Why Do Individuals Choose Define Contribution Plans?

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Abstract: This paper uses a new survey of participants in the State Universities Retirement System (SURS) of Illinois to determine what factors lead individuals to choose a defined contribution (DC) pension plan over a defined benefit (DB) pension plan, holding all other employment characteristics fixed. In addition to finding that more highly educated and risk-tolerant participants prefer the DC plan, we also provide direct evidence on five hypotheses about DC pension choice. First, we find that individuals who value "control" over their investments are substantially more likely to choose the DC option. Second, we find that political risk matters: individuals with less confidence in the Illinois state legislature (the body responsible for the current under-funded status of the DB plans) are significantly more likely to choose the DC option (which is fully funded by definition). Third, our results do not suggest that the DC decision is driven by over-optimism of future equity market returns, although we do find that individuals who believe the stock market will provide higher returns than the DB plan are more likely to choose the DC option. Fourth, conditional on beliefs about future returns, investors who rate themselves as average or better than average investors are more likely to choose the SMP than those who rate themselves as worse than average. Finally, we find that a participant's knowledge of plan parameters is quite important, and that a significant minority of participants appear to make decisions based on mistaken beliefs.

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1. Introduction

Perhaps the single most important trend in the provision of retirement income in the United States over the past quarter century has been the shift away from traditional defined benefit (DB) pension plans and toward defined contribution (DC) pension plans. Numerous studies have explored the underlying determinants of this shift. On the employer side, studies have suggested that this shift is driven by factors such as the shift from large manufacturing firms (which traditionally offered DBs) to the rise of service firms (which are more likely to offer DCs), the decline of unions, reduced administrative costs associated with DC plans, and the reduction in funding risk associated with DC plans relative to DB plans (e.g., Gustman and Steinmeier 1992, Ippolito 1995, Munnell and Sunden 2004). In addition to these and other factors, much has been made of employee demand for defined contribution plans. According to Munnell and Sunden (2004), 401(k) and other DC plans are attractive to employees because they "gained control of their retirement planning," and also valued the portability of these plans as mobile workers changed jobs. The idea that employees prefer defined contribution plans for reasons such as increased control, more flexibility in portfolio choice, or increased portability has also led some to suggest a role for personal accounts as part of the U.S. Social Security system.

While there are many hypotheses about why individuals might prefer defined contribution plans, there is surprisingly little direct empirical evidence to identify which potential factors are most important. This is because in most employment environments individuals are not given a direct choice between a DB and a DC plan. Rather, the only way for most individuals to choose a DB vs. a DC plan is to choose their employer on this basis, but the choice of employer is a multi-dimensional choice over many job and employer characteristics, and it is likely that many of these other characteristics swamp the pension decision in importance for individuals on the verge of making an employment decision.

Fortunately, at least one interesting "laboratory" exists in which a large number of employees have the ability to make an explicit choice about pension type, while holding all other employment characteristics constant. Since the late 1990s, every person entering employment in the State Universities Retirement System (SURS) of Illinois is given a one-time, irrevocable choice between participating in a traditional DB system, a portable DB option, or a DC plan. Those individuals who do not make an active selection in the first 6 months of employment are automatically defaulted into the traditional plan. Because the combined employee / employer contribution to the system is large – a minimum of 14.6 percent of salary – and because state university earnings are not covered by Social Security, the financial consequences of this decision are potentially enormous.

In previous work, we analyzed administrative data from SURS, and found that the employees who choose the DC plan (known as the "Self-Managed Plan") constituted 15 percent of all employees and were disproportionately younger, with academic appointments (as opposed to staff appointments), and had higher earnings (Brown & Weisbenner 2007). While one can certainly speculate about why such individuals might value the defined contribution plan more highly, it is not possible from administrative data to provide empirical evidence on the underlying motivations. In order to move beyond the "who chooses defined contribution plans" to understand "why people choose defined contribution plans," we fielded a detailed survey of SURS participants in summer 2007. This survey, which will be described in more detail below, allows us to probe participants for detailed information about a wide range of issues, including how much they value control, their views about political risk, their degree of optimism about financial markets and their own investment abilities, their understanding of plan parameters, and other factors.

Our analysis of almost 2,500 responses yields several novel findings. First, we find that individuals who rate "control" over their investments as extremely important are approximately 45 percentage points more like to choose the DC option than an individual who ranks control as not at all important. Second, we find that political risk matters: we find a 19 percentage point difference between those are "extremely confident" in the Illinois state legislature (the body responsible for the current under-funded status of the DB plans) in the likelihood of choosing the DC option (which is fully funded by definition). Third, our results do not suggest that the DC decision is driven by over-optimism of future equity market returns, although we do find that individuals who believe the stock market will provide higher returns than the DB plan are roughly 5 percentage points more likely to choose the DC option. Fourth, conditional on beliefs about future returns, investors who rate themselves as average investors are 6 percentage points more likely to choose the SMP than those who rate themselves as worse than average. Finally, we find that a participant's knowledge of plan parameters is quite important, and that a significant minority of participants appear to make decisions based on mistaken beliefs. For example, we find that nearly 1 in 5 SURS participants mistakenly believe that the DC option offers the largest employer pension contribution, and these individuals are 20 percentage points more likely to choose the DC option.

2. Background on the SURS Pension Options[1]

[1] This background section draws heavily from our prior work using administrative data from SURS (Brown and Weisbenner 2007). A more detailed description of the three plan options can be found there.

The State Universities Retirement System of Illinois is the retirement program for all employees of the Illinois state university and community college system. Established in 1941, SURS "serves over 70 employers in Illinois, including state universities, community colleges, and state agencies. It employs more than 100 people in offices in Champaign and Chicago and provides benefit services to over 180,000 members throughout the world." (SURS website, 6/19/06). Employees include university, college or campus administrators, faculty members, administrative and clerical staff, individuals in the employ of university police, and others. Social Security taxes are not withheld from SURS earnings, and SURS participants are not eligible for Social Security coverage based on their employment with a SURS covered employer.[2] SURS withholds 8 percent of salary as an employee contribution to SURS. The State/employer contribution varies by plan.

