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¹² J. Cawley, D. Frisvold, and C. Meyerhoefer, "The Impact of Physical Education on Obesity among Elementary School Children," NBER Working Paper No. 18341, August 2012, published in *the Journal of Health Economics*, 32(4) (2013), pp. 743-55.

¹³ J. Cawley and J.A. Price, "Outcomes in a Program that Offers Financial

Rewards for Weight Loss," NBER Working Paper No. 14987, May 2009, and published as chapter 4 in *Economic Aspects of Obesity*, M. Grossman and N. Mocan, eds., Chicago, IL: University of Chicago Press, 2011, pp. 91-126. See also J. Cawley and J.A. Price, "A Case Study of a Workplace Wellness Program That Offers Financial Incentives

for Weight Loss," *Journal of Health Economics*, 32(5) (2013), pp. 794-803.

¹⁴ J. Cawley, R.J. Avery, and M. Eisenberg, "The Effect of Deceptive Advertising on Consumption of the Advertised Good and its Substitutes: The Case of Over-the-Counter Weight Loss Products," NBER Working Paper No. 18863, March 2013.

Public Sector Retirement Plans

Robert Clark*

Public sector pension plans and retiree health plans have been front page news during the past decade. While the popular press has focused almost exclusively on the underfunding of these plans, economic research has examined how these plans affect state and local budgets, intergenerational equity, and the behavior of public employees. Public employees account for 14 percent of the labor force and employee benefits comprise about 35 percent of the employment cost of public employees.¹ Thus, a clear understanding of the cost and benefits of pension and health plans is central to understanding this sector of the U.S. economy. Along with colleagues, I have examined the labor market effects of public pension plans and retiree health plans. The following describes my research on primary pension plans, retiree health plans, and supplemental retirement plans offered by state and local governments to their employees.

Public Pension Plans

I began my research on public pension plans through a study of the his-

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torical origins of retirement plans in the United States. In order to consider current retirement policies, it is important to understand when public sector retirement plans were established, why they were made more generous in the last quarter of the twentieth century, and what human resource objectives they are trying to achieve. The earliest retirement plans can be found in the public sector, dating at least from the early Roman Empire. The first public pension plans in North America were those established in the English colonies which provided benefits for the members of their local militias. During the earliest stages of the Revolutionary War, the Continental Congress established a retirement plan for its naval officers and enlisted sailors. The plan was funded primarily from booty seized on the open seas. (Later a plan was created for the Continental Army.) The history of the Navy Pension Fund offers an interesting narrative of the management of early pension funds, including periodic benefit increases, which ultimately led to the fund's exhaustion and a subsequent U.S. Treasury bailout. This fund was revived and prospered during the Civil War and was eventually rolled into the federal government's pension system for Union veterans and later military plans for "regular" army and navy personnel. At the local level, larger municipali-

ties established pension plans for their police officers, firefighters, and teachers during the late nineteenth century.²

By the first decade of the twentieth century, a few states offered plans for public school teachers, but the first pensions for general (that is, non-teacher) state employees were established in the 1910s; however, only after the enactment of Social Security did most states begin to establish retirement plans for their employees, with the last state plan being implemented in the 1960s. Initially, employer-provided pension plans were the only retirement plans available to public employees, because public employees were excluded from the Social Security system until the 1950s. Through the middle of the century, except for several of the country's larger cities, local teacher plans were consolidated into state-managed plans, and in about half of the states, teacher plans merged with plans covering general state employees. By the 1970s, public sector plans had matured and covered most full-time state and local employees.

These early public sector plans were almost exclusively defined benefit plans, providing life annuities to retired public employees. The last quarter of the twentieth century saw public employers increasing the generosity of their plans³ by: increasing the multiplier for benefits

per year of service, reducing retirement ages, reducing vesting periods, and adding cost-of-living adjustments to retirement benefits.⁴ To some extent, today's funding problems are based on these decisions to increase benefits without providing adequate revenue to support them.

Private sector employers began offering pension plans on a wide scale later than the public sector, though, like the public sector, most of the early plans were defined benefit plans. After the passage of the Employee Retirement Income Security Act (ERISA) in 1974, retirement plans in the private sector began a long-term movement away from defined benefit plans toward defined contribution plans.⁵ Public sector plans were not subject to ERISA, and government employers continued to offer defined benefit plans. However, since 2000 one third of the states have altered their plan structures by adopting defined contribution plans, cash balance plans or hybrid plans, either as replacements for traditional defined benefit plans or as options that new employees can select.

