Active Pension Participation and Household Wealth Accumulation

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Abstract

This paper investigates the impact of household exposure to employer pension plan features. We engage the Health and Retirement Survey to investigate whether exposure to active management (choice) or participation in plan sponsored financial education impacts household portfolio allocations and wealth. We consider interactions between pension design and investment patterns outside of the workers pension plan, utilizing two parametric estimators: the random effects probit and the multivariate probit. We extend our results non-parametrically via propensity score matching. We find repeated evidence that both of the plan features we test improve asset allocations and financial outcomes for recent retirees.

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1 Introduction

This paper investigates the impact of investment choice and financial education within employer defined contribution (DC) plans on more general household portfolio decisions. We accomplish this using longitudinal data on older US households, the Health and Retirement Survey (HRS) RAND version D data, which we augment with variables from HRS wave 1 and 5 datasets (1992, and 2000).

The issues associated with DC portfolio choice and savings are of considerable import for both personal and national savings. If portfolios are positively impacted as households gain experience with financial markets then a direct implication would be that the growth of employer DC plans is related to the evolution of household savings. Not unlike Weisbrenner (2002) we find that the ability to choose portfolios in retirement plans affects household's propensity to hold wealth in relatively risky assets, such as equities, after controlling for other factors such as preferences for risk and planning horizons. We interpret this as good news for recent retirees, considering recent observed equity premiums, but remain concerned that increasing equity holdings may not always be optimal. Over the longer run, because the individual's capacity for self management is an important consideration we also investigate comparative outcomes for those who report attending financial planning seminars; we find evidence that attendance is linked to greater household savings at retirement. Thus both features: choice, and education are seen as valuable employer retirement savings plan features which enhance private savings and capital formation though improved equity market participation. We offer that because well run employer savings programs are found to enhance household savings, potential impacts extend to national savings and to the current debate on magnitude and form of public social insurance programs.

2 Background

The standard models of savings in an inter-temporal setting are the life-cycle models. These models explicate savings and labor supply, examining how individuals divide their time between work and leisure including a period of retirement at the end of life. The models make some strong assumptions including individual rationality, long range planning horizons, and especially full information on behalf of economic agents.

With these assumptions in place the models are able to make strong predictions regarding the optimal annual saving rates, asset allocation, age of retirement, and the level of retirement income.

Regarding information assumptions in particular, while theoretical models of portfolio management call for some degree of equity participation for nearly all agents over the lifecycle, more limited stock market participation is actually observed as shown for example in Haliassos & Bertaut (2005). One possible reason for the observed departure may stem in part from individuals' lack of experience with financial markets. If learning curves are relatively steep, or perceived to be,[2] then those without opportunities for exposure may persist in non-participation when otherwise similar persons who have set positions in equities would increase asset shares at the margin. In this case exposure to financial markets, and education could effect change in retirement savings behavior, bringing it more in line with the predictions of traditional life-cycle models.

The changing employer role in life-cycle savings may in fact be a catalyst both for increasing exposure to equity markets, and improving individuals' financial management technique. Increasingly over the period we study, workers had three important responsibilities: first, to make decisions on participation into DC plans[3], second, to select a contribution level once they enroll, third, to continue to make asset allocation decisions within their DC plans over time. We posit that exposure to these decisions has important implications for workers' non-pension savings as well. As such our paper addresses two closely related issues that have been studied extensively but separately in the existing literature:(1) the impact of pension plan characteristics; (2) the effect of financial education on the composition and level of net household savings.

Previous researchers have documented a relationship between participation in employee sponsored financial literacy programs and improving retirement preparedness through higher participation in pension plans as seen for example in Bernheim & Garrett (2003), where the authors examine impacts of financial education on total savings measured as either total, or financial wealth.

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[2] Perhaps in part as a result of loss aversion as described by Kahneman & Tversky (1979).

[3] More recently this first responsibility has shifter away from workers, as defaults into plans have become more common, acknowledging work by Madrian & Shea (2001). Defaulting workers into savings plans would of course have the impact of further democratizing exposure to equity markets, and to the second and third decisions, regarding level, and composition of savings.

Others have studied the effect of financial education on savings and wealth. Lusardi (2004) utilizes the first wave of the HRS (1992) and finds that financial education seminars increase the likelihood that participants purchase equities. She further finds employees with low wealth are reported as being most affected by seminars. She suggests this as evidence that education is remedial and mainly influences those households who otherwise might not hold stocks.

Maki (2004) speculates that financial education affects workers' savings and asset allocation in a three ways: first, by causing the family to reduce its discount rate, second, increased financial knowledge could lead the household to become less risk averse--increasing investments with a greater levels of risk and expected return, and third and finally, financial education programs could change the households knowledge of investment choice sets. Other recent work has provided evidence that workers' asset allocation choices tend to deviate from those predicted by standard models of portfolio choice, reporting overly simplistic ('naïve') diversification strategies, Bernartzi & Thaler (2001), or tending to be 'passive' or reluctant to change from the default asset allocations set by employer plans as seen in Madrian & Shea (2001). The point to investigate here that speaks to these findings is whether direct attendance in financial education seminars is likely to increase active and judicious asset allocation decisions, on net.

The impact of the other characteristic studied here, the ability to choose asset allocations within employer plans, has been studied by two recent papers. The first is by Papke (2004) who examined how self direction (i.e. choice) in DC plans affects the composition of the assets held within the plan. Using data from the 1992 National Longitudinal Survey of Mature Women and the first wave of the HRS, she reports that choice increased equities as a proportion of asset allocations, and additionally increased both participant contributions, and account balances within the employer plan. She also finds evidence that those with IRAs or DB pension plan options hold fewer assets in their DC plan. Similar in spirit but differing in scope is the paper by Weisbrenner (2002) who like us wished to examine the spillover from choice in DC plans on the composition of workers' non-pension wealth. He reports that the ability to choose investments in retirement plans increased workers' probability of owning relatively risky assets outside of their retirement plan after controlling for worker preferences for savings, and portfolio re-balancing effects.

In contrast to these earlier papers, we employ six waves of data from the HRS panel data instead of the single years cross section Survey of Consumer Finance (SCF) used by Weisbrenner, [4] or the cross section of HRS data utilized by Papke, and by Lusardi. Additionally we focus on the impact of education and choice together allowing us to interact impacts of these two features. By considering both issues simultaneously we are able to account for the impacts of each feature more accurately, avoiding any possible cross correlates that would otherwise contribute to a potential omitted variable bias. We now describe our panel data in greater detail.

3 Data

The Health and Retirement Study has surveyed a nationally representative longitudinal sample of the cohorts born between 1931 and 1941 every two years since 1992. Topics covered by the HRS include information on respondents' income, assets, health, demographic characteristics, family structure, and employment history. The sample initially consisted of some 12,652 persons in 7,600 households whose average age in 1992 was 55. This study utilizes the public release version of the HRS developed by the RAND Corporation. The advantage of using the RAND version of the HRS data is that it provides imputations of missing observations of wealth, income, and medical expenditures between waves and matches like-measures across and within waves in a consistent manner. This increases comparability (and thus the quality of the panel data for analysis). While the HRS does not include a level of detail comparable to the SCF, it nonetheless does track information which can be used to learn about portfolios, both in terms of included asset types and in terms of their relative portfolio shares. We classify our assets as falling into three possible asset categories, constituted as follows:

1. *Safe Assets: checking & savings accounts, money market funds, CDs, US savings bonds, T-bills*
2. *Risky Assets: bonds, stocks, and mutual funds (held directly).*
3. *Retirement Assets: Individual Retirement Accounts (IRAs) and Keoghs.*

[4] We point out that a disadvantage of using the HRS is that we can obtain summarized information on the nature of the financial assets owned by the respondents in the survey. This stands in contrast with the depth of the information that is found in the Survey of Consumer Finance (SCF).

