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Why do individuals choose defined contribution plans? Evidence from participants in a large public plan

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ABSTRACT

We examine individual choices between a defined contribution (DC) and a defined benefit (DB) retirement plan at a large public employer. We find sensible patterns with regard to standard economic and demographic factors: the probability of choosing the DC plan decreases with the relative financial generosity of the DB plans versus the DC plan and rises with education and income. Using a survey of participants, we find that the ability to control for beliefs, preferences, and other variables not easily obtainable from administrative or standard household surveys increases the explanatory power over seven-fold. Among the important factors in the DB/DC pension choice are respondent attitudes about risk/return tradeoffs, financial literacy, return expectations, and political risk. We also find that individuals make sensible choices based on what they believe to be true about the plans, but that these beliefs about plan parameters are often wrong, thus leading to possibly sub-optimal decisions. Finally, we provide evidence that individuals' preferences over plan *attributes* (e.g., the degree of control provided) are even more important determinants of the DB/DC decision than expected *outcomes* (e.g., the relative generosity of the plans).

1. Introduction

Although much has been written about the dramatic shift in the U.S. private sector from defined benefit (DB) pension plans towards defined contribution (DC) pension plans over the past few decades,[1] less attention has been paid to the rise in the availability of individual-level choice between the two plan types in the public sector. About half of all states now provide a subset of their employees with such a choice, and this is especially common in higher education. As state and local governments grapple with the ongoing under-funding problems in their traditional DB plans, providing a voluntary DC option to partially or completely replace the DB plan is frequently suggested as part of reform efforts. Individuals in these public plans are often provided with a DB versus DC choice (as opposed to the more common private sector approach of freezing or closing the DB plan) because it is often the only way to make this shift in a setting where public DB pension plan participants have strong constitutional protections against involuntary changes to their pension plan.[2] Individual choice has also been provided in a number of international public pension reforms in recent years, and this idea was also central to some of the proposals put forth as part of the U.S. Social Security system over the past decade.[3]

Relatively little is known about what types of employees choose a DC over a DB plan when given the option to do so, and even less is known about *why* individuals make these choices. The answers to these questions are of interest for numerous reasons. First, at a very practical level, understanding what types of individuals prefer DC plans is helpful to any public or private plan sponsor considering the provision of DB/DC choice. The extent to which a plan achieves nearly any goal of pension reform (e.g., financial, distributional, or human resource goals) will depend not only on the number of employees who select the DC plan option, but also on the characteristics of these workers. Second, an understanding of why individuals choose DC plans helps to shed light on whether frequent assertions about the underlying motivations for why workers might value the opportunity to shift from a DB to DC system (e.g., that individuals valued having more control over their

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[1] Examples of papers exploring the determinants of this shift include Gustman and Steinmeier (1992) and Ippolito (1995).

[2] Brown and Wilcox (2009) discuss the range of strong constitutional protections available to public employees participating in DB plans. These range from explicit "non-impairment" clauses that specifically protect retirement system benefits to protections provided under constitutional contract clauses.

[3] Over the past 25 years, over a dozen countries in Latin America and Europe have reformed their pension systems to switch workers from a defined benefit plan to a defined contribution plan, with many of these countries allowing workers at the time of the reform a choice in the matter — see Disney et al. (1999) for a review. Argentina, Columbia, Peru, and the United Kingdom enacted reforms allowing both existing and future workers to choose between a publicly-managed defined benefit plan and a privately-managed defined contribution plan. The idea of allowing individuals to replace part of their Social Security defined benefit with contributions to a personal retirement account was a central feature of the 2001 President's Commission to Strengthen Social Security and subsequent reform proposals from the administration of President George W. Bush.

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retirement planning) have empirical support. Third, from a broader intellectual perspective, our results offer a number of insights into the growing literature on household financial decision-making, including the role of information and financial literacy.

We study the decisions of individuals in the State Universities Retirement System (SURS) of Illinois. Since the late 1990s, every person entering employment in public higher education in Illinois is given a one-time, irrevocable choice between participating in a DB or a DC plan. There are at least three features of the SURS plan that make it an attractive environment in which to learn more about the DB versus DC plan choice. First, SURS participants represent a broad cross-section of the population. Unlike many states that offer choice only to certain classes of employees, the SURS system covers all individuals in higher education, including a broad range of occupations (ranging from faculty to secretaries to maintenance workers) and a range of employers (ranging from a prestigious public research university to regional state institutions to community colleges).[4] Second, the DB/DC choice offered to SURS participants is a very consequential decision, ensuring that individuals take this choice seriously. Employment covered by SURS is not covered by Social Security, and thus the SURS system is designed to substitute for both Social Security and an employer-provided pension. This, and the fact that the combined employer/employee contribution to SURS is substantial (a minimum of 14.6% of salary), mean that this is a high-stakes decision for anyone planning to be in the system for more than a very short period of time. Of course, the downside of this particular strength is that our results may be less applicable to settings in which individuals are fully covered by Social Security and for whom a DB/DC plan decision may be less consequential because they already have a real annuity that provides a minimum guaranteed income floor. Third, the SURS administrative staff has been enormously supportive of academic research, and allowed our research team to field a detailed survey of SURS participants. This survey, which we fielded in 2007, allows us to probe participants for detailed information about a wide range of issues, including their understanding of plan parameters, preferences over financial decisions, financial literacy, and much more.

Our analysis, which is based on the 1441 survey respondents who made their initial pension-plan election in 2006 or 2007, yields several novel findings. First, we find sensible patterns with regard to economic and demographic factors: the probability of choosing the DC plan decreases with the relative financial generosity of the DB plans versus the DC plan[5] and rises with education and income. However, while the relative generosity of the plans does have a nontrivial effect on pension plan choice, it certainly is not a "sufficient statistic" in explaining that choice nor is it the most important determinant in terms of its economic magnitude. Second, we find that the ability to control for beliefs, preferences, financial skills, and plan knowledge – variables that are not available in standard administrative data sets – increases the amount of variation in plan choice that we are able to explain by approximately seven-fold, relative to using standard economic and demographic variables alone. Specifically, as measured by adjusted R-squared, economic and demographic characteristics such as gender, marital status, presence of children, education, income, net worth, occupation, and (self-reported) health can explain only 6.2% of the overall variation in the DB versus DC plan choice (adjusted R-squared = 0.062). When we expand our regression to include information about beliefs, preferences, financial skills, and plan knowledge, the adjusted R-squared rises to 0.471. Among the important factors in the DB/DC plan choice are respondent attitudes about risk/return trade-offs, financial literacy, beliefs about plan parameters, and attitudes about the importance of various plan attributes. Third, we note that beliefs about plan parameters are important *even when these beliefs are incorrect*. In general, people seem to make sensible choices based on what they believe to be true about the plans, but they do not always have accurate beliefs (and thus may not be making optimal decisions). Finally, we provide evidence that preferences over the attributes of the retirement system (e.g., the degree of control provided) are also significant determinants of the DB/DC plan decision.

This paper proceeds as follows. In Section 2, we discuss the availability of DB/DC choices in public plans across the U.S. In Section 3, we provide more detailed information about the choice setting confronting participants in Illinois SURS. In Section 4, we discuss our survey procedures and methods. We present our empirical results in Section 5 and provide further discussion and conclusions in Section 6.

2. How common is DB/DC plan choice in the U.S. public sector?

In the private sector, it is uncommon to allow participants to have a choice between a DC and a DB plan. Although many employers sponsor both DC and DB plans, they are generally not structured so as to allow choice: instead, the plans are designed to cover different employees, or the DC plan is designed as a (sometimes mandatory, sometimes voluntary) supplement to the DB plan.

