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Working Paper 12842
<http://www.nber.org/papers/w12842>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2007

This research was supported by the U.S. Social Security Administration through grant #10-P-98363-1-03 to the National Bureau of Economic Research as part of the SSA Retirement Research Consortium. The findings and conclusions expressed are solely those of the author(s) and do not represent the views of SSA, any agency of the Federal Government, or the NBER. We are grateful to SSA for this support. We are also grateful to Dan Slack, Doug Steele, and other staff members at the State Universities Retirement System for their tireless efforts to provide us with the data for this project and for helpful conversations about the SURS system. We thank Brigitte Madrian, Olivia Mitchell, and participants at the 2006 Retirement Research Consortium and the 2006 NBER RRC conference for helpful comments. Sarah Jackson provided excellent research assistance. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 12842
January 2007
JEL No. D14,G11

ABSTRACT

This paper provides new evidence on what types of individuals are most likely to choose a defined contribution (DC) plan over a defined benefit (DB) plan. Making use of administrative data from the State Universities Retirement System (SURS) of Illinois, we study the decisions of nearly 50,000 new employees who make a one-time, irrevocable choice between a traditional DB plan, a portable DB plan, and an entirely self-managed DC plan. Because the SURS-covered earnings of these employees are not covered under the Social Security system, their choices provides insight into the DB vs. DC preferences of individuals with regard to a primary source of their retirement income. We find that a majority of participants fail to make an active decision and are thus defaulted into the traditional DB plan after 6 months. We also find that those individuals who are most likely to be financially sophisticated are most likely to choose the self-managed DC plan, despite the fact that, given plan parameters, the DC plan is inferior to the portable DB plan under reasonable assumptions about future financial market returns. We discuss both rational and behavioral reasons that might explain this finding.

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1. Introduction

In recent years, numerous proposals have been forwarded to fully or partially replace the defined benefits provided by the U.S. Social Security system with personal retirement accounts. A key feature of many personal account proposals, including those of the President's Commission to Strengthen Social Security and the plan forwarded by President Bush in 2005, is that participation in personal accounts would be voluntary. Individuals would be given the opportunity to choose whether to redirect some of their existing payroll taxes away from the current system and into personal retirement accounts (PRAs). In exchange for the ability to participate in the personal accounts program, an individual would give up the right to some portion of the traditional OASDI benefit, a feature that is commonly referred to as a "benefit offset." An interesting and difficult question is who would choose to participate in such a plan were it to be offered.

Understanding participation is of more than academic interest. Participants in personal accounts would face a different risk and return profile of retirement benefits than would non-participants, and thus understanding who is most likely to participate might influence one's view of the individual welfare implications of reform. At an aggregate level, participation rates are a critical assumption in understanding the fiscal implications of Social Security reform proposals that involve a redirection of existing payroll tax revenue away from the Trust Funds and into personal accounts. For a given reform, high participation rates would increase the size of the transition cost that must be financed in the early years of a reform and, correspondingly, would result in larger reductions in pay-as-you-go expenditures in future years. When scoring reform proposals, the Social Security Office of the Chief Actuary typically handles this uncertainty by showing the financial implications of reform under several alternative assumptions, such as 100%, 67%, 50% and 0%. The uncertainty about participation rates is apparent from the comparison of the Administration and CBO estimates of participation for the President's plan. In its analysis of the President's FY 2007 budget, the CBO estimated that approximately one-third of workers would sign up for the accounts under the President's plan, whereas the OMB projected a two-thirds participation rate (CBO, 2006).

As important as participation rates are, there is very little useful guidance in the literature on how to estimate them. Unfortunately, the very large literature on 401(k) participation rates is of only limited use because the alternative to participating is entirely different in a 401(k) than in

most Social Security reform proposals. If one chooses not to participate in the 401(k), the alternative is to take the compensation in the form of taxable wages. In such a case, the main trade-off is between current and future consumption. In contrast, in Social Security plans with a benefit offset, the individual would face a trade-off between two alternative methods of financing future consumption. For example, according to President Bush's 2005 proposal, for every dollar that an individual redirected into a personal account, she would have been required to give up a traditional benefit amount equal to the annuitized value of that one dollar contribution accumulated at a 3 percent real rate of interest. Thus, if an individual were to receive an average real rate of return on the personal account balances in excess of 3 percent then their retirement income would be higher due to having participated in the account. In contrast, if the individual's average real return fell below 3 percent, participation in the account would reduce retirement income. Thus, the decision of whether or not to participate in a Social Security PRA program has less to do with one's views about the relative value of consumption today versus in the future (which is the key decision in a 401(k) plan), and more to do with an individual's beliefs about expected financial market returns, mortality risk, financial and political risk, the value of choice, the value of inheritability, and so forth.

A better way to learn about potential participation rates in a PRA plan would be to analyze situations in which an individual worker has an explicit choice between a DB and a DC plan, holding job characteristics fixed. In most cases, however, individuals can only choose their pension type by choosing their employer and it is quite clear that a firm's pension plan is but one element in a whole vector of characteristics that vary across jobs and firms. Thus, one can never be sure that the decision to work for an employer that offers a 401(k) instead of an employer that offers a DB plan reflects characteristics of the pension as opposed to numerous other differences across the employers. Alternatively, one could attempt to determine the worker characteristics that correlate with valuing DC over DB by looking at firm's that switch pension type. Such plan conversions, however, may be driven more by firm level concerns, such as the costs of plan administration, than by employee preferences *per se*. Even if the cross-sectional variation in which firms choose to convert to a DC plan is correlated with employee preferences, it only tells us that some subset of employees valued this shift, not that all employees at the firm valued such a shift.

Finally, in an ideal world, one would wish to examine the DB vs. DC choice in the absence of the confounding effects of the Social Security program itself. In most private sector plans, even if individuals were given a DB vs. DC choice, it would be for income that is above that which they expect to receive from Social Security in the first place. While there have been several studies that have been able to examine an explicit DB vs. DC choice, including among employees at a large non-profit firm (Yang 2005), among corrections officers in Michigan (Papke, 2004) and among faculty in the North Carolina university system (Clark, Ghent and McDermed, 2005), employees in all three cases were also covered by the existing Social Security system. Given that the value of annuitization, for example, is a declining function of the fraction of wealth already annuitized, this may make individuals more likely to choose a DC if it is on top of the DB already provided by Social Security.

In this paper, we make use of a unique data set of employees in the State Universities Retirement System (SURS) of Illinois. This sample has four key features that make it a particularly valuable environment for studying the DB vs. DC plan choice. First, these employees are given an explicit choice between a DB and a DC plan, holding all job characteristics fixed.¹ Specifically, in their first six months of employment, employees are asked to make a one-time, lifetime, irrevocable choice among three retirement plans: (i) a traditional formula-based DB plan; (ii) a “portable DB plan,” which is slightly less generous than the ordinary DB if one retires from the system, but more generous if they take an early lump-sum distribution; and (iii) the “Self-Managed Plan” or SMP, which is a 100 percent self-directed DC plan. Individuals who fail to make an active choice within the first 6 months of employment are automatically defaulted into the traditional DB plan.

Second, because Illinois is one of several states that opted out of the Social Security system,² wages of individuals earned from SURS covered employment are not covered by Social Security, meaning that no OASDI payroll taxes are withheld and no OASDI benefits accrue based on these earnings. Thus, unless an individual has substantial employment earnings outside

¹ As reported in Clark, Ghent and McDermed 2006, the choice between a DB and a DC plan is a common feature of pension plans at public (but not private) universities.

² According to the GAO (2003), “historically, Social Security did not require coverage of government employees because they had their own retirement systems, and there was concern over the question of the federal government’s right to impose a tax on state governments.” Other states whose employees do not participate in Social Security include California, Colorado, Louisiana, Massachusetts, Ohio and Texas.

of the SURS system, it will be SURS and not Social Security that will provide the primary source of income in retirement.