This measure is loosely based on that of Hurd (2001), however we amend his three categories in two ways, first: we lump his medium and high risk assets together, and second: we treat retirement assets as a separate category. This is done because retirement assets' differ from directly held risky assets in their special tax favored status, and in particular their withdrawal penalties. Our separation is suggested in recent work on workers' asset allocation decisions and tax incentives, Bergstrasser & Poterba (2004). In our setting retirement assets enjoy the type of tax preferred status that these authors investigate, and so our three asset categories are Safe, Risky, and Retirement. Because we are interested in observing behavioral spillovers from the workplace to personal finance we restrict our observation to non-pension financial wealth.

Because portfolio information is somewhat limited in the HRS, we can not observe marginal effects of portfolio composition at the intensive margin. This would require knowledge of inter-temporal trading behavior and more refined information on the composition of equity and bond portfolio components than what is available. Thus we focus on the extensive rather than the intensive margin. That is, we examine the impact of financial education and/or choice on ownership probabilities of assets rather than at portfolio shares of the various assets. We believe the extensive margin is interesting in its own right given the limited nature of stock market participation for US households. From here it follows that understanding whether employer plan features impact households' underlying tastes for adding whole classes of assets to their wealth portfolios remains an important research question.

To this end we augment the RAND panel with additional questions from the individual waves which are not contained in that panel, but which are pertinent to our study; most notably, we add information relating to our measures of financial education. HRS queries participants in each wave about the opportunity to select assets in employer plans by asking them the following question in its survey modules on pensions: "*Are you able to choose how the money in your account is invested*?" HRS queries participants at two points over time (1992, and 2000) regarding financial education by asking them the following question in its survey modules on retirement decision: "*Have you ever attended any meetings on retirement or retirement planning*?" Table 1 gives summary statistics on these and other pertinent variables including asset class ownership rates and portfolio choice.

‹Table 1›

The average age of respondents in the original cohort of the HRS population in Wave 1 was approximately 55 years of age which increased to 65 by Wave 6. Those holding DB plans are on average about three and a half years older and those holding DC plans are roughly one half year younger than this average. Within DC plans, those reporting educational seminar attendance or the ability to choose assets within there plan are constant in age with the general DC plan population Married couples constitute over the three fourths of the population, but a smaller portion of the population holding no plan. Women comprise roughly 53 percent of respondents, but lower levels of those holding either DB- or DC-type plans (44, and 42 percent respectively). They are a larger share of those reporting attendance of a financial seminar (44 percent) and a smaller proportion of those reporting choice as a feature of their plans (38 percent). Whites are more likely to hold employer pension or savings plans, and represent a disproportionately large portion of those attending education and/or reporting choice in their plans (90 percent of those reporting both, vs. 79 percent of the general HRS population studied here.) In terms of educational attainment roughly a third holds a High School degree or GED equivalent, with some minor variation across groups. By contrast Bachelors degrees are rare in the population, though among those reporting both financial education and choice in their DC plans the rate is roughly double that of the general population (23 percent vs. 11).

The 1992 HRS survey contained questions on the likelihood of leaving a sizable request ($10,000 or more). It appears that while DB and DC holders report similar likelihoods of "probably," or "definitely" leaving a bequest, (35, and 14-15 percent respectively) among those with DC plans who have both plan features the percentage reporting these levels of intent increases to roughly 45 percent for the "probably" crowd, and holds at the 14 percent level for the "definitely" crowd. Average earnings decline over the period, even conditional on work, suggesting households reduced labor force participation, including perhaps through mid-year, partial, or single-spousal retirements. While average earnings declines between 1992 and 2002 were roughly 22 percent, experiences differed across groups. Generically those with no plan experienced

reductions of just fewer than 10 percent, while the groups with either DB or DC plans[5] had average reductions in earnings of 26 percent. Within DC plan participants, those with choice averaged reductions of 27 percent, those with education saw reductions of 22 percent. Reductions for those with both plan features were the lowest of any group with a plan studied here, 16 percent. This suggests that education and choice may work somewhat differently in tempering incentives around late career workforce participation, but one should consider differences in asset holding by group as well. Household portfolio increases are the norm for all groups except the group with no plan. Increases averaged roughly $16,100 across all groups over the period. Greatest average gains were for the group with DC plans and choice alone, $100,000 (perhaps motivating the greater average reductions in earnings). The more general DC group doubled the DB groups asset gains, ($67,500 versus $38,300), those with DC programs who report financial education participation had average gains that were less than the DB plan participant group, $23,900. This is inline with Lusardi's (2004) suggestion that the financial education offerings being reported in HRS have a remedial quality. For those with no plan, outcomes were again worst. Average financial wealth in general, and both the housing and financial wealth categories comprising it decline, average declines overall for this group were roughly $7,200. One bright spot within financial wealth is with equities, where values increased an average $900. However we see that on average those with no plan hold the lowest proportion of equities (less than 50 percent in either 1992, or 2002) and also the lowest increases in equities as a percent of their portfolios in both absolute and relative terms (roughly a 4 percentage point increase, or a 9 percent increase in share). Again those with both features are the next most conservative in terms of share increases (13 percent) but they have the highest shares to begin with, roughly 59 percent.

We observe that those with no plan have the lowest likelihood of holding any of the three constructed asset classes {Safe, Risky, Retirement}, while the group with DC plans reporting both plan features consistently has the highest proportion holding all three types (51-53 percent).

From our consideration of summary statistics thus far it seems plan features being studied have a mixed performance – and that the features together may alloy

[5] It is interesting in it's own right that the DB or DC groups had equal reductions, at 26.2 percent, as incentives for reducing labor force participation across these plans are significantly different.

themselves in a way that affords them some of the best and worst of each. Alternatively what we are seeing may be driven by other factors, such as education (described above), or risk preference, and planning horizon which we next describe.

Regarding risk, households were asked whether they would take a job that could double their income with a 50 percent chance or cut it in half with a 50 percent chance. In our study we refer to workers who answered "*yes*" as "Relatively Risk-Loving". In a follow up to this question, for those answering "*no*," HRS next proposes the same 50 percent chance of doubling of income with reduced stakes to first 30 percent and then 20 percent. We classify those who answered "*no*" as "Relatively Risk-Loathing". Those who report they would take the second offer, but not the first are somewhat more moderately risk adverse. Compared with this middling group, those with more extreme risk preferences (that is either relatively risk-loving or risk-loathing) make up the greatest proportion of the group with DC plans reporting both plan features (roughly 82 percent average over the period). But this simple characterization is joined by another, perhaps more interesting one, as this group also reports the lowest number of risk lovers in 1992, (7 percent) and the greatest proportion of risk lovers in 2002 (30 percent). The proportion reporting risk-loathing changes just as dramatically in the opposite direction, (72 percent in 1992, declining to 54 percent a decade later). In both periods this groups risk characteristics constitute significant deviations from most of the groups reported here, exhibiting preferences most like the DC-education group. Otherwise worthy of note, the group with no plan is the only group to report declines in the proportion characterizing themselves as risk loving,[6] all groups show declines in the proportion reporting the strongest aversion to risk. It would seem there is a strong correlation between financial education and increases in risk tolerance over this period, very much in line with observations in Maki (2004).