There is a long history of economic research examining the effects of pension plans in general, but relatively few studies examine the effects of public sector plans. In part because of the lack of research on public retirement plans, along with several collaborators I helped to organize NBER research projects in 2010 and 2012 that explored various issues involving retirement plans and retiree health insurance offered by state and local governments.⁶ As part of the first project, Melinda Morrill and I examine the initial actuarial reports on retiree health insurance of all 50 states.⁷ Our survey shows that all states offered their retirees access to some form of retiree health insurance, although there are significant differences in the generosity of these plans across the states. Some states provide this insurance and pay the entire premium for their retirees, while some states merely offer retirees the opportunity to remain in the state plan if the individual pays the entire premium. Given this range of generosity, the unfunded liability associated with these plans varies substantially across the states.

As part of the second project, Morrill, David Vanderweide, and I examine the decisions of public employees who terminate employment but have not yet met the age and service requirements to begin their pension benefits.⁸ In general, employees at termination have the option of requesting a lump sum distribution of their pension or leaving their funds in the system. Our analysis finds that in the public sector the lump sum distribution amount is not typically equivalent to the present discounted value of the annuity payments, as it is in the private sector. Thus, although there is a considerable literature examining pension participants that finds workers have a preference for lump sums, when considering public sector workers, a very different pattern is observed. In this study, we find no such preference for lump sum distributions among public employees in North Carolina. Terminated workers tend to leave their accounts open even when the lump sum has a higher present value, suggesting an important role for framing, inertia, and defaults.

Retiree Health Insurance

Compared to the literature on pension plans, much less is known about the development of retiree health plans, how they are financed, and their effects on employee behavior. Employers began to extend health coverage to retirees on a large scale after the implementation of Medicare.⁹ While coverage in the private sector has been declining rapidly, incidence of retiree health insurance remains very high in the public sector. In 2004, the Governmental Accounting Standards Board issued a ruling requiring public employers to report their unfunded liabilities associated with the promise of health insurance in retirement. Prior to this time, very little was known about the magnitude of these liabilities.

Even though retiree health plans are an expensive component of employee compensation in the public sector, there is relatively little research on the impact of these programs on employee behavior. To address this need for research, Joseph

Newhouse and I organized an NBER research project in 2013 examining the economic effects of retiree health plans in the public sector.¹⁰

I contributed two papers to this project. One, co-authored with Olivia Mitchell, estimates the effect of coverage by retiree health insurance on individual saving.¹¹ There is a long literature by economists estimating the impact of employer pensions, Social Security, and Medicare coverage on personal saving but our paper is the first examination of the impact of retiree health insurance on saving and wealth accumulation. We find that public sector workers aged 50 and over covered by retiree health insurance had accumulated \$70,000 to \$100,000 less in net wealth than comparable private sector employees without retiree health insurance. Thus, workers expecting that their employer will subsidize their health insurance in retirement tend to save less.

In a second paper, Morrill, Vanderweide, and I examine the impact of policy changes on the choice of health plans by retirees in North Carolina.¹² All retirees receiving a pension were eligible to remain in the state health plan at no premium. Retirees had a choice between two plans with one plan (Standard Plan) being more generous than the other (Basic Plan). Retirees could select either plan, but if they wanted to add dependents to their plan both the retiree and the dependent had to be in the same plan with the retiree paying the full cost of his dependents' coverage. In 2009, 93 percent of retirees were in the more generous Standard Plan. Over a four-year period, non-Medicare-eligible retirees were subjected to changes in the default plan, introduction of a Comprehensive Wellness Initiative (CWI), the elimination of the CWI, and the introduction of a premium for enrollment in the Standard Plan.

Statistical analysis shows that these policy changes significantly altered enrollments in the two plans. The results indicate that the policy initiatives caused retirees to change to the less generous health plan, thus shifting costs from the state to these retirees. The evidence suggests a

strong role for defaults in retiree health plan choices. The findings suggest that plan sponsors can effectively move retirees from one plan to another through the use of plan characteristics and requirements. We are now engaged in a similar project examining how active workers responded to similar changes and the introduction of a new consumer-driven health plan.

