HOW MORE CHOICES ARE DEMOTIVATING:

IMPACT OF MORE OPTIONS ON 401(K) INVESTMENT *

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ABSTRACT

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Prior psychological studies documented the *choice overload* phenomenon (i.e., more choice leads to decreased probability that individuals choose to choose) in experiments using small consumer products. This paper examines whether such phenomenon exists in a non-experimental setting of defined-contribution retirement savings. Using records of 401(k) participation and contribution allocation for nearly 800,000 eligible employees from Vanguard, we find that for every ten funds added to the choice menu, (i) the average employee's participation probability is lowered by about 2%; (ii) the contribution allocation to safe funds (money market and bond funds) is 5.4 percentage points higher; (iii) the contribution allocation to stock funds is 7-9 percentage points lower. Such evidence supports predictions of the choice overload hypothesis that more choices can de-motivate choosing and that under such conditions individuals may resort to simplifying decision-making heuristics.

1. INTRODUCTION AND MOTIVATION

Current retirement plan design reflects an expanded drive amongst employers to afford their employees to exercise more personal autonomy and control in the selection of their savings plans. Pensions, Defined Benefit (DB) plans, and other forms of retirement savings which require less individual involvement and offer a smaller array of choices are being replaced by defined contribution (DC) retirement savings plans, such as the 401(k) plans, which allow employees to choose whether or not to participate, to what extent to participate, and where to participate. This freedom and flexibility may explain the rapid expansion of the 401(k) franchise whose aggregate assets totaled $1.97 trillion in 2001 [Liang and Weisbenner, 2002]. Plan sponsors have responded to this demand for 401(k) plans by offering employees a larger and larger set of options. For instance, recently the social security reform in Sweden offered its citizens as much as 450 different fund-choices for directing a portion of their salaries to individual accounts [Benartzi and Thaler, 2001]. Similarly, in the United States, records from the Vanguard Center for Retirement Research show that Vanguard defined contribution plans as of 2001 offered an average of 15 investment options per plan with some plans offering up to 59 investment

options, whereas in 1998 the average was 12. Inherent in these practices of choice-set expansion is the presumption that with greater autonomy and self-determination, more employees will choose to participate, and those who do participate will contribute more by availing themselves of the greater variety accorded them.

Yet, recent statistics on 401(k) participation rates suggest that counter to expectations, this proliferation in choices has not resulted in further growth in 401(k) participation. For instance, a Hewitt Associates survey reports that participation in 401(k) plans dropped from 71 percent in 2001 to 68.2 percent of eligible workers at the end of 2002 [Washington Post, June 22, 2003], while the Vanguard Center for Retirement Research reports that for 2001, participation across all plans was 65 percent. This stagnation in 401(k) participation is occurring despite the presence of such incentives as employer match, income tax deferral, and increased potential for portfolio diversification. Our investigation endeavors to assess the nature of this paradox by exploring how the promotion of individuation in 401(k) planning may actually be inhibiting investor participation.

Researchers have already begun examining the effects of individual (employee) and plan level characteristics on 401(k) participation rates and contribution amounts [Huberman, Iyengar, and Jiang, 2003; Iyengar, Jiang, and Huberman, 2003; Papke, 2002; Munnel, Sunden, and Taylor, 2000; Kusko, Poterba, and Wilcox, 1998; Clark and Schieber, 1998; Papke, 1995]. Specifically, at the individual level, employee wealth, compensation, gender, age and tenure, and, at the plan level, employer-match rates, defined benefit plans, and the availability of company stock as an investment option, have all been observed to be significant predictors of 401(k) participation. Before now, though, researchers have not examined the consequences of participant direction and individual discretion on 401(k) investment.

One key difference between the 401(k) plan and other consumer markets is that 401(k) choosers are not afforded the potential advantages of "retail service," in the form of being able to readily seek opinions from sales personnel. Indeed, existing 401(k) education materials purposefully avoid recommending specific plans so as to escape ERISA[1] classification as investment advice [Mottola and Utkus 2003]. Consequently, amidst a large volume of available options and in the absence of investment

advice, 401(k) choosers must identify for themselves the option or set of options which best match their investment preferences.

This paper analyzes extensive records provided by the Vanguard Center for Retirement Research to examine the effect of the increasing number of options in 401(k) plans on individual participation and investment decisions (in terms of contribution allocation to various assets). Our findings indicate that these increasing numbers of options have the potential to affect both the probability that people participate in 401(k) plans and which funds receive investment allocations.

This paper proceeds as follows. Section 2 provides background research on the effects of adding choices on consumer decision making. Section 3 describes the archival data used in this investigation. Sections 4 and 5 provide results for the participation probability analysis and the contribution allocation analysis, respectively. Section 6 concludes with further observations.

2. CHOICE OVERLOAD: FROM CONSUMER PRODUCTS TO RETIREMENT SAVINGS

A rational theory of choice assumes that choosers are better off with more rather than fewer choices. After all, the provision of extensive choices allows choosers the ability to choose an option or set of options, which most match their choice-making preferences and goals. Such a theory assumes that the desire for choice is infinite as is the human ability to encode the distinct attributes of each choice, suggesting choosers can differentiate the trade offs associated with the choices comprising a given choice-set, and in turn, entrusting choosers with the ability to recognize their hierarchy of preferences. Accordingly, then, enlarging 401(k) investors' choice sets is expected to increase their abilities to identify their most preferred set of options, inducing them to participate and make better allocations in their 401(k) plans.

Results from a series of laboratory and field studies, however, challenge the assumption that choosers confronted by extensive choices are more likely to choose (Iyengar and Lepper, 2000). In fact, observations of supermarket shoppers show that though large displays are more attractive to customers,

smaller displays precipitate more purchasing. In one field study arranged at a gourmet grocery store, passing customers encountered a display featuring either six (limited choice) or twenty-four (extensive choice) different flavored jams. Sixty percent of the passers-by approached the table in the extensive-choice condition as compared to only 40% in the limited-choice condition. However, 30% of the customers with a limited selection purchased a jam as compared to only 3% of those offered an extensive selection. Follow-up studies using Godiva chocolates found that choosers facing a selection of 30 chocolates were less certain of their selections than choosers deciding from among 6 chocolates, suggesting that, contrary to the predictions of rational choice theory, adding choices may increase choosers' uncertainty of their preferences.

To what extent does this phenomenon of choice overload, exhibited in the non-consequential and relatively spontaneous choices of jams and chocolates, generalize to the more sober and potentially life-changing process of 401(k) selection? Normatively, the decision to invest in 401(k) plans should be unaffected by the number of options available, given that not participating forgoes employer match contributions and tax-deferred income, resulting in less retirement savings. However, the very fear of choosing a money losing option or even failing to recognize the most profitable option may render choosers unable to identify their preferences, inducing an aversion to choosing.

