Individual Account Investment Options and Portfolio Choice: Behavioral Lessons from 401(k) Plans

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Abstract: This paper examines how the menu of investment options made available to workers influences portfolio choice. Using a unique panel data set of 401(k) plans, we examine four aspects of investment behavior. First, we show that the share of investment options in a particular asset class (i.e., company stock, equities, fixed income, and balanced funds) has a significant effect on participant portfolio allocations across these asset classes. For example, our estimates suggest that by increasing the share of equity funds from 1/3 to 1/2 (such as by adding an additional equity fund option to a plan that already offers company stock, one equity fund, and one fixed income fund), overall participant allocations to equity funds increase by nearly 6 percentage points. Second, we show that investment restrictions – such as requiring a match in company stock or placing a ceiling on the fraction of assets that can be held in a particular asset – can change the overall risk/return profile of the portfolio much more than would be expected in a standard portfolio model. For example, restricting investment in company stock is associated with an overall reduction in all equities, not just company stock. This finding is consistent with a view that participants view such restrictions as a form of implicit investment advice. Third, we find that investors respond to past asset returns, such as by allocating a higher fraction of contributions to equities when past 5-year returns on equities have been high. Finally, we provide strong evidence of inertia in investment behavior, as it takes several years for participant contributions to fully adjust to the addition of a new fund. Each of these findings has important implications for the design of any individual account based investment program, including one that would be part of Social Security.

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1. Introduction

Over the past decade, numerous proposals have been made to reform the U.S. Social Security program to include individual investment accounts. A key issue in designing such a program is determining what investment choices to offer individual participants. Basic portfolio theory suggests that it is sufficient to provide a choice consisting of one portfolio of risky assets – the market portfolio – and one risk-free asset, and then to allow individuals to mix these two portfolios in accordance with their individual risk preferences. The vast majority of private sector defined contribution pension plans, however, offer a larger number of investment options, often allowing individuals to choose from among several equity, bond, market and balanced fund options. Individuals also have thousands of mutual funds to choose from when allocating their non-pension portfolios. Existing Social Security individual accounts proposals vary widely with respect to the degree of investment choice, with some restricting individuals to a specified mix of stocks and bonds, and others allowing a much wider range of investments.

The central question of this paper is whether the mix of investment options available to participants in an individual accounts program matters for portfolio allocation. In particular, we are interested in the "behavioral" response to the selection of fund options, over and above any "mechanical" link. By "mechanical" link, we mean changes that are required due to the imposition of a binding constraint. For example, it is obviously the case that, if an individual is prohibited from owning a particular asset class, this will alter their portfolio choice if the absence of this the constraint the individual would have invested in this asset class. Our focus is on the "behavioral" response, which might occur, for example, when a change in the menu of investment options leads to a large change in asset allocation, even though the investment opportunity set has not significantly changed. For example, imagine that an investor, faced with a choice between a diversified stock fund and a diversified bond fund, chose to allocate 50

percent of her portfolio to each fund. If this individual were provided a second diversified stock fund as a third investment alternative, then the overall investment opportunity set of this individual has not substantially changed because the additional stock fund is largely redundant of the first. In this case, standard portfolio theory suggests that this individual's optimal allocation would still be close to 50 percent bonds and 50 percent stocks.

Recent evidence suggests, however, that many individuals do not follow optimal portfolio diversification strategies. For example, Bernartzi and Thaler (2001) suggest that many people follow a "naïve" diversification strategy, such as evenly dividing contributions across all available assets (e.g., a "1/n" strategy). If this is the case, then simply changing the relative number of stock and bond funds may alter the allocation of an investor's portfolio between stocks and bonds. If people behave in this way, then firm managers or policymakers who are charged with determining the set of investment options to make available to participants in a corporate or government individual accounts program should consider how the choice of fund options will influence individual portfolio allocations.

While the U.S. has no prior experience with individual accounts as part of the Social Security system, we are fortunate in that the private pension system provides a research laboratory with which to learn about these issues. In particular, the most common form of pension in the United States, the 401(k) plan, is itself a system of individual accounts. Because plan sponsors have significant leeway in choosing which investment options to make available, there is considerable time series and cross sectional variation in the set of investment opportunities facing 401(k) participants. Using a rich panel data set on fund options and fund contributions to 401(k) plans during the 1990s, we examine several issues in this paper related to how the structure of investment options within a plan affects participant diversification.

We first focus on how the set of investment alternatives effects portfolio diversification. While prior research has suggested that overall portfolio diversification is affected by the menu of options (Bernartzi and Thaler 2001), our data allows us to do a more comprehensive examination of this issue within and across multiple asset classes over many years. We find evidence that the allocation of contributions is significantly affected by the number and mix of investment options available. For example, our estimates suggest that by increasing the share of equity funds from 1/3 to 1/2 (such as by adding an additional equity fund option to a plan that already offers company stock, one equity fund, and one fixed income fund), overall participant allocations to equity funds increase by nearly 6 percentage points. We find similar strong effects for allocations to company stock, fixed income funds, and balanced funds.

A second issue that we address is the effect of investment restrictions. This issue is particularly relevant to those individual account proposals that restrict an individual to hold a minimum fraction of one's portfolio in a particular asset class, such as bonds. In our 401(k) data, we observe investment restrictions of two types. First some companies require that individuals hold employer contributions in the form of company stock. Second, some firms impose ceilings on the fraction of an individual's portfolio that can be invested in company stock. In each case, we find evidence that these restrictions influence behavior well beyond the mechanical imposition of the constraint. For example, we provide evidence that when individuals are required to invest employer contributions in company stock, they react by investing even more of their employee portfolio in company stock (consistent with Benartzi 2001 and Liang and Weisbenner 2002), and that these funds are primarily being redirected from safer asset categories, such as fixed income funds, rather than from other equity funds. We also show that when a company places a ceiling on company stock investment, it results in an overall

reallocation away from all equities, not just company stock, and towards safer assets. In each case, these results are consistent with a view that participants view the employer restrictions as an implicit form of investment advice (i.e., the "endorsement" effect proposed by Benartzi (2001)).

Third, we study the sensitivity of portfolio allocations to past asset returns across asset classes. We show, for example, that if past five year equity market returns are higher than average, that subsequent contributions are directed more heavily towards stocks and away from fixed income securities. We find that past returns on company stock, government bonds, and money market funds also have significant predictive power for future contribution allocations.

