

## How Much Is Investor Autonomy Worth?

Shlomo Benartzi\*

The Anderson School at UCLA  
110 Westwood Plaza  
Los Angeles, CA 90095-1481  
TEL: (310) 206-9939; FAX: (310) 825-3165  
E-mail: shlomo.benartzi@anderson.ucla.edu

Richard H. Thaler

University of Chicago  
Graduate School of Business  
1101 E. 58th St.  
Chicago, IL 60637  
TEL: (773) 702-5208  
E-mail thaler@gsb.uchicago.edu

March 2001

---

\* We would like to thank Jeff Maggioncalda, Jason Scott, Bill Sharpe, and Len Sheppard, among others at Financial Engines, for making their products available for our research. Detailed information on Financial Engines is available at [www.financialengines.com](http://www.financialengines.com). We would also like to thank to Michael Falk CFA, Carl Londe, and Tony Sabos of ProManage, Inc. (formerly, Strategic Financial Concepts, Inc.) for providing us access to the ProManage *PROgram*<sup>TM</sup>. Information about ProManage is available at [www.promanageplan.com](http://www.promanageplan.com). In addition, we are grateful to Tom Koelbl of SwedishAmerican Health System for letting us conduct surveys at SwedishAmerican Health Systems.

## How Much Is Investor Autonomy Worth?

### ABSTRACT

There is a worldwide trend towards increasing investor autonomy. Investors are increasingly able to pick their own portfolios. How good a job are they doing? We present individuals saving for retirement with information about the distribution of outcomes they could expect from the portfolios they picked and also the median portfolio selected by their peers. A majority of our survey participants actually prefer the median portfolio to the one they picked for themselves. Furthermore, we find that a majority of investors who preferred to form their own portfolio rather than accept one that was picked for them by a professional investment manager, preferred the distribution of returns implied by the suggested portfolio to the one they selected on their own. We investigate various alternatives to these findings and offer some evidence to support the view that part of the results are attributable to the fact that investors do not have well-defined preferences.

## 1. Introduction

A major trend in defined contribution savings plans is the expansion in the choices available to participants. A decade ago most plans offered very few choices, often just a money market fund, a bond fund, a stock fund, and stock in the company sponsoring the plan. Now the plans offer an average of 11 funds (Hewitt Associates, 1999), and some plan participants are even permitted to pick individual securities through a direct brokerage account. And, in Sweden, a recent social security reform giving workers the right to direct 2.5 percent of their salary to individual accounts, offered a stunning 450 different funds to choose from. Can an investor have too many options? It is a basic principle of economic theory that expanding the choice set cannot make a consumer worse off (at least ignoring decision-making costs). Here, where the financial stakes are quite high, and choices are made infrequently, many would argue that more choices are unambiguously a good thing.

Still, choice comes at a cost. For example, in discussing various options for a fully or partially privatized social security system, an important design issue is how much choice to offer participants. Diamond (forthcoming) estimates that administering individual accounts with even just a limited set of investment choices will cost between \$40 and \$50 per participant per year. With the commonly proposed deferral rate of 2 percent of income earned, typical individual account balances will be negligible for at least few years. Consequently, Diamond estimates that the administrative costs will be higher than the investment gains for some time. To minimize administrative costs, some have proposed that individual accounts will initially be invested in a single fund (perhaps a balanced fund that divides money between diversified portfolios of stocks and bonds), with choices only introduced once balances grow.

More generally, adding choices to 401(k) and 403(b) plans also increases the costs of administering these plans. Do participants gain from this expansion of their choice set, and if so, is the increase in utility worth the cost? Surely, the number of choices and utility are not perfectly correlated. For example, in the 2001 Zagat Restaurant Guide for Chicago, diners once again picked Charlie Trotter's as their favorite restaurant in spite of the fact that the restaurant has both the highest prices and the fewest choices in town. Diners at Trotter's are only given a choice between two tasting menus, one consisting entirely of vegetables, both priced at \$125 per person. Apparently, gourmets are happy to let Mr. Trotter select a portfolio of food for them to consume for dinner.

A recent paper by Iyengar and Lepper (2001) suggests that a limited number of choices may in fact lead to greater happiness. In a clever experiment conducted in an up-scale grocery store, the experimenters alternately set up sampling booths that displayed either 6 or 24 flavors of jam. Predictably, more shoppers were attracted to the booth displaying the 24 flavors. Sixty percent of the passing shoppers stopped at the booth when 24 flavors were on display, versus forty percent when only six were on display. Surprisingly, however, those visiting the extensive-choice booth were far less likely to end up purchasing jam. Only 3 percent of those visiting the extensive-choice booth ended up buying jam, versus 30 percent of those visiting the limited-choice booth.

In this paper, we investigate the role of choice in the domain of investment decisions. We attempt to find out how much, if at all, investors benefit from being able to choose their own retirement portfolios. Note that this is an empirical, rather than philosophical, question. We are only interested in whether investors who form their own portfolios are happier with those choices than they would be with the choices made by (say) average investors. Our methodology includes

the following three steps. First, we collected demographic and portfolio information from UCLA plan participants. Second, we projected the range of retirement income each participant could expect if invested in (a) her own portfolio, (b) the average portfolio, and (c) the median portfolio. Last, we went back to the participants and asked them to rate the attractiveness of the three (unlabeled) portfolios based on the projected range of retirement income.

We find that the attractiveness of participants' own portfolios and that of the average portfolio are indistinguishable. Specifically, participants' own portfolios received an average rating of 3.07 (on a 1 to 5 scale) versus 3.05 for the average portfolio. Since the average portfolio was influenced by a few participants who invested very conservatively (for instance, 100% in cash), we also analyzed the median portfolio. Interestingly, the median portfolio received an average rating of 3.86, significantly higher than participants' own portfolios. Therefore, we find no evidence that participants' own portfolios are more attractive than either the average or the median portfolio.

In a follow up study, we surveyed employees at SwedishAmerican Health Systems, Inc. SwedishAmerican offers a unique setting that is extremely valuable for our research. In particular, each employee is automatically provided an individually selected asset allocation using software developed by ProManage. Those participants who desire to pick funds on their own have to opt out of the automatic allocations. Similar to our previous study, we presented individuals with the range of retirement income they could expect if invested in (a) their own portfolio, (b) the average portfolio, and (c) the ProManage portfolio. We should highlight that we surveyed only individuals who opted out of the ProManage portfolio and selected portfolios on their own. Even for this sample, we found that the average portfolio was as attractive as participants' own portfolios (3.03 vs. 2.75). Furthermore, the portfolios designed by ProManage

received significantly higher ratings than participants' own portfolios (3.50 vs. 2.75). Again, we find that the value of being able to choose one's own portfolio is not great.

We have explored numerous explanations for our results, including lack of diversification and differences in opinion. We find that our results can not be fully attributed to lack of diversification, because many participants hold well-diversified portfolios.<sup>1</sup> Furthermore, even those who hold well-diversified portfolios tend to prefer the average portfolio to the portfolios they constructed on their own. With respect to differences in opinion, we find that while some people have different opinions about future returns, those differences do not have a large effect on actual portfolio choices. Ruling out diversification issues and differences in opinion (among other explanations we discuss later), we believe that participants pick the wrong point along the efficient frontier. Put differently, participants select portfolios that do not match their risk attitudes.