Historically, all employees in the SURS system were covered by a traditional defined benefit (DB) system. In 1997, the Illinois Legislature passed a law allowing participating employers to offer individuals a choice of three plans, and virtually all SURS covered employers began offering this choice by 1999. The DB plan, known as the "Traditional Benefits Package," remains one of the three options available to participants, and indeed is the default option for individuals who do not make an active plan designation within 6 months of the date that SURS receives certification of their employment. Of the 8 percent of pay that participants contribute to the Traditional plan, SURS reports that 6.5 percent is designated to fund the normal retirement benefit, 0.5 percent is designated to fund automatic annual increases in retirement benefits, and 1 percent is designated to fund survivor benefits, although it is not clear how closely these reported designations match actuarial costs. Because all SURS-covered workers are employees of the State of Illinois, the employer contribution to SURS is a general State obligation. For

[2] Participants hired after March 1986 are subject to withholding for Medicare.

participants in the Traditional plan, SURS documents state that "the State's share for a retirement annuity averages about 9.1 percent of the total earnings of all SURS participants in a Defined Benefit Plan" (pg 2). This 9.1 percent figure is an over-simplification, and most likely represents a lower bound on the average cost to the State. Indeed, for fiscal year 2007, the employer normal cost for the various benefits and expenses associated with the DB plan (which includes both the Traditional and the Portable plan) are approximately 10.8 percent of payroll.[3]

Benefits from the traditional plan are paid as life annuities. For most employees there are two formulas for calculating the retirement annuity.[4] For each individual, the benefit will be calculated each way, and the worker receives the larger of the calculated amounts. The first formula, known as the "General Formula," specifies that those retiring at age 60 receive a benefit that is equal to 2.2% x Years of Service x Final Average Earnings.[5] The second formula, known as the "Money Purchase Formula," is generally equal to 6.5% of the employee's salary plus a 140% match by the State of Illinois plus interest accumulated at a rate set by the SURS Board all divided by a unisex annuity factor.[6] In recent years, the majority of retirees have received the highest level of benefits under the money purchase formula. The only additional restriction is that, regardless of method, benefits in retirement cannot exceed 80 percent of final average pay (and some individuals have lower maximum pensions based on their termination date.)[7]

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[3] Based on personal communication with SURS, August 7, 2006.
[4] A third option, known as the minimum annuity formula, is so rarely used that it is largely obsolete.
[5] For non-disabled individuals with less than 30 years of service, there is an early retirement actuarial reduction of 0.5% for each month under age 60. For retirement after August 2, 2002, retirement at any age – without reduction – is permitted if a member has 30 or more years of service.
[6] Both these approaches to calculating the benefit have numerous additional complexities that we do not expand on here in the interest of space. For example, there are special rules governing a supplemental minimum annuity guarantee, reversionary annuities to provide a spouse or dependent with higher income than the usual survivor benefits, and an additional formula that applies only to police officers and firefighters.
[7] Benefits are automatically increased by 3 percent every January 1. There are also survivor benefits both before and after retirement. In particular, the benefit that comes out of these calculations is automatically paid as a joint and 50% contingent survivor annuity. If a single individual retires under the Traditional plan, then in addition to receiving the calculated monthly benefit, he is entitled to a refund of 1/8 of his contributions plus interest.

While the Traditional Benefit Package is fairly generous for those who retire from the system, it is not very generous for those who leave the system early and take a refund. Regardless of length of service, participants in the Traditional Benefit package who take a refund from the system upon terminating employment will receive their own contributions (equal to 8 percent of salary) plus a 4.5% interest rate. No employer/State contributions are refunded, even after the individual is vested. Many individuals who leave the system early would be better off leaving their contributions in the SURS system and claiming a benefit based on the money purchase formula.

A second plan option is known as the "Portable Benefits Package." It is quite similar to the Traditional benefits package, with a few key differences. First, if the person leaves the system early and takes a refund of their contributions, they typically receive a rate of interest that is substantially higher than the 4.5% provided by the Traditional plan. Indeed, this Effective Interest Rate (which, until 6/30/05 was the same rate used to calculate retirement benefits under the Money Purchase option) has averaged over 8% for the past 20 years.[8] If an individual has at least 5 years of service, and is thus vested, he/she also receives a full dollar-for-dollar match from the State. In short, any individual who departs SURS service and takes a refund rather than leaving the money in the SURS system, the portable plan is far more generous than the traditional plan. A second key difference is that the benefits from the portable plan are not as generous as the traditional plan if the individual retires from the system. In particular, for participants in the traditional plan, the monthly benefit amount is paid as a joint and survivor annuity. Single individuals under the traditional plan can take 1/8 of their contributions plus interest as a lump-sum at retirement in lieu of the survivor benefits. In contrast, under the

[8] Since 7/1/05, the State Comptroller sets the ERI for the Money Purchase option when calculating retirement benefit. The SURS Board continues to set the ERI for refund calculations. Since 7/1/06, these rates have diverged.

portable plan, the retirement benefit is a paid as a single life annuity, and married individuals must accept an actuarial reduction to convert it to a joint and survivor annuity.