401(k) investors' uncertainties regarding their preferences may stem from an inability to process the mass of information which accompanies their additional options. Typically, enlarged 401(k) plans offer more options of stock funds, which contain a wealth of information on the return-risk profiles of particular classes of stocks. Given that humans are unable to attend to and encode more than approximately seven +/- two chunks of information at any given moment, choosers' attempts to process such an influx of information may result in information overload and inability to recall the attributes associated with each of their options [Miller, 1956, Scammon, 1977]. Consequently, though choosers may value access to more options and even more information about those options, they are not necessarily capable of processing or utilizing their additional information when making investment decisions.

Preference uncertainty is further exacerbated when choosers are confronted by a set of options among which they cannot elucidate differences. Although, among bond funds, such a task is relatively simple in that choosers need only examine yields and duration of bonds, the process of choosing among stock funds is much more detailed. Not only must choosers encode each fund's asset class, such as large cap versus small cap, or growth versus value funds, but they must also account for possible trade-offs regarding risk versus return, and immediate satisfaction versus possible future discomfort [Tversky and Shafir 1992]. Decision-conflict emerges when the differences and trade-offs among these options is perceived to be small, yet the overall choice set is large and presented simultaneously rather than sequentially. It follows then, that when 401(k) planners present their participants with pamphlets containing all available options simultaneously, they may actually be increasing choosers' decision conflicts by testing the limits of their cognitive capacities to differentiate between many acceptable, but no clearly dominant choices.

Given the human cognitive limitations for managing an abundance of information within 401(k) plans, prospective participants are expected to encounter decision uncertainty as the number of options rises. In order to resolve this decision conflict, 401(k) participants may choose not to choose, and in doing so forego the benefits of employer match and tax deferral, or they may decide to postpone decision-making by investing in money markets, which allow employees to retain their employer match contributions while deciding between other investment options later [Iyengar and Lepper, 2000; Tversky and Shafir, 1992]. A third option to which conflicted choosers may turn is extremeness aversion, that is, they will choose some criteria or attribute by which to judge the various alternatives within an offered set, such that the options with extreme values become relatively less attractive than options with intermediate values [Shafir et al., 1993]. When perusing the typical 401(k) pamphlet, choosers see options listed in order of risk levels with money market funds – the least risky option – appearing at the top of the list and company stock – the most risky option – appearing at the bottom. In this case, wherein the most salient attribute by which participants may make judgments is in the form of risk level, extremeness averse

choosers are likely to select moderately risky options positioned intermediately in the list, that is, bond funds.

The following study tests two predictions: The first posits that increasing 401(k) options will be associated with decrements in 401(k) participation probabilities. The second prediction goes beyond questions of participation (immediate choice, affirmative or negative decision-making) to propose that increasing fund options may influence where participants allocate their contributions. Specifically, a greater number of options are predicted to increase the probability that investors would be more inclined to choosing safe assets like money markets and bond funds over risky assets, such as equities.

When employees are faced with ever increasing numbers of choices, why is there an increasing probability that they will choose not to invest in 401(k) pension plans or choose to invest more in conservative assets? Perhaps 401(k) choosers are daunted by not just the number of options but also by the expertise that they think they must develop about these options in order to make effective choice comparisons and management decisions regarding participation and allocations [Bettman, Johnson, Luce, and Payne, 1993]. The ability to distinguish between "money market funds" and "stable value funds" or "small cap value stock funds" may make all the difference in how confident an investor will feel in her own decision making, and notably, risky options require more information than safe or familiar assets. It follows that acquiring a functional investment vocabulary incurs both time and effort costs such that, what we witness is a manifestation of choosers' desire to either procrastinate or employ some form of simplifying heuristic, such as choosing a safe asset.

Indeed, employees who chose not to invest in their 401(k) or otherwise chose to invest predominantly in money market accounts are possible examples of procrastinators. That is, they did not consciously decide to forego their retirement savings (and thereby to reduce growth in their savings accounts), instead, they may have simply chosen to choose a delay option that enabled them to defer making a choice involving substantial commitment. Prior research has already posited the notion that increasing the complexity of a decision-making task leads to procrastination [Tversky and Shafir 1992; Shafir, Simonson, and Tversky 1993]. Alternatively, investors may choose deferring-options, such as

money market funds, associated with less information, less risk, and less uncertainty, in order to gain the instantaneous gratification of decisive action without undergoing the psychological taxation of deciding between more complicated, although potentially more rewarding, options [Laibson, Repetto, and Tobacman, 1998].

3. DATA AND OVERVIEW

This analysis relies on the archival data provided by Vanguard Group on records of eligible employees (including those who choose to not participate) in 647 defined contribution (DC) pension plans, mainly 401(k) plans. Data is retrieved at the end of the calendar year 2001, spanning 69 SIC two-digit industries and close to 800,000 eligible employees. Furthermore, given the nuance and detail to which the Vanguard Group has conducted its polling, this archival data constitutes both a broad and comprehensive record of 401(k) practices in addition to individual information regarding compensation, wealth, gender, age, tenure, and the type of company for which an employee works. Vanguard's data boasts a wide variety of demographics and policies, enabling us to identify the effects of specific attributes via regression analyses. We begin by summarizing the data, then identifying our key variables and the main control variables that we used in our analyses.

This paper analyzes how the number of available choices may affect participation and contribution allocation; therefore, the samples polled for each analysis are necessarily different. The participation analysis draws on 793,794 records of eligible employees (including voluntary non-participants) from an original sample of 926,104 subjects. The sample selection criteria are as follows: 1) All qualifying subjects had to have been employed for the whole year of 2001. 2) Each subject had to be at least 18 years old. 3) The annual compensation for each subject had to be between $10,000 and $1 million. We define participation as a positive contribution by the employee (excluding employer contribution) for the year 2001, resulting in an all-sample participation rate of 70.8%, comparable to but slightly lower than the 1998 Survey of Consumer Finance report that 72% of all eligible employees chose

to participate in 401(k) plans. Among participants, individual contribution amounts ranged from zero to $10,500 (or 25% of annual compensation), the statutory maximum in 2001.

In contrast to the participation analysis, the contribution allocation analysis uses only records of those employees who chose to participate in 401(k) plans. We further had to reduce the sample set because four plans (with 34,206 participants) did not provide information about asset allocation by individuals and are accordingly excluded. The final sample for contribution allocation analysis contains 527,800 observations in 643 plans.