Supplemental Retirement Plans and Financial Education

Many public sector employees are offered the opportunity to enroll in supplemental retirement saving plans. State and local employers can sponsor 401(k) and 457 plans while schools, universities, and health care organizations can also establish 403(b) plans for their employees. Very little is known about the participation and contribution rates of public employees in these plans. However, it does appear that public employers are much less likely to offer employer matches to these plans or to have adopted automatic enrollment or auto-escalation policies relative to private sector employers.¹³ The current state of supplemental plans raises important questions about the factors that prompt public employers to offer one of these plan types over another, and why some employers offer two or three different retirement saving plans.

In the educational sector, management of 403(b) plans appears to be inefficient and likely inhibits wealth accumulation by teachers. David Richardson and I find that states that allow all interested vendors to offer investment options to 403(b) plan participants had higher administrative fees and were more likely to include other fees, such as front-end fees and surrender charges for similar investment products.¹⁴ Emma Hanson and I review 403(b) plans in all 50 states and find that in over two-thirds of the states, 403(b) plans were managed at the school district level. In most cases, there was little or no oversight of the vendors or restrictions on their fees.¹⁵

As states reform their primary pension plans and reduce the generosity of retiree health plans, supplemental retire-

ment saving plans will become increasingly important for public sector employees. Future public employees will assume more responsibility for their retirement income. The importance of financial literacy and the need to understand sometimes complicated retirement plans will increase over time. In papers with Steven Allen, Morrill, and Jennifer Maki, I examine the role of employer-provided retirement planning programs,¹⁶ financial literacy programs,¹⁷ and the success of informational “nudges”¹⁸ in retirement planning. Our analysis shows that these types of programs have been successful in enhancing financial literacy, increasing the knowledge of retirement benefits, altering saving behavior, and modifying retirement plans.

¹ Information on employment from the Bureau of Labor Statistics, August 2013, <http://www.bls.gov/news.release/empsit.t17.htm>

² This discussion is based on R.L. Clark, L.A. Craig, and J.W. Wilson, *A History of Public Sector Pensions in the United States*, Philadelphia: University of Pennsylvania Press, 2003.

³ R.L. Clark and L.A. Craig, “Determinants of the Generosity of Pension Plans for Public School Teachers, 1982–2006,” *Journal of Pension Economics and Finance*, 10(1) (January 2011), pp. 99–118. This paper reports that the typical career teacher retiring in 1982 had a replacement rate of 50 percent of their final average salary while for a similar teacher retiring in 2006 benefit increases had raised the replacement rate to 56 percent.

⁴ R.L. Clark, L.A. Craig, and J. Sabelhaus, *State and Local Retirement Plans in the United States*, Northampton, MA: Edward Elgar Publishing, 2011.

⁵ R. L. Clark and A.A. McDermed, *The Choice of Pension Plans in a Changing Regulatory Environment*, Washington: American Enterprise Institute, 1990.

⁶ Jeffrey Brown and Joshua Rauh were co-directors of these projects. A summary of the first project can be found in J.R. Brown, R.L. Clark, and J.D. Rauh, “The

Economics of State and Local Public Pensions,” NBER Working Paper No. 16792, February 2011, and *Journal of Pension Economics and Finance*, 10(2) (April 2011), pp. 161–72. The list of research studies that were conducted as part of the second project can be found at <http://conference.nber.org/confer/2012/SLP/summary.html>

⁷ R.L. Clark and M.S. Morrill, *Retiree Health Plans in the Public Sector: Is There a Funding Crisis?* Northampton, MA: Edward Elgar Publishing, 2010. Also see R.L. Clark and M.S. Morrill, “The Funding Status of Retiree Health Plans in the Public Sector,” NBER Working Paper No. 16450, October 2010, and *Journal of Pension Economics and Finance*, 10(2) (April 2011), pp. 291–314.

⁸ R.L. Clark, M.S. Morrill, and D. Vanderweide, “Defined Benefit Pension Plan Distribution Decisions by Public Sector Employees,” NBER Working Paper No. 18488, October 2012, and forthcoming in the *Journal of Public Economics*.

⁹ In the private sector, coverage was generally limited to large companies, unionized firms, and of course, only employers who offered health insurance to active workers. In 1989, the Financial Accounting Standards Board required firms to determine the unfunded liability associated with the promise of health insurance to retirees. Subsequent to this new accounting policy, coverage in the private sector began to decline. Other factors influencing this decline were the rise in the ratio of retirees to active workers, the increase in medical cost that outpaced the general rate of inflation, and Medicare policy changes.

