holdings. They infer who owns stocks and the level of their asset holdings using tax information on dividends, interest, and capital gains.

between income growth and market returns influences portfolio decisions. She suggests that this lack of evidence is likely to be driven by the short sample period used to estimate income growth.[2] Most recently, Massa and Simonov (2006) show that income hedging motives do not influence the portfolio decisions of Swedish investors.

In this paper, unlike the evidence from these earlier empirical studies, we find strong support for income hedging motives in market participation and asset allocation decisions. We utilize a rich, unique Dutch data set (the Dutch National Bank (DNB) Household Survey) that enables us to better examine whether the relation between income growth and financial market returns affects portfolio decisions. This data choice is based on the belief that the unavailability of a long time series of good quality income data could be one of the main reasons for the lack of empirical support for the income hedging motive.

The main advantage of the DNB Household Survey is that it is a large annual panel covering the 1993–2011 period. The sample contains individuals across a wide age range from 18–94 years. Further, the data set includes information about income, taxes paid, and market participation, as well as a number of important traditional determinants of portfolio decisions such as age, education, risk aversion, and health status. Having multiple years of data for each individual allows us to obtain more precise estimates of the correlation between income growth and stock market returns.[3] Overall, the DNB Household Survey provides significantly richer information than commonly used US data sets such as the Survey of Consumer Finances (SCF) or the Panel Study of Income Dynamics (PSID). We exploit this richness of the DNB Household Survey to provide stronger support for the income hedging motive in stock market participation and asset allocation decisions.

Our empirical analysis combines the economic intuition from the capital asset pricing models (CAPM) that includes human capital (Mayers, 1972, 1973; Fama and Schwert, 1977; Jagannathan and Wang, 1996; Campbell and Viceira, 2002; and Eiling, 2012) and the literature on limited stock market participation (e.g., Vissing-Jorgensen, 2002). Specifically, following the limited participation literature, we conjecture that individuals with low income growth-market return correlation would perceive the net benefit of market participation to be high because that low correlation would suggest that the market offers high income hedging potential. Consequently, individuals who experience an income process that is not strongly positively correlated with the market would exhibit a stronger propensity to participate in the stock market. And according to human capital CAPM, upon participation, these investors are likely to choose a larger equity portfolio to maximally exploit the income hedging benefits offered by the stock market (Campbell and Viceira, 2002).

Our empirical evidence supports these key conjectures. In probit participation regressions, the probability of participation in the stock market is higher when the correlation of income growth with the Dutch stock market return is lower. The propensity to participate in the stock market increases significantly when the hedging potential is high, even when the level of income risk is very high. For example, a 1 standard deviation decrease in the correlation leads to about an 11 percentage point increase in the probability of investing in stocks and mutual funds. Similarly, individuals with low (bottom quartile) income-return correlation are about 12 percentage points more likely to own stocks, but individuals with low (bottom quartile) correlation and high (top quartile) income risk are about 24 percentage points more likely to own stocks.

Using Tobit and Heckman (1979) regressions, we find similar results for asset allocation decisions of households. The proportional allocation to risky assets increases when the market return is more negatively correlated with income growth. In particular, the Tobit regression estimates indicate that a 1 standard deviation decrease in the correlation is associated with a 5 and 3 percentage point increase in the wealth allocated to stocks and mutual funds, respectively.

These empirical findings are robust to several variations to the baseline estimation framework. In particular, the economic importance of the income-return correlation is strong for both direct and indirect market participation decisions. Our results are also qualitatively similar for risk seeking investors who hold only stocks but no mutual funds and for investors who are tax-sensitive and invest in funds that reinvest all distributions. Further, our findings are not driven by very young or very old investors because we find similar results for the middle-aged cohort. In additional tests, we find that the significance of the income-return correlation remains high even when we account for entrepreneurial risk. Last, we demonstrate that the correlation between income growth and market returns also affects the decision to remain in the market. Individuals with low income-return correlation own stocks in most of the survey years.

In most of our analysis, we use after-tax income derived from all sources. We focus on this comprehensive measure of income because canonical models of portfolio choice suggest that the risks from all sources of disposable income should affect portfolio decisions. However, to draw connection with existing studies that use before-tax labor income (e.g., Betermier, Jansson, Parlour, and Walden, 2012), we repeat our analysis using before-tax labor income. We find very similar results using this alternate measure of income. A lower correlation between market return and labor income growth is associated with higher market participation rates and larger allocation to risky assets.

Using the before-tax labor income measure, we are able to test finer theoretical predictions based on the

[2] Vissing-Jorgensen (2002) uses the Panel Survey of Income Dynamics (PSID). Given the limitations of the PSID, she computes the income growth-market return covariance using a relatively shorter period from 1982–1992.

[3] Due to data limitations, many existing studies on income risk either use synthetic cohorts (e.g., Davis and Willen, 2000a) or focus on income risk related to demographic characteristics such as occupation, education, and gender (e.g., Davis and Willen, 2000b). Other studies, such as Heaton and Lucas (2000a), have accurate income data from Internal Revenue Service tax filings but need to infer who owns stocks based on reported dividend income.