Third, the combined employer/employee retirement contributions to the SURS system are, at minimum, 14.6 percent of annual salary, which is larger than the payroll tax paid by those in the Social Security system. Therefore, the SURS system looms large as part of a participant's lifetime financial plan.

Fourth, the SURS data includes a diverse group of employees, including campus administrators, faculty members, clerical staff, individuals in the employ of university police and fire services, and others. Prior studies of the DB vs. DC choice using state university employees (e.g., Clark et al 2005, Clark & Pitts 1999) were limited to faculty members only, and thus it is more difficult to generalize the results to populations that are less highly educated. Our sample allows us the opportunity to more carefully examine how the DB vs. DC decision might vary across broad education and occupation groups.

Using administrative data on the full universe of SURS covered employees since the plan choice was first made available starting in 1998/99, we analyze what types of employees are most likely to choose the DC plan over the portable or traditional DB plan. We have two major findings. First, despite the projections by SURS at the start of the program that a majority of new employees would actively select the SMP or portable plan, in fact the majority of new employees never make any active pension choice, and thus are defaulted in to the traditional plan. After the initial publicity surrounding the introduction of plan choice started to fade, the proportion of new employees not making a choice, and hence defaulting into the traditional plan, increased from 43 percent in 1999 to roughly three-fifths over the period 2001-2004. Second, we find that approximately 15 percent of new employees choose the Self-Managed Plan, despite the fact that the SMP is likely an inferior choice due to plan parameters that make it less generous than the Portable plan under reasonable assumptions. Interestingly, we find that individuals are more likely than average to choose the SMP if they are more highly educated (as proxied by being an academic employee as opposed to staff, as well as being at a University as opposed to a community college), have higher earnings, are married, and work at an institution where a higher fraction of other employees also chose the SMP. We attribute much of the selection of the SMP to framing effects in how the plan choices are communicated to new

employees, but we discuss alternative explanations as well, including beliefs about political risk facing the DB and portable DB systems.

This paper is structured as follows: Section 2 outlines the basic structure of the SURS system, including more details about each of the plan options and how the choices are made. Section 3 discusses the administrative data in more detail, including its strengths and limitations. In section 4, we outline our empirical methods and present some simple tabulations of plan choice. Section 5 reports more formal results. Section 6 concludes and sets forth several directions for subsequent research.

2. SURS Choices

2.1 *Background on SURS and Allowance of Choice*

As the name implies, 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). “SURS covers all faculty and support staff of Illinois higher public education including universities, colleges, Class I community colleges, scientific surveys, and other related agencies.” (SURS Traditional Defined Benefit Package, pg. 1). There is a large range in the size of the employers, with several state agencies (e.g., the State Water Survey) having only a few new employees during our sample period while the University of Illinois at Chicago and the University of Illinois at Urbana-Champaign together comprise about one out of every four new employees over this period.

As noted above, the employees include university, college or campus administrators, faculty members, administrative and clerical staff, individuals in the employ of university police, and others. In general, an individual will participate as long as their position requires them to work “continuously for at least one academic term or 4 months, whichever is less, and ... employment is not temporary, intermittent, or irregular ... SURS participation ends on the date you retire or terminate employment with a SURS-covered employer.” Eligibility does not extend to students regularly attending classes at a SURS-covered employer who are employed on a part-

time or temporary basis for that employer, to J-1 or F-1 visa holders who have not yet established residency or to current annuitants from SURS.

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.³ SURS withholds 8 percent of salary as an employee contribution to SURS. The State/employer contribution varies by plan, and will be described in more detail below.

Prior to 1998, all employees in the SURS system were covered by the traditional defined benefit (DB) system. In the mid-1990s, however, pressure began building on the State Legislature to offer a DC option to state employees. In 1997, the Illinois Legislature passed a law allowing participating employers to offer individuals a choice of three plans. The addition of a DC option was viewed as having three key benefits. First, it was believed that a DC plan would be more attractive to potential new employees. The SURS executive director at the time was quoted as saying “The legislation passed because universities were saying they needed it to attract people from other states.”⁴ Second, the creation of the SMP option was viewed as a cost-reduction measure by the state, due to the fact that the state’s contributions to the SMP are lower than the contributions required to fully fund benefits under the traditional DB option.⁵ Finally, the shift was also promoted as a way to impose fiscal discipline on the State Legislature. State Senator Peter Fitzgerald, a leading advocate of the switch, argued that the DC plan would force lawmakers to put the money up-front so that employees could invest it, rather than offering promises of future benefits that the Legislature had a history of under-funding.⁶

The next three sub-sections summarize the key features of each of the three pension options.

2.2 Traditional Benefit Package

³ Participants hired after March 1986 are subject to withholding for Medicare.

⁴ “University Workers Get Greater choice in Retirement Planning.” The State Journal Register. Natalie Boehme. March 12, 1999, page 39.

⁵ Section 15-158.3 of the SURS governing statute requires an actuarial assessment of “the extent to which employee optional retirement plan participation has reduced the State’s required contributions to the System . . . in relation to what the State’s contributions to the System would have been . . . if the self-managed plan had not been implemented.”

⁶ “Fitzgerald Floats Trial Balloon to Change State Pension System to a 401(k) Plan.” Don Thomson. Daily Herald. January 14, 1997.

This SURS defined benefit (DB) retirement plan is the only one that was in place prior to 1998. As of the writing of this paper, the Traditional plan remains the default option for individuals who do not make an active plan designation within 6 months of their hire date (or specifically, the date that is received by SURS as the individual's certification of employment.) Employees contribute 8 percent of pay, which is the same contribution rate as in the other two options. Of this 8 percent, 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 participants in the Traditional plan, SURS documents state "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.⁷

Benefits from the traditional plan are paid as life annuities. An individual is eligible to receive benefits at age 55 with at least 8 years of service, age 62 with 5 years of service, or at any age with 30 years of service (if employment terminated after 8/2/02). An individual must start receiving a retirement annuity no later than April 1st of the year following the year they reach age 70½ if they are not participating in SURS or another Illinois state system.

For most employees there are two formulas for calculating the retirement annuity.⁸ For each individual, the benefit will be calculated each way, and the worker receives the larger of the calculated amounts.

The two formulas are:

(a) *The General Formula*: For those retiring at age 60 after July 1997, the formula is:

$$\text{Benefit} = 2.2\% \times \text{Years of Service} \times \text{Final Average Earnings}$$

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

⁷ Based on personal communication with SURS, August 7, 2006.

⁸ A third option, known as the minimum annuity formula, is so rarely used that it is largely obsolete.

after August 2, 2002, retirement at any age – without reduction – is permitted if a member has 30 or more years of service.

(b) *Money Purchase formula:* For most individuals, the money purchase formula is equal to 6.5% of the employee's salary (6.5% of the 8% contribution is for the retirement benefit, excluding survivor and inflation adjustments) 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.

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.

For all employees, the benefit is calculated under both methods (with one extra in the case of police and fire), and the individual receives the higher of these benefit amounts. 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.) Benefits are automatically increased by 3 percent every January 1. There are also generous 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.

The service credit is a key parameter in the calculation of one's benefits. In any academic year (from September 1 through August 31), an individual may earn no more than 1 year of service credit, and it is possible to earn fractional years of credit. A complex set of rules determines how service credits are affected by disability leave, sick leave, unused sick leave, prior service with other employers, military service, and other similar situations. A second key parameter is an individual's final average earnings (or "final rate of earnings." This is basically the four consecutive academic years of service in which the individual's earnings were the

highest. There are limitations on the rate at which earnings are permitted to grow year-over-year as part of this calculation.