In contrast to the Traditional and Portable plans, the third option – known as the "Self Managed Plan," or SMP – is a participant-directed defined contribution plan that invests a total of 14.6% of salary (8% employee and at least 6.6% employer[9]) into an individual account. Participants are able to choose from a variety of mutual funds and annuity contracts from Fidelity and TIAA-CREF. Upon full vesting after 5 years of service, the individual who separates from SURS employment is entitled to a 100% refund of both employer and employee contributions plus any investment gains or losses. Upon retirement, the individual is able to choose from a wide range of annuities (e.g., joint and survivor with 50%, 75%, or 100% survivor benefits, and the option of 10, 15, and 20 year period certain guarantees) or a lump-sum.[10]

As discussed in our previous paper (Brown and Weisbenner 2007), the educational material provided by SURS guides new participants through the plan choice by focusing on the distinction between DB and DC plans. A reasonable inference from this material is that the Traditional Benefit Package is the best choice for individuals who expect to retire from SURS covered employment, while the SMP option is a good choice for highly mobile employees (such as new, untenured faculty members) who value choice and are comfortable making their own investment decisions. The Portable plan is largely presented as a modified version of the DB. Indeed, much of the material is structured so as to guide individuals down the DB vs. DC path first, and then discuss the Portable vs. Traditional distinction only after one has gone down the DB path. Thus, many employees may be left with the general impression that the Portable plan

[9] The 6.6% rate has been the rate applied since the program's inception. Technically, this rate could rise slightly if SURS decides that the cost of providing disability benefits to SMP participants is less than 1%. It cannot rise beyond 7.6%, and indeed is unlikely rise to anywhere near this level due to the cost of paying disability benefits.
[10] In both the Portable plan and the SMP, an individual must annuitize their account balance if they wish to be eligible for retiree health care benefits.

lies somewhere between the Traditional and the SMP on nearly all dimensions. It is true that both the SMP and the Portable plan will likely result in less generous retirement benefits than the Traditional for those who remain in the system until they retire, but both offer a more generous lump-sum refund for those who leave the system.

A comparison of the SMP to the Portable option, however, is more complex. For an employee who leaves SURS employment and takes a lump-sum refund prior to being vested (i.e., less than 5 years), the difference between the Portable and SMP plan is small. Individuals receive their own 8% contributions, plus either the SURS rate of interest if in the Portable plan or actual investment returns if in the SMP. After the 5-year vesting period, however, the differences are much larger. For participants in the SMP, the individual receives a 6.6% of salary match from the State, while participants in the Portable plan receive a larger match of 8%. Thus, from purely a financial perspective (i.e., ignoring political risk, preferences, control, etc.), if the future SURS effective interest rates remain in the 8-9% range, an SMP participant would need to generate high average annual returns in order to beat the SURS rate and compensate for the 1.4% of salary shortfall in the match rate. Assuming an 8% return for the portable plan, SMP participants must expect annual rates of return of 8.5% even with a 30-year time horizon (those with a 5-year time horizon must achieve an 11.2% average return).[11] Note that nominal returns of this level are substantially greater than what one should expect from a diversified stock/bond portfolio using historical U.S. data, let alone what one should expect if the equity premium going forward is lower than its historical realized value. If the employee retires from SURS, the SMP provides the accumulated lump sum value or a monthly benefit from annuitizing that lump sum at market rates (such as those provided by TIAA-CREF). In contrast, a retiree under the Portable plan receives the higher of the money purchase option (using an 8-9% rate not only for

[11] These calculations assume a 3% annual increase in salary, and a fixed investment return from the SMP.

accumulation, but also for the annuity calculation) or the benefit from the General Formula (2.2% of final average salary for each year of service). In expected value, therefore, the SMP is clearly an inferior choice to the Traditional or the Portable plans.

3. Why Individuals Might Choose the Defined Contribution Option?

Given the financial disadvantage of the SMP option, why would anyone choose it? There are a number of possible reasons. Importantly, these reasons are not mutually exclusive, either at the level of the SURS population (i.e., different factors may matter more to different sub-populations) or even at the level of a single individual (i.e., more than one factor may be relevant to any particular individual). The goal of our empirical analysis is to determine which, if any, of these factors appear to be empirically relevant for pension choice.

We have identified at least five reasons that individuals might choose the Self-Managed Plan within SURS. These are:

1. <u>Control</u>: One of the commonly stated benefits of defined contribution plans is that they provide participants with more control over their investments. This could include control over how to allocate their portfolio across different asset classes, or even just the ability to more easily track the value of their retirement plan.
2. <u>Political risk of the DB plans</u>: As of June 30, 2007, the State Universities Retirement System had a funding ratio (i.e., a ratio of assets to liabilities) of only 68.3%.[12] The degree of official under-funding is widely reported in the Illinois press, as well as in the regular participant newsletters sent out by SURS, and thus many participants may believe that there is a political risk that DB pension promises may not be honored in the

[12] In actuality, the funding problem is worse than these official statistics indicated because the liabilities are discounted using a high discount rate that reflects the expected return on plan assets rather than using a riskless rate of interest that would be appropriate given the constitutional guarantee of benefits to participants.

future. In reality, this political risk is substantially mitigated by the fact that Article XIII, Section 5 of the Illinois Constitution states that "membership in any pension or retirement system of the State … shall be an enforceable contractual relationship, the benefits of which shall not be diminished or impaired." This "impairment clause" means that the Legislature cannot reduce the generosity of the SURS benefit without a constitutional amendment. Nonetheless, uncertainty about the ability of the State to make good on its future funding obligations may lead some individuals to prefer the Self-Managed Plan.[13]

3. Market Optimism: To the extent that an individual believes that future returns from investing in stocks and bonds are likely to be high, they may prefer the SMP so that they can capture these higher expected returns. More precisely, if the participant believes that future stock or bond market returns are likely to be higher than the effective rate of interest that SURS provides through the Portable plan, they may view the SMP as a "better investment."
4. Investor Skill Optimism: In addition to one's beliefs about average market-wide returns on stocks and bonds, a participant may be more likely to choose the SMP if she believes that she is an above-average investor. Conversely, a participant who is not very confident in their own investment skills and/or who lacks financial knowledge, may prefer one of the defined benefit plans.
5. Lack of Plan Understanding: Given the complexity of the three plan choices, it is not unreasonable to suspect that some participants simply may not understand the choices

[13] Indeed, as of July 1, 2005, the power to set the interest rate used in calculating benefits under the money purchase formula has been transferred from the SURS Board to the State Comptroller. In addition, the money purchase option was eliminated for employees starting after July 1, 2005. Such actions likely reinforce the belief that future benefits from SURS are not free from political risk.

they are making. While a general lack of understanding might make one less likely to choose the SMP (and perhaps be more likely to accept the default option), a lack of understanding of some plan parameters may bias toward the choice of the SMP. For example, if an individual mistakenly believes that the SMP provides the highest employer/State contribution, this might lead them to mistakenly choose the SMP.