Finally, we explore the role of investor inertia by examining participant responses over time to a change in the menu of investment options. We find a change in investment options has a gradual effect on future contributions, and that it takes 3-4 years for the effect to fully manifest itself. This suggests that individual portfolio allocations will be particularly sensitive to the initial selection of funds, a point which is particularly relevant for those individual account plans that begin with a limited number of investment options but envision an eventual increase in the array of investment choices.

This paper proceeds as follows. Section 2 provides background information on the range of investment options suggested in several existing individual accounts proposals for Social Security. We also review the relevant literature relating to the influence of investment options on portfolio allocation. In section 3, we describe our data on 401(k) plans and provide some initial summary statistics about the range of investment options available. In section 4, we provide evidence on how the number and mix of investment options influences the allocation of contributions in 401(k) plans. Section 5 concentrates on investment restrictions and past returns,

and section 6 studies the role of inertia. Section 7 concludes with a discussion of policy implications.

2. Background

2.1 Investment Options in Social Security Reform Proposals

Over the past decade, numerous proposals to incorporate individual accounts into Social Security have been put forth by commissions, members of the House and Senate, and independent groups and organizations. These proposals differ along many margins, including account size, the source of funding, changes to the traditional OASDI benefit formula, and access to funds before and during retirement, just to name a few.

One particularly important dimension is the degree of portfolio choice that individuals will have during the account accumulation phase. In general, the architects of alternative individual account proposals are attempting to balance a desire to allow portfolio choice, with a desire to keep administrative costs low and to ensure some minimum level of portfolio diversification. As a result, different plans envision providing different investment options to individual account participants.

At one end of the spectrum are plans that provide very limited choice. For example, Rep. Shaw's "Social Security Guarantee Plus Act of 2003" requires individuals to hold all account assets in a single fund that can be changed at most once per year.[1] The default option requires account balances to be invested in a manner that maintains a portfolio allocation of 60 percent stock index funds and 40 percent high-grade corporate bond index funds. The two alternative options differ only in that they permit higher equity allocations (65 percent stock / 35 percent

[1] Details on Rep. Shaw's proposal are taken from the January 7, 2003 memorandum to Rep. Shaw from the Social Security Office of the Chief Actuary "OASDI Financial Effects of the Social Security Guarantee Plus Act of 2003 (H.R. 75) – Information."

bonds or 70 percent stock / 30 percent bonds). Another plan that starts out with tight restrictions on choice is the Rep. DeMint's "Social Security Savings Act of 2003," in which account balances would initially be maintained in a default portfolio with 65 percent in a specified broad index fund of equities of U.S. corporations and 35 percent in long-term bonds issued by the Federal government. Once the IA balance reaches a specified level, two additional investments are available – a broad index of small-cap equities and a broad index of mid-cap equities.[2]

Other reform plans offer a slightly broader range of choices. For example, the models put forth by the President's Commission to Strengthen Social Security would initially limit investment options to a first tier of options that would include several broad index funds (equity, government bonds, and corporate and other bonds) plus several balanced funds.[3] This model, which is largely based on the federal government's Thrift Savings Plan, allows individuals to make equity or bond allocations ranging from 0 to 100 percent.[4]

In increasing recognition of the power of default options (e.g., Madrian and Shea 2001 and Choi, Laibson, Madrian, and Metrick 2001), an increasingly common structure for recent individual account proposals is to start participants off with a default portfolio allocation, and then allow them access to a broader set of funds once some minimum account balance is reached. One plan that allows a broad choice of investment options even at a low account balance is Rep. Ryan's "Social Security Personal Savings and Prosperity Act of 2004." This plan provides individuals with access to a "broader range of investment options ... provided by

[2] Details on Rep. Shaw's proposal are taken from the September 26, 2003 memorandum to Rep. DeMint from the Social Security Office of the Chief Actuary "Estimated Financial Effects of H.R. 3177, the Social Security Savings Act of 2003 – Information."

[3] "After several years, the board of the central authority would expand the options to include a second tier for individuals who had accumulated some threshold amount in their account. The second tier, still managed centrally, would offer a range of funds provided by approved private investment firms." From PCSSS actuarial memo.

[4] Details on PCSSS proposals are taken from the January 31, 2002 memorandum to Daniel Patrick Moynihan and Richard Parsons from the Social Security Office of the Chief Actuary "Estimates of Financial Effects for Three Models Developed by the President's Commission to Strengthen Social Security."

qualified private investment companies" as soon as an individual accumulates an account balance of $2,500 (in 2005 dollars, CPI-indexed thereafter).[5]

At the other end of the spectrum are some older plans, such as the Personal Security Account option (commonly referred to as the Schieber/Weaver plan) from the 1994-96 Social Security Advisory Council, which would have allowed virtually unfettered access to a broad universe of private sector investments.

There are numerous variations of investment options available in other reform plans. In some cases, the effect of the investment structure is obvious, such as in Rep. Shaw's proposal in which individuals must maintain one of three pre-specified mixes of equities and bonds. In other proposals, however, there are a sufficient number of choices available that individual decisions about equity vs. bond allocations are not overtly restricted. Even in these cases, however, the potential exists for the choice of investment options to strongly influence participant decisions about how to invest their individual account balances. For example, in Rep. DeMint's plan, the ultimate expansion of investment options increases the number of equity options relative to the number of bond options. Might such a change in the menu of investment options alter overall portfolio allocations? Would floors or caps on the amount that one can invest in a particular fund alter an individual's equity/bond mix, even if enough alternative equity and bond funds are available to permit any desired allocation?

The objective of this study is to provide empirical evidence on how the menu of investment options offered in an individual accounts system is likely to influence participant portfolio choices. We will do this by using data on private sector 401(k) plans, which like proposed individual accounts in Social Security, are defined contribution retirement plans that provide

[5] Details on Rep. Ryan's proposals are taken from the July 19, 2004 memorandum to Rep. Ryan from the Social Security Office of the Chief Actuary "Estimates of Financial Effects of the Social Security Personal Savings and Prosperity Act of 2004."

participants with a limited set of investment options. We can use both the time-series and cross-sectional variation in the number and type of investment options available to employees to learn how portfolio allocation is affected by plan parameters. This is an area that has been receiving increased attention in the economics literature, which we now briefly review.