To gauge the financial planning horizons HRS places responses in several categories: "the next couple of months," "next year," "the next year to 10 years ahead," and "more than 10 years." From this data we construct a more compact categorical variable that compares short horizon types (defined as less than a year) our omitted

[6] This maybe of interest to some readers as, on average, equities are the best performing segment of this group's portfolio, over this period.

comparison, with medium term (1-10 years), and long term (more than 10 years) types. Overall, planning horizons seem to be dimming marginally for this group over time, with the percentage reporting a planning frame of 10-or-more years declining by a little less than a percentage point, however within the DC population while the group reporting only choice reduce planning horizons in a degree that is similar to the overall average, those reporting education, either alone, or in combination with choice show increases in the proportions reporting longer planning horizons, with the education only group reporting the highest proportion planning finances 10 or more years in the future (14 percent), this finding is again consistent with Maki (2004) where education lowers discount rates. The HRS includes information on the likelihood that respondents will work past ages 62, and 65 in each wave. We report the average probability of working past age 65 for each group in 1992 wave. We restrict ourselves to using the base-line 1992 response to control for feedback effects of savings on these reports in later waves. From the initial reports we see that the group with no plan has the highest report (averaging 30.4 percent) while the group holding DB plans reports the lowest (18.9 percent), Among those with DC plans (21.9 percent) it appears that the group with education has a lower report (19.6 percent), the group with choice has a higher report (22.3 percent) and with both plan features reports a result essentially equivalent to the DB group (19.0 percent). Health-wise, overall just over a quarter of the population self-reports being in fair or poor health, with very little change over the period of observation[7]. The group with no plan has the highest percentage reporting as fair or poor (31-33 percent), followed by the DB plan population (16 percent) who are half as likely to report bad health. The DC group is about two percentage points less likely to report bad health. Within this group, those who report attending seminars are within the group least likely to report being in bad health (9-11 percent) the group reporting both plan features shows the same general pattern of being in-between the choice-only and education-only groups across characteristics, here the proportion reporting bad health (9-13 percent). For those interested in more detail regarding how covariates like age cohort, wealth quartiles, educational status, and race impact ownership rates for out three asset classes, we offer Appendix A at the end of this paper.

[7] Respondents report health on a five point scale (excellent, very good, good, fair, poor).

Behind our research question lays an interest in household wealth accumulation and retirement wellbeing. As such, before offering our parametric work we take a final moment to give the reader a picture which describes the fuller distribution of retirement wealth outcomes for workers retiring between 2000 and 2002, by plan feature.

‹Figure 1›

Importantly, the six panels of this figure suggest that both financial education and active asset management contribute to better financial outcomes at retirement. In the top two panels we see the unique effects of education (1.A), choice (1.B) and then a fuller set of interactions (1.C). This bottom set of 2 panels gives a distribution of financial and total wealth for workers exposed to one or both features, as well as those with neither feature. Those reporting neither plan feature have the lowest retirement wealth (group 1) throughout their distribution. To see this compare either the total distribution within the T-brackets, the placement of the gray box (which brackets the inter-quartile range) or the vertical line within the gray box (median), By comparison those with both plan features (group 4) do markedly better. A comparison of groups 2 and 3 with group 4 suggests that outcomes are most diffuse for those with education only, as was suggested above in the pour discussion of summaries across groups. It is possible either that the groups who participate in these seminars are bimodal (for example being either very risk adverse, or needing remedial education – with outcomes thus differing across these subpopulations) or that there are simply better and worse financial education programs to be had, (that is both the curricula and the populations in these seminars may be highly non-standardized over the period of study). Be that as it may, we nonetheless find evidence that education can address both the savings and investment risks mentioned earlier.

In short both choice and financial education appear to be associated with greater levels of wealth accumulation; however as we have observed the groups with these plan features differ from their counterparts in ways which arguably might drive differences in outcomes. For this reason we next describe multivariate analysis aimed at better controlling for cross correlates, and for endogeneity in selection across groups.

4 Method & Results

In the previous section we did not simultaneously control for factors that possibly drive workers decisions to hold assets. To examine how the particular form of employer provided pension impacts households' saving behavior we next employ three econometric techniques, random effects probit regression, a multivariate probit estimator, and propensity score matching. The first two are designed primarily to control for cross correlates, whereas the later is invoked in an attempt to control for self-selection tendencies. Additionally, the first two measure allocations on the extensive margin, and the latter measures wealth outcomes at retirement.

We begin first by examining the effect of financial education on household ownership probabilities of our asset classes estimating random effect (RE) probit models of ownership, via the *xtprobit* panel estimation procedure in *Stata*. Our econometric model is a static random effects probit model. The specification is:

$$y_{it} = X_{it} + D_i + \varepsilon_{it}, \quad "i = 1,...,N \; ; \; t = 1,...,6$$

$$y_{it} = \{1 \; if \; y^*_{it} > 0, \quad 0 \; else.\}$$

Where y_{it} is a dichotomous variable that indicates ownership of a particular asset type (Safe, Risky, Retirement), X is our set of control variables, D_i is our binary indicator for a plan feature (education and/or choice), and $\varepsilon = \gamma_i + \upsilon_{it}$.

Under RE we have:

1. $E(\gamma_i \mid X_i) = E(\upsilon_{it} \mid X_i) = 0,$
2. $Var(\varepsilon_{it} \mid X_i) = \sigma_\gamma^2 + \sigma_\upsilon^2$

As discussed in Miniaci & Weber (2002), this model assumes that error terms are random and therefore uncorrelated to the regressors, X, and thereby yield unbiased and consistent estimates. If however there are fixed effects (FE) that cause the regressors to be correlated with residual terms, an omitted variable bias problem develops which then normally yields inconsistent estimates. Accordingly one should check the RE model against an alternate FE specification. Unfortunately this is difficult to implement in the case of a discrete choice panel data model. Further, time invariant variables such as demographic variables and key aspects of the pension plan type & features in our data are all lost in any fixed effects type model. Thus, seeking an alternative robustness check we run a variety of RE probit specifications which make use of control variables available

in the HRS. We also run several multivariate probit specifications which estimate multiple equation probit models by the method of simulated maximum likelihood (SML) via the *mvprobit* routine in *Stata*. This routine estimates off-diagonal correlations for the variance-covariance matrix using the Geweke-Hajivassiliou-Keane (GHK) simulator to evaluate each of the normally distributed integrals in the likelihood function. We iterate the GHK simulation exercises 25 times to generate tables 3, and B1, which allows us to converge to robust estimates for the off diagonal correlates. For more on the *mvprobit*, see Cappellari & Jenkins (2003).

Having described our basic procedures now, we return focus to our baseline RE probit model. Included controls here are similar to those used in several previous studies on household portfolio choice.[8] Our full specification considers: (1) age; (2) square of age; (3) an indicator for education level set to 1 if a household has a college degree; (4a) an indicator of marital status, (4b) household size; (5) race; (6) a dummy variable for weak health set to 1 if at least one of the members reports that his/her health is "fair" or "poor."; (7) household labor income (in $10,000's) as well as a square of the term; (8) Dummy variables indicating the quartile in which a household's net worth falls; (10) Pension and tax advantaged savings dummies indicating whether a household holds a DB plan, a DC plan, and/or an Individual Retirement Account (IRA); (11) Controls for census region of residence, industry, and occupation category, job tenure, and wave specific indicator variables to account for time effects between waves.

Our variables of main focus are those describing participation in DC plans that include asset allocation choices, and financial education seminar participation.

Table 2 reports RE probit results for ownership probabilities on Safe, Risky, and Retirement assets for our baseline model specification.[9] probit coefficients are tricky to interpret, but in general the reader is reminded that they describe changes in terms of the standard deviation of the predicted probit (probability index). A very literal translation of the coefficients related to holding a DB Pension in the first three columns of Table 2 reads that a holding this type of pension results in predicted probit index changes of .15,

[8] See Haliassos & Bertraut (2005).

[9] We treat Retirement assets as a class, but since they are predominantly made up of IRAs, we must be careful in regressions not to include IRA among predictors--essentially placing IRAs on both the left and right hand side of the model we wish to estimate.

.19, and -.08 standard deviations in the of holding {Safe, Risky, and Retirement} assets classes, respectively--though the last result (Retirement) is not statistically significant. Looking at our second panel (columns 4-6) we see very consistent results both in terms of coefficient values and z-scores. We continue describing the general nature of our findings for the reader here. Fundamentally, we find that having an employer provided plan, be it either DB or DC, and/or owning an IRA, are all positively related and a highly significant predictor of ownership of Risky and Safe assets in non-pension wealth holdings. For Retirement assets we find that DB plans are negatively related, and DC plans positively related to holding this asset class on the margin. Though neither result is statistically significant, the signs are in agreement with the general idea that many IRAs act primarily as asset holding mechanisms for those leaving an employer with DC pension assets.