While the traditional benefit packages is quite generous relative to most private sector plans, it is important to bear in mind that the SURS package must substitute for Social Security as well as a private pension. Indeed, the 2.2 percent formula multiplier is, if anything, a bit less generous than that in other public pension plans whose employees are not covered by Social Security. A recent study of public pensions (Ford 2005) indicates an average formula multiplier of 2.27 percent among such states (versus 1.95 percent average among public pension plans in states that are covered by Social Security). Of course, over the 2001-2005 period, approximately two-thirds of SURS retirees received benefits via the money purchase option, which means this benefit was higher than that calculated under the traditional formula.

In short, the Traditional Benefit package is a fairly generous pension plan for those who retire from the system. The major downside of this plan, however, is that 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.

In contrast to private sector DB plans, the SURS benefits are not insured by the PBGC, and it is worth noting that the State of Illinois has massively under-funded its share of the pension obligations. As of March 31, 2006, the State Universities Retirement System investment portfolio (which covers both the Traditional and the Portable plan options) was valued at nearly \$14.5 billion, but faced liabilities of over \$21 billion, for a funding ratio of only 68%. 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 (discussed below). 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 most participants are likely aware that there is political risk to their future benefits.

This political risk is, however, 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,” as it has come to be known, 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. 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.

2.3 Portable Benefit Package

The portable benefit package is a modified version of the Traditional package. The first key difference is that if the person leaves the system early and takes a refund of their contributions, they have historically received 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.⁹ 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.

The 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 portable plan, the

⁹ 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.

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.

There are other differences as well. For example, whereas participants in the Traditional plan are required to annuitize their assets, Portable plan participants do have the option to take a lump-sum at retirement. Doing so, however, comes at the high cost of losing eligibility for retiree health benefits.

2.4 *Self-Managed Plan (SMP)*

The SMP is an entirely participant-directed defined contribution plan that invests a total of 14.6% of salary (8% employee and at least 6.6% employer¹⁰) into retirement accounts. Participants are able to choose from a variety of mutual funds and annuity contracts from TIAA-CREF and Fidelity. Upon full vesting after 5 years of service, the individual 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. As with the Portable plan, however, retirees must annuitize their full account balance in order to be eligible for retiree health benefits from the State of Illinois.

All of the educational information provided by SURS, including the instructional videos, the program guides and online information, guides new SURS participants through the plan choice by focusing on the distinction between DB and DC plans. A reasonable inference from this material, even by financially sophisticated employees, 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

¹⁰ 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.

employees may be left with the general impression that the Portable plan lies somewhere between the Traditional and the SMP on nearly all dimensions.

A more careful examination, however, suggests that the SMP may be an inferior choice, relative to the Portable plan, for most employees, regardless of their expected employment longevity with a SURS employer. To understand its inferiority, it is useful to consider the benefits from these two options for individuals at different points in their careers.

First, consider an employee who leaves SURS employment and takes a lump-sum refund from the system. If they leave service prior to vesting (i.e., individuals with less than 5 years of service), the differences are small. In both cases, individuals receive their own 8% contributions. In the portable plan, the individual receives the SURS rate of interest, while in the SMP, they receive actual investment returns. After vesting, however, the differences are much larger. Under the portable plan, the individual also receives a full 8% match from the State, while in the SMP, the individual only receives 6.6%. Thus, for the SMP to be an optimal choice based solely on relative returns (i.e., ignoring political risk), the individual must expect to earn investment returns that are sufficient to exceed the rate of interest credited by SURS to the portable plan (which has averaged 8-9% nominal for the past 20 years) *plus* enough extra return to make-up the 1.4% of salary shortfall in the State contribution 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.

Second, consider an employee who retires from SURS. In this case, the employee receives the higher of the two methods of benefit calculation discussed above. Just focusing on the money purchase option, the individual must, as in the case of a refund, beat the 8-9% effective interest rate plus make-up for the contribution shortfall. Furthermore, even if the Effective Interest Rate were to decline in the future, the General Formula provides a benefit floor equal to 2.2% of final average salary for each year of service. In short, for long service employees, the SMP is an inferior choice to the Traditional or the Portable plans.

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

Thus, unlike the theoretical comparison between DB and DC provided by Bodie, Marcus and Merton (1988) in which there is a constraint that the two plan types have equal costs to the employer, in the case of SURS the required employer contributions to the SMP plan are significantly lower than that of the two DB options. Given this, and the resulting disadvantage of the SMP to the Portable plan at all time horizons, it may be surprising that anyone chooses it. However, many of the differences just described, such as the difference in the match and the magnitude of the Effective Interest Rate, are not easily discernable from the material provided by SURS. Further, as previously mentioned, the framing of the pension plan choice as first a decision between DB and DC, as opposed to a direct comparison of all three options simultaneously, may also help explain participation in the SMP. The SURS manual explicitly cites as a disadvantage of a DB plan that “members with short service, or those who expect to leave their job soon, will not earn a large benefit” while a key advantage of a DC plan is that “members can transfer balances to other defined contribution plans should they change employers” (SURS, *The Power of Choice*, p. 5). However, while the Portable plan is classified as a DB-type plan, members with short service are treated essentially the same under the SMP and Portable plan options, with the accumulated balances of both allowed to be transferred to another plan if the worker changes employers (including employer contributions if vesting has occurred).

In addition to a simple lack of understanding of key plan parameters, there are other reasons that individuals may prefer the SMP option, despite its apparent financial disadvantages. These include concerns about political risk in the Traditional and Portable plans, arising from the fact that the State of Illinois has consistently under-funded the plans. While there is a State constitutional guarantee against the impairment of benefits for current state pension plan participants, the substantial under-funding of the plans may lead some participants to question the long-term ability of the State to make good on its pension promises. In contrast, the State contributions to the SMP are made immediately. Individuals may also have overly-optimistic beliefs about future equity market returns that lead them to believe that their SMP investments can outperform the SURS rate of interest. Individuals may also simply place a high value on the ability to choose their investment portfolio. While we are not able to distinguish among these various reasons in the current administrative data, we are planning to address these issues in follow-on work using a survey of SURS participants.

Finally, another difference between the SMP and the other two plans (Portable and Traditional), is that employer contributions commence after the employee formally selects the SMP option and not when employment starts. In the Portable and Traditional plans, the participant receives credit back to the date of employment for both benefit calculation and refund purposes.¹² Thus, a four-month lag between the start of employment and selecting a retirement plan will result in the worker losing four months of employer contributions in the SMP plan, but will result in no loss of employer contributions in the other two plans. This provides a financial incentive to make a quick decision if one is considering the SMP.

3. Data

The State Universities Retirement System of Illinois has provided us with a rich data containing administrative records for the entire population of workers who have started working for a SURS covered employer subsequent to that employer's offering of plan choice. SURS provided us with data on both a) employees who had already been covered by SURS at the point in time at which their employer first began offering choice and b) new employees who have joined the system since choice was first offered. We are confident that the new employee data is complete, i.e., that we observe individuals who were given a choice, even if they subsequently left the system, became disabled or died. With the pre-existing employee data, however, we are not confident that we have a complete set of records of individuals who subsequently left the system. Therefore, we will focus our analysis on the "new employee" sample, where there are no concerns about sample selection. Fortunately, this is also the more interesting population to examine because their choice is not "contaminated" by the fact that they had significant prior service under the Traditional plan. For pre-existing employees who switched to the SMP at the time the new plans were initially adopted, they had to forfeit all prior employer contributions, which should have strongly tilted the decision against the SMP (although interestingly, a non-trivial number of individuals made this choice).

As such, our analysis focuses on those individuals that began service with a SURS covered employer in 1999 or after. While most employers adopted the new choices at some point during the 1998 calendar year, we only know the year in which an employee began service

¹² In this sense, it is as if the employer made contributions retroactively to the first day of employment. In reality, the State contributions are made on an aggregate, not individual, basis and are generally not made at the level that would be required for the plan to remain fully funded.

with a SURS covered employer, and not the month, we are unable to determine which employees joining the system in 1998 joined the employer after adoption of the new plan options. By focusing on the 1999 or after sample, we are confident that we are examining the “post-choice” cohorts.