¹⁰ Joseph Newhouse and I were co-directors of this project. The list of research studies can be found at <http://conference.nber.org/confer/2013/SLHP13/summary.html>

¹¹ R.L. Clark and O.S. Mitchell, “How Does Retiree Health Insurance Influence Public Sector Employee Saving?” NBER Working Paper No. 19511, October 2013.

¹² R.L. Clark, M.S. Morrill, and D.Vanderweide, “The Effects of Retiree Health Insurance Plan Characteristics on

Retirees' Choice and Employers' Costs, NBER Working Paper No. 19566, October 2013.

¹³ R.L. Clark and J.M. Franzel, "Adopting Automatic Enrollment in the Public Sector: A Case Study," *Government Finance Review*, 27(1) (February 2011), pp. 42–8.

¹⁴ R.L. Clark and D.P. Richardson, "Who Is Watching the Door? How Controlling Provider Access Can Improve Teacher K-12 Retirement Outcomes," *Research Dialogue*, November 2010,

https://www.tiaa-crefinstitute.org/public/institute/research/dialogue/rd_98.html.

¹⁵ R.L. Clark and E. Hanson, "403(b) Plans for Public School Teachers: How They Are Monitored and Regulated in Each State," *Research Dialogue*, No. 107 (March 2013), TIAA-CREF Institute, <https://www.tiaa-crefinstitute.org/public/pdf/institute/research/dialogue/107b.pdf>

¹⁶ S.G. Allen, R.L. Clark, J.A. Maki, and M.S. Morrill, "Golden Years or Financial Fears? Decision Making After Retirement Seminars," NBER Working Paper No.

19231, July 2013.

¹⁷ R.L. Clark, M.S. Morrill, and S.G. Allen, "The Role of Financial Literacy in Determining Retirement Plans," NBER Working Paper No. 16612, December 2012, and *Economic Inquiry*, 50(4) (October 2012), pp. 851–66.

¹⁸ R.L. Clark, J.A. Maki, and M.S. Morrill, "Can Simple Informational Nudges Increase Employee Participation in a 401(k) Plan?" NBER Working Paper No. 19591, October 2013, and *forthcoming in the Southern Economic Journal*.

High-Skilled Immigration, Domestic Innovation, and Global Exchanges

William Kerr *

High-skilled immigrants account for about 25 percent of the workers in the most innovative and entrepreneurial U.S. industries, and they are responsible for a roughly similar share of output measures like patents or firm starts. Immigrants have also accounted for the majority of the growth in the U.S. scientific workforce since the 1990s. The magnitudes of these contributions make understanding the economic consequences of immigration an important research priority.

In this piece, I summarize the major themes that have emerged from my work on high-skilled immigration. I start by describing the construction of the ethnic patenting records that I use in most of my studies. I then outline projects that have considered the economic consequences of high-skilled immigrants for the United States. The last part of this research summary focuses on the outbound economic

consequences of high-skilled emigration for the home countries of those who move to the United States.

Developing Data

While the substantial role of immigrants in U.S. technological development has long been recognized, data constraints have posed a significant challenge for research. Some datasets, like the decennial Censuses, provide rich cross-sectional accounts but limited longitudinal variation. Others, such as the Current Population Survey, provide better longitudinal detail but less cross-sectional heterogeneity. Moreover, it has been especially difficult to collect data on the role of high-skilled immigrants in research-oriented firms and universities.

Most of my work on high-skilled immigrants builds off the assignment of probable ethnicities to individuals who appear in U.S. patent records. The United States Patent and Trademark Office (USPTO) publishes all the patents it grants, which have exceeded 200,000 grants in recent years. Every patent must list at least one inventor, and patents are allowed multiple inventors.

Several features of patent litigation make it advisable to correctly list the identities of those truly doing the innovative work when filing for a patent, and through the assignment of patents, this inventor role can be separated from ownership of the property rights to the patent.

I use the names of inventors to assign their probable ethnicities. This procedure exploits the fact that individuals with surnames of Gupta or Desai are likely to be Indian, Wang or Ming are likely to be Chinese, and Martinez or Rodriguez are likely to be Hispanic. Name matching procedures have been developed to provide probabilistic ethnicities for virtually all inventors in the USPTO system. The name approach is comparatively stronger at separating among Asian ethnic groups than among European or Hispanic names. This approach does not isolate immigration status directly for multiple reasons, but it does provide an indirect measure that proves useful in research.

The appeal of this approach is that it permits assignment of ethnicities to individual patent records. With this granularity, the USPTO records can be aggregated in many ways, for example by

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