In determining how choice operates within the 401(k) paradigm, it is important to note that some key questions employees face are whether or not to contribute to a plan, under what terms to contribute, or at what deferral rate to specify contribution. A typical plan will ask employees to specify their deferral rates at the beginning of the year, and, once again, the maximum contribution allowed in 2001 was either $10,500, or 25% of compensation for those with incomes under $42,000. The mean deferral rate was 5.2%, and 12% of the participants contributed the maximum. The majority of those employees earning $30,000 or above participated, with the majority of employees who earned above $130,000 contributing the maximum.

More importantly, the Vanguard records include information about plan policies, including the presence of defined benefit (DB) plans, the number of investable funds available, employer matching schedule (match range and match rate), the presence of company stock as an investment option, and whether the employer's contribution is in cash (discretionary match) or in company stock (restrictive match), and if the latter, then what restrictions on investment diversification are in place. The numbers indicate the range of choices subjects have at their disposal. Of the 647 plans in the sample, 124 (covering 58% of the sample employees) have own-company stock as an investment option, among which 47 plans match employee contribution with company stock only. 216 plans (covering 67% of the employees in the sample) offer defined-benefit options in addition to the defined contribution plan studied here.

To review, the purpose of our investigation is to examine how the number of choices offered to employees affects their participation and contribution allocation decisions. We isolate the following dependent variables: (i) A dummy variable (*PART*) equal to one if the employee is a DC pension plan participant in 2001, and zero otherwise; (ii) The percent of year 2001 contribution that goes to "safe" assets, namely money market and/or bond funds (*MM%* and *MM_BOND%*), and a dummy variable equal to one if the safe assets constitute 50% or more of the employee's current year contribution (*MM50* and *MM_BOND50*); (iii) The percent of year 2001 contribution that goes to equity funds (*EQ%*) where we examine both equity funds allocation including and excluding company stock, and, alternatively, a dummy variable (*EQ_PART*) equal to one if the participant contributes any positive amount to equity funds in 2001 (including or excluding company stock), and zero otherwise.

The key independent variable for this study is the number of funds offered by a plan, which ranges from 2 to 59 for plans in the sample. Clearly, the amount of choice presented to each individual is potentially overwhelming. The median number of funds per plan is 13, 90% of all plans offer between 6 and 22 fund choices, and 18 plans offer 30 options or more. Once the decision to participate is made, the question of how to allocate the contributions remains.

Participation can, of course, be affected by many other factors, and the control variables used for the model include both individual attributes and plan policies and attributes. Individual attributes include annual compensation (*COMP*), for which the median annual income was $47,430 (the mean was $67,150); the average wealth of the 9-digit zip-neighborhood the employee lives in (*WEALTH*);[2] gender dummy (*FEMALE*); age (*AGE*); and tenure (*TENURE*, in years) with the current employer. Of note is that 63% of the sample set is male and the mean age is 43.

Plan policy variables include the average employer match rate (*MATCH*, in percentage points) for the first 2% salary and for the first 5% salary; a dummy variable (*COMPSTK*) equal to one if company stock is among the fund choices; and a dummy variable (*DB*) equal to one if a defined benefit (DB) plan is also present. Plan attributes variables include the percentage of participants using web access (*WEB*), a variable proxy for the average education level (or technological sophistication) of the plan, and the log

number of employees in the plan (*NEMPLOY*), which serves as proxy for the size of the plan. Lastly, all regressions in this paper also control for the plan-level average of personal attributes (i.e., compensation, wealth, age, tenure, and gender composition). Table 1 reports the summary statistics of the main variables used in this paper.

4. CHOICES AND PARTICIPATION IN 401(K) PLANS

The results from the participation analysis lend support to the choice overload hypothesis. Essentially, employee participation in defined-contribution retirement savings plans decreases in relation to the increase of fund options, after controlling for other plan-level policies as well as personal attributes. In terms of predicted participation probability, the effect of options is significant. In fact, employees in plans that offer five funds have a predicted participation probability of 72%. When the number of funds in the plan increases to 35, however, the predicted participation probability drops to 67.5%. Within the entire population, the predicted individual participation probability declines by about 2% for every 10-option increase. Thus as evidenced below, a surplus of choices can increase the likelihood of 401(k) investors *choosing not to choose*.

In performing the analysis, we conduct a regression that targets the effect of number of funds on employee participation decision:

$$PART_{i,j} = \beta_0 + \beta_1 X_{i,j} + \beta_2 Z_{1j} + \beta_3 Z_{2j} + \gamma NFUNDS_j + \delta_j + \varepsilon_{i,j}, \quad (1)$$

for which we denote *i* and *j* as subscripts representing individuals and plans respectively. Our regression employs three vectors of regressors: 1) The vector of individual-specific attributes is $X_{i,j}$ = {*COMP, WEALTH, FEMALE, AGE, TENURE*}, including in this model also the quadratic terms *AGE* and *TENURE*. 2) The next regressor vector, Z_{1j} = {*MATCH, COMPSTK, DB, WEB, NEMPLOY*}, denotes plan policies and attributes, with *MATCH* calculated as the average match rate for the first 2% of employee salaries. Understandably, this marginal match rate (at initial levels of contribution) is an

incentive for employees to participate in a 401(k) plan. 3) Z_{2j} is the vector of plan-average of individual attributes.

Plan average variables (Z_{2j}) are included in the regressions to account for the possible endogeneity of plan policies in response to the *aggregate* characteristics and behavior of people within the plan. This addresses the "ecological" problem initially analyzed by Freedman (2001).[3] In general, plan policies (including number of funds) could be formulated in response to plan aggregate characteristics and demands. Therefore, the plan average variables (Z_{2j}) serves as instruments for this potential endogeneity so that we can identify how the number of choices affects *individual* participation decision after filtering out the impacts from the plan aggregate attributes [see Chamberlain, 1985 for a detailed discussion].

Since we have individual (employee) level data that belong to groups (plans), the error disturbance for our regression consists of two parts: a plan-level random effect (δ_j) as well as an individual disturbance ($\varepsilon_{i,j}$). Both terms are assumed to be uncorrelated with the regressors in (1), and δ_j and $\varepsilon_{i,j}$ are assumed to be uncorrelated with each other. We are effectively assuming a random effect model,[4] that is, any missing variables about plan attributes are assumed to be uncorrelated with our regressors, and most importantly, to be uncorrelated with *NFUNDS*. Because estimated residuals ($\widehat{\delta_j + \varepsilon_{i,j}}$) from the same plan are potentially correlated, all standard errors reported in this paper adjust for arbitrary correlation clustered by plans. With such adjustment, the "effective" sample size for coefficients on plan-level variables is 647, or the number of plans [see Wooldridge, 2003 for a discussion].

