Household Asset Allocation, Offspring Education, and the Sandwich Generation[†]

By Vicki L. Bogan*

Family size has always been a key factor affecting household investment decision making behavior (Browning 1992). Yet, recently, household financial decision making issues have become even more acute for millions of households that are part of the "Sandwich Generation." Households with children approaching college-age are now providing financial support for aging relatives. This combined with the continued rising cost of college tuition has meant that even more families struggle with decisions about financing the college education of their children and other portfolio choice decisions. Parker and Patten (2013) find that in 2005 around 12 percent of middle-aged adults were providing financial support to both an aging parent and a child and by 2012 that number had increased to 15 percent.

There is a substantial empirical literature documenting the household characteristics and traits that influence household investment behavior and college saving behavior. Empirical research shows that household investments increase with wealth and household head education and are sensitive to transaction costs (Bogan 2008). Bertaut and Haliassos (1997) show that labor income risk and bequest motives affect stock market participation. Both physical (Rosen and Wu 2004) and mental (Bogan and Fertig 2013) health influence investment behavior. Further, Choudhury (2001/2002) finds that minorities in the United States have lower financial market participation rates than white households.

Similarly, family income is shown to be an important factor in family financial planning for college education and college enrollment (Acemoglu and Pischke 2001). Yilmazer (2008)

shows that parents' support for children's college expenses decreases with the number of children. Lefebvre (2004) shows that characteristics other than income explained about half of the difference in savings between the highest income group and the lowest income group. Home ownership is strongly negatively related (since carrying a mortgage can interfere with the capacity to save), even when the family income is relatively high. Gender of the parent and child, academic achievement of the child, marital status, parental education, and educational aspirations have more mixed and weaker effects.

This paper addresses a lacuna in the literature by empirically investigating household investment and college savings behavior with regard to family composition. Specifically, do elderly dependents affect the use of tax-advantaged accounts for college savings and/or other household asset holdings? I find evidence that having an elderly person in a household decreases the probability of risky asset holding by 0.114 and decreases college savings account holding by 0.012. The fact that households reduce both risky asset holding and college savings to smooth consumption when providing care for aging relatives has critical implications for wealth accumulation and pension and college aid related policies.

I. Theoretical Framework

As the base framework for the analysis, I use a model of household consumption, investment, and savings behavior that incorporates the quality-quantity model of fertility. Individuals (parents) live for two periods. In the first period, a household i earns y_1^i, chooses to have n^i children, consumes c_1^i, saves s_1^i, and chooses how much of savings, s_1^i, to allocate to a risky asset (δ^i). In this model, the household also chooses how much of savings to allocate to a tax-advantaged education investment vehicle (ϕ^i) in the first period.

* Cornell University, 201K Warren Hall, Ithaca, NY 14853 (e-mail: vlb23@cornell.edu).

In the second period, with probability $0 \leq p \leq 1$, the household will incur elderly care-taking expenses $\tilde{c}$. In the second period, the return on the risk-free asset is r, the excess return on the risky asset is z, and the excess return on the tax-advantaged asset is v. The total second period return on all of the accumulated assets and second period wage income, y_2^i, is divided between consumption, c_2^i, paying for children's college expenses, en^i, where e is the amount of parental support for each child's college expenses,[1] and any elderly care-taking expenses, $\tilde{c}$.

The household derives utility $U(\,\cdot\,)$ from consumption. The household's optimization problem, given y_t^i, is to choose consumption and asset investment to maximize the value of expected, time-separable utility.

$$\max_{c^i, \delta^i, \phi^i} E\Big[\sum u(c_1^i) + pu(c_2^i - \tilde{c}) + (1 - p)u(c_2^i)\Big]$$

$$\text{s.t. } c_1^i + s_1^i \leq y_1^i$$

$$c_2^i + en \leq y_2^i + (1 + r)s_1^i + \delta^i z^i + \phi^i v^i.$$

If we assume a log utility function, $u(c) = \ln(c)$, we can identify the following relationship from the first order conditions:

$$(1) \quad y_2 + s_1(1 + r) + \delta z + \phi v - en = \tilde{c}(1 - p).$$

From equation (1), we can determine that risky asset holding decreases as the probability of elderly care-taking increases $\left(\frac{\partial \delta}{\partial p} < 0\right)$ and education savings account holding decreases as the probability of elderly care-taking increases $\left(\frac{\partial \phi}{\partial p} < 0\right)$. (Derivations available upon request.) Section III of this paper will focus on empirically examining how elderly care-taking responsibilities and other factors influence δ and ϕ.

II. Data

The primary data used for the empirical analysis come from the 2007–2009 panel dataset from the Survey of Consumer Finances (SCF).[2]

The average age of respondents in the sample is 50 years old. Fifty-four percent of the sample has a college degree, 81 percent of the respondents are white, and over 66 percent of the respondents are married. Median household income is $70,000 and over 75 percent of the sample owns a home. In the sample, 94 percent of the households hold safe assets, 44 percent of the households have stock or mutual fund investments (risky assets), and 6 percent of the households have a tax-advantaged college savings account.