In contrast, an explicit DC or DB choice is fairly common in the U.S. public sector, especially in higher education. Many states have a core public DB plan, but then offer an "alternative" or "optional" DC plan as a substitute into which individuals can voluntarily opt to participate instead of the DB plan. Although we are unaware of any single data source that provides a definitive list of DB versus DC plan choice among public plans in the U.S., we believe that we have compiled a reasonably comprehensive list of plans through a variety of channels. First, for non-higher-education employees, we rely on the work of Clark and Hanson (2011), who reviewed 105 of the largest public retirement plans for general state employees and public school employees in each of the 50 states. Although they were interested in a different set of research questions, Table 2 from their paper provides the following break-down of plans that offer choice:

Choice between DB and DC	Choice between DC or combination plan	Choice between DB or DC or combination plan
CO PERA	UT PERS-tier 2	OH PERS
FL FRS	WA PERS	OH STRS
MT PERS	WA TRS	
ND PERS		
SC SCRS		

The Clark and Hanson data does not cover higher education plans, except for those in which the higher education employees are part of another plan (such as Ohio STRS). To examine this sector – where plan choice is more common – we began with a list of state plans that provide choice that was compiled by the government affairs office of a large financial services institution with a large market share in the higher education space. We independently verified the presence or absence of a DC versus DB plan choice by going to the websites of the state plan or the benefits website for a range of institutions in the state. As a general rule, we found that it was relatively straightforward to document the states that offer a choice, as the presence of such a choice was often prominent in the materials provided to new employees. In contrast, it is more difficult to definitively document the absence of such a choice and thus our list is a lower bound on the number of states providing choice.

Based on this analysis, our best estimate is that approximately half of all states offer at least a subset of higher education employees a choice between a DB and a DC plan. States for which we have been able to

[4] Clark and Pitts (1999) and Clark et al. (2006) analyze the DB/DC plan choice of new entrants in the University of North Carolina system, but their studies are restricted to faculty and they have only administrative records.

[5] As we will discuss below, the relative generosity of the plans varies with the age, gender, and marital status of the individual.

independently confirm that at least some higher education employees have the ability to choose between a DB and DC plan include:

Alaska	Arizona	Arkansas	Connecticut	Florida
Georgia	Illinois	Iowa	Kentucky	Louisiana
Maryland	Massachusetts	Michigan	Mississippi	Montana
New Mexico	New York	North Carolina	Ohio	Pennsylvania
South Carolina	Tennessee	Texas	Virginia	Wyoming

Although we are unable to provide an accurate estimate of the overall number of employees facing such a choice, our analysis of the plan documents reveals several interesting facts.[6] First, for those plans that offer choice, the vast majority require that the choice is permanent and irrevocable. There are a few plans that allow a one-time option to switch plans (for an analysis of this option in Florida, see Lachance et al., 2003, and Milevsky and Promislow, 2004), but this is the exception rather than the rule. Second, most plans that offer such a choice use the traditional DB plan as the default option for those that do not elect the DC plan within a specified time period. Third, there is meaningful variation in the time period allowed to make such a choice, ranging from one to six months.

3. The SURS pension choice

The State Universities Retirement System (SURS) of Illinois is the retirement program for all employees of the Illinois state university and community college system.[7] Established in 1941, SURS "serves over 70 employers in Illinois, including state universities, community colleges, and state agencies … and provides benefit services to over 180,000 members throughout the world" (SURS website). Employees include university, college or campus administrators, faculty members, administrative and clerical staff, 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.[8] SURS withholds 8% of salary as an employee contribution to SURS. The "normal cost" to the state (i.e., the present value of benefits that participants have accrued during a year) for the DB plans was approximately 10.8% of payroll at the time our survey was conducted, and approximately 8% for the DC plan.[9] Because all SURS-covered workers are employees of the State of Illinois, the "employer contribution" to SURS is a general State obligation rather than the responsibility of each individual university or other employer.

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, with implementation starting in 1998 and virtually all SURS covered employers offering this choice by 1999. The DB plan, known as the "Traditional Benefits Package," continues to serve as 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. In return for their 8 percent contribution, participants are entitled to a retirement benefit, cost-of-living adjustments after retirement, and survivor benefits.

Benefits from the Traditional plan are paid as life annuities. For the individuals in our sample who joined the plan in 2006 or 2007, the traditional benefit formula specifies that those retiring at age 60 receive a benefit that is equal to 2.2% × Years of Service × Final Average Earnings, up to a maximum of 80% of final average earnings.[10] Once an individual is receiving benefits, they receive a 3 percent benefit increase every January 1. The benefit derived from this formula is automatically paid as a joint and 50% contingent survivor annuity. If an unmarried individual retires under the Traditional plan, then in lieu of the survivor benefit, he receives a refund of 1/8 of his contributions plus a specified interest rate.

Prior to July 1, 2005, individuals choosing the DB plan had their benefit calculated as the higher of this DB formula and a second "money purchase formula" which had many features of a DC plan (e.g., matching contributions and an annually-set rate of return). By limiting our sample to 2006 and 2007, we are able to focus on individuals who faced a "clean" choice between a pure DB plan – without the DC-like money purchase option – and a DC plan. An additional advantage of restricting our attention to this group is that it ensures that the choice was a very recent one as of the time of our survey.

Although the Traditional DB plan provides a high replacement rate for long-career employees, it is not very generous for those who leave SURS employment and take a refund (i.e., take a lump-sum payment). 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 plus a 4.5% interest rate on those contributions, but will receive no employer contributions.

A second version of the DB plan, known as the "Portable Benefits Package," is available to those who want a DB plan with a better separation package. Under the Portable DB, if the person leaves the system early and takes a refund of their contributions, they receive a dollar-for-dollar match from the state (if they meet the 5-year vesting requirement) and are credited with a rate of return that is substantially higher than the 4.5% provided by the Traditional plan. Indeed, this "Effective Interest Rate" (ERI), which is set each year by the SURS Board, had averaged over 8% for the 20 years leading up to the date of our survey. In return for receiving a more generous refund option, the Portable DB plan is less generous than the Traditional DB plan for those that retire from the system. Specifically, married participants in the Portable plan must take an actuarial reduction in benefits to obtain survivor benefits (whereas these are provided with no actuarial reduction in the Traditional plan), and single participants are not eligible for the partial refund of contributions that they can obtain from the Traditional plan. In all other important respects, these two DB plans are identical.

SURS participants also have a DC plan option that they can choose in lieu of either of the two DB plans. This "Self-Managed Plan" (SMP) is a participant-directed DC plan that invests a total of 14.6% of salary (8% from the employee and at least 6.6% from the employer[11]) into an individual account managed by Fidelity or TIAA-CREF (or both, if

[6] There are three reasons it is difficult to construct such an estimate. First, not every higher education institution within each state participates in the same plan. For example, in Kentucky, the largest public universities (e.g., University of Kentucky, University of Louisville) do not offer a choice, whereas most of the regional universities (e.g., Western Kentucky, Kentucky State) do offer a choice. Second, even at some universities that offer choice, the choice is not always available to all employees. For example, classified civil service employees in the Louisiana State system have no choice but to participate in the Louisiana State Employees' Retirement System (LASERS), a DB plan, whereas full-time faculty members in the LSU system are offered a choice between the Teachers' Retirement System of Louisiana (TRSL) and an optional DC plan. Third, even in states that provide choice to all higher education employees, the availability of choice is new enough that not all current employees were eligible to choose at the time they joined the system. For example, although the State Universities Retirement System (SURS) of Illinois has existed for approximately 70 years, the option to choose a DC plan was only introduced in 1998.

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

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

[9] Based on personal communication with SURS, August 7, 2006. As we discuss below, SURS offers participants one DC plan and two DB plans (a "Traditional" and a "Portable" version) from which to choose.

[10] 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.

[11] 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 to rise anywhere near this level due to the cost of paying disability benefits.

the individual wishes to divide their assets across the two fund providers). After 5 years of service, an individual who separates from SURS employment is entitled to a 100% refund of employer and employee contributions plus any investment gains or losses. Upon retirement, the individual is able to withdraw the money as a lump-sum or may 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).

The educational material provided by SURS at the time our participants were making this choice guided new participants through the plan choice by focusing on the distinction between the DB and DC plans. Those that go down the DB path are then presented with a choice between the Traditional and Portable plans. The focus of this paper is on the first branch of this decision tree – namely, whether to take a DC or a DB plan – although we will supplement our main results with a multinomial approach to highlight the few places where there are significant differences in characteristics between those that chose the Traditional DB plan and those that chose the Portable DB plan.