As shown in Table 2, our estimates of (1) use both the linear probability model (columns 1 and 2) and the Probit model (columns 3 and 4). *COMP* and *WEALTH* are expressed as logarithms (since both variables are close to being log-normal) in columns 1 and 3. In columns 2 and 4, *COMP* is expressed in multiples of $10,000, and *WEALTH* is expressed as the IXI rank from 1 to 24 (see note 2). Columns 3

and 4 report both Probit coefficient estimates and the marginal probabilities for the regression. Finally, all standard errors adjust for heteroskedasticity and within-cluster correlation clustered by plans using the Huber (1967)-type sandwich variance-covariance matrices.[5]

No matter which of the four specifications is used, the results remain consistent with our predictions that more choices are associated with lower 401(k) participation probability. Indeed, across the specifications, the coefficient estimates of our key interest, $\hat{\gamma}$, are rather stable at about 0.23 to 0.25. Thus, we find that other things constant, every ten funds added to a plan is associated with an about 2% reduction in the probability of individual participation, and this magnitude is statistically different from zero at less than 5% level.

As a robustness check, we also consider the participation regression at the plan level. In parallel to individual participation equation (1), the plan-level participation can be expressed as:

$$P_j = F\left(\beta_0 + \beta_1 Z_{1j} + \beta_2 Z_{2j} + \gamma NFUNDS_j\right) + \delta_j, \tag{2}$$

where P_j is the participation rate of plan j, Z_{1j} and Z_{2j} are defined as in (1), and δ_j is a random disturbance that is uncorrelated across plans. In particular, we adopt the Amemiya (1985) "normit" method[6] on group proportions data where $F(\bullet)$ is assumed to be the normal distribution so that the estimate $\hat{\gamma}$ from (2) should be comparable to the probit estimates from (1). In fact, the coefficient estimate $\hat{\gamma}$ from the plan level regression is –0.77 (standard error = 0.33), implying a marginal probability (by setting all independent variables at their respective mean levels) of –0.21. Both the coefficients and the level of significance are very consistent with the inference from the individual probit regression.

The coefficient estimate $\hat{\gamma}$ in (1), which gave the average effect of number of choices on individual participation, cannot identify the exact shape of the relation between the two given its assumed linearity. Therefore, in order to chart the path along which participation probability drops as number of

funds increases, we leave the function of participation versus number of choices unspecified and estimate the function *f(.)* in the following semiparametric specification using Robinson's [1988] method:

(3) $$PART_{i,j} = \beta_0 + \beta_1 X_{i,j} + \beta_2 Z_j + f(NFUNDS_j) + \varepsilon_{i,j}, \text{ where } \varepsilon_{i,j} = \varepsilon'_{i,j} + \delta_j,$$

where $X_{i,j}$ and Z_j are the same as in equation (3). Subsequent estimation entails two steps. First, we group data by employees who face the number of fund choices within a kernel bandwidth (each group could contain multiple plans), and all variables in (3) except *NFUNDS* are expressed as deviation from the group mean. The coefficients for $\hat{\beta}$ are then obtained by a linear regression using the demeaned data. Second, $f(NFUNDS_j)$ can be estimated by doing a nonparametric kernel regression of $\widetilde{PART}_{i,j}$ on $NFUNDS_j$, where $\widetilde{PART}_{i,j}$ is the residual imputed from the first-stage estimates:

(4) $$\widetilde{PART}_{i,j} = PART_{i,j} - \hat{\beta}_0 + \hat{\beta}_1 X_{i,j} + \hat{\beta}_2 Z_j.$$

The resulting function $\hat{f}(NFUNDS_j)$ (setting all other variables at their mean values) and its 95% confidence intervals, plotted in Figure 1, can then be used to effectively predict the interaction between option increase and participation inclination.

Indeed, the resulting estimates reinforce the choice overload hypothesis over a range of increment intervals. The predicted participation probability of an "average" employee (i.e., an employee who has average personal attributes and who belongs to a plan with average plan attributes) drops from 75% to 70% when the number of fund choices increases from 2 to 11. When the number of fund choices is between 11 and 30, the predicted participation probability is relatively constant. Then, although sparse observations make estimates less reliable (wide confidence intervals) as the number of fund choices goes beyond 30, there is a resumed downward trend of predicted participation probability.

5. CHOICE AND CONTRIBUTION ALLOCATION

For those employees who are not deterred from investing in 401(k) plans, does the size of the choice-set alter the way they allocate their contributions? The following analysis focuses on the potential

differences between decision-making heuristics for those confronted by a wide range of fund choices as compared to those facing fewer options. Recall our prediction that as 401(k) fund options proliferate, employees may refrain from choosing high-risk assets such as equity funds, opting instead for low-risk assets (bond funds) or those assets that would allow them to defer making a choice without forgoing their benefits (money market funds). Indeed, for every 10 funds added to a plan, there is a 5.4 percentage point increase in allocation to money markets and bond funds. In contrast, the proportion of a participant's contribution to equity funds is expected to drop by 7.1-8.9% per 10-fund interval. Thus, as illustrated below, increasing the number of 401(k) fund options may lead participants to opt for safe assets and *choice-postponing choices*.

Specifically, the Vanguard archival data provides information on how individuals allocate their total annual 401(k) contribution (including both employee and employer match) into six different categories: money market funds, bond funds, balanced funds, active stock funds, indexed stock funds, company stock funds, and other (mainly non-marketable securities). We tested the prediction that as the number of funds increased, investors would be more likely to contribute to safe assets such as money markets and bond funds, which amongst all funds categories are the safest and involve relatively simple investment instruments (especially money market funds).

We implemented controls ensuring that employer-restrictive matching in company stocks would not drive the regression results. Essentially, for no-match and cash-match plans, the allocation of total contribution can be viewed as solely reflective of the employees' desired allocation. However, the nature of restrictive-match plans further complicates the analysis given the possibility that employers' contribution in company stocks may exceed the employees' desired investment in their own company stock, potentially skewing the allocation. 539 out of 643 plans for which we have allocation information offer employer match. Among these plans, 489 (including 75 plans that have company stock as an investable option) have the employers match in cash, which employees can then allocate at their own discretion, while the remaining 50 plans offer restricted-match in company stocks.