One possible solution to the mismatch between individual preferences and portfolio choices is to help people find the "right" portfolio. Using additional experiments, we document that this solution is extremely challenging, because people's preferences are sometimes confused. In the experiments, we asked individuals to choose among investment programs that offer different ranges of retirement income (for instance, a certain amount of \$900/month versus a fifty-fifty chance to earn either \$1,100/month or \$800/month). When we presented individuals with three choices ranging from low risk to high risk, we found a significant tendency to pick the middle choice. For instance, people viewing choices A, B, and C, will often find B more attractive than C. However, those viewing choices B, C, and D, will often argue that C is more

---

<sup>1</sup> Benartzi (2001) examined retirement saving plans that offer individual securities in the form of company stock (i.e. stocks issued by the employer). In those retirement saving plans, the portfolios were not diversified.

attractive than B. Simonson and Tversky (1992) illustrated similar behavior in the context of consumer choice, which they dubbed extremeness aversion.

This paper proceeds as follows. In section 2, we describe the experimental method that we used to assess the attractiveness of participants' own portfolios. We also present the results of our UCLA survey and discuss numerous explanations. In section 3, we present our follow up survey at SwedishAmerican. In section 4, we explore whether people's risk attitudes are sometimes confused. A summary is provided in section 5.

## **2. UCLA Survey**

### *2.1. Method*

The basic idea is to see whether investors prefer the portfolios they have constructed themselves when compared with the average or median portfolio for their co-workers. The subjects compare the alternative portfolios using data provided by one of the leading commercial financial information providers, Financial Engines, founded by William Sharpe.

Our sample consists of UCLA staff employees who participate in the University's 403(b) plan. The plan is voluntary and participating employees are offered a menu of investment funds. We used electronic mail to solicit participation in our study in return for \$20 and a \$250 lottery. We received responses from 170 plan participants. Each participant was asked to provide the following information: gender, age, income, account balance, retirement contributions and portfolio allocations. They were told that we would contact them again later for a follow-up question.

In evaluating the portfolio choices people have made, one could either study the asset allocation of the balances (reflecting past contributions and returns) or their current allocation of

new contributions. In forecasting future returns, the former would be more accurate, and in a fully rational world this would reflect the true preferences of the participants who would be frequently rebalancing their portfolios to get them back in line with their risk preferences. However, past research shows that, to a first approximation, participants almost never rebalance. Two studies of TIAA-CREF participants make this point. An early study by Samuelson and Zeckhauser (1988) found that the median participant made *zero* changes to his or her retirement account over the working lifetime! More recently, Ameriks and Zeldes (2000) studied a panel of TIAA-CREF participants over a ten year period. In their sample, 78 percent made no changes to their portfolio over the entire ten-year period. If participants do not rebalance, then their account balances do not reflect their active choices but instead reflect a combination of a single prior choice plus some number of years of accumulations. In light of the evident inertia, we choose to study the current allocation of new contributions (which, of course, is very likely to be the same allocation picked when joining the plan.) For recent employees this will make little difference, but for the older employees we think this is more reflective of an actual choice than their account balances.

The demographic and portfolio information were fed into the software provided by Financial Engines in order to project the range of retirement income participants could expect. Financial Engine's retirement income figures are presented in before-tax current dollars, and they are based on the participant's current saving behavior. Since we do not know much about other sources of retirement income the participants might have, the projections pertained to the University 403(b) Plan only. Financial Engines does not provide the entire distribution of retirement income but rather the 5<sup>th</sup>, 50<sup>th</sup> and 95<sup>th</sup> percentiles only.



The retirement income projections were calculated for three different portfolios. First, we used participants' own portfolios, which represent a world with investor autonomy. The average allocations are: 21% cash, 7% bonds, 44% large cap stocks, 7% international stocks, and 21% small cap stocks. The plan participants exhibit quite a bit of variation in their choices. For instance, the allocation to equities is 97% for the top quartile versus 54% for the bottom quartile. The second portfolio we used was the average allocation chosen by plan participants. (Since our sample average and the US average, as reported by Financial Engines, are remarkably similar, it did not matter which one of the averages we used.) The mean asset allocation is heavily influenced by extreme portfolios, so we also wanted to offer a comparison based on a type of median portfolio. (We could not locate national statistics on the median allocation, so we used the UCLA median.) Since we had more than two asset classes, defining the median is not trivial. To select a median portfolio, we sorted the portfolios on estimated risk (standard deviation) and then picked the median value. Next, we used the Financial Engine's efficient frontier to pick a portfolio that corresponds to the median level of risk. The resulting portfolio has the following allocation: 8% cash, 4% bonds, 50% large cap stocks, 15% international stocks, and 23% small cap stocks.

We then contacted each subject and asked them to compare and evaluate three portfolios based on the distribution of projected income figures that we provided (i.e., 5<sup>th</sup>, 50<sup>th</sup>, and 95<sup>th</sup> percentile values.) The three portfolios had generic labels (i.e., A, B, and C) and the participants were not told that their own portfolio was one of those included. Based on the projected retirement income figures, the participants were asked to rate the attractiveness of each portfolio on a 1 (very unattractive) to 5 scale (very attractive). The stimulus is included in Appendix A.

Of the initial sample of 170 plan participants, 157 completed the follow up questionnaire and they were paid about a week later.<sup>2</sup>

Before we turn to our main results, we provide summary statistics on the sample. The average age is 41, the average income is \$54,236, the average account balance is \$44,701, and the average annual contribution is \$5,355. The expected value of retirement income projected by Financial Engines using the average portfolio ranged between \$9,172 and \$59,578 with a median of \$21,831. These statistics clearly illustrate the wide range of possible outcomes as well as the asymmetric nature of the distribution. When participants' own allocations are replaced with the average allocation, the estimated range was between \$10,571 and \$47,913 with a median of \$22,436. And when the median portfolio is used, the estimated range was between \$10,048 and \$60,235 with a median of \$24,456.

## 2.2. *Results*

Participants rated each portfolio on a 5-point scale with 5 being best. They gave their own portfolio and the average portfolio virtually identical ratings, 3.07 and 3.05, respectively. Forty two percent of the participants gave their own portfolios a higher score than the average portfolio, and exactly the same percentage preferred the average portfolio, with 16 percent indifferent (see Figure 1). While indifferent between the average portfolio and their own, 62 percent of the participants actually preferred the median portfolio to their own, with only 21 percent preferring their own portfolio. On average, participants gave the median portfolio a rating of 3.87, significantly higher than their rating of their own portfolios ( $t = 5.80$ ).

[Insert Table 1 About Here]

---

<sup>2</sup> Interestingly, many preferred not to be paid and asked that their payments will be used for future research on

The preference for the median portfolio over the one they have picked themselves does not depend on the risk preferences of the participants. We obtain similar results when we divide the sample into three groups according to the portfolio risk. In every group, participants rate the median portfolio better than their own.