From the first three columns of results in Table 2 we read that financial education is a positive predictor of Risky and Retirement asset ownership, carrying strong statistical significance. This pattern is broadly true whether the households reported attending financial education in 1992, or 2000. The ownership of Safe assets does not appear to be affected by attending financial education. This result may stem from the definition of this category which includes bank balances--suggesting merely that education is not observed to reduce the probability that one is "bank poor" in these data. Keeping our focus on the first three columns a moment longer, it appears that after controlling for financial education having choice in a pension plan increases the likelihood of owning Risky and Retirement assets, and reduces the likelihood of owning Safe assets,[10] though only the result for Risky assets is even mildly statistically significant. Thus it would be wrong to interpret financial education as having no impact on portfolio use of Safe assets, it may counter the low-magnitude negative impacts of choice on the likelihood of holding this asset class, we will offer more on this point as we consider our second set of RE probits.

In the second set of columns of Table 2 we consider the interaction of choice and financial education more directly, and find that that either attending financial education or having choice in plan is related to increases in probabilities for ownership of Risky

[10] Recall that our Safe asset category includes money market funds, so it is not the case that we are picking up movement from traditional interest free checking and NOW accounts to money markets.

and Retirement assets. For those with choice in plan we find that attending financial education increases the likelihood of owning Risky assets and reduces the likelihood of owning Safe assets, the results being significant at the 5, and 10 percent confidence levels, respectively. From the first set of columns we learned that education was a countering force, damping the negative association between choice and safe asset holdings. When combined we now observe the net marginal effect of both plan features on holding safe assets is negative. This result is weakly significant at the 10 percent level.

Given the differing nature of employer and employee risks embodied by the DB versus the DC plan, we might expect DB holders to be more aggressive in their non-pension wealth holdings, all else equal. However our results indicate that workers in DC plans are more, rather than less likely to own Risky assets and that choice increases this impact. Whether this is good or bad for wealth accumulation is perhaps outside the scope of this paper to say since we are limited to the extensive margin by our data, but it is in keeping with the idea that investment in financial markets is information and/or experience constrained. This provides support for the notion that employer pension design can inform households' tastes for owning and actively managing household assets.

Most off the rest of the included regressors impact asset holdings in ways which are consistent with the preliminary evidence in our summary statistics (Table 1) and the cross-tabulations offered in Appendix A (Table A1). We do not take further time to discuss them here, except to note that coefficients and reported significance levels are very stable across both sets of columns (1-3; 4-6), our results are thus seen to be robust to minor specification changes.

Moving next to multivariate probit specifications, we are able to do away with presumption of independence between alternatives. This allows for asset classes to be considered simultaneously by the model, the various rates of complementarily or substitutability now captured in a way not allowed in the segregated environment that generated the findings in Table 2. We take fuller advantage of the multivariate environment--now including a Housing asset-class as well, so as to account for possible interactions with this important component of wealth. (Appendix B provides the GHK derived cross correlations for these four asset classes for the interested reader.) Additionally we add new possible predictors for asset class holdings including discrete variables coding risk, and saving preferences (financial planning horizon and bequest

motives). Finally, because labor force participation is an effective substitute for savings (when feasible), we account for whether people plan to continue to work past 65, or retire earlier (using responses to whether persons plan to work at 62).[11] Table 3 displays our results with the polychotomous dependent variable and some additional controls.

‹Table 3›

Controlling for risk preferences, financial planning horizon, bequest motives, and subjective probabilities of retirement does not affect our core result. DC plan features of choice and/or financial education are correlated with what we read as increases in households' dexterity in managing non-pension wealth assets. As well, inclusion of variables thought of as being highly correlated with the underlying predisposition to save affect magnitudes for our key plan-feature variables of interest. Specifically we find the likelihood of households holding Risky assets in their portfolios continues to be highly positively correlated with attending financial education as well as having choice in DC plans. Our result shows education to be the greater contributor to increases both by way of the magnitude of coefficient and level of statistical significance (education is significant at the 1 percent level). Education reads to be even more important to generating Retirement asset holdings. Given the dynamic nature of the US labor market we believe this is an important and useful finding. Financial education tools which increase the propensity to transfer DC plan assets to tax preferred retirement savings accounts are important for both household and national savings. Outside of these two relatively large and significant results, overall, the multivariate environment attenuates the amplitude and reported precision of results, but not their general direction (sign). Regarding direction, while statistically insignificant it is interesting to note that the sign of estimates for plan features on holding our newly included Housing assets is negative.[12]

Current literature on portfolio choice has begun to think more carefully about illiquid assets such as housing. Housing is important for long run wealth generation, but it is unclear how households' view it in their portfolios. On the one hand drawing down

[11] The probability of being retired at age 65 is coded to be one minus the probability of work at age 62. Arguably the information included in the age 65 question is a more accurate estimate since more persons report exits by this age, but in this case we would face a case of perfect multi-collinearity. Estimates (even self-estimates) always carry a degree of vagueness, we suggest that the (1-'*work at age 62*') measure, being a lower bound on Pr(Retire |age 65), naturally affords for a degree of vagueness.

[12] In results not included here we ran the same estimation procedure with our original 3 asset classes. Results were entirely consistent with those reported here.

these assets appears to be hindered by some combination of factors (such as transaction costs, the lumpiness of the asset, psychological attachments, and its preferred legal status), relative to more liquid assets such as stocks. On the other hand housing wealth represents the single largest share of wealth for many older households.

Elsewhere a number of researchers have argued persuasively that the omission of housing assets may lead to bias in results due to correlations in the ownership of housing and risky assets (Table B1 reports this correlation as negative).[13] The main point we take away from work with this specification is that previous reported results are robust to the inclusion of housing assets (and the relaxation of the independence assumption regarding asset ownership decisions), this is good news for those who have ignored the asset class in work to date. We caution however that the extensive and intensive marginal dynamics may differ, and that the evolving markets for housing, mortgage-type assets, and long term care mean that this result may not hold for work with future data.

So far we have focused only on the extensive margin, which while important does not necessarily suggest that plan features contribute to overall higher levels of wealth (though Tables 1 and A1 suggest a positive relationship). Elsewhere, Berheim & Garret (2003) report a non-trivial impact of financial education on increasing the level of total savings. Private pension plans have been found to have a significant role in spurring savings, in pieces like Poterba, Venti and Wise, (1998) as well. A noted limit of previous work is the possibility for self-selection of workers across employers (plans) according to savings preferences. The idea that plan features are not drawn at random by workers making savings decisions motivates us to next employ a Propensity Score Estimator to consider the levels of wealth at retirement. This estimator literally scores worker characteristics placing workers into quasi-experimental and quasi-control groupings by matched characteristics (scores) to better control for possible endogeneity. Propensity Score Matching (PSM) estimators were previously used by Benjamin (2003), who considers whether eligibility for 401-k plans increased savings using data from the Survey of Income and Program Participation. We take some time to describe the PSM metod here for those who may be unfamiliar with it.

[13] See Cocco (2005) for a review of this literature.

Beginning from the experimental approach, ideally, to attribute changes in the household financial or total wealth directly to DC plan features we wish to observe:

$$Avg.\ Treatment\ Effect = E(Y_1|D=1) - E(Y_0|D=0),$$

where Y_1 is the outcome of interest for the set of households Y. In our case, Y_1 is total household wealth if the household is exposed to treatment while Y_0 denotes the assets held in household wealth if the selfsame households are not exposed. $D \in (1, 0)$ is our binary variable that indicates household exposure. With non-random data, the difficulty lies in that $\forall\, y_i \in Y$ we only observe either $(y_{i1}|D=1)$ or $(y_{-i0}|D=0)$ i.e. we either observe those that did attend financial education, or those that did not. Hence the need to construct a counter-factual, namely the total financial wealth the household would have had in the absence of the education or say choice $(y_{i0}|D=0)$. The technique of Propensity Score Matching (PSM), used in the program evaluation literature[14] has emerged as a way to perform this construction. Matching treated and non-treated households allows one to determine the net impact of financial education or choice on household's asset accumulation and allocation decisions. Rosenbaum & Rubin (1983) show that treated and untreated households matched on their propensity scores are balanced on their multivariate distribution of observed characteristics.

