



The link between pensions and retirement timing: Lessons from California teachers

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ABSTRACT

I exploit a major, unanticipated reform of the California teachers' pension to provide quasi-experimental evidence on the link between pension features and retirement timing. Using two large administrative data sets, I conduct a reduced-form analysis that leverages the nonlinearities in the return to work generated by the pension features and the reform-induced shifts of these nonlinearities for identification. The implied estimates of the elasticity of lifetime labor supply with respect to the return to work are centered around 0.04 in the medium-run and are less than 0.1 in the long-run.

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1. Introduction

With the baby boomers reaching retirement age, public officials and private pension managers are scrambling to design policy that will reduce the burden of pension obligations on younger workers and shareholders, while still fulfilling the promises made to those nearing retirement. The proposed reforms will inevitably alter key pension financial incentives faced by members, such as the financial gain for an additional year of work, making the degree to which these incentives affect retirement timing central to the policy debate.

Although there is an extensive literature that addresses the relationship between pensions and retirement, there is no firm consensus on the magnitude of the behavioral response to pension incentives. Recent work has emphasized the importance of forward-looking pension financial incentives to individual retirement decisions and has utilized both structural and reduced-form approaches to estimate the behavioral response to these incentives.¹ These estimation techniques, which assume that retirees facing diverse pension incentives are otherwise identical after controlling for other observable

characteristics, prove unsatisfactory as the potential for endogenous sorting makes it difficult to infer the true causal effects of the pension features.

In this paper, I address this concern by using a quasi-experimental approach to estimate the price elasticity of lifetime labor supply, a key parameter for predicting the response of individuals to pension reforms and for measuring the deadweight loss associated with retirement programs. I use two unique administrative data sets to exploit the exogenous variation in the return to work that is generated by the nonlinear features of the California teachers' pension benefits and by the reforms of these pension benefits. The distribution of retirements about the budget constraint nonlinearities reveals how much labor supply responds to changes in the return to work and is the basis for the estimates of the elasticity of lifetime labor supply. The results imply that California teachers' lifetime labor supply is relatively insensitive to the financial return to work.

This paper builds on both a growing literature that uses budget constraint nonlinearities to identify the causal effect of price changes on individual choice and a small literature that uses policy-reform based variation in pension financial incentives to address potential omitted variable bias. Saez (2010), which demonstrates that the compensated price elasticity is proportional to bunching at price schedule kink points in the context of income taxation, is a foundational work of this first literature.² More closely related to this paper, Manoli and

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¹ Rust and Phelan (1997) present one of the most comprehensive models which incorporates the financial incentives of Social Security and the additional incentives generated by Medicare. Stock and Wise (1990), and Gustman and Steinmeier (1986) are also examples. Samwick (1998) develops a reduced-form variant of the option value model introduced by Stock and Wise (1990) to estimate the effect of Social Security and pensions on retirement behavior. Coile and Gruber (2007) introduce a modification of the reduced-form option value model to disentangle the effect of Social Security financial incentives on retirement. Their approach is also used extensively in a volume edited by Gruber and Wise (2004) and by Asch et al. (2005). Costrell and Podgursky (2009) and Costrell and McGee (2010) are examples of the teacher-pension specific retirement literature.

² Studies using related empirical methods examine such diverse topics as the impact of tax rates on earnings (Kleven and Waseem, 2012) and on labor supply (Chetty et al., 2011), the effect of EITC on non-labor income (Weber, 2012), the income and labor supply effects of CHIP (Pei, 2012), the effect of the Saver's Credit on income and savings (Ramnath, 2011), and the response of automakers to fuel economy policy (Sallee and Slemrod, 2012).

Weber (2011) find that the extensive margin labor supply is inelastic by exploiting discontinuities in the level of benefits in the Austrian pension system. I contribute to this literature by using discontinuities in the growth rate of pension benefits to estimate the lifetime labor supply elasticity. I also extend the estimation method used in this literature by using policy reforms that shift budget constraint nonlinearities to provide information about the counterfactual labor supply on a linear budget constraint.

The policy-reform retirement literature generally finds a smaller role for financial incentives than non-reform studies. For example, Burtless (1986) and Krueger and Pischke (1992) examine individuals' responses to changes in the level of Social Security benefits and find a small role for Social Security in the trend toward later retirement. More recently, Mastrobuoni (2009) examined the effect of the expected rise in the Social Security normal retirement age on retirement behavior and found somewhat larger effects.³ This paper adds to this literature by focusing on distortions to the return to work rather than changes in the level of benefits.

The California public school system is an advantageous setting in which to estimate the impact of pension price incentives on retirement timing. California teachers are required to participate in a state pension system with a simple benefit formula, do not participate in Social Security, have tenure, and face a rigid collectively-bargained wage schedule, so there is little uncertainty in the financial return to work and it is both salient to the teachers and easily calculated with administrative data. Importantly, in contrast to the Social Security reforms addressed in the literature that primarily changed benefit levels and the focal retirement age, the California pension reform explicitly altered the financial return to an additional year of work. A further advantage of this study is that a large portion of the sample is women, a group which has arguably been understudied.