While portability of benefits is another factor that is often viewed as a benefit to choosing a DC over a DB plan, the predictions for whether an individual chooses the SMP is ambiguous due to the presence of the Portable Benefits Package. In other words, an individual who is concerned with portability should be less likely to choose the Traditional package, but more likely to choose the Portable package. Because the specifications in this paper analyzes whether one chooses the SMP, rather than the Traditional or Portable plans, we do not have a crisp prediction about the influence of portability on SMP plan choice.

Note that in order to determine which of these possible reasons for choosing the SMP are relevant, one must "get inside the heads" of participants to understand their understanding of and beliefs about SURS, general financial matters, and so forth. It is for this reason that we have undertaken a proprietary survey of SURS participants, which is described in the next section.

4. Survey Procedures and Data

4.1 Survey Methods

In cooperation with administrators at SURS and the University of Illinois Survey Research Lab, we fielded a web-based survey of SURS participants during the summer of 2007. We limited the survey to SURS participants with an active email on file who joined the SURS system after 1998 in order to ensure that the participants were making their SURS pension plan choice as new employees. Approximately 26,000 SURS participants who met our selection criteria were sent an email in late July, 2007 inviting them to participate in the survey. Those who chose to participate clicked on a link that directed them to an online questionnaire. Individuals who did not respond to the initial invitation received two subsequent invitations, with each invitation arriving approximately 2 weeks after the prior one. After three waves of invitations, we received nearly 3,600 responses, for a response rate of nearly 14%. After cutting out observations with key variables missing, we have nearly 2,500 observations, or nearly 10% of the surveyed population, on which we can conduct our multivariate analysis.

The survey covered a wide range of topics related to SURS, including questions about the individual's occupation, expected tenure under SURS, knowledge of SURS provisions, relative importance of various factors in making a decision (e.g., risk, control, etc.), knowledge and attitudes about investing, beliefs about risk and returns, confidence in various financial and political institutions, risk preferences, and basic demographics. In addition, the Survey Research Lab provided us with a dataset that merged these survey responses with SURS administrative data, so that we know the individual's actual (as well as self-reported) pension choice, employer, and so forth.[14]

4.2 Summary Statistics

Table 1 reports summary statistics for our sample. The first point to note is that the survey respondents represented a good cross-section of pension choice, with 27 percent of the sample participating in the Self-Managed Plan, 29 percent participating in the Portable plan, and the balance in the Traditional plan. These proportions are higher than the proportion of overall SURS participants in these plans: according to Brown & Weisbenner (2007), the fraction of

[14] Consistent with IRB protocols and the requirements of SURS, all data was stripped of any information that could be used to identify individual participants. This included providing categorical data rather than continuous data for items such as earnings, age, etc.

participants choosing the SMP and Portable plans over the 1999-2005 period was 15% and 19% respectively). This difference is likely driven both by the fact that SURS is less likely to have valid email addresses for individuals who accept the default option (and thus never filled out an enrollment form), and potentially the lower propensity of "defaulters" to take the time to fill out a survey. Consistent with this, conditional on making an active choice (i.e., not defaulting into the traditional plan, 32% of the sample of "active choosers" selected the SMP option, very similar to the 34% of the overall SURS participants that made an active choice.

Notably, SMP participants were generally quite good at self-identifying the plan in which they participated, with 99 percent of the participants who self-reported as SMP participants actually being SMP participants (as measured by SURS administrative data). Similarly, only 2 percent of those who identified themselves as participating in a non-SMP plan are actually SMP participants according to SURS administrative records. Throughout the rest of this paper, we will define SMP participants based on their self-reported status, but our results are virtually identical if we use SURS records and/or an intersection or union of the two definitions.

Approximately 3 out of 5 respondents is female, and just over 70 percent are married. The mean (median) age of respondents is 38 (37) years. Not surprisingly, given the population of participants, this is a highly educated group: 20% of respondents have a Ph.D., 40% have a Master's or professional degree, and another 23% have a Bachelor's degree. Most of the rest have some college or an associate's degree. 17% of the sample have at least one college degree in business, accounting, economics or finance, and 29% of the sample reports have some work experience in these areas.

The distribution of income from the SURS-covered job is quite disperse, with 20% of the sample earning less than \$20k per year, 28% earning \$20k – 40k, 28% earning between \$40k –

60k, 13% earning \$60k-80k, 4.5% earning \$80k-100k, 3% earning \$100k-120k, and 4% earning \$120k or more. Net worth (unreported in the table) is also quite disperse, with 15% of the sample having a net worth under \$20k, and 14% reporting a net worth in excess of \$500k. Over half of the respondents report owning mutual funds outside of SURS, and nearly one-third report owning individual stocks.

Our sample also exhibits nice variation in respondent expectations about one's likely length of employment under SURS, with nearly 20% of the sample indicating that it was "extremely likely" that they would work for SURS for the rest of their career, and 30% stating that this was "not at all likely."