[Insert Figure 1 About Here]

Why might participants prefer the median portfolio to their own? One possibility is that the participants have selected a portfolio that is below the Markowitz (1952) efficient frontier. Perhaps the median portfolio is attractive because it is more diversified than individuals' own portfolios. We investigated this possibility in two ways. First, we asked the Financial Engines software to improve the efficiency of each participant's portfolio. For 70 percent of the portfolios, the software indicated that the portfolios were already efficient and could not recommend a better portfolio (holding risk constant). This is not surprising since participants choose among investment funds rather than individual securities, and almost any array of funds will be close to the frontier. We then redid our analyses using only these participants whose portfolios were considered efficient with very similar results as before. The mean ratings for participants' own portfolios, the average portfolio and the median portfolio are 3.01, 3.14, and 3.79, respectively. Thus, our results do not seem to be explained by individuals picking inefficient portfolios.

Another possibility is that participants have made good choices based on different assumptions about the future than those used by the Financial Engines software. It is well known that if investors have differences in opinion about future returns then they will hold different portfolios (e.g., Harris and Raviv, 1993). So, for example, participants who expected gloomy equity returns and selected an all fixed income portfolio accordingly would still prefer the income projections of a risky portfolio when those are based on the historic equity premium.

We explored this possibility by asking plan participants whether they have an opinion about future stock returns and whether it influenced their investment choices. Of the 157 participants who completed the portfolio-rating task, 113 were willing to answer this questionnaire. (The questionnaire is included in Appendix B.) Seventeen participants indicated they have no opinion about stock returns, but the remaining 96 participants answered three questions about the expectations of future returns. First they were asked whether they thought returns over the next decade would be higher or lower than those we have experienced over the past 75 years. Respondents were somewhat bullish: 17 percent of the participants believe that returns on the stock market over the next ten years will be lower than the past 75 years, while 41 percent expected returns to be higher over the next ten years. However, few were very confident in their forecast, and many indicated that their forecasts had a limited effect on their portfolio choices. To further explore whether differences in opinion influence portfolio choices, we ran a regression of the percentage allocated to stocks on participants' own forecast of stock returns. The stock returns variable was measured on a 1 to 5 scale (1="much lower than it has been in the past 75 years", 5="much higher than it has been in the past 75 years"). We find that participants' own opinion explains no more than 5% of the variation in portfolio choices. Since differences in

opinion do not have a substantial effect on investor behavior, we believe that they are unlikely to fully explain our results.

[Insert Figure 2 About Here]

The higher ratings given to the median portfolio relative to the average portfolio suggest another explanation based on the assumed equity premium. Since the median portfolio has a higher equity exposure (88 percent versus 72 percent), if the equity premium used by Financial Engines is too high, then participants would be lured into preferring the riskier portfolio by optimistic forecasts. Of course, it is not possible to know whether Financial Engines is using the “right” equity premium. Their analyses assume an equity premium, defined as the arithmetic average spread between cash and large cap, of 5.7%. This is similar to the average estimate of pension fund managers (5.6%) as reported by Greenwich Associates, 1998, and Ivo Welch’s survey of finance professors reports an even higher number (Welch, forthcoming). In contrast, many observers (e.g., Campbell and Shiller, 2001, and Fama and French, 2001) are predicting an equity premium that is barely positive over the next 20 years. Still, none of this matters to our analysis of why our participants prefer the median portfolio to their own. What matters is their own forecast and we know that if anything they are more bullish than Financial Engines. Fully 80 percent of the participants believe the returns on the stock market will be at least as high as the past 75 years. Since stock returns averaged 13.3% over the 1926-1999 period (Ibbotson, 2000) and the current yield on t-bills is about 6%, the implied equity premium of 7.3% is higher than the Engine’s equity premium.

One other concern about our analysis is that our use of the current asset allocation as an indicator of the participant's preference might be biased if the participants have changed their preferences (but not their asset allocation) since they joined the plan. To investigate this possibility we have rerun our analyses using the participants in our data set who have a less than the median ratio of plan assets to annual contributions.<sup>3</sup> We find similar results for this subsample. In particular, the mean ratings of participants' own portfolios, the average portfolio and the median portfolio are 2.91, 2.99 and 3.85, respectively.<sup>4</sup>

To summarize, participants find the asset allocation of the average participant as attractive as the one they have picked for themselves, and they like the median asset allocation better than their own. We have explored numerous explanations for the phenomena including: (a) the failure to pick efficient portfolios; (b) differences of opinions about future stock returns, (c) an unrealistic equity risk premium assumption in the software; and (d) changes of preferences since the time of enrollment. None of these explanations is satisfactory. We are left with the conclusion that many participants made a mistake in choosing their asset allocation. In other words, they picked the wrong point along the efficient frontier. According to Brennan and Torous (1999), this can be a costly mistake. To illustrate, they considered an individual with a relative risk aversion coefficient of two who, based on their assumptions, ought to be 100 percent in stocks. Then, they calculated the loss of welfare from picking portfolios that do not match the assumed risk preferences. Using a 20-year investment horizon, they found that switching from

---

<sup>3</sup> An alternative would be to use tenure in the system but we failed to ask this question in our survey, demonstrating that bounded rationality applied to researchers as well as subjects.

<sup>4</sup> The results could also be affected by bad data coming back through the surveys due to participants' confusion. To alleviate this concern, we reran our analysis using participants who indicated that the survey was "very clear." The mean ratings of participants' own portfolios, the average portfolio and the median portfolio are 2.95, 2.98 and 4.04, respectively.

the optimal allocation of 100 percent stocks to no stocks reduces the expected utility by 37 percent.

### 3. SwedishAmerican Survey

The results of the previous experiment suggest that participants typically gain little by forming their own portfolios. However, our sample consisted of participants who were "forced" to choose a portfolio and did not have the option of letting someone else choose a portfolio on their behalf. In this section, we investigate a group of participants who did have the option of letting an investment manager pick a portfolio for them and chose to decline it. We explore whether this group of participants did well constructing their own portfolios.

#### 3.1. Method

In the savings plan offered by SwedishAmerican Health Systems Inc. every participant is offered a customized portfolio by ProManage (a financial consulting firm). ProManage's allocations are based on demographic variables such as age, but ProManage does not attempt to elicit any information about individual risk preferences. Participants are given the choice of accepting this default asset allocation or selecting one on their own. We identified 351 individuals who opted out of the ProManage portfolios, representing 36% of the total number of plan participants.<sup>5</sup> The unique setting at SwedishAmerican allows us to survey individuals who have announced a preference to make their own financial decisions.

Using this sample, we replicate our previous experiment, with some modifications described here. We received demographic and investment data from the plan sponsor directly, so

---

<sup>5</sup> We excluded inactive plan participants (for instance, terminated employees who kept their funds at SwedishAmerican), so our figures understate the total number of participants in the plan. We should also note that

there was no need to rely on self-reported data. We contacted the plan participants by mail and offered an entry in a lottery with a prize of \$500 as an incentive to participate. In the questionnaire, we asked the participants to rate the attractiveness of three (unlabeled) portfolios based on the range of retirement income they could expect (the stimulus is included in Appendix C). The three portfolios were: the individual's own portfolio; the average portfolio of SwedishAmerican participants; and the portfolio that ProManage had picked for this participant.