Obviously, one key determinant of the DB/DC decision should be the relative generosity of the plans. To control for this, we calculated the NPV of benefits under each of the three plans for every combination of starting age (18 to 59 years), marital status (which affects whether an individual receives survivor benefits or a partial refund when they retire from the Traditional plan) and gender (which affects the actuarial value of the DB plan annuities because of the differential life expectancies of men and women).[12] We then constructed the "ratio of maximum pension wealth from the two DB plans to that from DC plan" under various time horizons (with our analyses focusing in particular on the ratio of pension wealth under employment tenure of ten years). In other words, for each individual, we calculated the NPV of the Portable plan and the Traditional plan, take the maximum of these two, and then divide by the NPV of the DC plan. As one might discern from the differences in the normal cost of the DB versus the DC pensions mentioned above, the DB plans are, on average, more generous than the DC plan. For example, using a 10-year employment tenure, we find that the NPV of benefits under the more generous of the two DB plan options is, on average, 69% higher than the NPV of benefits under the DC plan (as reported in Table 1). At the low end, a refund from the Portable plan is approximately ten percent greater than the refund from the SMP plan, even with the same assumed rate of return, owing to the fact that the employer match on a refund from the Portable plan is greater than the employer match on the DC plan. For many individuals, their benefit is higher by keeping their money in the system and retiring with the Traditional DB annuity rather than an accumulated DC balance. At the 75th percentile of the distribution of this ratio, for example, the NPV of taking the Traditional DB annuity is 2.31 times the value of the accumulation in the DC plan.

Notably, from purely an expected value perspective, at least one of the DB plans always dominates the DC plan. This was an intentional feature of the original plan design, as one of the goals of reform was to reduce the state's retirement plan costs. Nonetheless, nearly a third of our sample chose the DC plan, and one goal of our analysis is to understand why. Given that there is large variation in the relative generosity of the plans based on individual characteristics, we control for this ratio in all of our specifications, under the hypothesis that the choice of the DC plan will be more likely when the ratio of DB to DC benefits is lower.

[12] We apply plan rules to individuals at each starting age assuming a 3 percent nominal growth rate in salaries, an 8 percent expected nominal return on the SMP and an 8 percent expected ERI on the Portable refund option. We calculate the NPV of all benefits as of the later of age 60 or 10 years of service. For the SMP plan, this is simply the accumulated value of the contributions plus investment returns. For the DB refund, we apply plan rules as described above. For DB benefits, we calculate the monthly annuity and convert it into its actuarial lump-sum equivalent by applying the age and sex specific annuitant mortality rates from the Annuity 2000 mortality table, discounted at 3%.

4. Survey procedures and data

4.1. Survey methods

In cooperation with the 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 sent a survey link via email in July 2007 to SURS participants that made a DB/DC plan choice and for whom SURS had a valid email address. 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 two weeks after the prior one. Several months later, we sent out a series of three additional reminders, again two weeks apart, to those who had not yet responded. Our overall response rate was nearly 20%. DC plan participants are over-represented in our survey because SURS is missing email addresses for some of the participants who defaulted into the DB plan. However, our survey respondents are very representative of the population of those who were sent the survey (i.e., those for which SURS had a valid email address). We limit our analysis to those SURS participants who joined the SURS system in 2006 and 2007 in order to ensure both that the choice is a recent one and that the DB plan options were not contaminated by the hybrid nature of the DB plans prior to July 1, 2005 (as discussed above). We also restrict our sample to those who were less than 60 years old when they enrolled in SURS (of the 2006–2007 sample, only 50 respondents were 60+ when they joined). This yields a final sample of 1441 respondents.

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 the Illinois government, risk preferences, and basic demographics. In addition, the Survey Research Lab provided us with a dataset that merged these survey responses with basic SURS administrative data, so that we know the individual's actual (as well as self-reported) pension choice and other administrative details such as gender and age at the time of joining SURS.[13]

4.2. Summary statistics

Table 1 reports summary statistics for our sample. Our main variable of interest, which we will use as the dependent variable in our specifications, is whether an individual chose the DC plan over the DB plans (based on administrative records). In our sample, 31.9% of individuals chose the DC plan. The remaining 68.1%, thus, are in one of the two DB plans (31.6% are enrolled in the Traditional DB and 36.4% picked the Portable DB).

In our analysis below, we will group our control variables into two broad categories. First, we will control for a broad range of standard demographic and economic variables, including the relative generosity of the DB plans versus the DC plan after ten years of service as discussed above. We will also include direct controls for sex, marital status, age, education, occupation, income, net worth, financial asset ownership, health, and whether the individual has reciprocal service in another DB plan, a characteristic that would make the DB plan more attractive.[14] These controls are a combination of variables that are often found in administrative data (e.g., age) and variables that

[13] Consistent with IRB protocols and the requirements of SURS, all data was stripped of any information that could be used to identify individual participants.

[14] SURS is one of 13 statewide and local public retirement systems in Illinois that allows members, under certain conditions, to add years of service accrued under the other public plans (called "reciprocal service") to years of service under their plan. Thus, someone joining SURS with reciprocal service from another plan will be entitled to a larger DB benefit under SURS than someone without that prior service.

Table 1
Summary statistics — averages of variables.

Pension choice	
Pick Self-Managed Plan (i.e., the DC plan)?	31.9%
Ratio of max pension wealth from the two DB plans to that from DC plan (ten-year horizon)	
Average of ratio	1.69
25th percentile of ratio	1.10
Median of ratio	1.10
75th percentile of ratio	2.31
Demographics & economics	
Female and married?	41.6%
Female and single?	22.3%
Male and married?	26.7%
Male and single?	9.5%
Age (when joined SURS, in years) — mean	37
Have children?	55.4%
Education	
Less than bachelor's degree	15.7%
Bachelor's degree	25.8%
Master's or professional degree	38.4%
Ph.D.	20.0%
College degree in finance or business?	17.3%
Work experience in finance?	28.0%
Occupation	
Support staff (secretary)	22.1%
Executive	1.3%
Academic professional	32.0%
Faculty (tenured)	1.3%
Faculty (tenure-track, not tenured)	9.7%
Faculty (non-tenure track)	20.4%
Other	13.1%
SURS-covered job income	
Less than $20,000	23.5%
$20,000 to $39,999	30.3%
$40,000 to $59,999	27.9%
$60,000 to $79,999	9.1%
$80,000 to $99,999	4.5%
$100,000 or more	4.8%
Share of family income in SURS-covered job	
0–24%	24.3%
25–49%	19.2%
50–74%	19.5%
75–100%	37.0%
Household net worth	
Less than $20,000	19.6%
$20,000 to $49,999	14.7%
$50,000 to $99,999	21.9%
$100,000 to $249,999	24.0%
$250,000 to $499,999	10.0%
$500,000 or more	9.8%
Own mutual funds outside of SURS plan?	48.8%
Own stocks outside of SURS plan?	27.1%
Have life insurance (excluding from work)?	51.6%
Have supplemental disability insurance?	20.3%
Ranking of health relative to others	
Very poor or poor	1.8%
Average	19.9%
Good	47.5%
Excellent	30.8%
Reciprocal service (DB option is attractive)?	11.7%
Paid Social Security for at least 20 years?	37.1%
Belief of how long stay in SURS	
Expected to stay at least 10 years when joined	
Not at all or slightly likely	41.9%
Moderately likely	27.0%
Very or extremely likely	31.1%
Risk preference & invest skill	
Risk–return tradeoff preference	
Above average risk and return	29.3%
Average risk and return	62.6%
Below average risk and return	8.1%
Take gamble (50/50, 100% ↑ or 33% ↓)?	
No	47.9%
Yes	28.5%
Don't know	23.5%
Self-assessment of investment skill	
Much or slightly worse than others	29.7%
Same as others	40.3%
Slightly or much better than others	30.0%
Financial literacy	
Can calculate compound interest over 2 years?	55.2%
Basic SURS pension literacy	
Know contribute 6–10% of salary to plan?	67.2%
Know do not pay Social Security tax?	70.7%
Believe SMP is best in:	
3-year lump-sum withdraw rule	8.8%
10-year lump-sum withdraw rule	4.1%
Employer contrib. when withdraw in 10 years	19.0%
Believe Traditional is best in:	
3-year lump-sum withdraw rule	3.6%
10-year lump-sum withdraw rule	2.9%
Employer contrib. when withdraw in 10 years	17.7%
Believe Portable plan is best in:	
3-year lump-sum withdraw rule	8.5%
10-year lump-sum withdraw rule	4.8%
Employer contrib. when withdraw in 10 years	27.9%
Asset return expectations	
Stock returns over next 20 years — mean	10.2%
Don't Know Expectation	31.7%
SURS ERI over next 20 years — mean	8.5%
Don't Know Expectation	47.9%
Confidence in government	
Illinois State Legislature	
Not at all or slightly confident	66.8%
Moderately confident	27.2%
Very or extremely confident	6.0%
Impt. factors in pension choice	
Having a safe and secure pension benefit	
Not at all or slightly important	7.1%
Moderately important	15.6%
Very or extremely important	77.4%
Being able to leave invest decisions to experts	
Not at all or slightly important	26.2%
Moderately important	32.0%
Very or extremely important	41.9%
Having personal control over investments	
Not at all or slightly important	29.9
Moderately important	28.2
Very or extremely important	41.9
Being able to invest part of pension in stocks	
Not at all or slightly important	36.9
Moderately important	27.8
Very or extremely important	35.3
Sample size	1441