Given that propensity score are themselves unobserved we need to estimate $\hat{p}_i$. This is done using *Stata's* estimator which employs a logistic regression for estimating the propensity score, matches treated and non-treated households via this score, and reports the outcome of interest.

$$Propensity\ Score\ Estimator = p(X) = \Lambda(x'\beta)$$

$$\Lambda = \left(\frac{e^{x\beta}}{1+e^{x\beta}} \right)$$

We in particular value the independent development of this set of standardized PSM tools for sample balance procedures herein. As one can readily infer, PSM methods rely critically on sample balance procedures—estimates are only as good as the match will allow. Indeed, an important condition for the successful matching of treated and untreated observations is balance i.e. similar first and second moments of the

[14] For instance Heckman, Ichimura, &Todd (1997) look at the impact of job training programs on income.

distribution of the groups score, based on observed covariates. The recent development of systematic approaches to testing for balance potentially improves the objectivity of the method by taking the researcher away from score generation weighting procedures, and makes the method more consistent across work. The *Stata* estimation procedure employs a kernel matching based approach to compute average treatments. Standard errors are generated by boot strap, allowing consideration of statistical significance of treatment effects. See Leuven and Sianesi (2003, 2005) for further details on implementation of the estimation method.

Here our empirical focus is on households that retired between 2000 and 2002 – a time when many workers in our sample reached their normal retirement age of 65. We match our treated households, i.e. those that attended financial education, with those who did not based on the specification of observed pre-treatment variables that include: (1) age cohort, education, race; (2) marital status; (3) a binary indicator for dual earner couples; (4) DC plan, DB plan, and/or IRA plan participation; (5) our indicator for poor health; (6) preferences for risk; (7) financial planning horizon; (8) earnings, and (9) net household wealth (both financial and total). Given the number of households not exposed to the treatment were much larger than the ones with treatment we employ kernel matching. This weights our match so as to make the very best use of a relatively large non-treatment group (i.e. households from the non-treatment group that are closer, are accorded greater weight in the match). Our kernel estimator matched 278 financial education treated observations with 1,141 observations that were otherwise similar. With respect to choice the estimator matched 241 treated observations with 168 else wise comparable observations.

Table 4 reports results. Results again associate choice and financial education attendance with improvements in household's financial outcomes at retirement. We find increases in both the level of financial wealth, and in total net wealth excluding pension and social security wealth. Attending an educational seminar is associated with an increase in financial wealth by some $6,386. For total household wealth we find that financial education is associated with increases of total net wealth by $40,482. However, while magnitudes here are obviously meaningful, we cannot report these results as being statistically significant. Our investigation of choice as a plan feature affords stronger

results. Choice is associated with increases of $26,665 in financial wealth and $66,818 in total household wealth--this last, largest magnitude is reported as significant at the 1 percent level.

We note here that our estimates represent only a point-in-time cohort level observation of the impact of financial education and choice in pension plans and the level of savings. The period of focus for our work with the PSM technique, 2000-2002 was, by and large, one of rising home values and declining equity market values, inflation was relatively mild over this period (with the exceptions of energy and healthcare). While it remains unclear whether dynamics associated with these plan features would be similar under alternate market conditions, our work allows us to comment on how these plan features may interact over time as we discuss next in our summary and conclusion.

5 Summary and Conclusion

Saving for retirement has traditionally been couched in terms of a three legged stool, the first leg being individuals' private savings, the second being public old age pensions such as social security, and the third being employer pensions. The focus of our study has been to demonstrate the interaction between two of these legs, employer plans and private savings, specifically the impact of pension design on the composition and level of private non-pension savings. Our results suggest that both plan features are useful in improving financial management during the period of accumulation (as seen by our work with the probit on the extensive margin) and in improving financial outcomes at retirement (as seen by our work with the PSM estimator). Further our work highlights interactions. For, while choice is read to be more important for wealth outcomes, as Figure 1.C suggests this is likely due to skew in the distribution of impacts. Education is seen as being more important in balancing portfolios across all asset classes studied here, though here our work suggests that improvements come from lower sections of the wealth and earnings distributions. Our results with the multivariate probit suggest that a main driver in education related improvements is the establishment of IRA plans, important for preserving DC balances at the time of a job/career change. In general much of the parametric and semi-parametric estimation we perform adds nuance to the basic patterns found in the data reported in Table 1, and in Figure 1, suggesting

that further gains might be had if variants of the plan features we study were offered to an expanded population, perhaps especially the population with no employer plan.

Consistent with this, much of what we observe for the education plan feature is in keeping with Lusardi (2004) where education is seen to have fundamental (remedial) value. With respect to public pension holdings, the impact of plan design on investment choices and wealth outcomes has an important policy implication for public pension proposals aimed at creating individual accounts for workers. Individual account structures shifting risk to participants. We suggest that those with exposure to DC plans, and in particular to the specific features considered here are likely to better manage the opportunities arising form any reform of this sort. It follows that we recommend financial education be added to any future proposal, with some particular attention focused on those without previous exposure to financial markets.[15]

Research by financial economists on portfolio choice has underlined the disparity between theoretical lifecycle models of portfolio choice, which call for a high level of equity participation, and actual empirical data that indicate limited stock market participation. The view advanced in this paper is that the theory and empirics can be reconciled if we relax informational assumptions imposed on agents in the classical model. We contend that low levels of savings and under-diversified portfolios are correlated rather strongly with inexperience with financial instruments. Accordingly, employer programs which contribute to participation and to understanding are found to have positive impacts for savings outside of it.

[15] Among the proposals aimed at social security reform, one of the latest, the 2006 proposal provided for hundreds of billions of dollars to establish individual accounts. The proposed budget included funding necessary to establish voluntary carve-out accounts that would partially replace traditionally defined Social Security benefits, it did not specifically provide for educational offerings.