In order to control for employer match interference while still keeping the variables used in Table 2, we added *MATCHINCOMP* to the contribution allocation analysis. *MATCHINCOMP* is constructed as the product of match rate (*MATCH*) and a dummy variable equal to one if the employer match is restricted to company stock. Furthermore, although match rate at initial level of contribution is more relevant for the incentive to participate, for the contribution analysis we calculated the *MATCH* variable as the average match rate for the first 5% salary, instead of the first 2% as used earlier. Given that the average savings rate of our sample is about 5.1%, and most plans stop match at 5-6% of employee salary, the average match rate for the first 5% is a reasonable measure of employer-match generosity.

The dependent variable in our contribution analysis, percentage allocation to a fund category (such as money market funds) is bounded between 0 and 100%, so we cannot use the regular linear regression (where the predicted values of the dependent variable could go outside of 0 and 100%), and instead we turn to censored regressions as the alternate tools for estimation. Furthermore, given that the dependent variable's distribution is both bimodal and highly skewed with a large proportion of participant contribution lying at extremes of either 0 or 100%, using a censored normal regression (two-sided Tobit) for the underlying model would likely lead to misspecification. Accordingly, we instead follow the Powell [1984] Censored Least Absolute Deviation (CLAD) method, which is consistent under both heteroskedasticity and non-normality.

Consequently, we employ the following regression specification:

$$(5) \qquad Y_{i,j} = \beta_0 + \beta_1 X_{i,j} + \beta_2 Z_j + \gamma NFUNDS_j + \varpi_{ij}, \text{ where } \varpi_{ij} = \delta_j + \varepsilon_{i,j},$$

where $Y_{i,j}$ is the percentage of individual contribution allocated to certain fund categories and is bounded between [0,100%]. Coefficient estimates in (5) are obtainable by the identifying condition: $Quantile_\theta(\varpi_{ij}) = 0$, when θ is set to be the quantile of the mean value of $Y_{i,j}$ to accommodate for skewness and to extract maximum information from data in the censored region. This estimation involves an alternation (till convergence) between a regular quantile regression and the deletion of observations whose predicted $\hat{Y}_{i,j}$ falls outside of (0, 100%).[7]

Indeed, when confronted by an increasing array of fund options, investors may delay decision-making to some future time by provisionally allocating large amounts of contribution to money markets. The results of our four regressions, as shown in Table 3, support this prediction. Column 1 indicates that the dependent variable represents the percentage of total contribution to money market funds with the mean allocation being 15.9%. With other things equal, for every 10 funds added to a plan, there will be a 3.9 percentage-point increase in contribution allocation to money market funds as the growth of 401(k) plan options induces investors to seek out a "choice-postponing" choice. Although the magnitude of allocation increase is considerable, it fails to reach conventional significance levels (t-statistic = 1.60). In column 2, we replace the dependent variable with a dummy variable equal to 1 if a participant engages in the extremely conservative strategy of allocating 50% or more of their contribution to money market funds. As shown in Table 3, results suggest that every ten funds increase will increase the probability of engaging in such conservative allocation by 1.7% (out of an all sample average of 15.1%), and that the magnitude is significantly different from zero at the 5% level.

In fact, if one considers money markets and bond funds as both being safe assets, then the findings are even more compelling when the two are regarded in combination as mutually reinforcing alternatives. Building upon the analysis conducted in columns 1 and 2, columns 3 and 4 investigate contribution allocation to money market and bond funds together instead of investment to money market funds alone. The mean allocation to money market and bond funds is 23.7%. Extrapolating these results suggests that every 10 additional funds is associated with an increase of 5.4 percentage points more allocation in these two categories, and an increase of 3.6% in probability (out of an all sample probability of 19.3%) that the participant will invest 50% or more of her contribution in the two safe categories. Both magnitudes are significantly different from zero at the 1% level.

But does an increase in fund choices necessarily lead to a corresponding decline of investment in more risky options, such as equities?[8] A priori, it is expected that equity investment will be affected by the presence of company stocks as well as employer matching policy. Consequently, we try to separate the effects of company stock in the specifications reported in Table 4. First, there is controversy in the

savings literature on whether employees treat investment in their own company stock as part of their equity investment, or as a separate account. From a portfolio investment perspective, company stock is part of the equity investment. However, according to the mental accounting hypothesis [Shefrin and Thaler, 1992; Thaler, 1999], investors may view company stock as a separate investment category from the non-company stocks.

Second, investment in equity funds (both including and excluding company stock) may be affected by employers' restrictive matches. Suppose an employer's restricted match exceeds an employee's desired allocation in company stock. The employee may then reduce investments in *other* equity funds. To avoid the spill-over from company stock and restricted match, we either exclude company stocks from both total contribution and allocation in equity funds (Columns 1 and 3), or use a sub-sample, which excludes plans where employers offer matches restricted to company stock (Columns 2 and 4). Accordingly, the control variable used in Table 3, *MATCHINCOMP*, drops out in Table 4.

Results suggest a correlation between a rising number of fund options and the decline in likelihood of equity-fund investment. The dependent variables in columns 1 and 2 are participants' percentage of contributions to equity funds, where the average is 61%. As the number of funds offered per plan increases, this percentage is expected to drop. In columns 3 and 4, the dependent variable is a dummy variable equal to one if the participant contributes any positive amount to equity funds. The all-sample probability is 78-80% (depending on whether a company stock fund is counted as an equity fund). As predicted, we observe a negative relationship between number of funds offered and contribution allocation to equity. Specifically, for every 10 funds added to a plan's menu, contribution allocation to equity funds decreases 7.1-8.9 percentage points, an amount both economically and statistically significant (at the 2.5% level). Moreover, the probability that an individual contributes anything at all to equity funds also decreases by 3.1-4.6%, significantly different from zero at the 5% level.

The number of equity funds tends to go up more than proportionately as plans offer more fund options. That is, when a plan offers more choices, the incremental choices are more likely to be equity funds than other types. For example, the average proportion of equity funds (excluding company stock)

out of total funds options is 53% for plans that offer 10 or fewer investment options, is 55% for plans offering between 11 and 20 funds; the same number increases to 64% and 70% for plans that offer between 21 and 30 options and those offering more than 30 funds. Therefore, the results in Table 4 could imply that both the percentage of allocation to equity funds and the probability of investing in equity funds *decrease* with the number of *equity* funds offered. In fact, if we replace *NFUNDS* in Table 4 with the number of equity funds offered, we obtain negative coefficients with a similar level of significance. Thus, the observation that raising the number of funds increases contributions to money market and bond funds, and that the number of equity funds leads to decreasing contributions to equities lend support to the choice-overload hypothesis.