are often in standard household surveys (e.g., self-reported health). The second set of variables includes measures of risk/return preferences, financial literacy and investment skills, plan knowledge, expectations about future returns, and the relative importance of plan attributes (e.g., the importance of having control), among many others.

4.2.1. Standard demographic and economic variables

Just under two thirds of respondents are female, nearly 70% are married, and the mean age of respondents is 37 years. Not surprisingly, given that this system serves higher education, this is a highly educated group: 20% of respondents have a Ph.D., 38% have a Master's or professional degree, and another 26% have a Bachelor's degree. Most of the remaining individuals have some college or an associate's degree. About 17% of respondents have at least one college degree in business, accounting, economics or finance, and 28% of the sample has some work experience in these areas. Nearly a third of respondents are members of the faculty, with a majority of these being non-tenure track. Academic professionals make up another third of respondents, followed by support staff at 22% of the sample.

The distribution of income from the SURS-covered job is quite disperse, with just under a quarter of the sample earning less than

$20,000 per year and nearly 5% earning $100,000 or more. There is also considerable dispersion in the fraction of total household income that is derived from SURS-covered positions: in nearly a quarter of households, income from SURS-covered employment accounts for less than a quarter of household income, whereas for more than a third of the sample it accounts for more than three-quarters of all income. Household net worth also varies greatly: about a third of the sample reports a net worth of less than $50,000, whereas a fifth of the sample reports a net worth in excess of $250,000.[15] Nearly half own mutual funds outside of SURS, over a quarter directly own stocks, and over half own individual life insurance outside of that provided through their employer.

Only 2% of respondents report their health as being very poor or poor and only 20% report being of average health relative to others of the same age. Fully 48% of the sample reports health being good and another 31% rates their health excellent. Nearly 12% of respondents have some "reciprocal service" with another public pension (such as TRS for teachers or SERS for non-higher-education public employees). Due to the reciprocal service arrangement, this individuals will have an incentive to choose the DB plan in order to combine their years of service (the other public pensions in Illinois do not have a DC option). It is also worth noting that although SURS-covered employment is not eligible for Social Security, 37% of SURS employees expect to have at least 20 years of other employment (e.g., from a prior job, or a concurrent job) that is covered by Social Security.

4.2.2. Beliefs, skills, knowledge and preferences

We asked respondents a wide range of questions about beliefs, preferences, and understanding of plan parameters. These key variables are also summarized in Table 1. When asked about their perceived likelihood when they joined of staying in the SURS plan for at least 10 years, 42% of the sample rated this as not at all or slightly likely, while 31% rated this as very or extremely likely. This should be a relevant parameter because the DB plan is more attractive the longer one stays with the system. When asked the standard "risk versus return" question from the Survey of Consumer Finances, we found that 29% of respondents were willing to take above average risk to earn above average returns, 63% of respondents preferred to take average risk to achieve average returns, and only 8% of respondents reported being comfortable taking only below average risks. We also adapted a Health and Retirement Survey question about one's willingness to take a gamble in which there is a 50/50 chance of doubling one's salary or seeing it reduced by a third. Overall, just under half the sample is unwilling to accept the gamble, about 29% of respondents are willing to take the gamble, and about 24% of respondents checked "don't know" (a response for which we control in our regressions).

There is substantial dispersion in investment knowledge. About 30% of respondents rate their investment skills as much or slightly worse than others, 40% rate their investment skills the same as others, and 30% rated themselves as slightly or much better than others. We also assessed their ability to compute compound interest (a variable that is commonly used as a proxy for financial literacy) and found that 55% of respondents were able to accurately compute the value of $200 invested at 10% for two years with annual compounding (i.e., they typed $242 into the text box): as expected given that the employer is a university system, this is a much higher level of financial literacy than is found in the general population.

In addition to general financial sophistication, we also tested for SURS-specific knowledge. About two-thirds of respondents accurately report that employee contributions to SURS are between 6 and 10% (the exact answer is 8%), and about 71% of respondents are aware that Social Security contributions are not withheld from their SURS earnings. We also asked questions to assess their understanding of more specific SURS plan rules. For example, for each of the plans (Traditional DB, Portable DB, and SMP) we asked whether an individual – if they were to leave SURS after 3 years and withdraw their pension to take a refund from SURS – would be eligible to keep no contributions, employee contributions only, or both employee and employer contributions (because SURS vesting occurs after 5 years, the correct answer after only 3 years of service is that they would be able to keep employee contributions only, and this is true under all the plans). We also asked the same after 10 years of service: at this point, an individual who departs the system and wishes to withdraw their pension is entitled to employee and employer contributions under the SMP and Portable DB, but still only employee contributions under the Traditional DB. Finally, we also ask a question about the relative size of the employer matching contribution available to those who refund from the system under each of the three plans after 10 years of service (the size of the annual employer contribution that can be refunded to participants is 8% for the Portable DB, 6.6% for the DC, and 0% for the Traditional DB).[16] By comparing a respondent's answers for each of the three plans, we can then construct a variable indicating whether they believe that one plan is better than the others (for example, if they stated that the SMP allowed you to keep both employee and employer contributions, while also stating that the other plans only allow you to keep employee contributions or no contributions, then we would code that the SMP as being viewed as the most generous plan by the respondent). We find that about 21% of respondents believe that one plan clearly dominates the other two after three years (an incorrect belief because all only refund employee contributions). Nearly 12% of respondents believe that one plan dominates at the 10 year mark, even though along the dimension be compared, the SMP and Portable DB are the same (they both refund employee and employer contributions). With regard to which plan provides the largest matching contribution after 10 years, we find that 19% believe that the SMP is most generous and 18% believe that the Traditional DB is most generous, both of which are incorrect. Twenty-eight percent correctly believe that the Portable DB provides the largest employer match if one takes a refund after 10 years of service. In short, there is a significant amount of misunderstanding of the plans, perhaps not surprising given how complex these plans are.

Turning to the second page of Table 1, we ask respondents to provide their subjective assessment of what average returns in the stock market and the SURS "effective rate of interest" (ERI) will be over the next 20 years. In each case, a large fraction of the sample is unable to provide an answer (for which we control). Among those who answer, the mean stock return expectation is 10.2% and the mean SURS ERI expectation is 8.5%.

We assess the importance of political risk (i.e., the risk of future benefit changes) by asking individuals to rate their confidence in the Illinois State Legislature, which is responsible for funding (or, more accurately, failing to fund) the DB pensions.[17] Consistent with concerns about funding, we find that two-thirds of respondents are "not at all" or only "slightly" confident in the Illinois Legislature, with only 6% "very" or "extremely" confident.

Finally, we asked individuals to rate the importance of various plan attributes. Seventy-seven percent of respondents believe that having a safe retirement is very/extremely important and only 7% indicated that it was not important. Forty-two percent of respondents rated as very/extremely important the idea that they would prefer to have an expert manage of their money for them, whereas 26% viewed this as of no or slight importance. Forty-two percent of

[15] When providing their approximate net worth, respondents were told to exclude the value of their SURS account.