Given the minimal employment-related uncertainty faced by the teachers, I use a nonstochastic lifetime budget constraint framework to model their retirement decisions. One salient theoretical prediction of this model is that a bunching of retirements will be observed at budget constraint kinks and discontinuities. In the California teachers' case these nonlinearities are a product of the pension program. I first examine the response of individuals to their pension features and to the pension reform in a flexible way. I construct the prereform and postreform distributions of retirees over age and show that there is a spike in the distribution at the universal prereform budget constraint kink and that this spike shifts to the new kink following the reform. The distributions over service are also consistent with the discontinuity in the level of benefits that is introduced by the pension reform. The reform provides evidence that the distinct retirement pattern is shaped by pension financial incentives rather than other coincident factors.

Next, I incorporate the pension reform into the estimation method introduced by Saez (2010) to quantify the excess retirements at the budget constraint kinks and to estimate the elasticity of lifetime labor supply. I determine the excess retirements as the difference between the pre- and post-reform retirement distributions at points where the kinks are removed or introduced. The estimates of the labor supply elasticity with respect to the financial return to work are relatively small with the preferred estimates centered at 0.04. The results imply that teachers are willing to adjust their retirement dates by less than two months in response to a 10% increase in compensation. I investigate the impact

of potential extensive-margin frictions, specific to this setting, that may cause the elasticity estimates to be downward biased. These include a high implicit cost to retiring during the school year, a cost to adjusting retirement plans in response to the pension reform, and the cost of health insurance coverage. I find that these factors have little effect on the overall results.

Finally, I use an instrumental variable strategy to estimate an alternative measure of labor supply — the effect of the financial return to working on the probability of working an additional year. This alternative measure of labor supply allows me to compare the behavior of California teachers with findings in the literature. I find that California teachers behave similarly to the Social Security population in the U.S. and the estimated elasticity is similar to the findings of Manoli and Weber (2011) for the Austrian population.

The remainder of this paper is organized as follows. In Section 2, I provide an overview of the California teachers' defined benefit program, the reforms of the program, and the data used in this study. Section 3 introduces the empirical strategy which is based on a simple lifetime budget constraint model that captures the teacher retirement decision. Section 4 presents the main labor supply elasticity estimates based on retirement behavior at budget constraint nonlinearities. Section 5 includes robustness checks for the main results and Section 6 presents alternative labor supply estimates. Section 7 concludes.

2. Background and data

2.1. CalSTRS defined benefit program

California public school teachers are covered by a defined benefit retirement plan administered by the California State Teachers' Retirement System (CalSTRS) which ranks among the ten largest public retirement systems in the United States both in terms of assets and members. The main features of the defined benefit pension resemble those of most employer-sponsored defined benefit retirement programs and also of Social Security. Participation is mandatory for teachers employed full-time in California public schools and upon retirement each CalSTRS member receives a lifetime annuity with an annual value based on years of service, age and past salary. The retirement system is financed with contributions from active members (8% of salary), employing school districts, and the State General Fund, as well as with investment earnings.

The CalSTRS pension is likely to be a prominent component of California teachers' retirement portfolios and an important consideration in the retirement decision for several reasons. First, the CalSTRS pension is the only source of employment-based retirement income for career teachers because California teachers are not simultaneously covered by Social Security. Second, CalSTRS members' pensions are not disrupted as they move between employing public school districts within California. Third, CalSTRS is relatively generous; the average replacement rate for retired teachers is 59% of final annual salary, while the replacement rate for the average Social Security annuitant is only 41% of average annual lifetime earnings.⁴

Features of the pension benefit calculation and the reforms of these features are central to the empirical strategy employed in this paper. Each retired CalSTRS member receives a lifetime annuity with an annual value calculated according to the following formula:

$$B(R, S) = k(R, S) \times S \times w_S^f. \quad (1)$$

³ There are also several papers that identify the responsiveness of retirement to financial incentives using a shock created by a temporary retirement incentive program. These include Lumsdaine et al. (1992) and Pencavel (2001). Both find evidence that separation rates are responsive to the incentive but are unable to predict who will leave. The one most closely related to this paper is Furgeson et al. (2006) which uses administrative data to look at the retirement of Pennsylvania teachers and find that the substitution elasticity of retirement is strongly negative. It is not trivial to compare the findings from examining temporary retirement incentive programs to those from examining permanent pension reforms.

⁴ Replacement rates are based on the author's calculations using data in the statistical section of the CalSTRS Comprehensive Annual Financial Report (CalSTRS, 2006a) and the Social Security Administration Performance and Accountability Report (Social Security Administration, 2006). The average replacement rate calculated for California teachers corresponds to an average retirement age that is just past 60, while the replacement rate reported for Social Security corresponds to retirement at age 65.

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