Turning to individual attitudes towards the importance of various factors in making a pension decision, we find that safety and security rank very high. For example, 47% of the sample ranks "limiting the risk that the State of Illinois would reduce the benefits that you were promised" as "extremely important," the highest fraction for any plan attribute, and "having a safe and secure pension benefit" being rated this highly by 43% of the sample. Other factors listed as extremely important by a high fraction of the sample were "receiving the largest possible contribution to your pension plan from your SURS-covered employer" (46%), "being able to receive the largest possible benefit if you were to stay in your job until retirement" (42%), :having a pension plan that was easy to understand" (37%), "being able to withdraw the largest possible lump-sum amount if you changed jobs before retirement" (37%), and "being able to easily keep track of your pension plan balance" (31%). Issues related to investment control and portfolio choice are not ranked as highly by most individuals, with only 16% ranking as "extremely important" the idea of "having personal control over how your pension plan is invested," and only 13% ranking "being able to invest part of your pension plan in the stock market" this highly.

When it comes to investment attitudes, just under one-third of the sample ranks themselves as being "much better than others" (7%) or "slightly better than others" (26%) when it comes to rating their own skill (compared to others) in investing money, while just under a third rate themselves as being "much worse than others" (9%) or "slightly worse than others" (20%). With regard to risk preferences, 30% of the sample is "willing to take above-average financial risks, expected to earn above-average returns," while only 8% prefer "below-average" risks and returns. Also related to risk preferences, 28% of the sample would be willing to accept a job that has a 50-50 chance of doubling one's income or cutting it by one-third.

For most of the distribution, expectations about future returns seem reasonable. Respondents were asked "at the time you first became eligible to participate in SURS, approximately what average yearly return did you expect each of the following investments to provide over the next 20 years?" For the U.S. stock market, the median response was 10%, with an inter-quartile range of 8%-12%. Interestingly, the 5th percentile response was 0%, and the 95th percentile response was 25%. For government bonds, the median response was 5%, with an inter-quartile range of 3%-7%. When asked about the "effective rate of interest SURS provides in the traditional and portable benefit packages," the median response of 8% is roughly consistent with historical returns, with an inter-quartile range of 5.5% - 9%. Importantly, just under one-third of the sample reported that the expected return on U.S. stocks would be higher than the effective rate of interest provided by SURS with one-tenth of the sample expecting the reverse (the remaining 60% of the sample expected the same returns or did not have an expectation for one or both of the returns). When asked "if you invest on your own over the next

20 years, how likely do you think it is that you will earn, on average," an 8% return, most respondents gave moderate responses. Indeed, only 8% of the sample believed it was "extremely likely" that they could beat an 8% annual return, and only 6% believed this was "not at all likely."

Confidence in various institutions also varies greatly within the sample. Respondents were asked "Below is a list of institutions and organizations in this country. How would you rate your confidence in each of the following?" On a 5 point scale, it is worth noting that financial institutions, public traded companies, and the like had very few respondents rank them as "not at all confident." Similarly, the State Universities Retirement System itself received a "not at all confident" rating from only 5.5% of the sample. In sharp contrast, confidence in the Illinois State Legislature was extremely low, with nearly 40% of respondents marking "not at all confident," nearly identical to the rating for the U.S. Social Security system.

SURS participants were also asked questions to their general financial knowledge as well as their knowledge of the SURS plan parameters. While only 38% of respondents answered correctly that a money market fund only contains short-term investments (such as Treasury bills), three-quarters of the sample did correctly answer that a bond fund can decline in value. Knowledge of SURS plan parameters was mixed. Two thirds of respondents placed the fraction of salary they contribute to their SURS pension plan in the range of 6-10 percent (the employee contribution is 8 percent of salary) and three quarters of the sample did know that they do not pay Social Security taxes on their SURS-covered income. We also asked individuals whether, if they were to leave their SURS job after three years, they would get to keep nothing, own contributions but not employers, or both employer and employee contributions, for each of the three plans.[15] Only 30 percent of the sample correctly answered this question for all three plans. An even smaller fraction of the sample (9 percent) correctly answered the questions about which contributions they are entitled to keep after 10 years.

5. Empirical Results: Why Do Individuals Choose the SMP?

In order to evaluate which factors are correlated with an individual's decision to choose the SMP, we create a binary variable (=100 if they choose SMP, =0 otherwise) and run a linear probability model against the large number of covariates summarized in the last section. Thus, the coefficients on the explanatory variables are expressed in percentage points. Table 2 reports the key results. Note that in addition to the coefficients reported here, this specification includes a complete set of employer effects. Note that while these employer effects are jointly significant, their inclusion has no economically meaningful effect on the other coefficients of interest. We have also experimented with a number of alternative specifications, and found the results to be quite robust.

Turning first to demographic variables, we find that women are 3 percentage points more likely than men to choose the SMP, whereas marital status and age have no significant effect. In prior work using administrative data (Brown and Weisbenner 2007), we found that individuals with an academic appointment were significantly more likely to choose the SMP than individuals with a staff appointment, but we were unable to distinguish whether it was the type of position or the level of education that drove this result. These survey results clearly indicate that it is having an advanced degree that matters. Specifically, while there is no significant difference across groups that have a college education or less, there is a sizable and statistically significant jump in the probability of choosing the SMP for those with a Master's or Professional degree (+8

[15] The answer for all three plans is that they get to keep the employee, but not the employer, contributions.

percentage points) or a Ph.D. (+14 percentage points). In contrast, the coefficients on job classification (executive, academic professional, faculty, support staff, etc.) are all statistically insignificant. Interestingly, having a degree in business, accounting, economics, or finance is significantly and negatively correlated with selecting the SMP while having prior work experience in these areas, is not significantly correlated with one's pension choice. Perhaps surprisingly, there appears to be no income gradient. Also, owning mutual funds and stocks elsewhere in their portfolio does not make a participant any more or less likely to pick the SMP.

It would be natural to suspect that one's expected career length under SURS might matter for one's pension choice. What implication it should have for the choice of the SMP, however, is ambiguous. This is because an individual who expects to spend their entire career at SURS would likely be better off choosing the Traditional plan, but someone who expects a shorter tenure under SURS might actually be better off under the Portable plan. Consistent with this ambiguity, when we ask individuals to use a five point scale (not at all likely to extremely likely) to rate the likelihood that they would continue in the SURS system for the rest of their career, the results are insignificant. Whether these expectations matter for the choice between the Portable and Traditional plan is a question we leave for later work.