[16] Specifically, for this question, respondents can respond that either: (i) none of the plans allow the individual to keep employer contributions in this situation; (ii) the Traditional DB plan allows the individual to keep the largest employer contribution; (iii) the Portable DB plan allows the individual to keep the largest employer contribution; (iv) the Self-Managed plan allows the individual to keep the largest employer contribution; or (v) all three plans allow the individual to keep the same amount of employer contributions.

[17] Shoven and Slavov (2006) discuss the notion of political risk in the context of public pension funding for the case of the U.S. Social Security system.

respondents rated the ability to have control over their pension investments as very/extremely important. Thirty-five percent placed a high level of importance on being able to invest their pension in stocks.

5. Empirical results: why do individuals choose DC plan over DB plan?

We created a binary indicator binary variable, based on SURS administrative records, "Is respondent in the Self-Managed Plan (the DC plan)?", that takes on the value 0 if no and 100 if yes so that we can interpret the coefficients in a linear probability model as percentage points. We will also report the relative-risk ratios from a multinomial logit model to show that the results are robust both to alternative specifications and that the determinants of selecting the two DB plans do not differ markedly from one another. Although we will focus our presentation on the linear probability model (OLS), we will highlight the few places where the multinomial logit results show significant differences in the DC vs. Traditional DB and the DC vs. Portable DB choices. It is worth noting that these differences exist only for a few variables and operate exactly in the direction one would expect based on the difference in the two DB plans (for example, characteristics related to valuing the portability of the plans).

5.1. Standard demographic and economic variables

Table 2 reports the results of the regression that includes only the core set of controls. This set of variables – which includes the relative generosity of the plans and numerous economic and demographic variables – can explain only 6.2% of the overall variation in plan choice (as indicated by the adjusted R-squared). Although the overall explanatory power is limited, a number of individual variables are highly significant. The generosity of the DB plans relative to the DC plan (evaluated with an employment tenure of 10 years) is significant and of the expected sign. For every additional 10 percent increase in the relative generosity of the DB plans to the DC plan, the likelihood of choosing the DC plan falls by 0.72 percentage points (the effect is a still significant 0.55 percentage points when the additional controls are added in Table 3). To put this into perspective, a move from the 25th to the 75th percentile of this ratio would make an individual 8.7 percentage points less likely to choose the DC plan, an effect that is sizeable relative to the 31.9% of the sample choosing the DC plan.[18] However, although the relative generosity of the plans does have a nontrivial effect on pension plan choice, as we will discuss below, it certainly is not a "sufficient statistic" in explaining that choice nor is it the most important determinant in terms of its economic magnitude.

We also find that single women are 7 percentage points less likely to choose the DC plan relative to married women (the omitted category), possibly reflecting that due to the absence of a spouse they are less likely to have Social Security coverage in the household. Differences across other sex and marital combinations are not significantly different from one another. Age also has no effect, at least after controlling for relative DB/DC generosity, which varies substantially with age. Whether the respondent has children (a crude proxy for bequest motives) has no effect.

The point estimates suggest that the probability of choosing a DC plan is monotonically increasing with educational attainment, although only the coefficient on having a Ph.D. is statistically significant, indicating that those with a Ph.D. are 9.9 percentage points more likely to choose the DC plan than are those with less than a Bachelor's degree (the omitted category). Whether one has at least one degree in a business related field and whether one has had financial experience in any of their jobs are not significantly correlated with plan choice, although we will show below that the ability to

Table 2
Linear regression of whether select Self-Managed Plan (the DC plan).

Demographic & economic explanatory variables			
Ratio of maximum pension wealth from the two DB plans to that from DC plan (ten-year horizon)	−7.2** (3.2)	Share of family income in SURS-covered job	
Female and single?	−7.4** (3.6)	25–49%	1.3 (4.5)
Male and married?	−5.3 (3.3)	50–74%	−6.0 (4.6)
Male and single?	−3.8 (5.0)	75–100%	−7.1 (4.5)
Age (when joined SURS, in years)	0.2 (0.3)	Household net worth	
Have children?	−3.7 (3.1)	$20,000 to $49,999	−2.8 (4.5)
Education		$50,000 to $99,999	−6.4 (4.2)
Bachelor's degree	2.9 (4.2)	$100,000 to $249,999	−7.6* (4.4)
Master's or professional degree	6.9 (4.6)	$250,000 to $499,999	−12.8** (5.5)
Ph.D.	9.9* (5.5)	$500,000 or more	−3.7 (6.4)
College degree in finance or business?	2.3 (3.9)	Own mutual funds outside of SURS plan?	12.1*** (2.7)
Work experience in finance?	0.5 (0.3)	Own stocks outside of SURS plan?	9.2*** (3.1)
Occupation		Have life insurance (excluding from work)?	−4.6* (2.7)
Executive	−19.4* (11.6)	Have supplemental disability insurance?	−0.9 (3.2)
Academic professional	0.4 (4.3)	Ranking of health relative to others	
Faculty (tenured)	−2.5 (12.3)	Average	−6.8 (9.0)
Faculty (tenure-track, not tenured)	10.0 (6.6)	Good	−5.6 (8.8)
Faculty (non-tenure track)	1.6 (4.9)	Excellent	−2.9 (8.9)
Other	2.8 (4.5)	Reciprocal service (DB option is attractive)?	−5.6 (3.9)
SURS-covered job income		Paid Social Security for at least 20 years?	2.6 (3.4)
$20,000 to $39,999	−3.8 (4.0)	Enrolled in SURS in 2007?	−0.7 (2.5)
$40,000 to $59,999	4.9 (4.6)		
$60,000 to $79,999	−1.5 (5.9)		
$80,000 to $99,999	−3.4 (7.2)	Adjusted R-squared	0.062
$100,000 or more	19.2** (8.2)	Sample size	*1441*

The specification is a linear probability model (OLS) in which the binary dependent variable, "Is respondent in the Self-Managed Plan?", takes on the value 0 if no and 100 if yes, as determined by SURS administrative records. Thus, the coefficients on the explanatory variables are expressed in percentage points. The regression is estimated over a sample of enrollees in SURS in 2006 and 2007. Standard errors, shown in parentheses, allow for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

[18] We estimated several alternative specifications focusing on the role of the generosity of the plans in the DB/DC pension choice. For example, we also calculated the ratio of pension wealth assuming employment tenure of five years and assuming work until one reaches 60 years of age. Adding one of these ratios to our regression does not affect the magnitude or significance of the pension wealth ratio based on the 10-year employment horizon, with the additional pension wealth ratio being insignificant. We further added to our regression interactions of the generosity of the DB plans relative to the DC plan with a respondents' education level, assessment of how long they will stay in their SURS job, financial literacy (as measured by their response to the interest compounding question), knowledge of plan details, and confidence in the Illinois State Legislature. None of these interactions with the generosity of the DB plans relative to the DC plan are significant at the 10-percent level.

Table 3
Linear regression of whether select Self-Managed Plan (the DC Plan), adding controls for beliefs, preferences, financial skills, & plan knowledge.