The universe of individuals beginning employment in 1999 or after (through 2004) consists of approximately 63,000 observations. However, SURS was unable to provide complete earnings records for the entire sample, and thus the sample size drops to just over 45,000 when we condition on observing earnings.¹³

In Table 1, we report the fraction of the population that makes each plan choice in each year of our 1999-2004 sample. Over the entire sample period, we see that slightly under half the sample (44%) made an active pension selection, while the majority (56%) were defaulted into the Traditional Benefits Package. The fact that the default option draws such a large number of individuals could reflect either the power of the default itself, as one would expect given the evidence in this area (e.g., Madrian and Shea, 2001, and Choi, Laibson, Madrian, and Metrick, 2001), or it could simply reflect that a large number of individuals concluded that the Traditional plan was the best choice and therefore just allowed SURS to default them into it. Another 10% of participants made an active choice into the Traditional plan, bringing the total number of participants in the Traditional Plan to nearly two-thirds of the sample. Approximately 15% of the sample chose the SMP while just under 19% chose the Portable package.

A striking feature of the data is that the fraction of individuals accepting the default option has grown steadily over time, from 43% in 1999 to around 58% in 2001, where it has remained relative stable since. This time series pattern perhaps reflects the flurry of local press attention paid during the introduction of plan choice, which quickly subsided.

The fraction choosing the SMP also shows substantial changes over time. Specifically, in both 1999 and 2000, 22% of the sample chose the SMP. These years came after a period of

¹³ Our measure of earnings is the reported earnings in the second year of employment. While we would have liked to use the respondent’s first year of earnings, we were given actual rather than annualized earnings during the first year. Thus, for many individuals who worked only part of the year, we observe only a fraction of their annual salary. We are unable to annualize the data because SURS did not provide us with the month that a person started employment. In addition to dropping observations that are missing earnings, we have experimented with several other approaches (including a dummy variable for missing along with its interaction with earnings, imputing each missing value with a predicted value, etc.) and found that our coefficient estimates were not terribly sensitive, which is not surprising given that the reason earnings is missing is not systematically correlated with plan choice. This is often called an “ignorable case” of missing data in the econometrics literature.

extremely high equity market returns, which peaked in early 2000. In 2001, the fraction choosing the SMP fell to only 13.8%, and declined further to 11.5% in 2002. In contrast, while the SMP has seen a sharp decline in enrollment from 2000-2004, enrollment in the Portable plan has remained relatively stable in the 18-19% range over the same period.

In Table 2, we report summary statistics for a number of key variables. We first report classifications by occupation (academic, staff, or police) interacted whether the individual works for a university, community college, or some other employer type. The single largest group, comprising just under one-third of the sample, are academic employees at state universities. Staff members at universities and academics at community colleges each contribute another 22-23% of the sample, while community college staff comprise 15% of the sample. Police account for less than 1% of the sample. Approximately 8% of the sample is employed by a state agency other than a university or community college.

Interestingly, only two-thirds of the participants in our sample are considered “active” SURS participants, meaning that they are still employed by a SURS covered employer and thus making contributions. Most of the rest left SURS employment, while a trivial fraction of the sample had died or retired. Individuals who leave SURS service after 5 years are considered vested, and thus eligible to receive State contributions along with their own if they choose the Portable of the SMP plan, and thus we will control for this in our analysis.

A majority of new employees (57%) are women, and 59% of our sample is married.¹⁴ The average age in the sample is just over 41 years. Approximately 14% of the sample has “reciprocal service” from another State administered pension plan, such as the State Teacher’s Retirement System: this is an important control since these individuals may have a financial incentive to stay with the Traditional plan due to rules that coordinate benefits across various public plans in the State of Illinois.

Average earnings in the sample are only \$24,100 per year, but this figure includes part-time employees (which are over one-quarter of our sample). If we condition the sample on being considered a full-time employee, the average earnings are roughly \$43,000 for an academic, \$35,000 for a police officer, and \$28,000 for staff. In addition to these covariates, we also know

¹⁴ For administrative reasons, marital status was missing for some of the individuals who accepted the default option. For these individuals, we imputed their marital status using a Probit analysis on those individuals who took the default option and whose marital status was known.

information about the individual's three-digit zip code and their campus, which we will use in some of our specifications below.

While our data is quite rich in many respects, it has the usual limitation of administrative data in that we do not know many potentially relevant demographic characteristics, such as health status, or non-SURS financial resources such as wealth, spousal earnings, or non-SURS earnings.

4. Unconditional Tabulations and Empirical Methods

When an individual joins a SURS covered employer, there are four possible outcomes with respect to their pension choice. These are:

- a. The individual chose the Self-Managed Plan
- b. The individual chose the Portable Benefits Package
- c. The individual actively chose the Traditional Benefits Package
- d. The individual made no active choice and was thus defaulted into the Traditional Benefits Package

Table 3 displays the retirement plan choices made across various groups based on occupation, plan status, and demographics. These unconditional tabulations suggest that academics at universities are more than twice as likely to enroll in the SMP (the DC plan) and are significantly less likely to actively select or be defaulted in to the Traditional (DB) plan than are other employees. Those employees that left their job before vesting (i.e., in less than five years) are more apt to have made no pension choice and thus be defaulted into the traditional plan ex ante than are employees who ended up staying with their employer or stayed long enough to be vested. This could reflect that, for this group of short-tenured workers, the pension choice is not viewed as being of much importance (i.e., differences in plan benefits are much more striking after vesting).

To more formally analyze these plan choices and their determinants, we follow two complementary approaches. First, we analyze a series of linear probability models to provide simple to interpret point estimates (marginal effects from Probit models are similar). We define the dependent variable y_i in six different ways: (i) chose SMP, (ii) chose Portable, (iii) chose or defaulted into Traditional, (iv) made any "active" choice (vs. defaulting), (v) actively chose traditional, conditional on being in traditional, and (vi) chose traditional, conditional on making

an active choice. These will be explained in more detail below. We include a full set of control variables.

A second approach is to use a multinomial logit model, in recognition of the fact that the individual is choosing from among four distinct outcomes that do not have a natural ordering. In the multinomial logit model, we estimate a set of coefficients $\beta^{1(\text{smp})}$, $\beta^{2(\text{port})}$, $\beta^{3(\text{trad})}$, and $\beta^{4(\text{default})}$ corresponding to each outcome category, such that the probability of an individual choosing SMP is:

$$\Pr(y = 1) = \frac{e^{X\beta^1}}{e^{X\beta^1} + e^{X\beta^2} + e^{X\beta^3} + e^{X\beta^4}}$$

To identify a multinomial model, it is standard to select one set of coefficients equal to zero, so that the remaining set of coefficients measures the change relative to the base group. In our specifications, we will use as our base group those individuals who failed to make an active choice and thus defaulted into the Traditional plan ($y=4$), and thus set $\beta^{4(\text{default})}=0$.

Thus, the *relative* probability of choosing the SMP to defaulting into the Traditional plan is:

$$\frac{\Pr(y = 1)}{\Pr(y = 4)} = e^{X\beta^{1(\text{smp})}}$$

Thus, the way to interpret the coefficients is that the exponentiated value of a coefficient is the relative risk ratio for a one unit change in the corresponding variable, where the risk is being measured is the “risk” of choosing SMP relative to taking the default option. The elements of X are the same as in the linear probability models. In our tables, we will report the relative risk ratios for ease of interpretation.