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Table 1: Summary Statistics

HRS Original Cohort (1931-1941)	All Groups		No Plan		Employer Sponsored Plan									
					DB Plan		DC Plan:		Education		Choice		Both	
	1992	2002	1992	2002	1992	2002	1992	2002	1992	2002	1992	2002	1992	2002
N	10,353	9,783	6,671	6,671	2,388	2,297	1,998	2,036	417	390	1,064	1,041	355	332
Average Age (years)	55.8	65.8	56.0	66.0	59.3	69.3	55.3	65.3	55.4	65.4	55.1	65.1	55.4	65.4
Basic Demographics (percent)														
Female	52.8		58.7		43.6		42.2		44.0		38.4		39.3	
White	78.7		81.6		80.3		84.7		86.7		88.0		90.0	
Black	21.3		14.6		17.5		12.8		11.8		9.1		8.3	
Hispanic	9.3		8.4		5.0		5.1		3.1		3.7		1.7	
Married	77.6		68.1		74.5		74.7		77.0		76.4		77.4	
Education (years)	12.0		11.5		13.2		13.2		14.1		13.7		14.1	
Terminal Degree: Bachelors (percent)	11.2		8.9		13.7		15.7		21.4		19.1		23.3	
Terminal Degree: HS Graduate (percent)	31.6		30.8		32.7		33.0		30.0		29.5		29.5	
Bequest Motive Intention (percent)														
Probably Leave a Bequest	31.7	-	29.9	-	35.5	-	35.3	-	42.7	-	37.4	-	44.8	-
Definitely Leave a Bequest	12.7	-	11.9	-	14.2	-	15.0	-	15.5	-	15.2	-	13.8	-
Income & Wealth (thousands of dollars)														
Earnings (conditional on work)	25.7	20.0	17.2	15.6	34.9	25.0	38.9	28.7	42.7	33.2	45.6	33.2	46.1	38.9
Total HH Wealth	315.0	331.1	302.7	295.5	299.0	337.3	375.2	442.7	435.4	459.3	445.1	545.3	446.8	487.5
Housing Wealth	89.1	88.2	81.9	79.5	94.1	95.9	107.1	108.0	110.6	119.4	123.4	119.2	113.4	118.4
Financial Wealth	87.6	105.8	77.1	76.1	94.1	126.3	114.7	180.3	136.2	161.2	140.5	251.2	143.8	178.2
Stock Wealth	43.7	61.6	35.0	35.9	50.4	81.5	64.5	123.9	82.2	98.4	78.7	183.8	85.4	113.8
Non Pension Assets (percent holding)														
Risky	29.8	33.6	23.2	23.5	41.1	40.3	40.5	39.7	51.8	47.0	50.6	50.2	57.4	55.6
Safe	85.9	87.0	82.6	83.7	92.7	93.2	93.1	93.9	96.5	96.5	95.4	96.3	97.7	97.0
Retirement	40.9	43.0	29.9	29.3	47.4	48.6	54.6	56.8	61.1	65.1	61.6	63.5	64.4	70.9
All Three Types	36.2	37.0	34.5	35.6	39.8	39.5	41.8	41.7	50.2	50.7	46.5	46.8	50.7	53.3
Risk Prefrences (percent)														
Relatively Risk Loving	13.6	14.0	16.3	14.4	9.0	11.6	10.1	15.5	8.7	25.0	10.3	17.4	7.4	30.2
Relatively Risk Loathing	65.1	62.6	63.9	61.9	67.3	64.9	66.7	62.1	71.2	56.3	66.4	58.2	72.1	54.0
Financial Planning Horizon (percent)														
1-10 years	89.7	90.4	90.5	91.0	87.9	90.7	88.9	88.1	89.1	85.8	88.3	89.2	90.0	87.1
10 years or more	10.3	9.6	9.5	9.0	12.1	9.3	11.1	11.9	10.9	14.2	11.8	10.8	10.0	12.9
Likelihood of working at age 65 (percent)	25.7	-	30.4	-	18.9	-	21.9	-	19.6	-	22.3	-	19.0	-
Bad Health (self-report: "fair" or "poor")	26.4	25.6	32.6	31.4	15.7	15.8	13.7	13.6	11.2	7.7	12.1	9.9	12.6	8.5

Table 2: Random Effects probit Specifications:

Ownership of Asset Class:	Safe		Risky		Retirement		Safe		Risky		Retirement	
	β	z-score	β	z-score	β	z-score	β	z-score	β	z-score	β	z-score
Pension Plan Participation												
Have a DB Plan	0.15	(2.92)***	0.19	(3.86)***	-0.08	(-0.8)	0.15	(2.94)***	0.19	(3.86)***	-0.07	(-0.78)
Have a DC Plan	0.25	(3.64)***	0.32	(5.08)***	0.20	(1.58)	0.25	(3.63)***	0.31	(5.02)***	0.19	(1.5)
Have an IRA	0.28	(6.36)***	0.22	(6.86)***	-		0.28	(6.35)***	0.22	(6.84)***	-	
Choice	-0.13	(-1.48)	0.13	(1.73)*	0.19	(1.3)	-		-		-	
Education in 1992	0.05	(0.67)	0.23	(3.72)***	0.32	(2.66)***	-		-		-	
Education in 2000	0.11	(0.31)	0.63	(2.25)**	0.35	(0.64)	-		-		-	
Both (Choice & Education)	-		-		-		-0.22	(-1.66)*	0.26	(2.31)**	0.30	(1.33)
Only Choice	-		-		-		-0.08	(-0.86)	0.19	(2.35)***	0.31	(1.92)*
Only Education	-		-		-		0.09	(1.15)	0.32	(4.55)***	0.49	(3.61)***
Income and Wealth (in $10,000)												
Income	0.02	(2.65)***	0.01	(2.38)***	0.03	(3.37)***	0.02	(2.65)***	0.01	(2.37)***	0.03	(3.32)***
Income ‹squared›	0.00	(-1.5)	0.00	(-0.98)	0.00	(-1.78)*	0.00	(-1.49)	0.00	(-0.99)	0.00	(-1.81)*
Wealth Segments:												
100k-250K	0.33	(7.56)***	0.66	(16.95)***	0.69	(8.54)***	0.33	(7.55)***	0.66	(16.94)***	0.69	(8.54)***
250-500k	0.47	(7.44)***	1.31	(26.13)***	1.29	(12.74)***	0.47	(7.43)***	1.31	(26.14)***	1.30	(12.75)***
500K plus	0.65	(8.3)***	1.72	(28.64)***	1.69	(14.82)***	0.65	(8.31)***	1.72	(28.65)***	1.69	(14.83)***
Age Cohort												
40-49	-0.05	(-0.28)	0.12	(0.6)	-0.19	(-0.56)	-0.05	(-0.27)	0.12	(0.6)	-0.21	(-0.61)
50-59	-0.05	(-0.21)	0.23	(1.01)	-0.15	(-0.38)	-0.04	(-0.19)	0.23	(1.03)	-0.18	(-0.45)
60-64	-0.04	(-0.15)	0.22	(0.78)	0.14	(0.28)	-0.03	(-0.12)	0.22	(0.8)	0.11	(0.23)
65+	-0.20	(-0.55)	0.02	(0.04)	-0.87	(-1.29)	-0.19	(-0.53)	0.02	(0.06)	-0.90	(-1.33)
Bad Health (fair or poor)	-0.02	(-0.29)	-0.07	(-1.36)	-0.23	(-2.14)**	-0.02	(-0.27)	-0.07	(-1.3)	-0.22	(-2.04)**
Married	0.08	(0.53)	-0.13	(-0.84)	0.68	(2.20)**	0.08	(0.53)	-0.13	(-0.83)	0.69	(2.37)***
Separated, Divorced, or Widowed	-0.01	(-0.07)	-0.20	(-1.22)	0.20	(0.62)	-0.01	(-0.08)	-0.19	(-1.2)	0.22	(0.71)
Female	-0.02	(-0.3)	0.08	(1.32)	0.07	(0.65)	-0.02	(-0.36)	0.07	(1.28)	0.07	(0.59)
White	0.44	(8.08)***	0.52	(8.04)***	0.54	(4.69)***	0.43	(8.06)***	0.52	(8.07)***	0.56	(4.81)***
Hispanic	-0.60	(-8.23)***	-0.78	(-7.52)***	-0.90	(-4.81)***	-0.60	(-8.24)***	-0.78	(-7.52)***	-0.91	(-4.81)***
Have a College Degree	0.13	(1.90)*	0.47	(7.91)***	0.37	(3.13)***	0.12	(1.83)*	0.47	(7.92)***	0.35	(3.03)***
Constant	0.51	(1.08)	-1.84	(-3.95)***	-4.79	(-5.24)***	0.53	(1.12)	-1.85	(-3.98)***	-4.84	(-5.31)***

Notes

N = 20,741. Statistical significnace: "***", "**", "*" convey significance at the 1, 5, and 10 percent levels, respectively.

Cohorts refers to Age Ranges in 1992. Ommitted categoris are: Wealth - "50-100 K"; Age Cohort -"30-39"; Marital Status: "Never Married."