It is possible that the popularity of bond and money market funds may not simply be attributable to their inherent characteristics (low risk and simple pay-off structure), but rather their positioning in Vanguard's choice display. Vanguard typically lists its options in order of risk, with least risky options listed first. As the number of options listed increased, investors may have been unwilling to commit the effort required for a progressive evaluation of each and every option, instead investors choose money market and bond funds because of their more salient position relative to stock funds. Consequently, we cannot disentangle the "safe asset effect" from the "list position effect."

Another limitation of this empirical analysis is that it does not enable us to draw any conclusions about the effect of the choice-set on the way in which individuals allocate their investments over time. The investigation was conducted on one cross-sectional data-set retrieved at year 2001 and does not allow for assessments of how extensive choices may affect 401(k) decisions over time. Furthermore, we have only the number of choices offered in our study year, while it is possible that actual participation and allocation decisions could have been made years in advance (e.g., when the subject first participated) when the choice-set size was different. It is possible that participants – having made their retirement savings decisions beforehand – are susceptible to the status quo bias, and as a result may not adjust their initial specifications as the choice-set evolves [Madrian and Shea, 2001; Agnew, et al, 2003]. Clearly, future research would benefit from an analysis on a longitudinal data set.

6. CONCLUDING REMARKS

This empirical investigation suggests that the expansion of choice-sets can have considerable economic consequences. In particular, it affects whether people choose to save for their retirements and how they will direct their retirement savings. This paper has documented two significant consequences of option proliferation on 401(k) savings behavior. Firstly, as predicted, when offered extensively increasing numbers of fund options by their 401(k) plans, employees were more likely to choose not to choose. Specifically, for every 10-option increase, predicted individual participation probability declined by about 2%. Secondly, in cases where option proliferation did not inhibit employees from participating in 401(k) plans, participants' investment decisions were still affected by the expanded choice selection. Results suggest that every ten-fund increase led to a greater proportion of contribution to less risky funds like money market funds and bond funds by 5.4 percentage points, and allocation to the more risky equity funds decreased by 7.1-8.9 percentage points.

Arguably, for some people providing extensive choices leads to suboptimal choosing behavior. The expected value of choosing any randomly selected fund option would be higher than the values associated with not choosing (given the tax deferral and employer match). Consequently, for some, restricting the choice set, rather than expanding it, would result in greater utility maximization in the form of greater 401(k) participation rates.

As their number of options rose, 401(k) plan participants were more likely to invest in money market and bond funds as opposed to equity funds. This is consistent with Simon's theory of bounded rationality which states that an "organism may make its choice within a set of alternatives more limited than the whole range objectively available to it." [Simon, 1955] Accordingly, 401(k) participants may practice satisficing in that they simply stopped exploring their choices once they found a set of satisfactory options.

Invariably, when choosers satisfice by selecting the first subset of options which match their goals, they reduce their choice set, and in doing so, ignore some options altogether [Samuelson and

Zeckhauser, 1988]. In such cases, default options assume an asymmetric position in the decision-making process relative to other options, and consequently, are more likely to be chosen by a broader spectrum of investors. Specifically, 401(k) investors, confronted by the complexity of extensive choices, may resort to this type of simplifying heuristic [Choi, Laibson, Madrian, and Metrick, 2001]. Thus, as options proliferate, and the distinctions between them become more obscure, choice set restriction may necessarily favor familiar options, potentially leading to greater investment in safe assets and less portfolio diversification [Huberman, 2001].

From a policy perspective, there may be two goals: 1) To induce greater 401(k) participation 2) to promote portfolio diversification. One way of ensuring that these two goals are met is by automatically enrolling eligible employees in a plan which offers a diversified portfolio. This strategy has spurred participation in such companies as Safelite Glass of Columbia, Ohio, which testifies to the potential success of automatic enrollment policies in its report stating that since instituting the policy in 1998, 401(k) plan participation rates have doubled to about 95 percent of the more than 6000 employees [Harris, 2003]. This is likely due to the inertia effect experienced by automatically enrolled employees who are unlikely to divest themselves of their plan [Madrian and Shea, 2001].

The dilemma confronting policy makers, then, is the desire to both preserve and enhance individual self-determination and autonomy while also assuring that employees select the optimal set of funds for themselves. To fulfill these goals, Sunstein and Thaler (2003) have suggested that employers adopt a policy of "Libertarian Paternalism" whereby employees enjoy both investment direction and the freedom of choice. One potential operationalization of this philosophy would be to implement a tiering system which would account for variations in individual expertise. These tiers would present menus focusing principally on core choices and emphasizing the relative importance of the various options, while also providing an "11^{th} option" window to be incorporated within the standard, essential, limited fund menu. Unfamiliar investors could then quickly learn a manageable number of funds, while sophisticated investors could open this window to explore a wider range of options as they see fit.

Thus, a major challenge for 401(k) design is how to accommodate disparate levels of education, opportunity, and inclination into a broadly based and responsible program for national retirement savings investment. To increase employee participation and plan productivity, plan sponsors should work toward developing 401(k) plans that emphasize pertinent incentives, such as the presence and size of employer match, while providing a modicum of guidance for participants who wish to explore diverse investment strategies.

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Notes:

[1] ERISA - The Employee Retire Income Security Act of 1974 is a federal law that created minimum standards by which most voluntarily established pension and health plans in private industry must prov ide protection for individuals in these plans.

[2] A company called IXI collects retail and IRA asset data from most of the large financial services companies, receiving data from all companies at the 9-digit zip level, and then divides the total financial assets by the number of households in the relevant 9-digit zip area to determine the average assets for each neighborhood (there are 10-12 households per zip-area on average). IXI then assigns a wealth rank (from 1 to 24) to the area. The resulting WEALTH variable can be viewed as a proxy for households' financial wealth.

3 The original ecological problem is the following: immigrants overall earn lower income than residents in the US. However, if one conducts a regression analysis at the state level regressing average income on the proportion of immigrants in the population of the states, one would infer a positive relation (only because immigrants are more attracted to richer states). Doing the same regression on the individual level (personal income on the immigrant dummy) would offer a correct inference about the relation between immigrants and relative income levels.

4 Note that a plan-fixed effect model would not allow us to identify the γ coefficient in (1). The plan-level regression serves as a robustness check on the random effect assumption.

5 See, e.g., Hardin and Hilbe (2001) Chapter 17 for details. Several researchers (see a summary by Wooldridge (2003)) point out that the method performs well when the number of clusters is much larger than the typical size of a cluster, which is not the case in our sample. We have 643 clusters (plans), and the average plan size is 1,489 employees. Under such situation, the cluster-adjusted standard errors tend to be on the conservative side (overestimated) if there is no substantial cluster effect (after controlling for plan-level attributes). This is also verified by the authors' independent simulation. Since there is no prior knowledge about the magnitude of the residual plan effect, we stick to the conservative estimates of standard errors assuming cluster effect at the plan level.