2.2 Literature on Investment Options and Portfolio Choice

Within a neoclassical economics framework, the number of investment options available to an investor should matter only insofar as it alters ones ability to diversify. For example, if participants in a defined contribution account were provided with bond investment options only, and no equity investment options, then their portfolio choices would be constrained in an obvious way. In reality, however, most 401(k) plans do not restrict investments in such an overt way. Rather, the typical 401(k) plan offers participants a range of funds that invest in equities and bonds and allow participants to cover a wide range of the risk/return spectrum. As such, in a world where all participants behave according to standard finance theory, the constraints imposed by the firm's investment choices are unlikely to have a first order effect on an individual's portfolio allocation across different asset classes.

Nonetheless, more recent "behavioral" research, however, has shown that the menu of investment options selected by an employer can have a significant influence on participant portfolio allocation. For example, Benartzi (2001) and Liang and Weisbenner (2002) examine the effect of employer 401(k) match policy, and find that when employers restrict individuals to hold employer stock, an implicit "endorsement effect" leads employees to purchase more employer stock in their own accounts. Bernartzi and Thaler (2001) and Liang and Weisbenner (2002) also find evidence consistent with employees following "naïve diversification strategies," such as allocating 1/n of their contributions to each of the n investment choices available.

Samuelson and Zeckhauser (1988) and Ameriks and Zeldes (2001) show that investors are slow to rebalance portfolios, which can lead to allocations of total holdings that look very different than allocations of contributions. Madrian and Shea (2001), Choi, Laibson, Madrian, and Metrick (2001), and Agnew, Balduzzi, and Sunden (2003) document the importance of plan design and employee inertia as they show that many new plan participants invest in the plan's default investment option and are slow to move out of that option for potentially higher-return assets. In their study of company stock holdings, Liang and Weisbenner (2002) also show that key design features, such as maximum limits on certain investment options, can influence purchases of company stock beyond just the "mechanical" effect of such a limitation.

3. Data

3.1 Data Source

The primary source of data for this project is 401(k) plan level financial data from the 1990s. This rich source of data is compiled by hand from 11-k filings with the SEC, which a company files when it provides an option to invest in company stock that is deemed an offering of securities. From these filings, we collect information about the number and type of investment options offered. We categorize each investment option into one of four categories – company stock, other equity funds, fixed income funds (which includes money market, guaranteed investment contacts, government bonds, and corporate bond funds), and balanced funds. For each investment option, we collect total participant contributions, total employer contributions, and total assets. For the few firms with multiple plans, we collect data for the largest plan.

Starting with all U.S. firms listed in Compustat any year from 1993 to 1999, we identify

firms that filed an 11-k at least once during this period.[6] We were able to hand-collect data for 770 companies for which we could accurately classify their investment option, yielding 2,362 firm-year observations. As reported in table 1, most of the data are in the period 1993 to 1998, with the largest number of firms, 444, in 1998. On average, there are approximately three observations per firm, with 48 percent of the firms with two observations or less and 52 percent of the firms with three or more observations. In 1999, there was a change in ERISA reporting requirements that led to fewer companies reporting contributions by asset category, leaving us with contribution data for far fewer plans in 1999 and 2000 than in 1998.

To characterize our sample, we focus on firms in the sample in 1998, one of the more recent years with the largest number of firms. As shown in table 2a, about one-half of the sample was a member of the S&P 1500 during 1998.[7] Thus, the typical firm in our sample is smaller, measured by both market value and employees, than the typical S&P 1500 firm, but is larger than the average of all public companies as available from Compustat. The sample represents a broad cross-section of industries. As noted in the table, 17 percent of the sample is in the technology sector, somewhat less than the overall market.

Companies that issue shares for their retirement plan, rather than purchase shares on the open market, are required to file an 11-k. While this raises the possibility that the sample could be biased toward firms that do not repurchase stock, in separate work (Brown, Liang & Weisbenner 2004) we document that repurchase activity by firms in our sample does not differ from that at other publicly-traded firms.[8]

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[6] 11-k filings are available on the SEC's Edgar website starting in 1994. The 1994 filing reports plan activity during 1993. Some firms will report not only plan activity during the past year, but also plan activity over the past three years. Thus, we have 138 observations in 1992 and 38 observations in 1991.

[7] The S&P 1500 consists of the 1500 stocks that comprise the S&P 500 index, the S&P 400 MidCap index, and the S&P 600 SmallCap index.

[8] In the uncommon event that the plan does not allow employees to purchase company stock but does provide the employer match in company stock, it would generally not be deemed an offer of securities, and the plan would not

We also compare our sample of plans to those at publicly-traded firms as reported on Form 5500 filed with the DOL.[9] In the aggregate, for our sample of the largest plans at 444 companies in 1998, total plan assets were $150 billion, representing 21 percent of the $698 billion in plan assets at all publicly-traded companies (table 2b). Total contributions by participant and company for our sample totaled $9.2 billion, just under 19 percent of the $49.2 billion for publicly traded firms. Estimates from the DOL for 1998 for all US companies, public and private, are $1.54 trillion in assets and $135 billion in contributions.

A key advantage to this data over data used in prior studies on portfolio options and investment allocations is that we have a panel comprised of companies with multiple years of plan information. As such, we are able to trace how changes in investment structure influence portfolio behavior over time, while controlling for cross-sectional differences in firms.

3.2 Summary Statistics on Fund Options

In table 3, we report the number of distribution of the number of investment options available to 401(k) plan participants in our sample. The median firm provides 6 investment options, and the most common offerings are to have 5 or 6 fund available. Over 70 percent of the firm-year observations offer between 4 and 8 options, inclusive. Only 10 percent of the sample offers 11 or more funds, with the highest single number in our sample reaching 31 funds.

Table 3 also shows how, for the average firm in our sample, the total fund options offered at the end of the year are divided between four investment classes: employer stock, other equity funds, fixed income funds, and balanced funds. Because the 11-k filing is triggered for firms when they offer company stock, and because firms typically only have one company stock fund

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be required to file an 11-k. In our discussion with SEC staff, the onus is on the company to determine whether it needs to file an 11-k.

[9] Publicly-traded companies in the DOL Form 5500 data set were identified by whether they had a CUSIP and matching EINs with those in Compustat.

available to employees, it is nearly always one of the investment options.[10] More interesting is the relative numbers of equity, fixed income and balanced funds. If a firm provides only two investment options in our sample, it is always a company stock fund plus a fixed income (usually money market) fund. If the firm offers a third fund, 81 percent of the time it is an equity fund, 14 percent of the time it is a balanced fund, and 6 percent of the time it is a second fixed income fund.