One difficulty with this subject pool is that there is not a lot of variation in the overall asset allocation. The average allocation to stocks was 86 percent. In the top quartile the average allocation to equities was 100 percent and in the bottom is was 80 percent. These high allocations to equities in part reflect the funds they had to choose from: only two of the ten options are fixed income (see Benartzi and Thaler, 2001). However, some of the participants made extreme bets on specific segments of the stock market with the most common bet being small cap growth. Hence, lack of diversification might play a bigger role in the SwedishAmerican data than it did in the UCLA study. For comparison purposes, we should note that the portfolios selected by ProManage had, on average, 92% in stocks.<sup>6</sup>

The survey participants were also asked to indicate whether they have an opinion about the future performance of the investment funds that are available through the SwedishAmerican plan. And those having an opinion were asked to indicate their opinion on a five-point scale, ranging from "much lower than the S&P 500 index" to "much higher than the S&P 500 index." The subjective future performance estimates should enable us to explore the role of differences

---

inactive participants are more likely to delegate the asset allocation decision to ProManage in comparison to active participants.

<sup>6</sup> Note that the customized portfolios were selected by ProManage, whereas income projections were calculated by Financial Engines, ensuring the independence of the advice and the projections.



in opinion. The specific questions that we presented to the participants and the list of funds in the SwedishAmerican plan are included in Appendix C.

Before we turn to our results, we provide summary statistics on the sample. The average age is 45, the average income is \$50,002, the average account balance is \$75,852, and the average annual contribution is \$4,442. Based on the participants' current allocations and deferral rates, Financial Engines projected retirement incomes with a range between \$7,854 and \$59,879 and a median of \$20,056 (the reported numbers are the means of the projections for individual participants). Again, these statistics illustrate the wide range of possible outcomes. When participants' own allocations are replaced with the average allocation, the Engine provides a range between \$8,339 and \$51,877 with a median of \$20,378. And when the ProManage portfolio is used, the Engine's range is between \$9,175 and \$48,904 with a median of \$21,102.

### 3.2. *Results*

Fifty-nine participants completed the survey.<sup>7</sup> The average rating of the participants' own portfolios is 2.75 on a 1 to 5 scale (see Table 2). They liked the average portfolio slightly (and insignificantly) more, giving it a mean rating of 3.03 ( $t = 1.25$ ). Forty-four percent of the participants prefer the average portfolio, 22 percent are indifferent, and 34 percent prefer their own portfolios (see Figure 3). Surprisingly, even individuals who specifically elect to form their own portfolios find the average portfolio at least as attractive as their own choices.

[Insert Table 2 About Here]

[Insert Figure 3 About Here]

We also examined the ratings of the ProManage portfolios and found out that they are more attractive than participants' own portfolios. The ProManage portfolios received an average rating of 3.50, which is statistically higher than the 2.75 average of participants' own portfolios ( $t = 2.84$ ). Similarly, 61 percent of the participants prefer the ProManage portfolios, 19 percent are indifferent, and only 20 percent prefer their own portfolios. We find it puzzling that most of the participants who opted out of the automatic portfolios actually found those more attractive than their own self-constructed portfolios.

The SwedishAmerican data enables us to revisit the issue of differences in opinion. We find that many of the participants do not have an opinion about the future performance of the investment funds in the plan. Thirty-two percent of the participants have no opinion about any of the funds, 41 percent have an opinion about some (but not all) of the funds, and only 27 percent have an opinion about all of the funds. We investigated those who have an opinion in more details and found, very similar to the UCLA study, that the association between fund ratings and allocation choices is weak. Among the stock funds, for instance, the highest rated fund constituted 10 percent of the portfolio and the lowest rated fund constituted 9 percent of the portfolio. Hence, we believe that differences in opinion could not explain much of our results.

In summary, we find that investor autonomy is not worth much. Ruling out differences in opinion, we believe that people fail to diversify, or alternatively, they pick the wrong point along the efficient frontier. Given the complexity of the task, it is not that surprising that people have a hard time constructing a well-diversified portfolio that fits their personal preferences. However, is there a way to help individuals find the "right" portfolio? Can't we simply elicit

---

<sup>7</sup> We have excluded several participants who indicated that they did not fully understand the questionnaire.

people's preferences and then construct suitable portfolios on their behalf? As we illustrate in the next section, it is not that trivial to elicit preferences, because people's preferences are sometimes confused.

#### **4. Do Investors Have Well-Defined Preferences?**

A possible explanation for the results we have obtained here is that investors do not really have stable, well-defined preferences. There is a well-established literature in psychology, beginning with Lichtenstein and Slovic (1971, 1973) showing that people do not have coherent preferences. This is demonstrated by inducing subjects to exhibit preference reversals. The first experiments showed this with gambles. Subjects were shown two bets, one relatively risky, the other safer. Subjects were then asked to choose between the two bets and also to name reservation prices to sell each bet. As predicted by Lichtenstein and Slovic, but surprising to economists, most of the subjects who said they preferred the safe bet announced a higher reservation price for the risky bet. Many psychologists now believe that people do not really have well-formed preferences, but rather construct preferences when choices are elicited. Since the form of the elicitation can affect the choices people make, there is not a single preference ordering that can be clearly identified. (See Tversky and Thaler, 1990, for a summary of this literature.)

If investors have incoherent or ill-formed preferences about their investments, then it would not be surprising that they would end up preferring a portfolio someone else has picked for them. Of course, some might argue that in the case of savings for retirement, where the stakes are so much higher than they are in a laboratory experiment, people would think hard and

---

Including those participants did not affect our results.

straight. So, in this section of the paper we investigate whether incoherent preferences are a problem in the domain of saving for retirement.

There are many ways to demonstrate incoherent preferences, if they exist. Here we focus on one type of incoherent preference that seems particularly relevant to portfolio selection. Specifically, we explore the effect of “extremeness aversion” on portfolio choices. Extremeness aversion refers to the tendency for consumers to prefer an option that does not appear to be at the extreme point of some relevant continuum. For example, a wine drinker who exhibits this trait might avoid ordering either the most expensive or the least bottle on the wine list. Simonson and Tversky (1992) provide a nice illustration of how extremeness aversion can produce inconsistent choice. They asked subjects to choose between two cameras costing \$169.99 and \$239.99 and found an even fifty-fifty split between the two. Then, they asked another group of subjects to choose among three cameras consisting of the above two cameras and third, more expensive camera costing \$469.99. Traditional economic analysis suggests that the addition of a third option cannot increase the market share of either of the existing cameras. Note, however, that the \$239.99 camera is now the middle choice, and, consistent with extremeness aversion, its market share actually rose to 57 percent. This violates the rationality principle of independence of irrelevant alternatives.

To test extremeness aversion in the context of portfolio choice, we designed an experiment in which the same portfolio is framed as either the middle choice or an extreme choice. Consider, for instance, four portfolios, A, B, C, and D, with an increasing level of risk moving from A to D. When choosing from the set {A, B, C} portfolio C is framed as an extreme choice. However, when choosing from the set {B, C, D} portfolio C is framed as the middle choice. If investors choices depend on their attitudes toward risk and return, rather than on the

set of alternatives available, then the preference between B and C should be independent of whether A or D is available. If, instead, people exhibit extremeness aversion, then the attractiveness of portfolio C will be greatest when it is framed as the middle choice.