Turning now to a discussion of plan attributes, our regression results provide very strong support for the hypothesis that control over how one's pension plan is invested is highly correlated with pension choice. Earlier, we noted that 16% of the sample said that "having personal control over how your pension plan is invested" was an extremely important consideration in making their pension choice. The regression results indicate that this belief is an extremely important determinant of pension choice: those who rate control as extremely important are 31 percentage points more likely to choose the SMP than are individuals who rate this factor as "slightly" to "very" important. At the other extreme, those who rate control as "not at all important" are 14 percentage points less likely to choose the SMP. Given that 27% of the individuals in our sample choose the SMP, a 45 percentage point swing when one moves from rating control as not at all important to extremely important is a very substantial effect.

We also find a smaller, but still significant, effect of how much one values "being able to withdraw the largest possible lump-sum amount if you changed jobs before retirement." Consistent with an good understanding of plan parameters that would suggest that the Portable plan is preferable to the SMP in this regard, we find that individuals who rate the lump-sum issue as extremely important are 4 percentage points less likely, and those who rate it not at all important are 6 percentage points more likely, to choose the SMP than individuals in the middle three groups. Also consistent with an understanding of plan rules, individuals who highly value "being able to receive the largest possible benefit if you were to stay in your job until retirement" are 6 percentage points less likely, and those who rate it not at all important are 10 percentage points more likely, to choose the SMP relative to the middle ratings. Individuals who do not place much importance on "being able to easily keep track of your pension plan balance" are 11 percentage points less likely to choose the SMP.

Turning now to investment and risk attitudes, we find that individuals who rate their own skill in investing money as "much worse than others" are 6 percentage points less likely to choose the SMP. Consistent with standard predictions, we also find that individuals who rate themselves as being more tolerant of risk prefer the SMP, while more risk-averse individuals prefer other plans. Specifically, an individual who describes their risk preferences as "I am willing to take above-average financial risks, expecting to earn above-average returns" is 13 percentage points more likely to choose the SMP than someone whose risk/return preference is "average." Those who prefer "below-average" risks and returns are an additional 5 percentage points less likely to choose the SMP. As another proxy for risk aversion, we asked a question that has been used in the Health and Retirement Survey that asks the person whether they would be willing to accept a new job that has a 50-50 chance of doubling their income or cutting it by a third. We find that individuals who are willing to take the new job are an additional 3 percentage points more likely to choose the SMP than those who would not accept the new job.

We also asked individuals what average yearly return they expected from various investment types over at 20 year time horizon. Of those individuals who provide estimates, we find no direct effect of higher stock or government bond returns on pension choice. We do, however, find that individuals who provide a "don't know" answer for stocks, perhaps signaling a lack of financial knowledge, are less likely to choose the SMP. A higher estimate of the "effective rate if interest SURS provides in the traditional and portable benefit package" makes one less likely to choose the SMP, which is sensible given that a higher effective interest rate makes the alternative plans more attractive. Indeed, when we include an indicator variable for whether the individual provides an expected rate of return on stocks that is greater than their expected return on the SURS effective interest rate, we find a positive and significant effect.

Another hypothesis as to why individuals choose the SMP is that they may be concerned about the financial status of the Traditional and Portable plans. Each year, the Illinois state legislature is responsible for allocating state resources to fund the state pension plans, including SURS. For many of the last 30 years, the legislature has failed to adequately fund (or in some years, fund at all) the pension contributions. Interestingly, we find that individuals who rate their confidence in the Illinois state legislature as "extremely confident" are 19 percentage points less likely to choose the SMP, suggesting that political risk of the DB system is a relevant factor in making a pension choice. To alleviate concerns that confidence in government is simply a proxy for other preferences that might cause a spurious correlation with pension choice, it is notable that one's confidence in the U.S. Social Security system is not correlated with one's pension choice.

While general financial knowledge, such as what assets are in a money market fund and whether a bond fund can fall in value are not correlated with the SURS pension choice, knowledge – or lack of knowledge – of the SURS plan parameters clearly matters. For example, we asked individuals whether, if they were to leave their SURS job after three years, they would get to keep nothing, own contributions but not employers, or both employer and employee contributions, for each of the three plans. As mentioned earlier, only 30 percent of the sample correctly answered this question for all three plans. Those that did so were about 4 percentage points more likely to choose the SMP. An even smaller fraction of the sample (9 percent) correctly answered the questions about which contributions they are entitled to keep after 10 years, but (at least conditional on the 3 year response) this variable is not significant. Quite interestingly, however, a small fraction of respondents (3%) *mistakenly* believed that the self-managed plan allowed one to keep both employer and employee contributions after 10 years while the Traditional and Portable packages allowed only employee contributions or none at all. Individuals with this mistaken belief were 20 percentage points more likely to choose the SMP. Further underscoring the importance of plan understanding, individuals who answered correctly that the Portable benefits package is allows them to keep the largest employer contribution if they leave SURS were 10 percentage points less likely to choose the SMP. Eighteen percent of individuals, however, *mistakenly* believed that the SMP is the plan that allows the individual to keep the largest employer contribution, and individuals with this belief are 20 percentage points more likely to participate in the SMP.

Our regression also includes indicator variables for the year in which the individual made their pension choice. Consistent with our prior work, we find that the popularity of the SMP was highest in the first few years after its introduction, and that the choice of the SMP dropped significantly in 2001 and 2002, before slowly recovering in later years. While there are many factors that may be responsible for this time path of plan choice, the pattern is at least broadly consistent with the desirability of the SMP choice being influenced by concurrent equity market performance.

6. Discussion and Conclusions

Our results suggest that individuals are significantly more likely to choose the defined contribution plan option in SURS if they are female, have a graduate degree, and if they are more tolerant of risk.