As the number of options rises from three to four, about 40 percent of firms add an equity fund, 40 percent add a fixed income fund, and 20 percent add a balanced fund. Beyond this point, as the number of options rises to five, then six, and on up to 11+, equity funds account for the vast majority of the increase. For example, moving from four fund options to ten fund options, the average number of equity funds increases by 4.5, while the number of fixed income options rises by less than one, with balanced funds comprising the small remainder.

In short, table 3 illustrates the interesting fact that as firms increase the number of options available to employees, it is predominantly concentrated in an increase in the number of equity funds. If employees are not unduly influenced by the mix of options, for example by following an optimal portfolio strategy or by allocating according to a fixed allocation rule (e.g., a 60/40 equity/bond mix), then increasing the proportion of equity fund options should not have a large effect on the individual's overall equity exposure. In contrast, if the mix of options does influence behavior, as would be the case if participants follow a naïve 1/n diversification heuristic, then we would expect to see higher equity allocations at firms with more equity fund options.

[10] A handful of firms that started the year with a company stock option in the plan may have dropped it by year-end. These firms would be reported as having no company stock option.

4. How the Number and Mix of Investment Options Influence Portfolio Decisions

4.1 Composition of Investment Options and Investment Choices by Number of Funds

The results of the previous section indicate that as firms increase the number of options available, an ever-increasing proportion of these options are in equity funds, with a declining proportion in fixed income funds. A natural first question, therefore, is whether the share of contributions follows a similar pattern.

Table 4 reports how the share of funds matches up with the share of contributions to those funds (numbers are reported in percentage points). Across all asset types, there is a striking relation between the share of fund options available in each asset class and the share of contributions made to funds in that asset class. Consistent with the findings of Bernartzi & Thaler (2001) and Liang & Weisbenner (2002), the share of contributions made to company stock falls nearly proportionally with the number of total funds.

As we move from a total of three fund options to a total of ten, the fraction of equity funds rises from 27 percent to 57 percent, while the fraction of contributions made to equity funds rises from just under 20 percent to just over 60 percent. Similarly, the decline in the fraction of contributions directed toward fixed income funds closely follows the decline in the fraction of fund options in this category. To a lesser extent, the relationship holds with balanced funds as well.

Thus, table 4 provides strong suggestive evidence that the mix of investment options made available to employees influences their portfolio allocations. Specifically, as employers provide more options, they appear to be doing so primarily by adding additional equity funds, and to a lesser extent, balanced funds. Correspondingly, participants appear to be placing a higher fraction of their portfolio in equities as the fraction of equity options rises. Similarly,

participant allocations to balanced funds rise, and allocations to bond funds fall, as the share of those funds changes.

4.2 Regression Analysis

The prior table provides initial evidence that employees may be influenced in their overall portfolio allocation behavior by the mix of investment choices provided to them. To investigate this idea more completely, we turn to a regression framework.

We begin by estimating simple regressions in which the dependent variable is the share of contributions allocated to each of our four investment categories. On the right hand side, we include the fraction of investment options that are in this category. Thus, when testing for company stock, we regress the share of contributions to company stock against 1/n, which represents the share of total investment options that are comprised by the company stock fund. For equity funds, we regress the share of contributions against e/n, where e is the number of equity funds and n is the total number of investment options. We follow a similar approach for bonds and balanced funds.

If the coefficient on the share of fund options is zero, it indicates that individual portfolio allocations are not influenced by the mix of investment choices available. At the other extreme, a coefficient of one suggests that individuals, on average, follow a "1/n" strategy, implying that the mix of investment options translates nearly one-for-one into changes in portfolio allocations.[11] Significant intermediate results would indicate that the mix of investment choice

[11] Given our contribution data are firm-level, and not worker-level, it is worth pointing out that one cannot distinguish between two possible explanations for the relationship between company stock allocations and the number of options offered. The first possibility is that all workers naively diversify across multiple options and thus an increase in the number of options would reduce all workers' allocations to company stock. A second possibility, also consistent with the 1/n result, is that workers randomly put all of their 401(k) portfolio in one option, with different workers concentrating their purchases in different options, in which case an increase in the number of options would reduce the fraction of workers that concentrate all of their holdings in company stock. Benartzi and Thaler (2001) provide evidence of the former and Huberman and Jiang, 2004, Agnew, 2002, and Holden and VanDerhei, 2001 provide evidence for the latter, suggesting that both types of investors may exist.

clearly matters, though not to the full extent predicted by a strict 1/n hypothesis.

In the first row of table 5, we report the results of univariate regressions with no other controls. Each coefficient in this row is from a separate regression of the share of contributions for the particular asset class against the share of funds in this same asset class. For all four asset classes, we find coefficients that are highly significantly different from zero. For company stock and equity funds, the coefficients are approximately 0.83. To assist in the literal interpretation of this coefficient, imagine a firm has five investment options available, three of which are equity funds and two of which are fixed income funds. If the firm added another equity option, the share of equity choices changes from 3/5 to 4/6, or an increase of 6.7 percentage points. Multiplying by the 0.83 coefficient means that participants would be expected, on average, to increase their allocation to equities by 5.5 percentage points. The coefficient is a smaller, but still highly significant, 0.5 for fixed income funds, and 0.74 for balanced funds. The smaller sensitivity for fixed income funds is not surprising given that fixed income funds are often chosen as the "default" investment for participants who do not make an active alternative selection.

The literal interpretation of the coefficient estimates just provided assumes that differences in portfolio allocations across firms are not driven by other factors that could be spuriously correlated with a firm's choice of investment options. However, there are two reasons why we might be concerned that these results might be spuriously driven by year effects. First, given the unbalanced nature of our panel, as discussed in table 1, it is important to ensure that the "naïve diversification" results are not being driven by differences in market returns. For example, if firms increase the number of options over time, in our sample this corresponds with a period of rising equity markets. Thus it is important to ensure that the results are not being

driven by individuals placing more money into equity funds in response to rising equity markets. Second, it is likely that the increase in the number of investment alternatives over time was due in large part to the proliferation of different types of mutual funds offered over the past decade. For example, the ICI reports that the total number of mutual funds rose from 3,405 in 1991 to 8.171 in 2000 (Investment Company Institute, 2001).