Our study was quite simple. Subjects were UCLA staff solicited by e-mail to participate in a study on investment decision making. They were asked to compare investment options in the context of a privatized social security system in which individuals select their own portfolios. For each option they were given two equally likely possible pay-outs: a good scenario and a bad scenario. The specific investment choices we used: A, B, C, and D, are displayed at the bottom of Table 3. Investment Program A, for instance, provides a certain amount of \$900 per month (pretax in today's dollars). In contrast, the amount of retirement income provided by Programs B, C, and D depends on market conditions between now and retirement. Program B, for instance, has a fifty-fifty chance of providing either \$1,100/month or \$800/month. Programs C and D involve higher upside potential, but also higher risk. Note, however, that the compensation for assuming greater risk is diminishing as we move from Program A to D, which captures the concavity of the efficient frontier.<sup>8</sup>

Subjects were assigned to one of three conditions randomly. In the first condition, we framed Program C as an extreme option, by having subjects choose among A, B, and C. In the second condition, we framed Program C as neither extreme nor middle choice, by having subjects choose between B and C. And in the third condition, we framed Program C as the middle choice, by choosing among B, C, and D. Extremeness aversion predicts that Program C

---

<sup>8</sup> One caveat is that our experimental design provides a joint test of extremeness aversion and the "tradeoff contrast" effect (Simonson and Tversky, 1992). Consider, for instance, the ABC condition. Program B offers a fifty-fifty chance to end up with \$200 more or \$100 less than Program A. Similarly, Program C could result in \$160 more or \$100 less than Program B. Hence, Program B offers a more attractive risk-return tradeoff. Note that both

will be least attractive in the ABC condition and most attractive in the BCD condition. (A sample questionnaire is provided in Appendix D.)

[Insert Table 3 About Here]

Table 3 displays participants' first, second, and third choice (condition BC had two choices only). The table provides the frequency of a given choice pattern by condition. For instance, Panel A includes condition ABC, where 20.8% of the respondents indicated their first, second, and third choices for Programs B, A, and C, respectively. Note that options B and C are present in every condition, and rational subjects would not switch between these two choices as other options are varied. We therefore report the relative attractiveness of C compared to B. In condition ABC, where Program C is framed as an extreme choice, 29.2% preferred Program C to B. In condition BC, where Program C is neither an extreme nor the middle choice, 39.0% preferred Program C to B. And in condition BCD, where Program C is framed as the middle choice, 53.8% preferred Program C over B. Consistent with extremeness aversion, Program C is least attractive when framed as an extreme choice and most attractive when framed as the middle choice. All the differences are significant at the 0.05 level.

Our results confirm that investors choosing among portfolios behave much like they do when buying cameras: their choices between alternatives depends on other irrelevant options available. This illustrates that their choices are not rational according to standard economic criteria, and helps us understand why they might end up preferring the portfolio chosen by the median respondent to one they choose on their own.

---

extremeness aversion and tradeoff comparisons might cause people to choose Program B. Since our goal is to

## 5. Summary

Defined-contribution savings plans, and individual savings accounts within a social security type system, are said to have many virtues, such as vesting, portability, and the ability to construct a portfolio to match one's tastes. In this paper, we have attempted to quantify the value of this latter feature. Do participants actually gain much in utility by being able to choose their own portfolio? We find that they do not. Most of our participants find the portfolio of the median participant more attractive than the one they have chosen for themselves, and this was even true for those who rejected a portfolio customized for them by experts.

There are similarities between our results and those of the psychologists Iyengar and Lepper (2001) mentioned in the introduction. Recall that Iyengar and Lepper found that people are initially attracted to an extensive menu of choices. We found that 36 percent of the SwedishAmerican plan participants rejected the automatic portfolios and spent the time and effort constructing portfolios on their own. Iyengar and Lepper also found that those who chose chocolates from a set containing many options were less satisfied with their selection, and we find that SwedishAmerican participants find their own portfolios unattractive relative to the automatic portfolios. Is this correspondence surprising? While it is true that the portfolio choice problem is much more important than finding the right candy, a factor that might induce participants to choose portfolios with more care than they use in selecting a chocolate truffle, it is also true that the portfolio choice problem is much more difficult. Even many economists might find picking the best chocolate less daunting than picking the right portfolio.

When choice problems are hard, people often (sensibly) resort to simple rules of thumb to help them cope. In our study, we find that people use the "avoid extremes" heuristic when

---

document that preferences are inconsistent, we make no attempt to distinguish between the two explanations.

choosing among portfolios that can naturally be ordered. This result raises major concerns with respect to the design of model portfolios or "lifestyle funds". Suppose a plan sponsor offers three model portfolios that are labeled as conservative, moderate, and aggressive. Furthermore, suppose that the equity allocation of the three portfolios is 0, 40 percent, and 80 percent, respectively. In this case, choosing the middle portfolio implies an equity allocation of 40 percent. However, suppose that the equity allocation of the three portfolios is 40 percent, 70 percent, and 100 percent, respectively. In this case, choosing the middle portfolio implies an equity allocation of 70 percent. Depending on what is being perceived as the "middle" choice, individuals might end with different portfolios. Similar concerns apply to leverage. Suppose that individuals saving for retirement were allowed to leverage their portfolios. In particular, suppose that the range of equity allocation was extended so that individuals could have up to 200 percent in equities. In this case, people might view a portfolio that is 100 percent in stocks as a moderate choice.

What are the policy implications of our study? We find several. First, in deciding how many choices to offer participants, there is an implicit cost-benefit analysis involved. There is a presumption that adding more choices will make consumers better off, and surely not worse off. Our research weakens that presumption. Although more work needs to be done to nail this down, we believe that whatever gains there are to be had from giving investors the opportunity to choose their own portfolios, they are likely to reach a near maximum with a small number of options (i.e., not hundreds). Second, extreme care must be taken in selecting which options people choose amongst. As we showed in a previous paper (Benartzi and Thaler, 2001), when a plan is loaded up with equity funds, participants also load up on equity funds. Here we have shown that when there is an array of balanced funds with a range of risk levels, some investors



will be attracted to the middle one, simply because of its relative position. This result implies that plan sponsors, when choosing the array of funds, may be implicitly (and unintentionally) “suggesting” particular funds or asset allocations.

## References

- Ameriks, J., and S. Zeldes, 2000, How do Household Portfolio Shares Vary with Age? working paper, Columbia University.
- Benartzi, S., 2001, Excessive Extrapolation and the Allocation of 401k Accounts to Company Stock, *The Journal of Finance*, forthcoming.
- Benartzi, S., and R. Thaler, 2001, Naive Diversification Strategies in Defined Contribution Saving Plans, *American Economic Review*, forthcoming.
- Benartzi, S., and R. Thaler, 1999, Risk Aversion or Myopia? Choices in Repeated Gambles and Retirement Investments, *Management Science* 45.3, 364-381.
- Brennan, J. M., and W. N. Torous, 1999, Individual Decision-Making and Investor Welfare, working paper, UCLA.
- Campbell, John Y., and Robert J. Shiller, 2001, Valuation Ratios and the Long-Run Stock Market Outlook: An Update, working paper, Yale University.
- Diamond, P., Administrative Costs and Equilibrium Charges with Individual Accounts, forthcoming in *Administrative Costs and Social Security Privatization*, edited by J. B. Shoven.
- Employee Benefit Research Institute, 1997, *EBRI Databook on Employee Benefits*, Washington, DC: EBRI.
- Fama, Eugene, F., and Kenneth R. French, 2001, The Equity Premium, The Center for Research in Security Prices Working Paper No. 522, University of Chicago.
- Greenwich Associates, 1998, *What Now? A Report to Fund Professionals*, CT: Greenwich.