5. Results on Plan Choice

5.1 *Who Chooses the SMP, Portable, and Traditional?*

Table 4 reports results from six linear probability models. We begin in columns 1, 2, and 3 with an analysis of who chooses the SMP, Portable, and Traditional (whether by active choice or default) plans, respectively. Since an individual will ultimately be in one of these three plans, and being in one plan means not being in the other two, the coefficients across the three columns will add up to zero (within rounding). Consistent with the simple tabulations presented in Table 3, the results clearly indicate strong differences by occupation (which, in this setting, is a good

proxy for educational attainment and perhaps financial sophistication). When one accounts for all of the interaction terms, we find that, relative to an academic at a university, staff members at a university are 9.7 percentage points less likely to choose the SMP, academics at a community college are 3.6 percentage points less likely to choose the SMP, and staff members at a community college are 6.9 percentage points less likely to choose the SMP. These effects are quite large given the baseline SMP participation rate of only 15%. Relative to other occupation groups, academics at universities are much less likely to be enrolled in the Traditional plan. This is very much consistent with many academics' uncertainty surrounding their long-term future at a university (i.e., the tenure decision) when these retirement plan decisions are made (recall the Traditional plan is particularly attractive for employees likely to have a long stay with their employer). For example, staff members at a university are 13 percentage points more likely to be enrolled in the Traditional Plan than are academics (with the difference much more muted when one focuses on staff and academics at community colleges). Part of the community college effect might also be driven by the fact that many community colleges in Illinois are heavily unionized, and the faculty unions tend to be "pro-DB."

Benefits for police officers under the portable and traditional plans are more generous than those for other employees due to the existence of a fourth option for calculating benefits that applies only to police and fire employees. Consistent with this, police officers at a University are 23.1 percentage points less likely to participate in the SMP, while police officers at a community college are 10.2 percentage points less likely to do so.

There is evidence that there is a correlation between the *ex post* employment duration and the *ex ante* retirement plan choices. For example, those individuals that ended up leaving the firm before vesting were more likely to enroll in the Traditional plan (the default option). For a worker that leaves SURS before vesting, the choice of retirement plan has little economic consequence. However, workers that *ex post* left the SURS system, but with sufficient tenure to obtain vesting, were much less likely to have chosen the Traditional Plan. Recall that workers who leave their SURS employer after vesting and opt for a refund of their retirement plan balance receive both employee and employer contributions under the SMP or Portable plans, but relinquish employer contributions under the Traditional plan. Thus, assuming some foresight in employment duration, the coefficients on the "left with vesting" and "left without vesting" variables are sensible given the pension plan rules in place.

Higher income workers are more likely to enroll in the SMP or Portable plans, at the expense of enrollment in the Traditional plan—a \$10,000 increase in earnings corresponds to a nearly 3 percentage point increase in the probability of choosing the SMP, a 0.7 percentage point increase in the probability of choosing Portable, and a 3.6 percentage point decline in enrollment in the Traditional plan. To the extent that income may proxy for greater financial sophistication (similar to being an academic at a university), greater financial sophistication is associated with a higher likelihood of selecting the DC plan. Females are more likely to pick the Portable plan than males and married individuals are more likely to pick the SMP than single. Both younger and older individuals seem less likely to select the SMP and are instead more apt to enroll in the Traditional plan (but perhaps for different reasons given that the Traditional is also the default option).¹⁵ As expected, individuals with prior service in another system with reciprocity are more likely to be enrolled in the Traditional plan.

We also observe how the plan choice varies over time, holding fixed other characteristics. The time series trends presented in Table 4 are very similar to the unconditional trends documented in Table 1. We find that SMP participation rates in 2001 – 2004 are significantly lower than the rates in 1999-2000. These effects are quite large: holding all other covariates fixed, an individual joining the plan in 2003 was 11 percentage points less likely to choose the SMP than was an individual who joined SURS in 1999. This is consistent with the possibility that SMP participation rates are influenced by equity market performance in prior years. There is very little time trend in take up of the Portable plan from 1999-2004, all of the decrease in SMP selection is attributable to an increase in enrollment in the Traditional plan (mainly through default).

Finally, “Percent on campus” indicates what fraction of the campus population chose the same option as the individual. This is defined by taking the total number of employees on that campus at the time the individual began employment who chose the SMP option, for example, and dividing it by the total number of campus employees (excluding individual *i*). We find a strong positive relation for all the pension plan decisions, indicating the possibility of either peer effects (e.g., an individual is more likely to choose the SMP if others on the campus also did so), “human resources” effects (e.g., the H.R. officer gives common advice to all new employees on

¹⁵ The omitted age group in the regression is 35-39.

that campus), or more generally sorting of individuals across campuses based on unobserved characteristics (to the econometrician) that are correlated with pension plan choice.

In unreported results, we further explore peer effects. In the spirit of Duflo and Saez (2002, 2003), we also include the percent of academics making a particular choice and the percent of staff making a choice. We then interact these two campus-wide measures with whether the individual is an academic or staff. This enables us to test whether academics are more influenced by the decisions of fellow academics as opposed to staff, and vice versa. We find, across all of the pension choices, that the choice of a given academic is highly correlated with that of other academics on campus, but is uncorrelated with that of staff on campus, with the reverse also holding.

To summarize, we find that the SMP (DC plan) is most likely to be chosen by individuals who are highly educated (e.g., university academics) and have higher incomes, while the Traditional plan (DB plan) is most likely to be chosen by less educated individuals with lower incomes. In essence, the SMP is disproportionately chosen by the very group that one would likely expect to be the most financially sophisticated. It is ironic, that, as explained in section 2 above, a close examination of this plan suggests that it may be inferior to the Portable plan in most states of the world. While we plan to do more research on this subject, our initial hypothesis is that most participants are making a more general “DB vs. DC” decision, and that the SMP may indeed be rationally preferable to the Traditional plan for most of these employees. The failure to choose the Portable plan instead, however, may be due to the difficulty of understanding the relative advantages of the Portable plan, particular given the manner in which this complex information is provided to new participants. Other possibilities include that individuals are over confident in their ability to earn high returns through the SMP or that individuals are concerned about political risk in the Portable or DB system.¹⁶

5.2 Active vs. Passive Choice

The results in column 3 combine individuals who actively chose the Traditional plan and those who were defaulted into it. This distinction is worth further consideration, as these may represent two very different populations. In column 4, we use as our dependent variable whether the individual simply made any active choice (including SMP, portable, or traditional) as

¹⁶ Indeed the recent decision by the Legislature to shift decision making authority over the setting of the ERI in the future is one manifestation of political risk.

opposed to passively accepting the default. The complement of this dependent variable is defaulting into the Traditional option (and thus the coefficients from a “default” regression will simply be the negative of those displayed in column 4). Consistent with earlier results, we find that more educated individuals (academics, university employees), and those with higher earnings are more likely to make an active plan choice, as are women, and married individuals. As noted earlier, the overall fraction of active decision-making declined substantially over the period, falling by 15 percentage points between 1999 and 2003.

In columns 5 and 6, we examine individuals who made an active choice to go with the Traditional plan, even though an active choice was not necessary to achieve the Traditional plan outcome. In column 5, we limit the sample to those in the Traditional plan, and are thus analyzing active vs. passive Traditional plan participants. We can clearly reject that these two groups are the same. Conditional on ending up in the Traditional plan, it is actually community college employees and staff members who are most likely to have actively made this choice. Higher earners, women and married individuals are also more likely to have made this active choice, while younger people are more likely to have ended up in the Traditional plan by default. In sum, the population of defaulters is “different” both from the general population of those that made an active pension choice as well as those that actively selected the same plan as the default option (i.e., the Traditional plan).

In column 6 we explore how those who actively chose the Traditional plan differ from other individuals who made active choices (dropping those who defaulted). The patterns are largely as expected based on earlier results.