We address both of these concerns in the second row of table 5 by including year fixed effects. Consistent with the concern that our original coefficient estimate was picking up a gradual increase in the number of options, especially during a bull market, inclusion of year effects does reduce the magnitude of the coefficient on both equity funds and fixed income funds. Importantly, however, the coefficients remain strongly positive and significantly different from zero.

Another potential concern is that there is tremendous heterogeneity across firms, and thus the potential for other forms of spurious correlation is quite high. To address this, we add firm fixed effects, both alone (row 3) and in addition to year effects (row 4). The inclusion of these 770 firm specific fixed effects soak up all variation in the allocation of contributions that can be attributed to time-invariant differences in the characteristics of firms and their employees. In other words, with firm fixed effects in place, these coefficients are identifying the relationship of interest based solely off of *within-firm changes over time* in the number of investment options offered. In addition, the row 4 results control for year effects, to counteract previously discussed concerns about market returns.

Not surprisingly, controlling for firm heterogeneity has an important effect on the magnitude of the company stock effect, with the coefficient falling to 0.27 with no year effects, and 0.26 with year effects, although still highly significant. Importantly, the influence of the

number and mix of investment options on portfolio choice is still quite strong for other equity funds. Even in a regression that controls for both year and firm fixed effects, the coefficient of 0.368 is highly significant (with a t-statistic of nearly 12). To put this into perspective, imagine a firm that began with one company stock fund, one equity fund, and one bond fund added a fourth investment option. If this fourth option were a second equity fund, then the fraction of fund options in equity would rise from 1/3 to 1/2. Applying the 0.368 coefficient indicates that this change would be expected to increase the allocation of contributions to equity by 6.1 percentage points, which represents a significant change in the risk/return profile of participant portfolios. In the year and firm fixed effects specification (row 4), the coefficient on fixed income funds is a nearly identical 0.36. The coefficient on balanced funds is even stronger, at 0.50.

These results provide clear evidence that the number and mix of investment options matter. An important policy implication of this finding is that the choice of investment options to make available in an individual accounts program is likely to have a first-order effect on the portfolio allocations that individuals make. Thus, if a system of individual accounts is introduced as part of the Social Security system, the number and mix of investment options is likely to have an important effect on the portfolio allocations of participants.

5. Effect of Other Attributes: Investment Restrictions and Past Returns

The previous section has established that the number and mix of investment options clearly matters for the portfolio choices of account participants. In addition, policymakers interested in understanding, or even influencing, portfolio decisions in an individual accounts system may wish to understand the effect of other factors as well. In this section, we explore two

additional issues: the role of explicit investment restrictions, and the effect of equity and bond market returns.

5.1 Investment Restrictions

It is not difficult to imagine an individual accounts proposal in which individuals are required to invest a minimum proportion in a particular asset (such as government bonds) or have maximum limits placed on their allocations to a particular asset class (such as international equities). Beyond the obvious mechanical effect for those individuals who find these constraints binding, what is the impact of such restrictions on overall portfolio allocations? For example, would a ceiling on international equity holdings result in reallocations toward the next riskiest asset class, or would it result in reallocations across all available funds?

There are two types of investment restrictions that occur within private 401(k) plans that allow us to provide some indirect evidence on these questions. First, some companies require that individuals invest the company contributions to their 401(k) plan in company stock. The effect of this restriction has been carefully studied in work by Benartzi (2001), Liang & Weisbenner (2002), and Brown, Liang, & Weisbenner (2004). A second type of investment restriction is that, for just over three percent of the firm-year observations, there is a ceiling on company stock holdings.

To explore the effect of these investment restrictions, we merge our sample of 11-k filings with Center of Research in Security Prices (CRSP) and Compustat data and regress the share of contributions in each investment category against a number of controls. These include binary variables for whether the firm restricts its employer match to company stock, and whether the firm places limits on a participant's allocation to company stock.

We also control for past 5 year returns on each employer's stock, overall equity markets

(i.e., large-cap equity returns), long-term government bonds, and money market funds. The company stock returns are taken from CRSP and the latter three returns are reported in Ibbotson Associates (2002). We also control for each individual company's stock price volatility (measured as the standard deviation of total returns over the past 24 months), market-to-book ratio, log of plan assets, whether the firm has a defined benefit plan, and the whether the firm's bonds are investment grade as a proxy for bankruptcy risk.

Table 6a reports the results of a cross sectional analysis, while table 6b includes firm fixed effects and thus identifies relationships solely off of within-firm variation. We report both because we do not have any time variation within firms with regard to investment ceilings, and the inclusion of firm fixed effects in table 6b renders it impossible to econometrically identify the effect of an investment limit. Similarly, one cannot identify the effect of past asset class returns if time dummies are included in the regression. As such, both tables 6a and 6b exclude year effects. The results in tables 6a and 6b are consistent with our previous results regarding the importance of the mix of plan options.

In table 6a, we are able to identify the effect of the company stock match as well as the effect of investment restrictions in the form of ceilings on company stock. Our results are consistent with previous findings (Benartzi 2001, Liang & Weisbenner 2002, and Brown, Liang, & Weisbenner 2004) that employees at firms where the employer match is restricted to company stock direct, on average, 8 percentage points more of their own contributions to company stock. Interestingly, only about one-third of this 8 percentage point increase comes out of allocations to other equity funds, while nearly 46% comes out of fixed income investments. One interpretation of this finding is that participants view the employer's match policy as an endorsement on the part of the firm that company stock is a good investment. In table 6b, the inclusion of firm fixed

effects substantially reduces the magnitude of the match policy variable, although it is still significant.

Table 6a also allows us to examine the impact of investment ceilings on company stock. For just over three percent of the firm-year observations, there is a ceiling on how much of the employee contribution can be made in company stock, ranging from 10 to 50 percent of total contributions. Among plans with a ceiling, just over one-third have an upper limit of 50 percent and an additional third have a limit of 25 percent. An even smaller fraction, less than one percent, put a floor on purchases of company stock.

Results from table 6a suggest that employees at firms that place a cap on allocations to company stock allocate, on average, 11 fewer percentage points of their contributions to company stock. A striking finding is that employees do not respond simply be shifting this 11 percentage points into other equity funds. Rather, they respond by substantially increasing allocations to fixed income funds, and, slightly *reducing* other equity allocations. These results suggest that placing portfolio limitations on individual accounts, such as a cap on international equities, may be interpreted by participants as a form of implicit investment advice, and could cause a change in the overall risk and return profile that differs substantially from what standard portfolio theory would predict. Further, a limitation placed on one asset class (in this case company stock) may have spillover effects reducing allocations to similar asset classes (in this case general equity funds).