Panel A: demographic and economic controls			
Ratio of maximum pension wealth from the two DB plans to that from DC plan (ten-year horizon)	−5.5**	Share of family income in SURS-covered job	
	(2.6)		
Female and single?	−3.9	25–49%	−0.0
	(2.8)		(3.7)
Male and married?	−6.4**	50–74%	−6.6*
	(2.6)		(3.8)
Male and single?	−7.3**	75–100%	−2.9
	(3.7)		(3.6)
Age (when joined SURS, in years)	0.3	Household net worth	
	(0.2)		
Have children?	−1.6	$20,000 to $49,999	−1.8
	(2.5)		(3.4)
Education		$50,000 to $99,999	−4.3
			(3.2)
Bachelor's degree	4.1	$100,000 to $249,999	−5.4
	(3.5)		(3.4)
Master's or professional degree	5.5	$250,000 to $499,999	−9.7**
	(3.9)		(4.3)
Ph.D.	8.8**	$500,000 or more	−7.4
	(4.4)		(5.0)
College degree in finance or business?	0.7	Own mutual funds outside of SURS plan?	3.3
	(2.9)		(2.2)
Work experience in finance?	−2.8	Own stocks outside of SURS plan?	2.4
	(2.5)		(2.3)
Occupation		Have life insurance (excluding from work)?	−2.2
			(2.1)
Executive	−16.1**	Have supplemental disability insurance?	−2.3
	(7.9)		(2.4)
Academic professional	1.2	Ranking of health relative to others	
	(3.3)		
Faculty (tenured)	−3.0	Average	−0.8
	(10.8)		(7.8)
Faculty (tenure-track, not tenured)	4.4	Good	−0.9
	(4.9)		(7.6)
Faculty (non-tenure track)	−1.4	Excellent	−3.6
	(3.9)		(7.7)
Other	−2.3	Reciprocal service (DB option is attractive)?	−5.3*
	(3.7)		(3.0)
SURS-covered job income		Paid Social Security for at least 20 years?	3.6
			(2.7)
$20,000 to $39,999	−0.1	Enrolled in SURS in 2007?	2.6
	(3.3)		(2.0)
$40,000 to $59,999	3.3		
	(3.8)		
$60,000 to $79,999	−1.4		
	(4.7)		
$80,000 to $99,999	−7.1		
	(6.1)		
$100,000 or more	11.1*		
	(5.8)		
Panel B: controls for beliefs, preferences, financial skills, and plan knowledge			
Belief of how long stay in SURS		Basic SURS pension literacy	
Expected to stay at least 10 years when joined		Know contribute 6–10% of salary to plan?	0.4
			(2.2)
Not at all or slightly likely	4.5*	Know do not pay Social Security tax?	−2.0
	(2.5)		(2.3)
Very or extremely likely	−0.7	Believe Self-Managed Plan (DC plan) is best in:	
	(2.6)		
Risk preference & invest skill		3-year lump-sum withdraw rule	−1.3
			(3.3)
Risk–return tradeoff preference		10-year lump-sum withdraw rule	13.6***
			(5.0)
Above average risk and return	9.8***	Employer contrib. when withdraw in 10 years	15.8***
	(2.6)		(3.0)
Below average risk and return	−5.3	Believe traditional DB plan is best in:	
	(3.4)		
Take gamble (50/50, 100% ↑ or 33% ↓)?		3-year lump-sum withdraw rule	−5.6
			(5.3)
Yes	−1.3	10-year lump-sum withdraw rule	−0.9
	(2.3)		(5.8)
Don't know	2.2	Employer contrib. when withdraw in 10 years	−8.7***
	(2.5)		(2.7)

Table 3 (*continued*)

Panel B: controls for beliefs, preferences, financial skills, and plan knowledge			
Self-assessment of investment skill		Believe portable DB plan is best in:	
Much or slightly worse than others	−0.1	3-year lump-sum withdraw rule	−0.6
	(2.3)		(3.9)
Slightly or much better than others	−2.4	10-year lump-sum withdraw rule	−0.9
	(2.6)		(4.3)
Financial literacy		Employer contrib. when withdraw in 10 years	−11.0***
			(2.6)
Can calculate compound interest over 2 years?	3.5*		
	(2.1)		
Panel C: further controls for beliefs and preferences			
Asset return expectations (in %)		Impt. factors in pension choice (cont.)	
Stock returns over next 20 years	−0.2	Being able to leave invest decisions to experts	
(zero if answered "don't know")	(0.2)		
Don't know expectation	−5.7	Not at all or slightly important	11.0***
	(3.8)		(3.0)
SURS ERI over next 20 years	−0.8***	Very or extremely important	−5.9**
(zero if answered "don't know")	(0.3)		(2.3)
Don't know expectation	−2.1	Having personal control over investments	
	(3.4)		
Confidence in government		Not at all or slightly important	−4.9**
			(2.5)
Illinois State Legislature		Very or extremely important	23.4***
			(3.0)
Not at all or slightly confident	4.1*	Being able to invest part of pension in stocks	
	(2.2)		
Very or extremely confident	−5.2	Not at all or slightly important	−3.8
	(4.7)		(2.5)
Impt. factors in pension choice		Very or extremely important	21.4***
			(3.1)
Having a safe and secure pension benefit			
Not at all or slightly important	2.7	Adjusted R-squared	0.471
	(4.3)		
Very or extremely important	−3.1	Sample size	1441
	(2.7)		

The specification is a linear probability model (OLS) in which the binary dependent variable, "Is respondent in the Self-Managed Plan?", takes on the value 0 if no and 100 if yes, as determined by SURS administrative records. Thus, the coefficients on the explanatory variables are expressed in percentage points. The regression is estimated over a sample of enrollees in SURS in 2006 and 2007. Standard errors, shown in parentheses, allow for heteroskedasticity.
***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

compute compound interest (a proxy for financial literacy) is predictive of the pension choice.

The respondents' job type (e.g., faculty versus staff versus academic professional) is not correlated with plan choice after controlling for education. The only exception is the very small number of executives in our sample, who are much less likely to choose the DC plan.

The highest earners – those making over $100,000 per year – are 19.2 percentage points more likely to choose the DC than those in the lowest income group, and this higher earner coefficient is also significantly different from all the other income groups. In the right column of Table 2, we see that those respondents for whom SURS-covered income is a greater share of household income are directionally more likely to choose one of the DB plans (consistent with placing a higher value on the annuity due to the absence of Social Security), but these effects are not statistically significant at standard levels (joint test for these controls has a p-value of 0.12).

Somewhat surprisingly, there appears to be a skewed U-shaped pattern with respect to net worth. Specifically, those with a net worth of $100–$250k and those with a net worth of $250–500k are 7.6 and 12.8 percentage points, respectively, less likely to choose the DC plan than those with virtually no net worth (less than $20k). Those with a net worth of $500k or more, however, choose the DC plan in similar proportions to those at the low end of the wealth distribution. Other indicators of wealth – such as owning stocks or mutual funds outside of SURS – are significantly positively correlated with DC plan choice. For example, those that own mutual funds outside of their SURS plan, after controlling for income and net worth, are 12 percentage points more likely to pick the DC plan. Life insurance ownership is negatively correlated with choice of the DC plan, which may simply reflect risk aversion. The remaining variables in Table 2 are not statistically significant, including the indicator variable for whether the individual made their plan election in 2006 or 2007.

5.2. Does the extended set of controls change the initial inferences?

In Table 3, we augment our specification with the extended set of controls discussed above. As noted above, the explanatory power of this regression increases more than seven-fold in comparison with the basic specification in Table 2, from 0.062 to 0.471.

Overall, most of the patterns observable in Table 2, including the relative generosity of the various plans, still hold when these additional variables are added. There are, however, some exceptions. First, the coefficient on "single and female" is cut in half and no longer significant, whereas the two male coefficients are now significantly different from zero. Overall, it still appears that married women (the excluded group) are more likely to choose the DC plan. The effects of income and net worth are partially attenuated, although the general patterns remain. The significance of the coefficients on financial asset ownership (owning mutual funds, stocks, and life insurance) is substantially reduced in magnitude and is no longer significant. We also note that the coefficient on reciprocal service is now statistically significant, consistent with the fact that these service credits make the DB plans more valuable.

In comparing the coefficients on the variables that are common to Tables 2 and 3, our overall takeaway is that the addition of these other factors does not substantially alter the overall pattern of the inferences one makes, which is good news for studies that do not have access to non-standard variables. However, the magnitude of some coefficients

Table 4
Selection of Self-Managed, Traditional DB, or Portable DB pension plan, using multinomial logit model.