[6] The model produces a heteroscedastic linear regression: $\Phi^{-1}\left(P_j\right) = \beta_0 + \beta_1 Z_{1j} + \beta_2 Z_{2j} + \gamma NFUNDS_j + u_i$, where $E\left(u_j\right) = 0$, and $Var\left(u_j\right) = \frac{\Phi_j\left(1-\Phi_j\right)}{n_j \phi_j^2}$. Amemiya (1985) shows that the weighted least square estimate has the same property as the maximum likelihood estimator.

7 We are grateful to Jim Powell for offering advice regarding the implementation of CALD.

8 The remaining categories are balanced funds and other assets (mainly non-marketable securities). Average participants in the sample invest about 14.8% of their contribution to balanced funds, and 0.1% to other assets.

Table 1. Summary Statistics

Panel A reports the summary statistics of all employees in the sample (including non-participants). Panel B reports the summary statistics of participants (employees who contribute positive amount to their DC plans in 2001).

	Unit	Mean	Std. Dev.	5%	25%	50%	75%	95%
Panel A: Eligible Employees (793,794)								
PART	0-1	0.71	0.45	0	0	1	1	1
COMP	$10,000	5.81	3.78	1.91	3.23	4.81	7.16	13.76
FEMALE	0-1	0.38	0.46	0	0	0	1	1
WEALTH	$10,000	4.69	15.89	0.04	0.17	0.73	3.57	18.70
AGE	year	43.00	9.72	27	37	43	50	59
TENURE	year	11.33	9.07	1.50	3.67	10.08	16.08	29.83
MATCH(2%)	1%	51.31	35.51	0	25	50	100	100
COMPSTK	0-1	0.58	0.49	0	0	1	1	1
DB	0-1	0.66	0.47	0	0	1	1	1
NFUNDS	fund	13.05	5.73	6	9	12	16	22
WEB	1%	26.92	12.05	10.35	18.58	25.54	34.74	51.68
NEMPLOY	person	20146	23445	342	2217	6333	34010	69378
Panel B: Participants (527,800)								
MM%	1%	15.93	30.28	0	0	0	18.64	100
MM_BOND%	1%	20.75	32.72	0	0	0	30.72	100
MM50	0-1	0.15	0.36	0	0	0	0	1
MM_BOND50	0-1	0.16	0.37	0	0	0	0	1
EQ%(inc.. Co. Stk.)	1%	64.09	36.78	0	37.51	75	100	100
EQ%(ex. Co. Stk.)	1%	60.81	38.82	0	25	70	100	100
EQ_PART(inc. Co. Stk.)	0-1	0.84	0.36	0	1	1	1	1
EQ_PART(ex. Co. Stk.)	0-1	0.79	0.41	0	1	1	1	1
COMP	$10,000	6.59	5.09	2.27	3.75	5.43	7.82	1.45
FEMALE	0-1	0.38	0.46	0	0	0	1	1
WEALTH	$10,000	6.07	17.67	0.04	0.36	1.64	6.13	23.71
AGE	year	43.69	9.59	28	37	44	51	59
TENURE	year	11.67	9.12	1.50	4.00	9.92	16.75	29.92
MATCH(5%)	1%	49.67	29.17	0	30	50	70	100
COMPSTK	0-1	0.60	0.49	0	0	1	1	1
DB	0-1	0.63	0.48	0	0	1	1	1
NFUNDS	fund	13.60	5.76	7	10	13	16	22
WEB	1%	28.68	11.73	12.91	19.63	26.21	36.25	51.68
NEMPLOY	person	17330	22340	291	1687	5788	26433	69378

Table 2. Choices and Participation in Defined Benefits Pension Plans

The dependent variable is PART, a dummy variable equal one if the employee contributed positive amount to his DC pension account. The all-sample participation rate is 70.8%. All coefficients and standard errors are multiplied by 100. Columns (1) to (2) use the linear probability model. The standard errors adjust for both heteroskedasticity and within group correlation (due to the group-specific disturbance). Columns (3) and (4) adopts Probit model. The standard errors adjust for correlation within the same plan. Pseudo R-squared and incremental probability of correct prediction are reported for goodness-of-fit. The marginal probabilities are calculated by setting all non-dummy variables at their mean values, and all dummy variables at zero. In columns (1) and (3) COMP and WEALTH are expressed in log dollars. In columns (2) and (4) COMP is expressed in $10,000, and WEALTH is expressed in IXI ranks from 1 to 24. Plan-level average individual attributes are used as control variables (coefficients not tabulated). The number of observations is 793,794 individuals and 647 plans.

	Linear Probability				Probit					
	(1)		(2)		(3)			(4)		
	COEF	SE	COEF	SE	COEF	SE	Margl. Pr.	COEF	SE	Margl. Pr.
NFUNDS	**-0.23**	0.11	**-0.25**	0.13	**-0.92**	0.31	-0.25	**-0.78**	0.34	-0.25
COMP	**15.27**	0.21	**2.60**	0.06	**57.34**	4.72	18.12	**11.54**	0.94	3.71
WEALTH	**5.96**	0.06	**0.47**	0.02	**23.16**	1.30	7.32	**2.14**	0.34	0.69
FEMALE	**5.64**	0.50	**5.50**	0.43	**18.88**	1.29	5.97	**20.11**	0.93	6.47
AGE	**0.21**	0.05	**0.49**	0.06	**0.32**	0.44	0.10	**0.88**	0.51	0.28
AGE^2	**0.00**	0.00	**-0.01**	0.00	**-0.01**	0.01	0.00	**-0.01**	0.01	0.00
TENURE	**1.30**	0.08	**1.43**	0.10	**4.79**	0.47	1.51	**5.07**	0.55	1.63
TENURE^2	**-0.03**	0.00	**-0.03**	0.00	**-0.12**	0.01	-0.04	**-0.12**	0.02	-0.04
MATCH	**0.12**	0.02	**0.12**	0.02	**0.44**	0.04	0.14	**0.41**	0.04	0.13
COMPSTK	**3.50**	1.60	**2.96**	1.85	**9.47**	4.40	3.01	**7.53**	3.58	2.41
DB	**-0.28**	1.45	**-0.65**	1.55	**1.01**	2.11	0.32	**0.26**	2.60	0.09
WEB	**0.07**	0.08	**0.19**	0.08	**0.31**	0.14	0.10	**0.65**	0.14	0.21
NEMPLOYEE	**-2.89**	0.52	**-3.11**	0.57	**-9.55**	2.10	-3.02	**-9.80**	2.02	-3.15
CNST	**-214.14**	36.88	**-4.51**	14.68	**-926.76**	81.03	--	**-173.06**	86.21	--
Goodness of Fit	**0.19**		**0.13**		**0.18**		**0.33**	**0.13**		**0.26**