5.2 Past Returns

Another issue that may influence portfolio choice is how various asset classes have performed in the recent past. For example, do individuals "chase" past returns, such as allocating more of their contributions to equities following a stock market run-up like the one we

observed in the late 1990s? Prior research (e.g., Bernartzi 2001, Agnew 2002, Huberman & Sengmueller 2004, and Choi, Laibson, Madrian, & Metrick 2004) suggests that individuals are more likely to invest in their employer's stock if it has performed well in recent years.

Focusing on the effect of past returns, we do find significant effects in the direction one would expect. For example, holdings of own employer stock are positively related to past 5 year returns on that stock (and negatively related to the stock's price volatility), but negatively correlated with the overall market portfolio. In contrast, the share of contributions directed toward other equity investments is significantly positively related to past 5 year market performance, and negatively related to own company stock performance. These results suggest that, on the margin, the relative performance of company stock and broader equity markets influences an individual's equity allocation between company stock and more diversified equity funds. Given an "adding up constraint," it is not surprising that we also find that higher equity market returns also predict lower allocations to bond funds.

Past returns on money market and bond instruments are negatively correlated with allocations to equity funds, and positively correlated with allocations to bonds. Because blended funds are, by definition, a mix of equities and bonds, it is not surprising that most of the return coefficients are not significantly different from zero.

The coefficients on the firm-characteristics variables are in general similar to those found in other studies. The company stock purchase rate is higher at less volatile firms, larger firms, and firms with higher market-to-book ratios (a proxy for growth opportunities). The presence of a defined benefit plan or an investment grade bond rating has little effect on participant investment decisions.

6. The Role of Inertia

In many Social Security reform proposals, the plan architects envision an ultimate expansion in the number of investment options to be made available to individual participants over time. For example, several plans envision allowing participants to gain access to a "second tier" of investment choices once their account balances reach some threshold level. Even plans that do not envision such a second tier may find that, over time, that it is desirable to expand the number of investment options, as the Federal Thrift Savings plan did in May 2001 when they increased the number of investment options from three (large cap stocks, bonds, and government securities) to five with the addition of a small/mid cap equity portfolio and an international stock fund.

If fully informed investors re-optimize their portfolio allocations each year, we would expect that, to the extent that additional investment options expand the risk/return frontier, that investors would respond immediately to any such change. However, many recent studies have found that there is a strong "inertia effect," that leads participants to be quite slow in adjusting account balances. For example, Liang & Weisbenner (2002) find that only a small fraction of employees adjust their contribution allocations each year in response to a change in the number of investment options, with some employees taking up to four to five years after new options are added to reduce company stock purchases. This result is consistent with other research that finds evidence of investor inertia in 401(k) plans (e.g., Madrian and Shea (2001), Choi, Laibson, Madrian, and Metrick (2001), Samuelson and Zeckhauser (1988), Ameriks and Zeldes (2001), and Agnew, Balduzzi, and Sunden (2003)). A recent report by Hewitt Associates found that only about one in six participants in 401(k) plans adjusted their allocations in 2002.[12]

[12] Ryst, Sonia, "Guide to Fixing your 401(k)," Wall Street Journal, Aug. 11, 2003.

To explore this effect in our data, we construct measures of the cumulative change in the number of options available at those firms for which we observe multiple years of data. In table 7a, we report this cumulative change over a five-year horizon. These results clearly indicate a significant increase over time in the number of equity options available (nearly three new equity funds are added over a five-year period), and substantially smaller increases in the number of fixed income and balanced funds (only 0.3 new bond and balanced funds are added, on average, over five years). In table 7b, we then examine changes in contributions over these same time horizons. Consistent with our earlier results that individuals respond to the mix of investment options, we find that the share of contributions going to equity funds is rising and the share flowing to fixed income funds is falling.

The question in this section, however, is whether individuals respond immediately to a change in the mix of options, or whether there is a lag in the contribution response. We test for this by regressing the cumulative change in the share of contributions over one year (table 8a) and four years (table 8b) against the year-by-year change in the share of fund options in each asset class.

The magnitude of the coefficients in table 8a are smaller than what we have previously observed, suggesting that contributions may not be immediately adjusting to the change in the mix of investment options. More direct evidence can be seen in table 8b, where we trace out the patterns over four years. The pattern of these coefficients clearly indicates a lagged response. This can be seen by the fact that the magnitude of the coefficient is generally much larger for the change that happened over the first year (i.e. four years ago), relative to the effect of later changes (i.e., a change that happened last year).

A natural interpretation of these results is that investors do exhibit inertia with regard to making portfolio choices. That is, as the number of investment options is altered, it takes upwards of several years for individuals to fully adjust their future contributions. When combined with the evidence of Samuelson and Zeckhauser (1988) and Ameriks and Zeldes (2001) that individuals rarely rebalance their existing assets, this suggests that the *initial* set of investment options made available to participants in an individual accounts program will have an important long-run effect on their overall portfolio allocation, even if additional fund choices are later added.

7. Conclusions

A key policy issue in the design and implementation of personal accounts as part of an investment-based Social Security system is how to structure the investment options that will be made available to participants. While it is well understood that the structure of investment options can have an important effect on the level of administrative expenses of an individual accounts program, we show that the number and mix of investment options can also have a first order effect on the risk and return profile of average portfolios. Even after controlling for individual firm and year fixed effects, we find a strong positive relationship between the share of investment options provided to employees that are in each asset class and the share of their portfolios invested in each asset class. This strongly suggests that average participants are not optimally allocating their portfolios according to standard finance theory predictions, but instead are following naïve strategies that subjects them to "manipulation" by non-binding changes in the number and mix of investment options. A key policy implication is that, if individual accounts are implemented as part of a reformed Social Security system, the number and mix of

investment options will have an important effect on overall asset allocation within these individual accounts. In short, it appears to be possible to influence the portfolio allocation of individual participants by altering the mix of equity and bond funds, even if the overall investment opportunity set remains unchanged.