Relative-risk ratios of Traditional and Portable Plans relative to selection of Self-Managed Plan	Trad. DB	Port. DB
Demographic & economic		
Ratio of maximum pension wealth from the two DB plans to that from DC plan (ten-year horizon)	1.8**	1.9**
Female and single?	**1.3**	**2.1****
Male and married?	2.1***	1.5
Male and single?	2.4**	2.0*
Age (when joined SURS, in years)	0.97	0.95**
Have children?	**1.4**	**1.0**
Education		
Bachelor's degree	0.7	0.6
Master's or professional degree	0.5*	0.7
Ph.D.	**0.3*****	**0.6**
College degree in finance or business?	0.8	0.8
Work experience in finance?	1.5	1.2
Occupation		
Executive	9.8**	16.1***
Academic professional	0.7	0.7
Faculty (tenured)	1.6	1.7
Faculty (tenure-track, not tenured)	**0.3****	**0.7**
Faculty (non-tenure track)	1.1	0.9
Other	1.3	1.2
SURS-covered job income		
$20,000 to $39,999	**1.3**	**0.8**
$40,000 to $59,999	1.0	0.6
$60,000 to $79,999	1.1	1.1
$80,000 to $99,999	2.4	2.3
$100,000 or more	0.7	0.3*
Share of family income in SURS-job		
25–49%	0.9	1.0
50–74%	2.0*	2.0*
75–100%	1.4	1.3
Household net worth		
$20,000 to $49,999	1.2	1.1
$50,000 to $99,999	2.4**	1.5
$100,000 to $249,999	1.8	1.6
$250,000 to $499,999	3.0**	2.1
$500,000 or more	2.6*	1.7
Own mutual funds outside of SURS?	**0.6****	**0.8**
Own stocks outside of SURS plan?	0.8	0.8
Have life insurance?	**1.6***	**1.1**
Have suppl. disability insurance?	1.8**	1.3
Ranking of health relative to others		
Average	2.7	2.0
Good	2.6	1.6
Excellent	3.8**	2.5
Reciprocal service?	2.0**	1.6
Paid Social Security for at least 20 years?	0.8	0.6
Enrolled in SURS in 2007?	0.8	0.9
How long stay in SURS		
Expected to stay at least 10 years		
Not at all or slightly likely	0.7	0.6**
Very or extremely likely	**1.5**	**0.7**
Risk pref. & invest skill		
Risk–return tradeoff preference		
Above average risk and return	0.4***	0.4***
Below average risk and return	2.4	2.0
Take gamble (50/50, 100% ↑ or 33% ↓)?		
Yes	1.0	1.3
Don't know	0.5**	0.6**
Self-assessment of investment skill		
Much or slightly worse than others	1.1	1.0
Slightly or much better than others	1.1	1.3
Financial literacy		
Can do compound interest over 2 years?	0.7*	0.8
Basic SURS pension literacy		
Know contribute 6–10% of salary?	0.8	1.0
Know do not pay Social Security tax?	1.5	1.7**
Believe SMP (DC plan) is best:		
3-year lump-sum withdraw rule	0.9	1.3
10-year lump-sum withdraw rule	0.3**	0.4*
Employer contrib. when withdraw in 10 years	0.2***	0.2***
Believe Trad. DB plan best:		
3-year lump-sum withdraw rule	2.7	1.6
10-year lump-sum withdraw rule	**1.4**	**0.6**
Employer contrib. when withdraw in 10 years	**2.8*****	**2.0****
Believe Portable plan best:		
3-year lump-sum withdraw rule	1.1	1.0
10-year lump-sum withdraw rule	1.1	1.3
Employer contrib. when withdraw in 10 years	**1.4**	**3.5*****
Asset return expectations (in %)		
Stock returns over next 20 years (zero if answered "don't know")	1.0	1.0
Don't know expectation	2.1*	2.3**
SURS ERI over next 20 years (zero if answered "don't know")	1.1**	1.1**
Don't know expectation	1.1	1.0
Confidence in government		
Illinois State Legislature		
Not at all or slightly confident	0.6**	0.7
Very or extremely confident	1.5	1.5
Impt. factors in pension choice		
Having a safe and secure pension benefit		
Not at all or slightly important	0.4*	0.5
Very or extremely important	1.3	1.3
Being able to leave invest decisions to experts		
Not at all or slightly important	0.6*	0.5**
Very or extremely important	1.9**	1.9***
Having personal control over investments		
Not at all or slightly important	3.4***	3.8***
Very or extremely important	**0.1*****	**0.2*****
Being able to invest part of pension in stocks		
Not at all or slightly important	1.5	1.5
Very or extremely important	0.2***	0.2***
Pseudo R-squared	0.386	
Sample size	1441	

The specification is a Multinomial Logit model of pension plan choice (with a selection of the Self-Managed Plan as the baseline category). Pension plan choice is based on administrative records. Coefficients are transformed into relative-risk ratios with statistical differences from 1.0 indicated in the table. A relative-risk ratio greater than (less than) one means an increase (decrease) in the variable leads to an increase (decrease) in the likelihood of the individual selecting that type of DB plan relative to selecting the Self-Managed Plan. Bold print indicates a statistically significant difference in the coefficients for the Traditional DB and Portable DB plans. The regression is estimated over a sample of enrollees in SURS in 2006 and 2007. Standard errors allow for heteroskedasticity. For readability of the table, standard errors are not reported (only statistical significance is indicated).
***, **, and * indicate that the relative-risk ratio is different from one at the 1%, 5%, and 10% levels, respectively.

is affected: for example, including only the standard set of controls appears to upward bias the effect of high income and, especially, the asset ownership variables. Perhaps more importantly, however, is the fact that the extended set of variables adds substantially to the ability to explain the overall cross-sectional variation in the plan choice.

Before turning to the new variables, we also note that there are a few differences in our core control variables in the multinomial logit results. In Table 4, the results are reported as a relative risk ratio of the Traditional DB (column 1) or Portable DB (column 2) relative to the DC plan, and statistical significance is relative to a value of 1.0. A ratio that is significantly greater than 1.0 indicates that the individual is more likely to take the particular DB plan relative to the DC plan, whereas a value less than 1.0 indicates the individual is more likely to take the DC plan. The most interesting results from the multinomial logit model are those that highlight the differences in relative-risk ratios across the two DB plans (statistically significant differences across the Traditional DB and Portable DB are in bold italics). Individuals with a Ph.D. are especially like to choose the DC over the Traditional DB plan, whereas the relation between the DC and the Portable is not statistically significant. This result also holds for tenure-track faculty who are not yet tenured. This is a quite sensible result: tenure-track assistant professors do not know with certainty that they will be able to stay at a SURS-covered employee beyond the probationary period, and thus are much more likely

to choose the DC or the Portable DB plan, and very unlikely to choose the Traditional DB (which has the least desirable refund policy).[19]

We now turn back to the simple linear model of DC plan choice and discuss the effects of the new variables themselves, including direct questions about expectations regarding the length of one's likely tenure under SURS.

5.3. Expected job tenure

The relative generosity of the three plans depends on an individual's expected job tenure, something that is normally not observable from administrative data. We ask individuals to indicate on a five point scale how likely it is that they will remain in a SURS covered position for at least ten years. We find that those who are "not at all likely" or only "slightly likely" to do so are 4.5 percentage points more likely to take the DC plan in Table 3. When we look at the multinomial results, consistent with the discussion in the prior subsection, we find an important difference across the two DB plans. As its name suggests, the Portable plan is much more generous than the Traditional plan for individuals who leave SURS service early. Consistent with this, individuals who are very/extremely likely to stay in SURS for ten or more years are more likely to choose the Traditional DB relative to the Portable DB. These results, combined with the pattern of multinomial risk ratios for having a Ph.D. and being in a not-yet-tenured position, underscore the importance of job tenure expectations and uncertainty in influencing the DB/DC decision.

5.4. Risk preferences

As noted above, we include two proxies for risk aversion. The first of these, which is a recreation of the Survey of Consumer Finances question about willingness to take higher risk to obtain higher returns, is highly significant. Specifically, in Table 3, those comfortable taking above average risk are nearly 10 percentage points more likely to take the DC plan than those willing to only take average risk for average returns. This result is very consistent with a view that individuals who are more comfortable with moving further out the risk/reward frontier are more likely to choose to invest their retirement funds on their own.

5.5. Financial literacy

Our measure of general financial literacy is the respondent's ability to accurately compute compound interest ($200 invested for 2 years at 10% compounded annually). Those able to answer this question correctly (i.e., those who typed $242 into the text box) are 3.5 percentage points more likely to choose the DC plan. This is consistent with a view that those who are less knowledgeable about financial management being less willing to invest on their own through the DC plan.