- Harris, M., and A. Raviv, 1993, Differences of Opinion Make a Horse Race, *The Review of Financial Studies* 6.3, 473-506.
- Hewitt Associates, 1999, Trends & Experience in 401(k) Plans, IL: Lincolnshire.
- Ibbotson, R., 2000, Stocks, Bonds, Bills and Inflation, 2000 Yearbook: Ibbotson Associates, Chicago, IL.
- Iyengar, S. S., and M. R. Lepper, 2001, When Choice is Demotivating: Can One Desire Too Much of a Good Thing? working paper, Columbia University.
- Lichtenstein, S., and P. Slovic, 1971, Reversals of Preference Between Bids and Choices in Gambling Decisions, *Journal of Experimental Psychology* 89.1, 46-55.
- Lichtenstein, S., and P. Slovic, 1973, Response-Induced Reversals of Preference in Gambling: an Extended Replication in Las Vegas, *Journal of Experimental Psychology* 101.1, 16-20.
- Markowitz, H. M, 1952, Portfolio Selection, *Journal of Finance* 7, 77-91.
- Pensions and Investments, Oct. 4, 1999, DC Choices: Sponsors Keep Piling Options on Participants' Plates, by Arleen Jacobius.
- Samuelson, W., and R. J. Zeckhauser, 1988, Status Quo Bias in Decision Making, *Journal of Risk and Uncertainty* 1, 7-59.
- Simonson, I., and A. Tversky, 1992, Choice in Context: Tradeoff Contrast and Extremeness Aversion, *Journal of Marketing Research* 29, 281-295.
- Tversky, Amos, and Richard H. Thaler, 1990, Anomalies: Preference Reversals, *The Journal of Economic Perspectives* 4.2, 201-211.
- Welch, I., Views of Financial Economists on the Equity Premium and on Professional Controversies, *Journal of Business*, forthcoming.

## Appendix A

### INVESTMENT QUESTIONNAIRE

- (1) Suppose you were offered three different investment programs through the University of California 403(b) Plan. Below you will find the annual retirement income you could expect if you invest in the different investment programs. The estimated retirement income figures are pretax in today's dollars, and they are based on your current saving behavior. Since we do not know much about other sources of retirement income you (or your spouse) might have, the information provided in the table below reflects retirement income from the University 403(b) Plan only.

	Investment Program A	Investment Program B	Investment Program C
Upside Income	\$60,300	\$81,000	\$95,900
Median Income	\$23,800	\$26,800	\$25,600
Downside Income	\$9,590	\$9,270	\$7,740

In reviewing the above table, please note that you have a 5% chance of having more than the upside income, a 50% chance of having more than the median income, and a 5% chance of having less than the downside income.

Please rate the three investment programs on a 5-point scale, with 5 being "very attractive" and 1 being "very unattractive."

	Very Unattractive				Very Attractive
My rating for Investment Program A is:	1	2	3	4	5
My rating for Investment Program B is:	1	2	3	4	5
My rating for Investment Program C is:	1	2	3	4	5

- (2) On a scale of 1 to 5, with 1 being "Not at all clear" and 5 being "Very clear," how clear was this survey?

- 1 Not at all clear
- 2
- 3
- 4
- 5 Very clear

As a thank you for participating, you will receive \$20. In addition, you might win the \$250 lottery. Once the lottery drawing is finalized, I will contact you with payment information.

## Appendix B

### INVESTMENT QUESTIONNAIRE

- (1) Do you have an opinion about the future returns on the stock market over the next ten years?
- No. (If you check this answer you may skip the rest of the questions.)
  - Yes. It will be much lower than it has been in the past 75 years.
  - Yes. It will be somewhat lower than it has been in the past 75 years.
  - Yes. It will be about the same as it has been in the past 75 years.
  - Yes. It will be somewhat higher than it has been in the past 75 years.
  - Yes. It will be much higher than it has been in the past 75 years.
- (2) How confident are you in your answer to the previous question?
- 1 (Not at all confident)
  - 2
  - 3 (Somewhat confident)
  - 4
  - 5 (Very confident)
- (3) Has your opinion about the future returns on the stock market influenced your investment choices?
- 1 (Not at all)
  - 2
  - 3 (Somewhat)
  - 4
  - 5 (a lot)

## Appendix C

### INVESTMENT QUESTIONNAIRE

(1) Suppose that you were offered three different investment programs through the SwedishAmerican retirement saving plan. Below you will find the annual retirement income you could expect if you invest in the different investment programs. The estimated retirement income figures are pretax in today's dollars, and they are based on your current saving behavior. Since we do not know anything about other sources of retirement income you (or your spouse) might have, the information provided in the table below reflects retirement income from SwedishAmerican only.

The table below shows, for each investment program, three numbers: "downside income," "median income," and "upside income." The interpretation of the three income figures is best illustrated with an example. For instance, if you elect Investment Program A, then you have a 95% chance of having an annual retirement income of at least \$9,590, a 50% chance of having at least \$23,800, and a 5% chance of having at least \$60,300. Similarly, if you elect Investment Program B, then you have a 95% chance of having an annual retirement income of at least \$9,040, a 50% chance of having at least \$25,600, and a 5% chance of having at least \$95,900. If you elect Investment Program C, then you have a 95% chance of having at least \$8,470, a 50% chance of having at least \$30,000, and a 5% chance of having at least \$115,000.

	Investment Program A	Investment Program B	Investment Program C
Upside Income	\$60,300	\$95,900	\$115,000
Median Income	\$23,800	\$25,600	\$30,000
Downside Income	\$9,590	\$9,040	\$8,470

Please rate the three investment programs on a 5-point scale, with 5 being "very attractive" and 1 being "very unattractive."

	My rating for Investment Program A is:	My rating for Investment Program B is:	My rating for Investment Program C is:
Very Unattractive	__ 1	__ 1	__ 1
	__ 2	__ 2	__ 2
	__ 3	__ 3	__ 3
	__ 4	__ 4	__ 4
Very Attractive	__ 5	__ 5	__ 5

(2) Below is a list of the investment funds that are offered through the SwedishAmerican plan. We would like to know whether or not you have an opinion about the future return on each of these funds over the next ten years. If you have an opinion, please indicate your best estimate of the future return over the next ten years relative to the S&P500 index. If you don't have an opinion, simply check the "Don't know" box.

Name of Investment Fund	Much lower than the S&P500 index	Somewhat lower than the S&P500 index	About the same as the S&P500 index	Somewhat higher than the S&P500 index	Much higher than the S&P500 index	Don't know
Dresdner Rcm Large-Cap Growth						
Deutsche Preservation Plus Fund						
Artisan Small-Cap Value						
Emerging Markets Stock Fund						
Robertson Stephens Emerg GR						
Total Equity Market Index						
International Stock Fund						
Equity Index 500 Fund						
Dividend Growth Fund						
Spectrum Income Fund						

(3) On a scale of 1 to 5, with 1 being "Not at all clear" and 5 being "Very clear," how clear was this survey?