Over 1 percent of the households have dependent elderly individuals living in the home. For the analysis, co-residence will be used as a criteria to classify the sandwich generation. Using a co-residence criteria is an extremely conservative assumption that substantially decreases the sandwich generation sample size. Most households that provide financial support to aging parents do so without co-residence. For example, Pierret (2006) finds in a sample of women from the National Longitudinal Survey that while one percent had both parents and children living with them, 9 percent of the sample provided support (greater than $1,000 or 500 hours per year) for both an aging parent and a child.[3]

Both households with only dependent children and households with both dependent elderly and children have on average two children. Yet, there could be a selection concern in that the sample of sandwich generation households could be distinctly different from households with only children dependents. However, the subsample of households with both children and elderly dependents does not have significantly different household head ages, college graduates, percent with pensions, home owners, or heads in poor health. Although the difference

---

[1] For simplicity, parents' financial support of children's college expenses is assumed to be equal for all n children. The model does not include the effect of financial aid on college savings.

[3] If the support definition is expanded to greater than $200 or 100 hours, then over 33 percent of the sample can be classified as part of the sandwich generation.

is not statistically significant, the median annual household income for the sandwich generation subsample ($84,000) is larger than the median annual household income for the subsample of households with no elderly dependents ($78,000). There are some notable statistically significant differences. Households with elderly dependents are more likely to contain a married couple and are more likely to have an employed household head. Significantly more households with dependent elderly have anticipated college expenses (67 percent) compared to households with only children dependents (55 percent). Yet, Figure 1 shows that fewer of these households hold risky assets and fewer hold tax-advantaged college savings accounts.

III. Econometric Analysis and Results

The empirical analysis focuses on investigating how household characteristics influence risky asset holding and the use of tax-advantaged accounts for college savings compared to safe asset holding. Specifically, I look at the effects of number of children, anticipated college expenses, and elderly care-taking on the probability of holding safe assets, risky assets, and tax-advantaged college savings accounts (the extensive margin).

I use univariate probit models in which the dependent variable is a binary variable for one of three investment types: safe assets (transaction accounts, certificates of deposit (CDs), and bonds), risky assets (stocks and mutual funds), or tax-advantage assets (529 plans and Coverdell Educational Savings Accounts).[4] The key independent variables of interest are number of children, an anticipated college expenses dummy variable,[5] and a have dependent elderly persons living in the household dummy variable.

The other control variables are ones that previously have been shown to influence household investment and college savings behavior: log of household income, total household
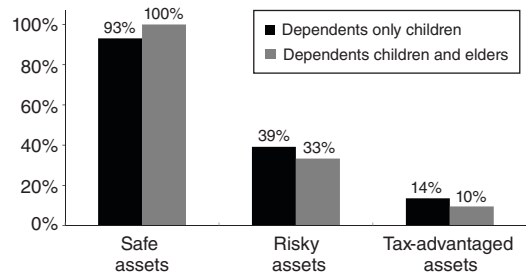

FIGURE 1. ASSET CLASS HOLDINGS BY HOUSEHOLD TYPE (2009)

size, a respondent married dummy variable, a respondent age variable, a respondent college graduate dummy variable, a respondent employed dummy variable, a respondent managerial or professional occupation dummy variable, a has a pension dummy variable, a home owner dummy variable, a poor health dummy variable, a has health insurance dummy variable, a year 2009 dummy variable, and race dummy variables (Bertaut 1998; Keister 2003; Bogan 2008; Rosen and Wu 2004; Bogan and Fertig 2013; Bogan 2013). The model specification is

$$OWNASSET_{it} = \beta_0 + \sum_{k=1}^{K} \beta_{kt} X_{ikt} + \epsilon_{it},$$

where X_{ikt} is the set of household characteristic variables.[6] The standard errors in all regressions are adjusted for intra-cluster correlations.

Consistent with the literature (in results not shown), I find that parental age, parental education, home ownership, and parental health influence parental saving for offspring education. Both having household health insurance and having a managerial or professional occupation increase the probability of a household investing in safe assets, risky assets, and college savings accounts.

Table 1 shows the results for the key independent variables of interest. Having anticipated college expenses increases the probability of investing in risky assets (significant at the 1 percent level) and increases the probability of having a tax-advantaged college savings account

---

[4]529 plans and Coverdell Education Savings Accounts are tax-advantaged investment plans designed to encourage saving for the future higher education expenses of a designated beneficiary.

[5]This variable is given a value of 1 if the respondent indicates that saving for their children's college education is a large anticipated expense in the next five to ten years. The variable is set to 0 otherwise.

[6]A fixed effects model cannot be used due to sample size issues. Since a fixed effects identification strategy is based upon changes in elderly care-taking responsibilities over time, the fixed effects model substantially decreases the sample size.

