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

Kristine M. Brown

University of Illinois at Urbana-Champaign, 504 E. Armory Ave., Champaign, IL 61820, United States

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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 non-linearities in the return to work generated by the pension features and the reform-induced shifts of these non-linearities 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 non-linear features of the California teachers’ pension benefits and by the reforms of these pension benefits. The distribution of retirements about the budget constraint non-linearities 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 non-linearities 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...
introduced by Saez (2010) to quantify the excess retirements at the
timing. California teachers are required to participate in a state pension
system with a simple benefit formula, do not participate in Social Secu-
ritv, 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 benefits and the focal retire-
ment 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 argu-
ably 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 bud-
get constraint kinks and discontinuities. In the California teachers’ case
these nonlinearities are a product of the pension program. I first exam-
ine the response of individuals to their pension features and to the pen-
sion 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 distribu-
tions over service are also consistent with the discontinuity in the level
of benefits that is introduced by the pension reform. The reform pro-
vides 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 elas-
ticity with respect 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 alter-
native measure of labor supply — the effect of the financial return to
working on the probability of working an additional year. This alterna-
tive 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 re-
tirement 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 consider-

ation 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.3

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:

\[
B(R, S) = k(R, S) \times S \times w_f^R. 
\]

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 Fugere 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 statisti-
cal section of the CalSTRS Comprehensive Annual Financial Report (CalSTRS, 2006a)
and the Social Security Administration Performance and Accountability Report (So-
cial Security Administration, 2006). The average replacement rate calculated for California
teachers corresponds to an average retirement age that is just past 60, while the re-
placement rate reported for Social Security corresponds to retirement at age 65.
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