Not at all clear					Very clear
__1	__2	__3	__4	__5	

Thank you for participating. If you have any comments, feel free to write them in the space below.

## Appendix D

### INVESTMENT QUESTIONNAIRE

(1) As you probably know, one of the benefits provided by the social security system is retirement income. You probably also know that you don't have control over the way your social security taxes are invested. However, suppose that the social security system offered you different investment programs. Below you will find the annual retirement income you could expect if you elect the different investment programs. (The retirement income figures are pretax in today's dollars.) If you elect Investment Program A, then you will receive \$900/months, regardless of market conditions. However, if you elect Investment Program B, then you have a fifty-fifty chance of having either \$1,100/month or \$800/month, depending on market conditions between now and retirement. And if you elect Investment Program C, then you have a fifty-fifty chance of having either \$1,260/month or \$700/month.

RETIREMENT INCOME PER MONTH (PRETAX IN TODAY'S DOLLARS)			
	Program A	Program B	Program C
Favorable market conditions	\$900	\$1,100	\$1,260
Unfavorable market conditions	\$900	\$800	\$700

Based on the above information, please answer the following questions:

My first choice is Investment Program    \_\_A \_\_B \_\_C  
My second choice is Investment Program    \_\_A \_\_B \_\_C  
My third choice is Investment Program    \_\_A \_\_B \_\_C

(2) Are you planning to retire in the next ten years?  
\_\_Yes  
\_\_No

(3) On a scale of 1 to 5, with 1 being "Not at all clear" and 5 being "Very clear," how clear was this survey?

\_\_1 Not at all clear  
\_\_2  
\_\_3  
\_\_4  
\_\_5 Very clear

Thank you for participating.



**Table 1**  
**Mean Ratings for Participants' Own Portfolios, the Average Portfolio and the Median Portfolio**

	N	Participants' own portfolios	The average portfolio	The median portfolio
<i>Panel A: All Participants</i>				
	157	3.07	3.05	3.86
<i>Panel B: By Portfolio Risk</i>				
Low risk	52	2.48	3.60	3.77
Moderate risk	53	3.47	2.81	4.11
High risk	52	3.27	2.75	3.69

Hundred and fifty seven UCLA plan participants were presented with the range of retirement income they could expect from their own portfolios, the average portfolio and the median portfolio. Then, they were asked to rate the attractiveness of the three (unlabelled) portfolios on a 1 (very unattractive) to 5 (very attractive) scale. In Panel A, we provide the mean ratings for the entire sample. In Panel B, we split the sample into three groups based on portfolio risk (defined as standard deviation).

**Table 2**

**Mean Ratings for Participants' Own Portfolios, the Average Portfolio and the ProManage Portfolios**

N	Participants' own portfolios	The average portfolio	The ProManage portfolios
59	2.75	3.03	3.50

Fifty-nine SwedishAmerican employees were presented with the range of retirement income they could expect from their own portfolios, the average portfolio and portfolios constructed by ProManage, a professional investment manager. Then, they were asked to rate the attractiveness of the three (unlabelled) portfolios on a 1 (very unattractive) to 5 (very attractive) scale. The table displays the mean ratings of the portfolios.

**Table 3**

**Rankings of Hypothetical Social Security Programs by UCLA Employees**

Participants' 1 <sup>st</sup> Choice	Participants' 2 <sup>nd</sup> Choice	Participants' 3 <sup>rd</sup> Choice	Frequency (%)
<i>Panel A: Participants Choosing among Program A, B and C (n=96)</i>			
A	B	C	37.5
A	C	B	5.2
B	A	C	20.8
B	C	A	12.5
C	A	B	2.1
C	B	A	21.9
Program C Preferable to Program B			29.2
<i>Panel B: Participants Choosing between Program B and C (n=80)</i>			
B	C	N/A	61.0
C	B	N/A	39.0
Program C Preferable to Program B			39.0
<i>Panel C: Participants Choosing among Program B, C and D (n=100)</i>			
B	C	D	41.2
B	D	C	1.2
C	B	D	23.8
C	D	B	12.5
D	B	C	3.8
D	C	B	17.5
Program C Preferable to Program B			53.8

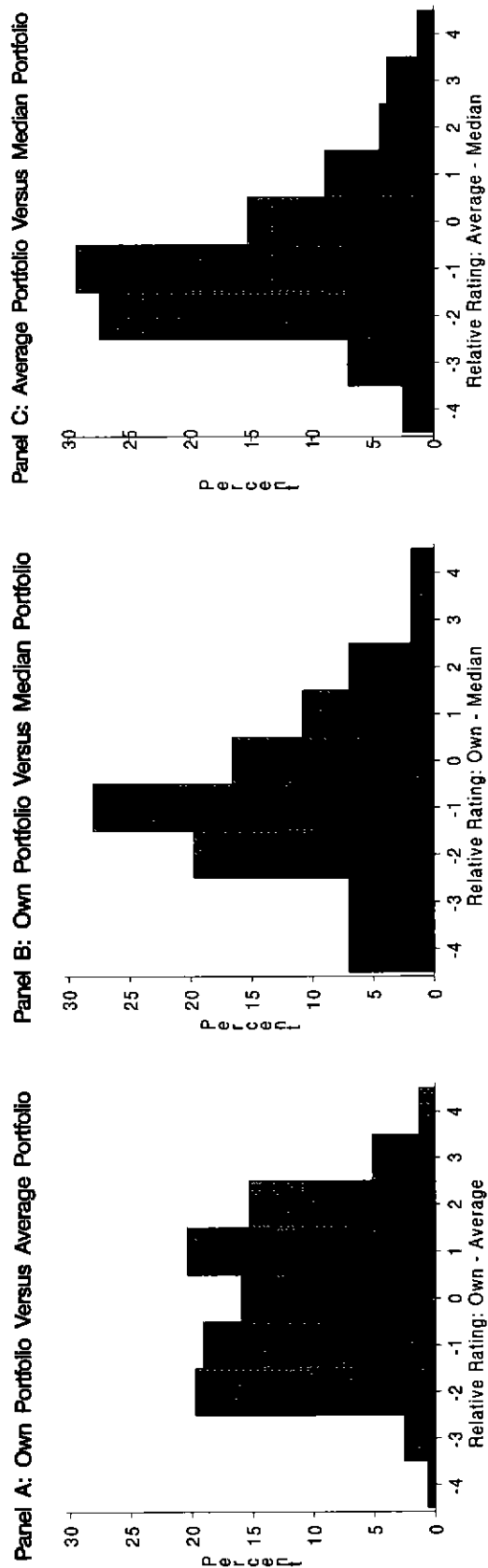
UCLA staff employees were presented with hypothetical social security programs. The monthly retirement income that the various programs provide is as follows:

	Investment Program A	Investment Program B	Investment Program C	Investment Program D
Favorable market conditions (prob. = .5)	\$900	\$1,100	\$1,260	\$1,380
Unfavorable mrkt. conditions (prob. = .5)	\$900	\$800	\$700	\$600

Panel A displays the choices of those viewing Program A, B and C; Panel B displays the choices of those viewing Program B and C; And panel C displays the choices of those viewing Program B, C and D. The table also provides the percentage of participants who prefer Program C to B.