A second finding is that investment restrictions can alter the risk and return profile of a portfolio beyond what the restriction itself imposes. We find that when individuals are required to hold their company contributions in company stock, for example, that these employees also increase their own allocations to company stock. This finding is consistent with a view that individuals view such investment restrictions as an endorsement of company stock, or implicit investment advice from the company. Similarly, we find that placing a maximum limit on the amount of company stock in one's 401(k) plan does not simply result in a shift from company stock into other equity funds. Rather, it results in a reduction in overall equity allocations, and an increase in bond allocations. This suggests that minimum or maximum portfolio allocations to specific asset classes might have stronger effects than would be predicted in a standard portfolio model.

A third finding is that individuals, on average, tend to "chase" past five year returns when allocating portfolio contributions. When equity markets have performed well, participants are likely to increase future contributions to equity funds, and reduce contributions to bond funds. Such behavior can have important consequences for the risk and return characteristics of individual portfolios, particularly following long periods of bull or bear markets.

Finally, we find that individuals adjust their contributions to the changing menu of investment options slowly over time. This "inertia" effect implies that the initial menu of portfolio options will continue to influence contribution levels for several years, even if the menu

of options is later expanded. This finding is particularly relevant for those individual account proposals that envision allowing a "second tier" of investment options once a participant's account balance reaches some minimum threshold.

In future research, we plan several extensions to the results in this paper. First, we will merge our sample with data on mutual fund performance to investigate the relationship between the number of investment options that people are offered, and the subsequent investment performance of their portfolios. This will allow us to investigate whether having a larger number of investment options from which to choose improves risk-adjusted investment performance or not. Second, we will investigate individual behavior when investors are faced with a choice between actively and passively managed funds, and its effect on portfolio balances.

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Table 1: Sample Composition

Data collected for all U.S. companies listed in Compustat any year from 1993 to 1999 that filed an 11-k at least once during 1994-2001, and for which complete fund classification was possible. See text for further details.

Year	Number of observations	Number of years in sample	Number of firms	Number of observations
1991	38	1	198	198
1992	138	2	170	340
1993	246	3	139	417
1994	263	4	87	348
1995	336	5	63	315
1996	401	6	62	372
1997	428	7	38	266
1998	444	8	11	88
1999	51	9	2	18
2000	17			
TOTAL	**2362**	**TOTAL**	**770**	**2362**

Table 2a: Characteristics of 1998 Sample, S&P 1500, and Public Firms

	1998 Sample	S&P 1500	Public Firms
Market Value ($ millions)			
Mean	4,695	7,283	2,438
Median	716	1,329	192
[10^{th} % – 90^{th} %]	[70 – 9,010]	[238 – 14,211]	[26 – 3,260]
Employees (000s)			
Mean	11.7	19.9	5.4
Median	4.0	6.6	0.5
[10^{th} % – 90^{th} %]	[0.5 – 27.5]	[0.9 – 45]	[0.02 – 10.2]
Member of S&P 1500 (%)	51	100	20
Technology Sector (%)	17	19	24

Data are from Compustat. Public firms include 7,501 U.S. firms.

Table 2b: Aggregate 401-k Plan Assets and Contributions for 1998 Sample, Public Firms, and All Firms

	1998 Sample	Public Firms	All Firms
Total 401-k Assets ($ billions)	150	698	1,541
Employee and Employer Contributions ($ billions)	9.2	49.2	134.7

Data on 401-k assets for public firms are from 1998 5500 filings with the Department of Labor. Data for all firms (public and private) are estimated by the Department of Labor. Company stock for public firms and all firms excludes stock indirectly held in trusts and pooled accounts. Employer contributions constitute 29 percent of total contributions for the 1998 sample and 31percent for all public firms.

Table 3. Mix of Fund Type by Number of Fund Options in Plan

Data from 11-k forms. "Number of Funds" is the mean number of funds of each asset class offered within 401(k) plans. See text for further information.

Total # of Fund Options Offered by Plan	Number of Observations	Number of Company Stock Funds	Number of Equity Funds	Number of Fixed Income Funds	Number of Balanced Funds
2	11	1.0	0.0	1.0	0.0
3	109	1.0	0.8	1.1	0.1
4	312	1.0	1.2	1.5	0.3
5	382	1.0	1.8	1.7	0.5
6	379	1.0	2.7	1.8	0.6
7	319	1.0	3.4	2.0	0.6
8	292	1.0	4.2	2.3	0.5
9	181	1.0	4.9	2.4	0.8
10	131	1.0	5.7	2.4	0.9
11+	246	1.0	7.8	3.0	1.4

Table 4. Comparison of Percent of Funds Offered to Percent of Contributions

Data from 11-k forms.

Total # of Funds Offered by Plan	Company Stock*		Equity Funds		Fixed Income Funds		Balanced Funds	
	Percent of Fund Options	Percent of Contributions	Percent of Fund Options	Percent of Contributions	Percent of Fund Options	Percent of Contributions	Percent of Fund Options	Percent of Contributions
2	50.0	38.9	0	7.1**	50.0	51.8	0	2.2**
3	33.0	36.0	26.9	19.4	35.5	40.6	4.6	4.1
4	24.8	24.6	30.4	31.3	36.6	38.2	8.2	5.9
5	19.8	23.1	36.3	39.2	34.1	29.3	9.7	8.5
6	16.2	16.6	44.8	50.0	29.6	25.7	9.4	7.7
7	14.1	18.0	48.9	52.4	28.6	22.5	8.4	7.0
8	12.4	16.8	52.5	53.5	28.2	23.4	6.8	6.3
9	10.9	14.4	54.0	57.4	26.6	20.0	8.5	8.2
10	9.8	12.0	56.9	60.5	23.9	20.1	9.3	7.4
11+	7.6	13.0	59.2	59.8	22.7	20.3	10.5	7.0

* A handful of firms that started the year with a company stock option in the plan may have dropped it by year-end (when we measure the composition of fund offerings), and thus the share of funds that are company stock may very slightly diverge from 1/(total number of options).

** It is possible for the percent of contributions to be positive even though the percent of options at year-end is zero when, during the course of the year, the fund options may have changed. Thus, a firm may have started the year with an equity fund, but ended the year with no equity funds available.

Table 5. Regression of Share of Contributions Against Share of Fund Options

Each cell of this table represents a separate regression. The dependent variable is the share of contributions in each asset class, and the independent variable is the share of funds in the same asset class.