5.3 Campus/Employer Fixed Effects

As stated earlier, the framing of the pension plan choice as a discussion of DB vs. DC, as opposed to simultaneously comparing all three plans (SMP, Portable, and Traditional) may obfuscate the benefits of the Portable plan (particularly relative to the SMP). Of all the more than 60 campuses/employers covered by the State Universities Retirement System (SURS), one would expect/hope that the employees of SURS itself, the organization that makes and administers the pension plan rules, would be best informed of the pros and cons of all three retirement plans. Focusing on employers with at least 25 new hires over the period 1999-2004 (there are a handful of employers with just a couple new hires), we find that only 19% of the sample chooses the portable option. In contrast, we find that 49% of new employees working

directly for SURS chose the Portable plan. Not only is this the largest fraction of any employer, but it vastly exceeds the 27% of new employees choosing the Portable plan at the next highest employer. Only 5% of SURS employees select the SMP, the 4th lowest among all employers, compared to 15% for the whole sample. Also, 90% of SURS employees make an active choice (i.e., only 10% default into a choice), which is again the highest proportion by far across the employers covered by SURS. This evidence is consistent with our hypothesis that the SMP, once its details are understood, is inferior to the Portable plan. It also suggests, more generally, that there may be important employer effects influencing plan choice.

More formally, in specifications not reported, we have further included employer indicator variables in our regression specifications. While we are no longer able to identify some of our campus-wide variables in these specifications (such as community college and its interactions, or the % choosing the same option) because of a very little time series variation in these variables, we do find that the campus variables are jointly significant, with a p-value of 0.000, even in a regression that already controls for 3-digit zip codes. This clearly suggests that there are strong campus effects, although it does not allow us to definitively distinguish whether it is driven by peer effects, human resource effects, or sorting effects.¹⁷

5.4 Multinomial Logit Results

A limitation of the OLS specification is that they limit us to examining one choice at a time. In reality, individuals can choose from the entire menu of actions upon joining a SURS covered employer. Specifically, there are four distinct actions an individual can take, as noted earlier. In Table 5, we introduce a multinomial logit specification to examine this choice. By treating the default option as our base category, we report the relative risk ratio of our key covariates for each of the other three possible outcomes. In interpreting the coefficients, recall that what matters is whether the risk ratio is greater than or less than 1.0. For example, the relative risk ratio of 0.744 for community college in column 1 means that an employee of a community college is only 74.4% as likely to choose the SMP over the Traditional plan than is an employee of a University. Note that unlike the earlier table, all of the columns in Table 4 are from the same regression. Column 1 reports the risk ratio for the SMP vs. the default option, column 2 for Portable vs. the default option, and column 3 for actively choosing the Traditional plan vs. accepting the default option.

¹⁷ All of the patterns in coefficients in Table 4 also hold in the employer-fixed-effect regression.

The direction and significance of most of the effects are consistent with what we found using the series of linear probability models. Specifically, relative to university employees, those that work for a community college are less likely to choose the SMP or Portable plan, and more likely to actively choose the Traditional plan. Employees at other employer types are less likely to make any active choice, meaning that they are much more likely to accept the default. Relative to academic employees, staff are also less likely to choose the SMP or Portable options, and more likely to actively choose the Traditional plan. Police officers, particularly those at universities, are substantially less likely to take the SMP or Portable option.

Individuals who subsequently leave employment for any reason (disability, retirement, death, or leaving prior to vesting) are significantly less likely to have been SMP participants. Those who left SURS employment with vested benefits were much more likely to have chosen the Portable plan.

Higher earners and those with full-time status are less likely to default and more likely to choose each of the active plans, with the earnings effect strongest for the SMP. In general, women are more likely to make an active choice, as are married individuals. Individuals under the age of 30 are far less likely to make any active choice, while those at over 50 are less likely to choose the SMP, but more likely to actively choose the Traditional plan.

To put all these findings together, it is useful to consider a few stylized individuals and what our results suggest about their choices:

- Young, single, male low earners with less job attachment to the SURS employer (both in terms of % time worked in terms of whether they subsequently leave) are extremely likely to accept the default option.
- High earning, well-educated, married professors in their 30's with the strongest attachment to their employer are disproportionately likely to choose the SMP plan, and to a slightly lesser extent, the Portable plan.
- Older, part-time, married, female, community college staff members with above average earnings are disproportionately likely to actively choose the Traditional plan.

6. Conclusions and Future Directions

This paper has provided novel evidence about what types of workers are most likely to choose defined contribution plans. We find that, even in an environment where choosing the pure DC plan may not be the best financial decision, individuals are more likely to choose the DC option if they are high earners, well-educated, married, in their 30's, with strong attachment to their employer. These findings suggest that these "educated, high earning, young professionals" have a strong preference for DC plans, even when the financial terms are unfavorable. For example, among the 650 individuals in our sample who are full-time, age 30-39, academics at a university, married, have earnings in excess of \$50,000, and are still active employees as of spring 2006, 52% of them chose the self-managed plan (versus 15% in the sample as a whole). This is despite the fact that an individual would need to earn a nominal rate of return of 5.5% - 11.2% per year (which is, at current inflation rates, substantially higher than the 3% real rate in President Bush's Social Security proposal) in order for the SMP to be preferred to the Portable plan. Using Robert Shiller's (2005) methodology, we estimate that even using what most would consider rather high historical equity returns in the market, no cohort of individuals between 1871 and 2004 would be able to achieve these returns by following a life-cycle portfolio strategy over their full working lives.

This analysis raises fascinating questions as to *why* individuals who, by most observables, appear to be highly capable individuals make what appear to be sub-optimal choices. We speculate that there are at least five reasons why they may do so. First, participants may simply have difficulty processing the complex information that they are provided when making this choice, due either to time constraints or some form of bounded rationality. Second, the information provided by SURS may not be optimally designed to facilitate meaningful comparisons between the self-managed plan and the portable benefits package. This might lead some employees to mistakenly believe that the self-managed plan is the most generous plan for individuals who leave SURS employment early in their career. Third, individuals may understand the rules, but may simply suffer from overconfidence in their investment abilities and/or have unrealistically high expectations about future risk-adjusted equity market returns. Fourth, individuals may have either rational or irrational beliefs about the degree of political risk in the traditional or portable benefit plans, arising due to the chronic under-funding problem facing the SURS system. Fifth, individuals may simply place a very high value on choice for its

own sake. In future research, we intend to explore these alternative hypotheses using a survey of current SURS participants.

References

- Bodie, Zvi,, Alan J. Marcus, and Robert C. Merton, 1988, “Defined Benefit versus Defined Contribution Pension Plans: What are the Real Trade-offs?” In *Pensions in the U.S. Economy*, edited by Zvi Bodie, John Shoven, and David Wise, Chicago, IL: University of Chicago Press: 139 – 162.
- Choi, James, David Laibson, Brigitte Madrian, and Andrew Metrick, 2001, For better or for worse: Default effects and 401(K) savings behavior, NBER Working paper 8651, December.
- Clark, Robert L., Linda S. Ghent, and Ann A. McDermed, “Pension Plan Choice Among University Faculty,” *Southern Economic Journal*. 2006.
- Clark, Robert L. and M. Melinda Pitts, “Faculty Choice of a Pension Plan: Defined Benefit vs. Defined Contribution.” *Industrial Relations*. 38: 18-45.
- Congressional Budget Office, “An Analysis of the President’s Budgetary Proposals for Fiscal Year 2007,” March, 2006.
- Duflo, Esther, and Emmanuel Saez, “Participation and Investment Decisions in a Retirement Plan: The Influence of Colleagues’ Choices,” *Journal of Public Economics*, LXXXV (2002), 121-48.
- Duflo, Esther, and Emmanuel Saez, “The Role of Information and Social Interactions in Retirement Plan Decisions: Evidence from a Randomized Experiment,” *Quarterly Journal of Economics*, CXVIII (2003), 815-42.
- Ford, William, 2005. “2004 Comparative Study of Major Public Employee Retirement Systems.” Wisconsin Legislative Council, December 2005.
- Madrian, Brigitte, and Dennis Shea, 2001, The power of suggestion: Inertia in 401(k) participation and savings behavior, *The Quarterly Journal of Economics* 116, 1149-1525.
- Papke, Leslie, 2004, “Pension Plan Choice in the Public Sector: The Case of Michigan State Employees,” *National Tax Journal*, Vol. 57(2), Part 1: 329-339.
- Shiller, Robert J., 2005, “The Life Cycle personal Accounts Proposal for Social Security: An Evaluation,” Yale ICF Working paper No. 05-06.
- U.S. Government Accounting Office, 2003, “Social Security: Issues Relating to Noncoverage of Public Employees,” Statement of Barbara D. Bovbjerg before the Subcommittee on Social Security, Committee on Ways and Means, House of Representatives. GAO-03-710T.
- Yang, Tongxuan. “Understanding the Defined Benefit versus Defined Contribution Choice.” Pension Research Council working paper 2005-04, The Wharton School, University of Pennsylvania. 2005.