Figure 1

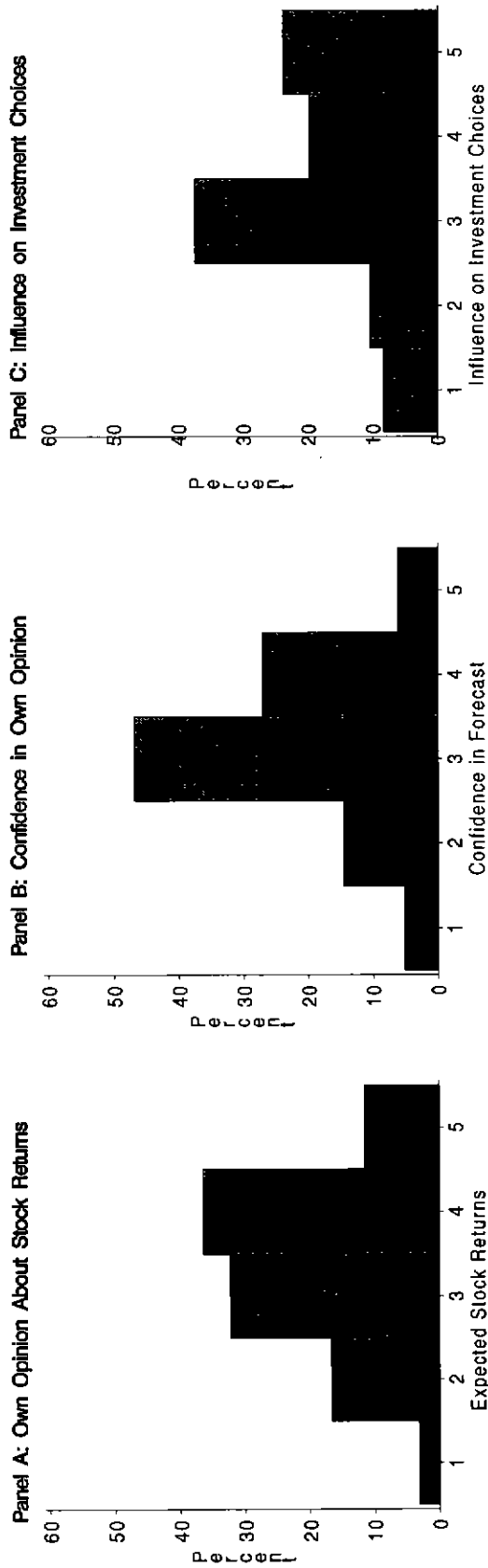
The Relative Ratings of Participants' Own Portfolios, the Average Portfolio and the Median Portfolio



Hundred and fifty seven UCLA plan participants were presented with the range of retirement income they could expect from their own portfolios, the average portfolio and the median portfolio. Then, they were asked to rate the attractiveness of the three (unlabelled) portfolios on a 1 (very unattractive) to 5 (very attractive) scale. The above histograms present the relative ratings of the portfolios. For instance, Panel A indicates that 16% of the participants are indifferent between their own portfolio and the average portfolio (i.e. rating of own portfolio minus rating of average portfolio is equal to zero).

Figure 2

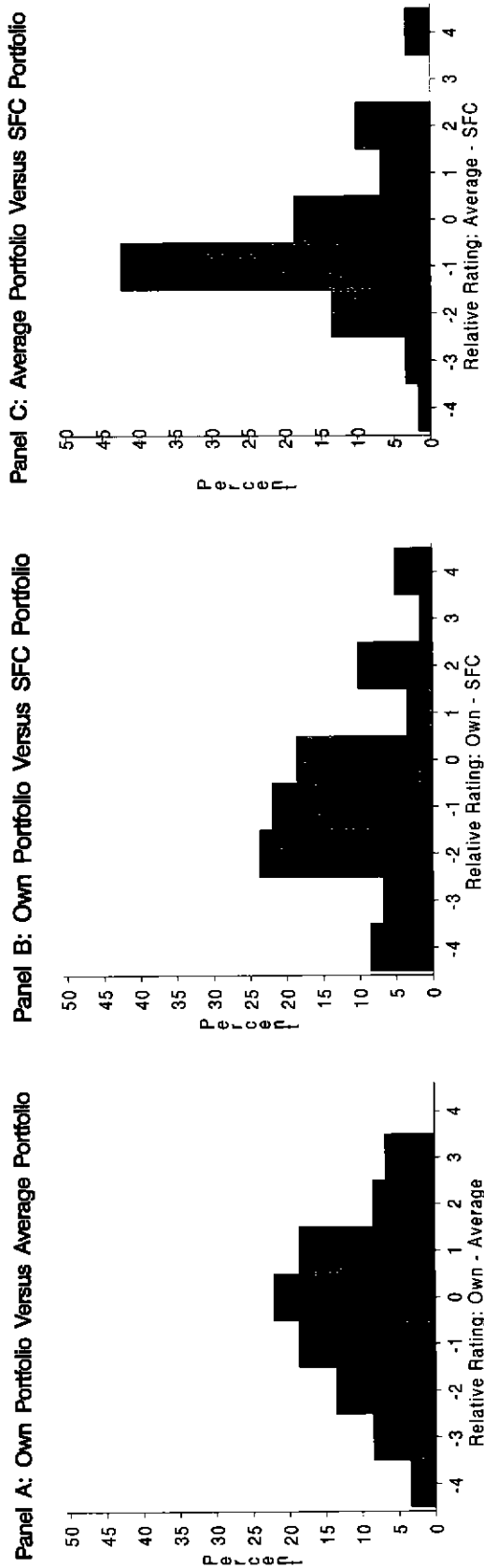
Participants' Own Opinion About the Future Returns on the Stock Market Over the Next Ten Years



Hundred and thirteen UCLA plan participants were asked for their own opinion about the future returns on the stock market over the next ten years. Seventeen of the participants did not have an opinion, and the remaining 96 participants indicated their opinion on a 1 to 5 scale (1="much lower than it has been in the past 75 years", 5="much higher than it has been in the past 75 years"). The participants were also asked for their confidence (1="not at all confident", 5="very confident") and whether their opinion influenced their investment choices (1="not at all", 5="a lot"). The above histograms present the frequency of each response. For instance, Panel A indicates that 3% of the participants believe that the future returns on the stock market will be much lower than the past 75 years.

Figure 3

The Relative Ratings of Participants' Own Portfolios, the Average Portfolio and the ProManage Portfolios



Fifty-nine SwedishAmerican employees were presented with the range of retirement income they could expect from their own portfolios, the average portfolio and portfolios constructed by ProManage, a professional investment manager. Then, they were asked to rate the attractiveness of the three (unlabelled) portfolios on a 1 (very unattractive) to 5 (very attractive) scale. The above histograms present the relative ratings of the portfolios. For instance, Panel A indicates that 22 percent of the participants are indifferent between their own portfolio and the average portfolio (i.e. rating of own portfolio minus rating of average portfolio is equal to zero).