5.6. (Incorrect) beliefs about plan generosity

A particularly interesting finding is that beliefs about relative plan generosity are important, *even when these beliefs are inaccurate*. For each of the three plans (Traditional DB, Portable DB, and DC) we ask the respondent about plan rules regarding refunds when a plan participant separates from SURS service. Specifically, we ask whether when someone leaves the SURS system after 3 years of service and wants a refund, and again at 10 years of service, whether they will be permitted to keep no contributions, only employee contributions, or both employee and employer contributions. As noted above, we then construct a series of variables based on these responses that indicates whether the individual's combined responses suggest that they believe the Traditional DB plan is more generous, the Portable DB plan is most generous, or the SMP plan (i.e., the DC plan) is most generous.

We do not find statistically significant effects for the perceived generosity after 3 years. At the 10-year horizon, however, we find a very large effect. Specifically, those who believe that the DC plan has a systematically more generous withdrawal provision (for example, believing that it allows one to keep employee and employer contributions while incorrectly believing that neither of the others do) are 13.6 percentage points more likely to choose the DC plan. It is important to reinforce that this belief is incorrect: only those individuals who did not indicate a clear "winner" are correct because both the DC and Portable DB refund both employee and employer contributions after 10 years.

Relatedly, we also asked respondents which of the three plans provided the largest employer match when they separate from the system and request a refund. Those believing that the DC plan was most generous are 15.8 percentage points more likely to choose the DC, even though this belief is incorrect. Those believing that the Traditional DB plan had the highest match were 8.7 percentage points less likely to choose the DC, even though this belief is also incorrect. The correct answer – that the Portable plan offered the highest percentage match – leads to an 11 percentage point reduction in the probability of choosing the DC plan. Although in this case this is the correct answer, it is interesting that the magnitude of this coefficient is smaller than the coefficient on the incorrect response in the DC case and similar to the incorrect response in the Traditional case.

When we repeat this analysis in the multinomial logit model in Table 4, the findings are consistent with this interpretation. Specifically, those that view the Portable DB plan as being more generous are much more likely to choose the Portable plan, whereas those that view the Traditional DB plan as more generous are more likely to choose the Traditional plan.

Overall, these results suggest that people make important choices based on a flawed understanding of plan parameters. Interestingly, they make sensible choices conditional on the information they believe to be true, i.e., they are more likely to choose the plan they believe is more generous. The problem is that the information that some of them believe to be true is, in fact, incorrect.

5.7. Return expectations

Although we do not find a correlation between expected future stock market returns and plan choice, we do find a relation between the expected SURS Effective Rate of Interest (ERI) and plan choice. Recall that the ERI is the parameter that determines the rate of return that SURS will provide on refunds under the Portable plan, and is also used for other purposes (e.g., calculating the cost of service credit purchases). Our results indicate that for every one percent increase in the expected ERI, individuals are 0.8 percentage points less likely to choose the DC plan.

5.8. Political risk

As reported in Table 1, about two-thirds of SURS participants have a low level of confidence in the Illinois State Legislature, likely owing to the many decades of chronic under-funding of the SURS pension fund. Relative to the 27 percent of respondents who have a moderate degree of confidence in the legislature, those with a low level of confidence are 4.1 percentage points more likely to choose the DC plan, which is fully

[19] Because in Table 4 we are considering determinants of the choice between the three pension plans (as opposed to just a DB/DC choice), we also estimated a specification where we replaced the "Ratio of maximum pension wealth from the two DB plans to that from DC plan" with the pension–wealth ratios of the Traditional DB to the DC plan and the Portable DB to the DC plan. As a practical matter, since the Traditional DB and Portable DB use very similar formulas to calculate the annuity benefits for retirees, these two pension–wealth ratios have a correlation of 0.95 for the survey respondents. Consequently, while we find that the generosity of the Traditional DB plan predicts less choice of the Portable DB relative to the Traditional DB (relative risk ratio of 0.64) and the generosity of the Portable DB plan predicts more choice of the Portable DB relative to the Traditional DB (relative risk ratio of 1.75), neither of these relative risk ratios are statistically different from one.

funded on an annual basis and therefore is not subject to political risk on past accruals in the same way that the DB plans might be. Relative to the small fraction that expresses a high level of confidence in the Illinois Legislature, those that express a low level of confidence are a statistically significant 9.3 percentage points more likely to choose the DC plan (p-value of this estimate is 0.04).

5.9. Preferences over plan features

Our final set of results focuses on preferences about plan features. There are three sets of results that are significantly correlated with plan choice. First, there is a 17 percentage point difference in the probability of choosing the DC plan between those who believe that being able to "leave investment decisions to experts" is very/extremely important versus those who do not (i.e., rate it as not at all or slightly important). Second, there is a 28 percentage point difference between those who rate "having personal control over investments" as very/extremely important versus those who do not. Finally, there is a 25 percentage point difference with regard to the importance of being able to invest part of their pension in stocks. Although we admit the possibility of ex post justification bias, and thus hesitate to draw causal inferences, these effects are all quite large, particularly relative to the 31.9% of the population that actually chose the DC. To further illustrate how large the effect of these preferences are on plan choice, a switch in the importance placed on "having personal control over investments" from very/extremely to not at all/slightly has the same predicted increase on the likelihood of picking a DB plan over the DC plan as a 500% increase in the relative generosity of the DB plans relative to the DC plan.

Another way to view the quantitative importance of these factors is to measure the increase in the adjusted R-squared that occurs when one adds these factors to the regression. For perspective, when one runs the full specification from Table 3 but excluding the four plan attribute variables, the adjusted R-squared is 27.7 percent. Thus, these four variables combined can help to explain an incremental 20% of the overall variation in plan choice. This is particularly notable given that the standard economic and demographic variables could only explain 6.2% of the variation on their own. This means that individual plan attributes are arguably more important in explaining DB/DC plan choice than the relative generosity of the plans themselves.

6. Discussion and conclusions

Although the ability for an individual to choose between DB and DC plans without changing jobs is rare in the U.S. private sector, it is quite common in public plans in the U.S. and internationally. This paper examines the individual level determinants of the DB/DC plan choice and makes several novel findings.

First, we find sensible patterns with regard to economic and demographic factors. For example, the probability of choosing the DC plan decreases with the relative financial generosity of the DB plans versus the DC plan and rises with education and income.

Second, the ability to control for beliefs, preferences, and other variables not easily obtainable from administrative or standard household surveys increases the explanatory power by over seven-fold. Among the important factors in the DB/DC pension choice are respondent attitudes about risk/return tradeoffs, financial literacy, return expectations, political risk, and attitudes about plan attributes. An implication of this is that it is difficult to predict plan choices from standard administrative data. For example, if a public pension system was considering the introduction of plan choice as a way of changing the financial structure of their plan, they may have difficulty assessing the proportion of the population that would choose the new option without knowing much more about the distribution of preferences, beliefs, and attitudes within the participant population.

Third, we note that beliefs about plan parameters are very important, even when these beliefs are factually incorrect. In general, people seem to make sensible choices based on what they believe to be true about the plans, but they do not always have accurate beliefs (and thus may not be making optimal decisions). An obvious implication of this finding is that plan sponsors cannot assume that individuals will understand a complex pension choice. Whether it is possible to cost-effectively inform new participants of the relevant plan parameters, and thus help them make a more appropriate plan choice, is an interesting question for future research.

Finally, we provide evidence that individuals' preferences over the attributes of the retirement system (e.g., the degree of control provided) are very significant determinants of the DB/DC decision. This provides indirect empirical support for the notion that participant preferences are an important determinant of plan sponsor decisions to adopt alternative plan types. However, we caution that our evidence is necessary but not sufficient to support Munnell and Sunden's (2004) hypothesis that participants' desire for control helped to drive the private sector shift from DB to DC. To establish that this contributed to the shift from DB to DC in the private sector, one would also need to show that participant attitudes about the desirability of control increased markedly over time or that firms' willingness to respond to this desire for control by offering a DC plan increased substantially over the past few decades.

From a policy perspective, our results are highly relevant. Numerous states are suffering from severe funding shortfalls in their public pension plans (Novy-Marx and Rauh, 2009), and this has led to increasing interest in reforming public DB plans. Often, reform proposals include a role for a DC plan as a partial or complete substitute for a legacy DB plan. Similar proposals have been made in the past decade regarding the U.S. Social Security system. A key finding of this analysis is that there is substantial heterogeneity in the extent to which individuals prefer DB versus DC plans, and that much of this heterogeneity is not easily observable from information available in administrative records.

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