Table 1: Plan Choice by Start Year

Variable	Start Year						
	Total	1999	2000	2001	2002	2003	2004
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Made an Active Choice	0.443	0.569	0.497	0.421	0.394	0.396	0.402
Chose SMP	0.153	0.220	0.215	0.138	0.115	0.118	0.125
Chose Portable	0.186	0.204	0.175	0.186	0.190	0.182	0.180
Chose Traditional	0.104	0.146	0.107	0.096	0.089	0.096	0.097
Defaulted into Traditional	0.557	0.431	0.503	0.579	0.606	0.604	0.598
Number of Observations	45,303	6,596	7,187	8,649	7,975	7,158	7,738

Table 2:
Descriptive Statistics

Variable	Plan Choice					
	Full Sample	Made Active Choice	Chose	Chose	Chose	Defaulted into
			SMP	Portable	Traditional	Traditional
(1)	(2)	(3)	(4)	(5)	(6)	
OCCUPATION						
Academic*University	0.315	0.395	0.510	0.415	0.191	0.251
Staff*University	0.218	0.237	0.159	0.242	0.345	0.202
Police*University	0.003	0.002	0.001	0.003	0.005	0.004
Academic*Comm. College	0.233	0.179	0.190	0.143	0.229	0.275
Staff*Community College	0.151	0.141	0.108	0.152	0.170	0.159
Police*Community College	0.004	0.004	0.001	0.005	0.006	0.004
Other Type of Institution	0.077	0.042	0.032	0.042	0.055	0.104
PLAN STATUS						
Active	0.663	0.732	0.787	0.675	0.753	0.609
Disabled	0.003	0.003	0.002	0.004	0.004	0.003
Retired	0.000	0.000	0.000	0.000	0.000	0.000
Dead	0.001	0.000	0.000	0.000	0.000	0.001
Left with Vested Benefits	0.016	0.022	0.025	0.024	0.014	0.011
Left Prior to Vesting	0.317	0.243	0.186	0.297	0.228	0.377
FINANCIAL						
Earnings in \$100,000s	0.241	0.318	0.390	0.303	0.237	0.180
Percentage Time Worked	0.722	0.803	0.799	0.838	0.745	0.659
DEMOGRAPHICS						
Female	0.568	0.582	0.525	0.612	0.611	0.557
Single	0.262	0.340	0.306	0.401	0.280	0.200
Married	0.590	0.626	0.669	0.563	0.677	0.561
Age	41.5	42.2	41.9	40.9	45.0	40.9
Reciprocal Service Agreement	0.137	0.114	0.102	0.097	0.162	0.156
Number of Observations	45,303	20,049	6,920	8,421	4,708	25,254

Table 3: Plan Choice by Group

Variable	Plan Choice			
	SMP	Portable	Chose Traditional	Defaulted into Traditional
	(1)	(2)	(3)	(4)
OCCUPATION				
Academic*University	0.247	0.245	0.063	0.445
Staff*University	0.111	0.206	0.164	0.518
Police*University	0.028	0.162	0.155	0.655
Academic*Community College	0.125	0.114	0.102	0.660
Staff*Community College	0.109	0.186	0.117	0.588
Police*Community College	0.035	0.227	0.157	0.581
PLAN STATUS				
Active	0.181	0.189	0.118	0.512
Disabled	0.092	0.239	0.146	0.523
Retired	0.000	0.750	0.000	0.250
Dead	0.000	0.087	0.087	0.826
Left with Vested Benefits	0.239	0.277	0.092	0.392
Left Prior to Vesting	0.090	0.174	0.075	0.662
DEMOGRAPHICS				
Female	0.141	0.200	0.112	0.547
Male	0.168	0.167	0.094	0.571
Married	0.164	0.168	0.113	0.555
Not Married	0.134	0.216	0.089	0.561
RECIPROCAL SERVICE				
Yes	0.114	0.131	0.123	0.632
No	0.159	0.195	0.101	0.546

Table 4: OLS Estimate of Plan Choice¹

Independent Variable	Dependent Variable					
	SMP	Portable	Traditional	Any Active	Choose Traditional Given Traditional	Choose Traditional
	(1)	(2)	(3)	Choice	(5)	Given Choice
Community College	-0.036 *** (0.006)	-0.009 (0.006)	0.047 *** (0.008)	-0.017 ** (0.008)	0.025 *** (0.007)	0.081 *** (0.012)
Other Type of Institution	0.006 (0.008)	-0.012 (0.009)	0.009 (0.012)	-0.008 (0.013)	-0.004 (0.008)	0.036 ** (0.018)
Staff	-0.097 *** (0.005)	-0.032 *** (0.005)	0.130 *** (0.006)	-0.053 *** (0.006)	0.078 *** (0.006)	0.188 *** (0.008)
Staff*Community College	0.064 *** (0.007)	0.043 *** (0.008)	-0.107 *** (0.009)	0.043 *** (0.010)	-0.063 *** (0.009)	-0.169 *** (0.015)
Police	-0.231 *** (0.016)	-0.076 ** (0.031)	0.308 *** (0.035)	-0.221 *** (0.041)	0.034 (0.037)	0.336 *** (0.073)
Police*Community College	0.129 *** (0.022)	0.152 *** (0.045)	-0.282 *** (0.048)	0.252 *** (0.056)	0.039 (0.053)	-0.234 ** (0.093)
Disabled	-0.069 *** (0.023)	0.015 (0.037)	0.054 (0.040)	-0.073 * (0.043)	-0.037 (0.043)	-0.021 (0.056)
Retired	-0.183 *** (0.038)	0.418 * (0.227)	-0.242 (0.231)	0.106 (0.256)	-0.369 *** (0.023)	-0.260 *** (0.051)
Dead	-0.153 *** (0.020)	-0.093 (0.059)	0.245 *** (0.063)	-0.285 *** (0.083)	-0.107 * (0.063)	0.236 (0.229)
Left with Vested Benefits	-0.006 (0.016)	0.056 *** (0.017)	-0.051 *** (0.018)	0.000 (0.018)	-0.063 *** (0.021)	-0.071 *** (0.019)
Left Prior to Vesting	-0.062 *** (0.004)	0.000 (0.004)	0.061 *** (0.005)	-0.091 *** (0.005)	-0.052 *** (0.005)	-0.010 (0.008)
Earnings in \$100,000s	0.299 *** (0.011)	0.065 *** (0.010)	-0.364 *** (0.012)	0.339 *** (0.012)	0.100 *** (0.015)	-0.140 *** (0.012)
Percentage Time Worked	-0.027 *** (0.007)	0.141 *** (0.008)	-0.115 *** (0.009)	0.144 *** (0.010)	0.054 *** (0.009)	-0.034 ** (0.015)
Female	0.004 (0.003)	0.042 *** (0.004)	-0.047 *** (0.004)	0.060 *** (0.005)	0.033 *** (0.004)	-0.008 (0.006)
Married	0.029 *** (0.005)	-0.032 *** (0.005)	0.003 (0.006)	0.024 *** (0.006)	0.047 *** (0.007)	0.032 *** (0.006)
Age 15-19	0.047 (0.047)	-0.043 (0.045)	-0.003 (0.067)	-0.078 (0.068)	-0.080 *** (0.013)	-0.354 *** (0.044)
Age 20-24	-0.017 ** (0.008)	-0.055 *** (0.011)	0.072 *** (0.012)	-0.100 *** (0.014)	-0.034 *** (0.011)	0.008 (0.029)
Age 25-29	-0.019 *** (0.006)	0.003 (0.007)	0.016 ** (0.008)	-0.035 *** (0.008)	-0.027 *** (0.007)	-0.038 *** (0.011)
Age 30-34	0.009 * (0.009)	-0.006 (0.006)	-0.003 (0.003)	-0.019 *** (0.003)	-0.032 *** (0.003)	-0.046 *** (0.003)