We also outlined five specific hypotheses about why individuals might choose the defined contribution plan over the portable or traditional defined benefit plans. With regard to the first hypothesis, that "control" is an attractive features of defined contribution plans that make them popular among employees, we find that approximately 1 in 6 participants in SURS believes that having control over their investment choices is "extremely important." These individuals are substantially more likely to choose the SMP. Similarly, we find that individuals who place a high value on being able to track the value of their pension are also more likely to choose the SMP.

A second hypothesis about the value of defined contribution plans, particularly in the presence of an under-funded State pension plan, is that concern over political risk makes the defined contribution option more appealing. Consistent with this, our evidence suggests individuals are more likely to choose the SMP if they have a lower level of confidence in the Illinois state legislature.

We do not find a robust pattern that participants in the SMP plan are excessively-optimistic about stock or bond returns, our third hypothesis. We do, however, find that individuals who expect average future stock returns to exceed the average future effective rate of interest provided by SURS to participants in the two defined benefit plans are more likely to choose the SMP.

Our fourth hypothesis was that, conditional on beliefs about market returns, individuals who believe they are better than average investors are more likely to choose the SMP. While we do not find a statistically significant difference between those who rate themselves as better than their peers and those who rate themselves as average, we do find that individuals who are worse than average are less likely to choose the SMP.

Our fifth hypothesis is that participant knowledge – or, in some cases, lack of knowledge – matters. Our evidence is strongly consistent with this hypothesis. Overall, we find that knowledge of some relevant SURS parameters is quite low: for example, fewer than one-third of respondents are able to answer correctly questions about what combination of employer and employee contributions they would be permitted to keep if they left SURS before or after the 5-year vesting period. More importantly, it appears that many SURS participants are acting on mistaken beliefs: for example, individuals who mistakenly believe that the defined contribution option offers the most generous employer contribution are significantly more likely to choose the

Self-Managed Plan. Given that the SURS pension choice is a once-in-a-lifetime, irrevocable choice that must be made in the first six months of employment, the financial consequences of having inaccurate knowledge about the SURS program are substantial.

References

Brown, Jeffrey R and Scott J. Weisbenner. 2007. "Who Chooses Defined Contribution Plans?" NBER Working Paper No. 12842.

Gustman, Alan and Thomas Steinmeier. 1992. "The Stampede toward Defined Contribution Pension Plans: Fact or Fiction?" *Industrial Relations* 31(2): 361-69.

Ippolito, Richard. 1995. "Toward Explaining the Growth of Defined Contribution Plans." *Industrial Relations*. 34(1): 1-19.

Munnell, Alicia H. and Annika Sunden. 2004. Coming Up Short: The Challenge of 401(k) Plans. Washington, DC: Brookings Institution Press.

Table 1: Summary Statistics – Averages of Variables

PENSION CHOICE		Track pension plan balance easily	
Pick Self-Managed Plan (SMP)?	26.7%	Not at all important	4.1%
Pick SMP (given do not default)?	32.1%	Extremely important	31.3%
DEMOGRAPHICS & FINANCIAL		**INVESTMENT SKILL & RISK PREFERENCE**	
Female?	59.5%	Self-assessment of investment skill	
Married?	70.8%	Much worse than others	8.9%
Age (when joined SURS, in years) – mean	38	Much better than others	6.8%
Education		Risk- Return Tradeoff	
Less than high school	0.1%	Above average risk and return	30.2%
Completed high school	2.3%	Below average risk and return	8.1%
Some college	7.9%	Take Gamble (50/50, 100% ↑ or 33% ↓)	
Associate's degree	6.4%	Yes (No is omitted group)	28.2%
Bachelor's degree	23.3%	Don't know (No is omitted group)	21.4%
Master's or professional degree	40.0%	**ASSET RETURN EXPECTATIONS**	
Ph.D.	20.0%	Stock returns over next 20 years – mean	10.2%
College degree in finance or business?	17.0%	Don't Know Expectation	29.6%
Occupation		Gov't bond returns over next 20 years	6.3%
Executive	1.7%	Don't Know Expectation	33.6%
Academic professional	30.1%	SURS ERI over next 20 years – mean	8.4%
Faculty	31.9%	Don't Know Expectation	45.3%
Other support staff	22.6%	Stock expectation > ERI expectation	30.8%
Other	13.7%	ERI expectation > Stock expectation	8.8%
Work experience in finance?	28.9%	How likely can beat 8% return on own	
SURS-covered job income		Not at all likely	5.9%
Less than \$20,000	20.0%	Extremely likely	8.3%
\$20,000 to \$39,999	28.1%	**CONFIDENCE IN INSTITUTIONS**	
\$40,000 to \$59,999	27.7%	SURS	
\$60,000 to \$79,999	13.0%	Not at all confident	5.5%
\$80,000 to \$99,999	4.5%	Extremely confident	6.7%
\$100,000 to \$119,999	2.7%	Illinois Legislature	
\$120,000 or more	4.1%	Not at all confident	39.4%
Own mutual funds outside of SURS plan?	53.7%	Extremely confident	0.7%
Own stocks outside of SURS plan?	31.8%	U. S. Social Security	
PAST STATE PENSION, STAY IN SURS		Not at all confident	39.1%
Reciprocal service?	11.2%	Extremely confident	1.9%
Expected to stay rest of career when joined		**FINANCIAL LITERACY**	
Not at all likely	30.1%	Know assets in money market fund	37.9%
Extremely likely	19.4%	Know bond fund can fall in price	76.8%
IMPT. FACTORS IN PENSION CHOICE		**SURS PENSION LITERACY**	
Having personal control over investments		Know contribute 6-10% of salary to plan	67.0%
Not at all important	12.6%	Know do not pay Social Security tax	75.0%
Extremely important	16.5%	Know lump-sum withdraw rules after 3 yrs.	30.4%
Withdrawing largest lumpsum if leave		Know withdraw rules after 10 years	9.4%
Not at all important	12.7%	Know which plan provides largest employer contribution	26.1%
Extremely important	37.2%	**BELIEVE SMP IS BEST IN:**	
Receiving largest benefit if never leave		3-year lump-sum withdraw rule	7.3%
Not at all important	7.0%	10-year lump-sum withdraw rule	3.0%
Extremely important	41.6%	Employer contribution	18.0%