Additional unreported controls include Job Tenure, Job Tenure Squared, Wave, Industry and Occupation Dummies

Table 3: Multivariate Probit with additional controls

Ownership of Asset Class:	Safe		Risky		Retirement		Housing	
	β	t-stat	β	t-stat	β	t-stat	β	t-stat
Pension Plan Participation								
Have a DB Plan	0.17	(3.1)***	0.12	(3.77)***	-0.09	(-1.55)	0.14	(2.34)***
Have a DC Plan	0.21	(2.9)***	0.17	(4.39)***	0.14	(-1.83)*	0.20	(2.63)***
Have an IRA	0.20	(4.01)***	0.33	(11.94)***	(-)		0.12	(2.26)
Have Choice & Education	-0.10	(-0.72)	0.12	(-1.74)*	0.03	(-0.19)	-0.03	(-0.24)
Have Only Choice	-0.07	(-0.72)	0.08	(-1.54)	0.02	(-0.17)	-0.08	(-0.8)
Have Only Education	0.13	(-1.58)	0.14	(3.4)***	0.23	(2.73)***	-0.12	(-1.6)
Income and Wealth (in $10,000)								
Income	0.02	(-1.45)	0.01	(-1.76)*	0.05	(3.41)***	0.00	(-0.08)
Income <squared>	0.00	(-0.86)	0.00	(-1.61)	0.00	(-1.38)	0.00	(-0.22)
Wealth Segments:								
100k-250K	0.32	(6.12)***	0.42	(12.44)***	0.44	(6.54)***	0.28	(4.69)***
250-500k	0.41	(5.37)***	0.86	(20.12)***	0.89	(10.87)***	0.28	(3.61)***
500K plus	0.52	(5.45)***	1.04	(20.59)***	1.06	(11.69)***	0.34	(3.75)***
Age Cohort								
40-49	-0.03	(-0.11)	0.10	(-0.69)	0.05	(-0.21)	0.27	(-1.2)
50-59	-0.04	(-0.14)	0.22	(-1.43)	0.04	(-0.13)	0.07	(-0.25)
60-64	0.02	(-0.07)	0.26	(-1.41)	0.22	(-0.63)	0.04	(-0.11)
65+	0.05	(-0.11)	0.17	(-0.64)	-4.25	(-0.1)	-0.45	(-1.05)
Bad Health (fair or poor)	0.01	(-0.17)	-0.10	(2.13)**	-0.15	(-1.6)	0.14	(-1.46)
Married	0.03	(-0.16)	-0.13	(-1.35)	-0.03	(-0.15)	0.59	(4.53)***
Separated, Divorced, Widowed	-0.10	(-0.6)	-0.19	(-1.78)*	-0.30	(-1.52)	-0.05	(-0.37)
Female	-0.02	(-0.23)	0.04	(-1.13)	0.08	(-1.03)	0.29	(4.31)***
White	0.41	(6.99)***	0.25	(5.76)***	0.07	(-0.93)	-0.08	(-1.02)
Hispanic	-0.43	(5.38)***	-0.43	(6.07)***	-0.36	(2.84)***	0.24	(-1.95)*
Have a College Degree	0.11	(-1.48)	0.21	(5.44)***	0.08	(-1.01)	-0.07	(-1.04)
Risk Prefrences								
Relatively Risk Loving	-0.13	(-1.68)*	0.08	(-1.63)	0.06	(-0.67)	-0.25	(3.14)***
Relatively Risk Loathing	0.06	(-1.03)	-0.07	(2.08)**	0.02	(-0.31)	0.05	(-0.87)
Financial Planning Horizon								
Less than 10 years	0.18	(2.96)***	0.03	(-0.79)	0.22	(2.52)***	0.25	(3.6)***
10 years or more	0.33	(3.21)***	0.13	(2.18)**	0.41	(3.56)***	0.16	(-1.63)
Bequest Motive (chance of leaving $10,000 or more)								
Probably	0.09	(-1.65)	0.02	(-0.51)	-0.07	(-1.26)	0.01	(-0.09)
Definitely	0.05	(-0.65)	0.07	(-1.74)*	-0.03	(-0.37)	-0.02	(-0.26)
Retirement Timing (Pr(.)>50 percent)								
Pr (Retire|age 65)	0.18	(3.64)***	0.03	(-1.18)	0.04	(-0.66)	0.10	(-1.85)*
Pr (Work|age 65)	-0.07	(-0.82)	-0.15	(2.57)***	-0.17	(-1.61)	-0.04	(-0.46)
Constant	0.33	-0.62	-1.33	(4.00)***	-3.50	(5.20)***	-0.28	-0.49

Notes:

N = 10, 385. Statistical significnace: "***", "**", "*" convey significance at the 1, 5, and 10 percent levels, respectively.

Additional unreported controls include Job Tenure, Job Tenure Squared, Time (Wave), Industry and Occupation Dummies

Table 4: Results from Propensity Score Matching Estimation Procedures

Financial Education	Treatment Group (278 Observations)	
Comparison Group (1,141 Observations)	Financial Wealth	Total Wealth
	$6,387 (1.61)	$40,482 (0.568)

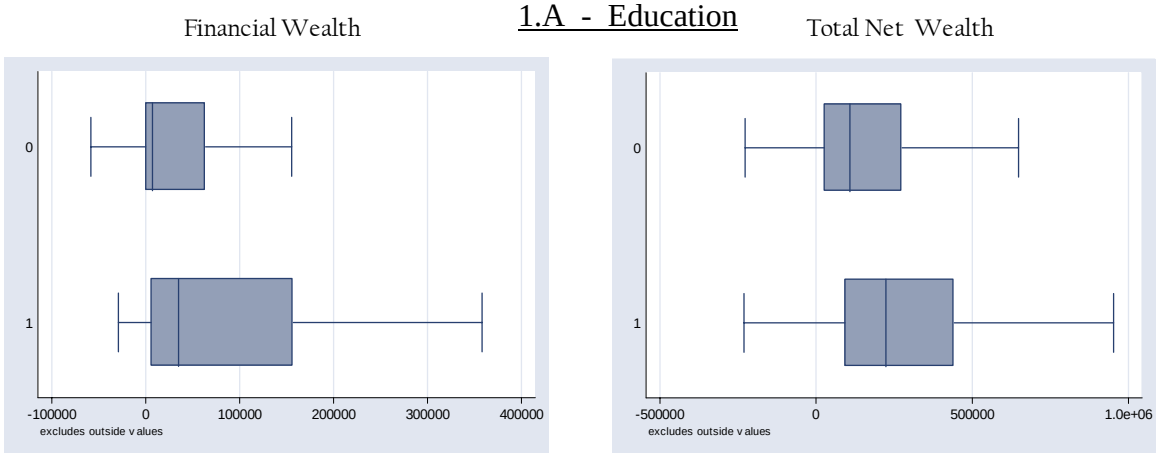
Choice	Treatment Group (241 Observations)	
Comparison Group (168 Observations)	Financial Wealth	Total Wealth
	$26,665 (0.64)	$66,818 (3.68)***

Note:

1. Propensity Score Matching specification is selected to balance covariates that included: age, participation in pension plan, have IRA, wealth quartile, income, income squared, age cohort, risk preferences, financial planning horizon, bequest motives, and subject retirement probabilities.
2. Treatment effect is computed using guassian kernel matching in STATA, t-statistics are computed using the bootstrap, reported significnace: "***", "**", "*" convey significance at the 1, 5, and 10 percent levels, respectively.