Table 1—Household Characteristics and Investments
(*Key marginal effects*)

	Safe assets	Risky assets	Tax-advantaged assets
Number of children	0.008 (0.006)	−0.091 (0.056)	0.006 (0.004)
Anticipated college expenses dummy variable	−0.000 (0.001)	0.039*** (0.009)	0.046*** (0.004)
Have elderly in household dummy variable	0.009** (0.002)	−0.114** (0.053)	−0.012** (0.004)
Observations	28,505	31,805	31,805

Note: Standard errors are adjusted for intra-cluster correlations.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

(significant at the 1 percent level). Having an elderly person in the household increases the probability of a household holding safe assets (significant at the 5 percent level). In contrast, having an elderly person in the household decreases the probability of investing in risky assets by 0.114 (significant at the 5 percent level). This number is significant but also large relative to the mean value of risky asset holding, 0.441. Having an elderly person in the household decreases the probability of having an educational savings account by 0.012 (significant at the 5 percent level). This coefficient is significant and large relative to the mean value of educational savings account holding, 0.061. These results provide evidence that risky asset holding and college savings behavior are connected to household elderly care-taking responsibilities above the effects of a bigger household size.

These results are especially compelling given that the sandwich generation households in the sample are more likely to have anticipated college expenses, an employed household head, and be a married couple—all traits associated with higher probabilities of risky asset holding and college savings.

IV. Concluding Remarks

Specific aspects of family composition beyond household size have significant effects on household asset allocation and portfolio choice. While it has been shown that children influence household financial behaviors, elderly dependents also have a large and significant effect on household investment decision making. Elderly care-taking responsibilities significantly decrease risky asset holding as well as household savings for offspring education. In terms of the magnitude of the effect on college savings, having an elderly person in the household affects the probability of investing funds for offspring education twice as much as the household head having poor personal health. Similarly, having elderly dependents reduces risky asset holding more than twice as much as the household head having poor health. This suggests that households reduce offspring educational investment and risky asset investments in order to smooth consumption.

These results indicate potential negative effects on economic mobility across generations through two channels. Limited parental funds for education can decrease human capital accumulation of offspring and correspondingly their long-term earnings potential. Moreover, as risky asset holding is critical to long-term wealth accumulation, the decrease in risky asset holdings can have significant effects on wealth transfers across generations. These results have critical policy implications as they demonstrate important intergenerational links between the pension system, the college financial aid system, and wealth accumulation. Further this effect could contribute to racial wealth disparities. Among those with at least one parent age 65 or older, Hispanics and blacks are much more likely than whites to financially assist a parent. Compared to 24 percent of whites, 65 percent of Hispanics, and 40 percent of African Americans say they have provided financial support to a parent in the past 12 months (Parker and Patten 2013).

REFERENCES

Acemoglu, Daron, and Jörn-Steffen Pischke. 2001. "Changes in the Wage Structure, Family Income, and Children's Education." *European Economic Review* 45 (4–6) 890–904.

Bertaut, Carol C. 1998. "Stockholding Behavior of U.S. Households: Evidence from the 1983–1989 Survey of Consumer Finances." *Review of Economics and Statistics* 80 (2): 263–75.

Bertaut, Carol C., and Michael Haliassos. 1997. "Precautionary Portfolio Behavior from a Life-Cycle Perspective." *Journal of Economic Dynamics and Control* 21 (8–9) 1511–42.

Bogan, Vicki. 2008. "Stock Market Participation and the Internet." *Journal of Financial and Quantitative Analysis* 43 (1): 191–211.

Bogan, Vicki L. 2013. "Household Investment Decisions and Offspring Gender: Parental Accounting." *Applied Economics* 45 (31): 4429–42.

Bogan, Vicki L., and Angela R. Fertig. 2013. "Portfolio Choice and Mental Health." *Review of Finance* 17 (3): 955–92.

Browning, Martin. 1992. "Children and Household Economic Behavior." *Journal of Economic Literature* 30 (3): 1434–75.

Choudhury, Sharmila. 2001/2002. "Racial and Ethnic Differences in Wealth and Asset Choices." *Social Security Bulletin* 64 (4): 1–15.

Keister, Lisa A. 2003. "Sharing the Wealth: The Effect of Siblings on Adults' Wealth Ownership." *Demography* 40 (3): 521–42.

Lefebvre, Sophie. 2004. "Saving for Postsecondary Education." *Perspectives on Labour and Income* 5 (7): 5–12.

Parker, Kim, and Eileen Patten. 2013. *The Sandwich Generation: Rising Financial Burdens for Middle-Aged Americans*. Washington, DC: Pew Research Center, Social and Demographic Trends.

Pierret, Charles R. 2006. "The 'Sandwich Generation': Women Caring for Parents and Children." *Monthly Labor Review* 129 (9): 3–9.

Rosen, Harvey S., and Stephen Wu. 2004. "Portfolio Choice and Health Status." *Journal of Financial Economics* 72 (3): 457–84.

Yilmazer, Tansel. 2008. "Saving for Children's College Education: An Empirical Analysis of the Trade-off Between the Quality and Quantity of Children." *Journal of Family and Economic Issues* 29 (2): 307–24.