Table 2: Regression of Whether Select Self-Managed Plan (SMP), continued on next page

DEMOGRAPHICS & FINANCIAL		Own mutual funds outside of SURS plan?	0.4 (1.7)
Female?	3.3** (1.7)	Own stocks outside of SURS plan?	-0.2 (1.8)
Married?	2.1 (1.7)	**PAST STATE PENSION, STAY IN SURS**	
Age (when joined SURS, in years)	-0.1 (0.1)	Reciprocal service?	-3.1 (2.6)
Education		Expected to stay rest of career when joined	
Less than high school	Omitted	Not at all likely	0.0 (1.9)
Completed high school	Omitted	Extremely likely	-2.6 (2.2)
Some college	0.4 (5.8)	**IMPT. FACTORS IN PENSION CHOICE**	
Associate's degree	1.7 (6.1)	Having personal control over investments	
Bachelor's degree	3.2 (5.6)	Not at all important	-14.3*** (1.9)
Master's or professional degree	7.6 (5.6)	Extremely important	31.3*** (2.5)
Ph.D.	14.5*** (5.9)	Withdrawing largest lumpsum if leave	
College degree in finance or business?	-4.4* (2.3)	Not at all important	5.6** (2.6)
Occupation		Extremely important	-3.9** (1.7)
Executive	-10.5 (7.0)	Receiving largest benefit if never leave	
Academic professional	-2.1 (2.6)	Not at all important	9.6*** (3.3)
Faculty	0.0 (2.7)	Extremely important	-5.6*** (1.8)
Other support staff	1.5 (2.6)	Track pension plan balance easily	
Other	Omitted	Not at all important	-10.6*** (4.0)
Work experience in finance?	-0.9 (2.0)	Extremely important	0.8 (2.0)
SURS-covered job income		**INVESTMENT SKILL & RISK PREFERENCE**	
Less than $20,000	Omitted	Self-assessment of investment skill	
$20,000 to $39,999	-2.3 (2.6)	Much worse than others	-5.7** (2.4)
$40,000 to $59,999	0.6 (2.7)	Much better than others	-2.7 (3.1)
$60,000 to $79,999	2.3 (3.2)	Risk- Return Tradeoff	
$80,000 to $99,999	4.0 (4.5)	Above average risk and return	13.0*** (2.0)
$100,000 to $119,999	2.2 (5.4)	Below average risk and return	-5.2** (2.4)
$120,000 or more	6.3 (4.7)		

Table 2: Regression of Whether Select Self-Managed Plan (SMP), continued

Take Gamble (50/50, 100% ↑ or 33% ↓)		**FINANCIAL LITERACY**	
Yes (No is omitted group)	3.2* (1.8)	Know assets in money market fund	1.4 (1.6)
Don't know (No is omitted group)	2.9 (2.0)	Know bond fund can fall in price	0.4 (1.7)
ASSET RETURN EXPECTATIONS		**SURS PENSION LITERACY**	
Stock returns over next 20 years (conditional on have expectation)	0.2 (0.2)	Know contribute 6-10% of salary to plan	8.1*** (1.7)
Don't Know Expectation	-12.2*** (4.3)	Know do not pay Social Security tax	2.3 (1.9)
Gov't bond returns over next 20 years (conditional on have expectation)	-0.2 (0.2)	Know lump-sum withdraw rules after 3 yrs.	3.9** (1.7)
Don't Know Expectation	1.4 (3.7)	Know withdraw rules after 10 years	-0.3 (2.6)
SURS ERI over next 20 years (conditional on have expectation)	-0.7*** (0.2)	Know which plan provides largest employer contribution	-9.6*** (1.7)
Don't Know Expectation	10.0*** (3.2)	**BELIEVE SMP IS BEST IN:**	
Stock expectation > ERI expectation	5.0** (2.5)	3-year lump-sum withdraw rule	1.6 (3.3)
ERI expectation > Stock expectation	-3.4 (3.1)	10-year lump-sum withdraw rule	20.5*** (4.9)
How likely can beat 8% return on own		Employer contribution	20.3*** (2.4)
Not at all likely	-4.5* (2.8)	**YEAR EFFECTS**	
Extremely likely	-1.2 (3.1)	2000	3.0 (4.3)
CONFIDENCE IN INSTITUTIONS		2001	-10.2*** (3.7)
SURS		2002	-19.0*** (3.8)
Not at all confident	3.5 (3.6)	2003	-13.2*** (3.7)
Extremely confident	-3.4 (3.0)	2004	-10.1*** (3.8)
Illinois Legislature		2005	-6.8* (3.6)
Not at all confident	-0.1 (1.8)	2006	-3.6 (3.6)
Extremely confident	-19.4*** (6.8)	2007	-4.9 (3.9)
U. S. Social Security		**EMPLOYER EFFECTS (59 employers) are included in the regression**	p–value = 0.000***
Not at all confident	2.4 (1.7)	*Adjusted R-squared*	*0.368*
Extremely confident	4.3 (5.1)	*Sample Size*	*2,472*

The specification is a linear probability model in which the binary dependent variable, Are you in the Self-Managed Plan?, takes on the value 0 if no and 100 if yes. Thus, the coefficients on the explanatory variables are expressed in percentage points.
Standard errors, shown in parentheses, allow for heteroskedasticity.
***, **, * indicates significance at the 1 percent, 5 percent, and 10 percent levels, respectively.