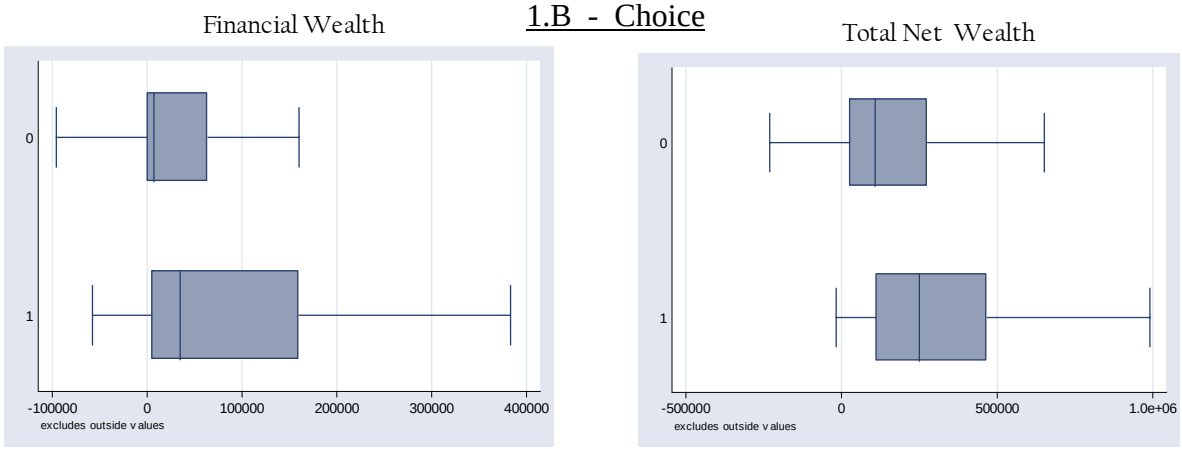
Figure 1: Plan Features and Wealth for Workers Retiring between the years 2000 and 2002

1.A - Education



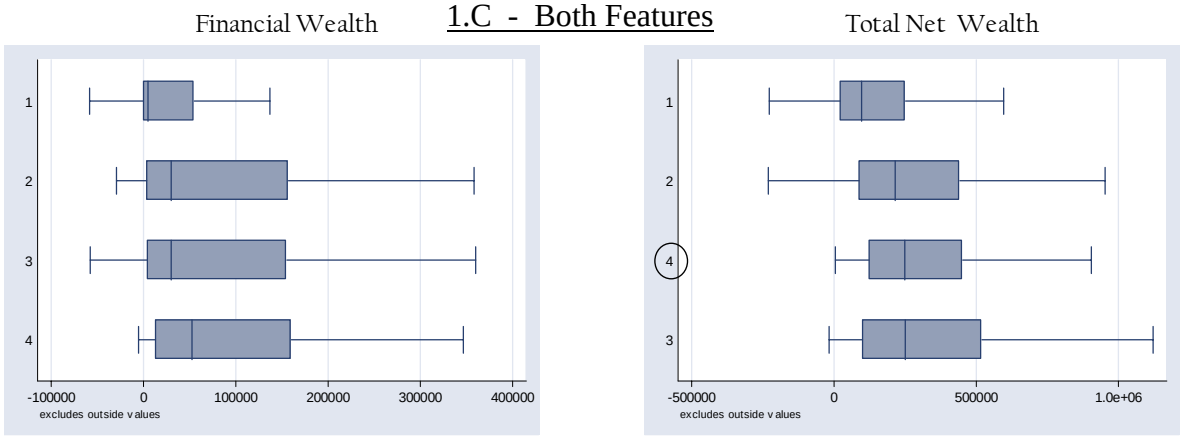
Legend: 0: Did Not Attend Any Financial Education, 1: Attended in 1992 or 2000

1.B - Choice



Legend: 0: Did Not Have Choice in Pension Plan 1: Have Choice in Plan

1.C - Both Features



Legend: 1: Neither Financial Education or Choice in Plan, 2: Financial Education only, 3: Choice only, 4: Both

APPENDIX A:

Table 1A provides cross-tabs that allow for estimation of the impacts of possibly important predictors of asset ownership {age, wealth, education, race, and gender}, reporting percentages of households holding each of three asset classes based on exposure to plan features and four dimensions of variation. For these cross tabs our sample universe was restricted to be households interviewed in all of the first six waves of the Health and Retirement Survey – that is surviving households from the original 1992 HRS cohort though 2002.

We note at the most general level that there is similarity among the percentages of subpopulations that reported attending some form of financial education and those reporting choice in DC plans; looking at risky asset ownership across the six waves, approximately 55 percent of the workers who attended financial education and 56 percent of those that reported asset allocation choices in DC plans directly held risky assets. Percentages holding other main asset classes here, are likewise within a few percentage points, {95, 96}, {68, 71} for education and choice in the safe, and retirement asset categories, respectively. Likewise differences in ownership for populations with versus without plan features are also very similar. However while broadly similar, relative impacts for financial education and asset allocation choices vary a good deal across and within each panel, {Age Cohort, Wealth Quartile, Education, Gender, and Race}.

Table 1A: Cross Tabs -- variation in ownership of asset classes by group

	Risky Assets Ownership				Safe Assets Ownership				Retirement Assets Ownership			
Plan Feature:	Education	None	Choice	None	Education	None	Choice	None	Education	None	Choice	None
All Households	55.4	41.7	56.2	42.2	95.0	86.7	95.5	87.0	67.7	50.0	70.3	50.5
Panel A: Age Cohort												
30-39	47.0	48.2	61.5	47.1	92.4	86.8	94.8	86.4	59.1	50.7	59.4	50.4
40-49	55.4	42.9	50.6	43.2	93.8	87.4	93.9	87.3	71.6	50.7	65.4	51.0
50-59	54.1	40.7	56.8	40.7	94.6	86.2	95.9	86.3	66.1	48.8	70.8	48.8
60-64	59.4	42.4	57.5	44.6	96.2	87.7	94.4	88.9	70.6	52.9	72.4	54.9
65+	54.6	48.2	43.9	49.4	96.1	88.7	90.9	90.0	70.6	54.3	71.2	56.8
Panel B: Wealth Quartile												
1st Quartile	27.0	16.6	28.0	16.8	92.6	86.0	93.2	86.2	46.4	30.9	52.2	30.8
2nd Quartile	46.2	35.7	51.0	35.6	96.4	94.7	96.6	94.8	68.1	52.9	70.3	53.5
3rd Quartile	69.0	57.7	69.5	58.8	97.7	96.9	98.2	96.9	79.0	65.1	80.4	66.3
4th Quartile	91.5	90.8	90.4	90.9	99.2	99.2	98.8	99.3	90.4	91.3	91.4	91.2
Panel C: Educational Attainment												
College Educated	63.0	61.2	68.0	60.3	96.9	95.9	97.7	95.9	75.3	69.2	81.0	68.5
HS Educated	54.0	44.0	53.5	44.6	95.1	91.4	95.5	91.5	65.8	54.7	68.1	55.0
Panel D: Race & Gender												
Male	56.1	44.9	59.2	45.0	95.3	88.2	95.9	88.5	68.3	53.0	72.9	53.1
Female	54.7	39.0	52.4	39.9	94.6	85.5	94.9	85.9	66.9	47.5	66.9	48.4
White and Non-Hispanic	59.0	44.6	58.0	45.4	96.6	90.4	96.6	90.7	71.8	54.2	72.9	54.8
Non-White, Non-Hispanic	37.4	31.4	45.5	31.2	86.7	73.5	87.7	74.1	45.8	35.1	52.6	35.2
Hispanic	23.1	27.4	32.7	27.0	89.2	69.0	93.7	68.9	41.9	32.2	49.3	32.0

This table reports percentages of households holding each of three asset classes based on exposure to plan features and four dimensions of variation.
Sample universe: households interviewed in all of the first six (1992 - 2002) waves of the Health and Retirement Survey.

APPENDIX B:

This Appendix provides the reader with information regarding the cross correlation of asset class holdings. Unsurprisingly most of the major asset categories are positively correlated with each other in statistically significant ways – suggesting that the assumption that alternatives are independent and therefore irrelevant is too strong. However, countering that result, for housing, both risky and safe assets appear to be negatively correlated with the ownership of housing assets. For this important case then we suggest that previous work which neglected considering housing wealth explicitly may be robust to the inclusion of housing assets (and the relaxation of the independence assumption regarding asset ownership decisions), this is good news for those who have ignored the asset class in work to date. We caution however that the extensive and intensive marginal dynamics may differ, and that the evolving markets for housing, mortgage-type assets, and long term care mean that this result may not hold for work with future data.

Table B1: asset class ownership correlations

	Safe	Risky	Retirement
Safe	1	-	-
Risky	0.11 (3.94)***	1	-
Retirement	0.04 (-0.84)	0.26 (7.65)**	1
Housing	-0.10 (-1.95)**	-0.13 (3.97)**	0.03 (-0.63)