		Share of Contributions in:			
	Fixed Effects?	Company Stock Funds	Equity Funds	Fixed Income Funds	Balanced Funds
Share of Fund Options	None	0.836 (0.101)	0.833 (0.031)	0.497 (0.049)	0.743 (0.034)
Share of Fund Options	Year Effects	0.876 (0.139)	0.656 (0.039)	0.258 (0.055)	0.739 (0.035)
Share of Fund Options	Firm Effects	0.273 (0.049)	0.708 (0.027)	0.784 (.0048)	0.511 (0.032)
Share of Fund Options	Firm and Year Effects	0.258 (0.063)	0.368 (0.032)	0.363 (0.051)	0.503 (0.034)

Table 6a. Regression of Share of Contributions Against Share of Fund Options, Controlling for Returns and Firm Characteristics

	Share of Contributions in:			
	Company Stock Funds	Equity Funds	Fixed Income Funds	Balanced Funds
Share of Fund Options	0.850	0.646	0.194	0.714
	(0.141)	(0.046)	(0.056)	(0.042)
Co Stock Match Required?	0.083	-0.027	-0.038	-0.021
	(0.015)	(0.013)	(0.012)	(0.005)
Limit on Co. Stock?	-0.109	-0.044	0.141	0.002
	(0.025)	(0.027)	(0.039)	(0.012)
Past 5 Year Return on:				
Company Stock	0.012	-0.007	-0.004	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Stock Market	-0.025	0.092	-0.084	0.003
	(0.010)	(0.011)	(0.010)	(0.005)
Money Market	-0.125	-0.944	1.243	-0.017
	(0.130)	(0.092)	(0.098)	(0.037)
Gov't Bonds	-0.011	-0.049	0.065	-0.003
	(0.019)	(0.017)	(0.017)	(0.008)
Std Dev of Co. Stock	-0.491	0.277	0.222	-0.023
	(0.160)	(0.149)	(0.136)	(0.062)
Market-to-Book (q)	0.010	-0.002	-0.007	-0.003
	(0.005)	(0.006)	(0.004)	(0.001)
Ln (Assets)	0.025	-0.018	-0.0009	-0.005
	(0.005)	(0.004)	(0.005)	(0.002)
DB Plan?	-0.007	-0.006	0.020	-0.006
	(0.015)	(0.014)	(0.012)	(0.006)
Inv. Grade Bonds?	-0.008	-0.009	0.004	0.001
	(0.019)	(0.014)	(0.015)	(0.016)
Firm Fixed Effects?	No	No	No	No
Number of Observations	1657	1657	1657	1657

Table 6b. Regression of Share of Contributions Against Share of Fund Options, Controlling for Returns and Firm Characteristics with Firm Fixed Effects

	Share of Contributions in:			
	Company Stock Funds	Equity Funds	Fixed Income Funds	Balanced Funds
Share of Fund Options	0.245	0.374	0.368	0.489
	(0.069)	(0.031)	(0.060)	(0.038)
Co Stock Match Required?	0.032	0.011	-0.040	-0.001
	(0.013)	(0.014)	(0.019)	(0.007)
Past 5 Year Return on:				
Company Stock	0.004	-0.003	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.0004)
Stock Market	-0.028	0.099	-0.072	-0.002
	(0.007)	(0.007)	(0.007)	(0.004)
Money Market	0.246	-1.072	0.983	-0.061
	(0.060)	(0.060)	(0.059)	(0.027)
Gov't Bonds	0.009	-0.056	0.042	0.006
	(0.012)	(0.013)	(0.012)	(0.007)
Std Dev of Co. Stock	-0.171	0.057	0.234	-0.073
	(0.125)	(0.127)	(0.140)	(0.074)
Market-to-Book (q)	0.014	-0.014	0.000	-0.001
	(0.003)	(0.003)	(0.003)	(0.001)
Ln (Assets)	0.047	-0.029	-0.014	-0.004
	(0.008)	(0.008)	(0.009)	(0.004)
DB Plan?	0.011	0.005	0.000	-0.013
	(0.009)	(0.009)	(0.008)	(0.007)
Inv. Grade Bonds?	0.004	0.002	-0.009	-0.001
	(0.010)	(0.009)	(0.013)	(0.005)
Firm Fixed Effects?	Yes	Yes	Yes	Yes
Number of Observations	1657	1657	1657	1657

Table 7a. Changes in Within-Firm Composition of Fund Options Over Time

Number of Years over which Change Occurs	Cumulative Change in Number of Funds Offered: Co. Stock	Equity Funds	Fixed Income Funds	Balanced Funds
1	0.0	+0.5	+0.1	+0.1
2	0.0	+1.1	+0.1	+0.1
3	0.0	+1.6	+0.2	+0.2
4	0.0	+2.2	+0.3	+0.2
5	0.0	+2.7	+0.3	+0.3

Table 7b. Changes in Within-Firm Contributions Over Time

Number of Years over which Change Occurs	Cumulative Change in Share of Contributions to: Co. Stock	Equity Funds	Fixed Income Funds	Balanced Funds
1	+0.000	+0.040	-0.040	+0.000
2	-0.006	+0.084	-0.081	+0.003
3	-0.011	+0.131	-0.126	+0.006
4	-0.018	+0.175	-0.166	+0.009
5	-0.030	+0.227	-0.215	+0.017

Table 8a. Regression of One-Year Cumulative Change in Contributions on One-Year Change in Share of Fund Options

Change in Share of Fund Options	Cumulative Change in Share of Contributions to: Co. Stock	Equity Funds	Fixed Income Funds	Balanced Funds
(1) ΔShare: (t+1) – (t)	0.170	0.317	0.319	0.354
	(0.062)	(0.041)	(0.069)	(0.042)

Table 8b. Regression of Four-Year Cumulative Change in Contributions on Yearly Changes in Share of Fund Options

Change in Share of Fund Options	Cumulative Change in Share of Contributions to: Co. Stock	Equity Funds	Fixed Income Funds	Balanced Funds
(1) ΔShare: (t+1) – (t)	0.701	0.478	0.558	0.622
	(0.178)	(0.093)	(0.145)	(0.078)
(2) ΔShare (t+2) – (t+1)	0.378	0.323	0.415	0.612
	(0.157)	(0.099)	(0.169)	(0.080)
(3) ΔShare (t+3) – (t+2)	0.049	0.317	0.510	0.455
	(0.178)	(0.085)	(0.176)	(0.060)
(4) ΔShare (t+4) – (t+3)	-0.077	0.205	0.339	0.343
	(0.169)	(0.071)	(0.156)	(0.096)