Table 3. Relation between Number of Funds Offered and Allocation in Money Market/Bond Funds

Columns 1 and 2 analyze contribution allocation to money market funds, and columns 3 and 4 analyze allocation to money market and bond funds. In columns 1 and 3, the dependent variable is the percentage of total contribution allocated to the particular category. Estimates are obtained from the Powell (1984) censored least absolute deviation (CLAD) regressions. Pseudo-R^2 of quantile regressions is reported as goodness of fit. In columns 2 and 4 the dependent variable is a dummy variable equal one if the employee invests 50% or more of her total contribution to the category. Coefficients and standard errors in Columns 2 and 4 are multiplied by 100. All standard errors adjust for heteroskedasticity as well as within-cluster (plan) correlations. The number of observations is 500,022 individuals and 631 plans in columns 1 and 2 (applied to employees who are offered at least one money market fund), and 527,800 individuals and 643 plans in columns 3 and 4.

	Cash Funds				Cash and Bond Funds			
	% of total contribution		1(% > 50%)		% of total contribution		1(% > 50%)	
	COEF	SE	COEF	SE	COEF	SE	COEF	SE
NFUNDS	**0.39**	0.24	**0.17**	0.08	**0.54**	0.20	**0.36**	0.08
COMP	**-19.15**	1.75	**-5.45**	0.16	**-14.69**	1.21	**-6.34**	0.16
WEALTH	**-4.65**	0.40	**-1.34**	0.05	**-3.55**	0.20	**-1.47**	0.06
FEMALE	**1.31**	0.51	**-0.10**	0.12	**2.91**	0.55	**0.43**	0.15
AGE	**-2.57**	0.23	**-0.92**	0.05	**-2.30**	0.23	**-0.95**	0.07
AGE^2	**0.04**	0.00	**0.01**	0.00	**0.04**	0.00	**0.02**	0.00
TENURE	**2.38**	0.24	**0.64**	0.06	**1.57**	0.18	**0.68**	0.06
TENURE^2	**-0.04**	0.01	**-0.01**	0.00	**-0.02**	0.01	**-0.01**	0.00
MATCH	**0.02**	0.03	**0.01**	0.02	**0.07**	0.04	**0.00**	0.02
MATCHINCOMP	**-0.18**	0.07	**-0.07**	0.02	**-0.17**	0.05	**-0.10**	0.02
COMPSTK	**-0.49**	0.52	**-1.09**	1.23	**-1.04**	2.68	**-3.78**	1.16
DB	**7.29**	3.50	**2.14**	1.12	**8.97**	3.14	**3.21**	1.35
WEB	**0.03**	0.20	**-0.03**	0.07	**0.06**	0.11	**-0.03**	0.07
NEMPLOYEE	**-0.93**	1.45	**-0.12**	0.45	**-1.33**	1.16	**0.46**	0.44
CNST	**235.86**	60.60	**83.30**	17.19	**335.46**	65.13	**99.84**	20.16
Goodness of Fit	**0.058**		**0.046**		**0.046**		**0.054**	

Table 4. Relation between Number of Funds Offered and Allocation in Equity Funds

In columns 1 and 2, the dependent variable is the percentage of contribution allocated to stock funds. Estimates are obtained from the Powell (1984) censored least absolute deviation (CLAD) regressions. Pseudo-R^2 of quantile regressions is reported as goodness of fit. In columns 3 and 4 the dependent variable is a dummy variable equal one if the employee participates (i.e., invest positive amount) in stock funds (all coefficients and standard errors are multiplied by 100). In columns 1 and 3, contributions to company stock are excluded from both investment in equity funds and total contribution. Columns 2 and 4 exclude all participants in plans where employer match is restricted to company stock. All standard errors adjust for heteroskedasticity as well as within-cluster (plan) correlations. The number of observations is 527,800 individuals and 643 plans in columns 1 and 3, and is 355,571 individuals and 596 in columns 2 and 4.

	Allocation				Participation			
	Ex. Company Stock		Ex. Restrictive Match		Ex. Company Stock		Ex. Restrictive Match	
	COEF	SE	COEF	SE	COEF	SE	COEF	SE
NFUNDS	**-0.71**	0.31	**-0.89**	0.35	**-0.31**	0.14	**-0.46**	0.17
COMP	**15.06**	1.05	**13.69**	0.99	**8.10**	0.23	**7.54**	0.27
WEALTH	**3.26**	0.18	**3.38**	0.22	**1.78**	0.10	**1.61**	0.14
FEMALE	**-3.29**	0.54	**-3.50**	0.39	**0.92**	0.14	**0.15**	0.16
AGE	**1.01**	0.16	**0.87**	0.21	**0.72**	0.10	**0.65**	0.06
AGE^2	**-0.02**	0.00	**-0.02**	0.00	**-0.01**	0.00	**-0.01**	0.00
TENURE	**-0.54**	0.16	**-0.35**	0.20	**-0.34**	0.06	**-0.16**	0.07
TENURE^2	**0.00**	0.01	**0.00**	0.01	**0.00**	0.00	**0.00**	0.00
MATCH	**0.21**	0.06	**0.26**	0.09	**0.10**	0.04	**0.15**	0.04
COMPSTK	**4.81**	4.05	**7.54**	4.13	**1.62**	3.37	**5.77**	2.82
DB	**-4.59**	2.44	**-6.75**	2.40	**-0.72**	2.13	**-2.38**	1.59
WEB	**0.01**	0.11	**0.03**	0.12	**-0.02**	0.09	**-0.10**	0.07
NEMPLOYEE	**-1.28**	0.89	**-1.93**	1.25	**-2.13**	0.68	**-2.16**	0.67
CNST	**-17.29**	29.17	**-49.23**	28.36	**103.78**	29.37	**59.40**	21.72
Goodness of Fit	0.073		0.084		0.049		0.074	

Figure 1. The Relation between Participation and Number of Funds Offered

The graph plots the relation between participation rate (all explanatory variables except the number of funds offered are set at their respective mean values) and the number of funds offered using the Robinson (1988) two stage semiparametric estimation method. The dotted line represents the 95% confidence intervals.