	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.009)
Age 40-44	-0.008	0.001	0.007	-0.004	0.003	0.012
	(0.006)	(0.007)	(0.008)	(0.008)	(0.008)	(0.010)
Age 45-49	-0.009	-0.005	0.014 *	-0.003	0.014 *	0.026 **
	(0.006)	(0.007)	(0.008)	(0.008)	(0.008)	(0.011)
Age 50-54	-0.029 ***	0.001	0.028 ***	-0.005	0.025 ***	0.048 ***
	(0.006)	(0.007)	(0.008)	(0.008)	(0.008)	(0.011)
Age 55-59	-0.035 ***	0.006	0.029 ***	0.024 ***	0.068 ***	0.094 ***
	(0.007)	(0.007)	(0.009)	(0.009)	(0.009)	(0.013)
Age 60-64	0.011	-0.033	0.022	-0.035	-0.019	-0.004
	(0.018)	(0.024)	(0.027)	(0.032)	(0.031)	(0.050)
Age 65+	-0.054 ***	0.027	0.026	0.062 **	0.106 ***	0.161 ***
	(0.014)	(0.020)	(0.023)	(0.026)	(0.025)	(0.041)
Reciprocal Service Agreement	-0.022 ***	-0.020 ***	0.043 ***	-0.025 ***	0.013 **	0.063 ***
	(0.005)	(0.005)	(0.006)	(0.007)	(0.006)	(0.011)
Start Year 2000	-0.015 **	-0.028 ***	0.044 ***	-0.077 ***	-0.074 ***	-0.035 ***
	(0.007)	(0.007)	(0.008)	(0.008)	(0.009)	(0.010)
Start Year 2001	-0.083 ***	-0.017 ***	0.103 ***	-0.137 ***	-0.099 ***	-0.018 *
	(0.006)	(0.006)	(0.008)	(0.008)	(0.009)	(0.010)
Start Year 2002	-0.106 ***	-0.008	0.117 ***	-0.146 ***	-0.101 ***	-0.010
	(0.006)	(0.007)	(0.008)	(0.008)	(0.009)	(0.011)
Start Year 2003	-0.114 ***	-0.013 *	0.129 ***	-0.149 ***	-0.098 ***	0.010
	(0.006)	(0.007)	(0.008)	(0.009)	(0.010)	(0.012)
Start Year 2004	-0.107 ***	-0.012 *	0.122 ***	-0.141 ***	-0.098 ***	-0.003
	(0.006)	(0.007)	(0.008)	(0.009)	(0.010)	(0.012)
% Made Choice on Campus	0.238 ***	0.492 ***	0.358 ***	0.356 ***	0.231 ***	0.018
	(0.078)	(0.078)	(0.058)	(0.047)	(0.059)	(0.076)
Constant	0.207 ***	0.002	0.418 ***	0.194 ***	0.061 ***	0.203 ***
	(0.013)	(0.018)	(0.043)	(0.031)	(0.022)	(0.029)
Zip Code Controls (3-digit)?	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.1053	0.0446	0.1318	0.1305	0.0647	0.0811
Number of Observations	45,303	45,303	45,303	45,303	29,962	20,049

¹ Standard Errors in Parentheses; ***, **, * Significant at the 1 percent, 5 percent, and 10 percent levels, respectively

Table 5: Multinomial Logit Estimate of Plan Choice¹

Independent Variable	Plan Choice [†]		
	SMP	Portable	Traditional
	(1)	(2)	(3)
Community College	0.744 *** (0.036)	0.788 *** (0.037)	1.349 *** (0.080)
Other Type of Institution	0.447 *** (0.034)	0.469 *** (0.029)	0.552 *** (0.040)
Staff	0.432 *** (0.018)	0.722 *** (0.025)	1.957 *** (0.089)
Staff*Community College	1.674 *** (0.113)	1.460 *** (0.085)	0.564 *** (0.040)
Police	0.061 *** (0.032)	0.400 *** (0.096)	1.520 * (0.383)
Police*Community College	3.852 ** (2.595)	3.683 *** (1.144)	1.067 (0.363)
Disabled	0.458 ** (0.142)	0.931 (0.207)	0.715 (0.188)
Retired	0.000 *** (0.000)	5.167 (7.164)	0.000 *** (0.000)
Dead	0.000 *** (0.000)	0.280 * (0.212)	0.407 (0.302)
Left with Vested Benefits	0.985 (0.103)	1.392 *** (0.136)	0.634 *** (0.089)
Left Prior to Vesting	0.498 *** (0.019)	0.927 ** (0.028)	0.615 *** (0.024)
Earnings in \$100,000s	11.116 *** (0.958)	4.319 *** (0.348)	2.243 *** (0.246)
Percentage Time Worked	1.231 *** (0.080)	3.145 *** (0.195)	1.644 *** (0.122)
Female	1.175 *** (0.035)	1.426 *** (0.039)	1.262 *** (0.043)
Married	1.401 *** (0.056)	0.970 (0.034)	1.517 *** (0.074)
Age 15-19	1.037 (0.789)	0.536 (0.397)	0.000 *** (0.000)
Age 20-24	0.429 *** (0.068)	0.613 *** (0.059)	0.641 *** (0.085)
Age 25-29	0.765 *** (0.044)	0.953 (0.044)	0.753 *** (0.050)
Age 30-34	1.029 (0.046)	0.908 ** (0.038)	0.713 *** (0.042)
Age 40-44	0.932 (0.046)	0.996 (0.046)	1.029 (0.060)
Age 45-49	0.934 (0.048)	0.968 (0.047)	1.101 * (0.064)
Age 50-54	0.799 *** (0.044)	0.990 (0.050)	1.192 *** (0.069)
Age 55-59	0.804 *** (0.050)	1.081 (0.060)	1.567 *** (0.095)
Age 60-64	1.214 (0.303)	0.771 (0.156)	0.887 (0.161)
Age 65+	0.598 ** (0.127)	1.302 (0.213)	2.181 *** (0.325)
Reciprocal Service Agreement	0.812 *** (0.038)	0.809 *** (0.035)	1.187 *** (0.056)
Start Year 2000	0.765 *** (0.036)	0.693 *** (0.033)	0.598 *** (0.033)
Start Year 2001	0.424 *** (0.021)	0.639 *** (0.029)	0.483 *** (0.026)
Start Year 2002	0.332 ***	0.645 ***	0.463 ***

	(0.017)	(0.030)	(0.026)
Start Year 2003	0.307 ***	0.606 ***	0.477 ***
	(0.017)	(0.029)	(0.027)
Start Year 2004	0.337 ***	0.617 ***	0.471 ***
	(0.018)	(0.030)	(0.027)
Pseudo R2	0.0871		
Number of Observations	45,303		

¹ Standard Errors in Parentheses; ***, **, * Significant at the 1 percent, 5 percent, and 10 percent levels, respectively

†Default into Traditional Plan is the Omitted Category