What are the labor supply and mobility effects of lost retirement income? Evidence from widespread pension freezes

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Overview

Amidst the overall decline in the provision of defined benefit (DB) pension plans in the United States, DB sponsors have increasingly chosen to suspend further benefit accruals for covered employees in actions known as "hard freezes". As seen in Figure 1, over one million workers in the private sector faced hard freezes by 2015. Hard freezes are seen by plan sponsors as a solution to the problem of unfunded pension liabilities not only in the private sector, but also in the public sector. For example, Detroit hard froze its DB plan after declaring bankruptcy in 2013, and in 2015 New Jersey's governor proposed a hard freeze to prevent pensions from overwhelming the state budget.[1]

Although DB hard freezes disproportionately affect the baby boomer generation precisely when these older cohorts are nearing retirement, very little is known about how older workers react to this newfound source of uncertainty. In this project I create a new data source that links administrative data on DB pension plans with matched employer-employee administrative data from the Census Bureau to study the effects of pension freezes on the labor supply and mobility choices of older workers.

Exploiting variation at the employer level sheds light not only on the effects of financial incentives on retirement behavior, but also on two aspects of the labor market for older workers that have not been studied. First, the empirical setting illustrates heterogeneity in worker responses based on the likelihood that their employers will enact pension freezes in the future. Second, to the extent that freezes lead workers to switch employers, they reveal information about the nature of job offers that older workers encounter in the labor market.

Economic implications of pension freezes

A DB pension provides an annuity which is typically an increasing function of tenure and final earnings that is payable from retirement until death. Thus, for each additional year of service, a worker covered by a DB plan accrues increments to her retirement income according to a predetermined plan-specific schedule. When a pension freeze is announced, accruals to the worker's DB benefits cease. Although DB freezes are often accompanied by expansions in defined contribution (DC) retirement benefits, these expansions do not completely indemnify the average older worker for the losses they face from a DB freeze.[2]

Reductions in retirement income generate wealth effects that encourage workers to delay retirement. At the same time, a decline in the payoff to working for their current employer generates two margins of

[1] See, e.g., Mary Williams Walsh, "Cracks Starting to Appear in Public Pensions' Armor," *New York Times*, Feb. 25, 2015. As of 2017, unfunded liabilities in state and local pension systems across the United States are estimated at $3.8 trillion; see, e.g., Joshua Rauh, "Hidden Debt, Hidden Deficits: 2017 Edition. How Pension Promises are Consuming State and Local Budgets," Hoover Institution.

[2] See, e.g., Barbara Butrica, Howard Iams, Karen Smith, and Eric Toder, "The Disappearing Defined Benefit Pension and its Potential Impact on the Retirement Incomes of Baby Boomers," *Social Security Bulletin*, 2009, 69(3), 1-27.

adjustment relating to the substitution effect. Workers could substitute towards leisure thereby hastening retirement. They may also switch to another employer, or to self-employment. Because these incentives offset, the effect of a pension freeze on retirement behavior is theoretically ambiguous. Consequently, pension freezes potentially generate both labor supply and mobility responses.

An important variable affecting worker responses are their expectations about facing a pension freeze in the future. These expectations are illustrated in Figure 2 which shows the estimated one-year-ahead probability of a freeze conditional on past plan characteristics.[3] Employees of firms that are at a higher risk of freezing their pensions may expect as much and seek to insure themselves against ensuing income losses through increased labor supply, transitioning to new employers, or more saving. Anticipatory behavior will therefore attenuate observed responses on impact because adjustments might have been made in advance. As such, both the labor supply and mobility effects of pension freezes should be mitigated by rational expectations about the future.

Finally, the extent to which affected workers can switch employers depends on the demand for older workers in the labor market. Indirect evidence from survey data suggests that labor force participation at older ages may be limited by the lack of suitable opportunities or low expectations about finding them rather than preferences for leisure.[4] In the current context, the lack of worker mobility away from employers who freeze their pension plans would provide direct evidence that older workers face limited opportunities. In contrast, increased mobility away from employers who freeze their pension plans would reveal information about the types of offers being made to older workers.

Data and empirical strategy

To quantify the effect of pension freezes on worker behavior, I rely on two different sources of administrative data. Information on pension plans, including designations of hard freezes, comes from the universe of private sector DB sponsors who are all required to file Internal Revenue Service (IRS) Form 5500. I match these publicly available records at the employer level with the Census Bureau's Longitudinal Employer Household Dynamics (LEHD) file to construct a panel of workers employed at firms that provide DB pension benefits.[5] I have access to the Census RDC environment and experience with these data sources by virtue of working on CenHRS, a project that links respondents in the Health and Retirement Study (HRS) to Census Bureau data on firms and establishments.

To measure the effects of pension freezes on the retirement incomes of affected workers, I will rely on the actuarial data in Schedule B of Form 5500 and the earnings histories in the LEHD. Together, these two sources of data allow me to approximate the plan benefit schedule and impute the DB income losses that

[3]The probability estimates, although based on public information, may not accurately reflect the risk perceptions of plan participants themselves.

[4]See John Ameriks, Joseph Briggs, Andrew Caplin, Minjoon Lee, Matthew Shapiro, and Christopher Tonetti, "Older Americans Would Work Longer if Jobs Were Flexible," NBER Working Paper 24008, 2017.

[5]Administrative data are particularly valuable in this setting because the relative rarity of pension freezes makes them difficult to study using survey data alone. Using employer identification numbers (EIN's), approximately 90 percent of plan sponsors in From 5500 can be matched to employers in the Census Bureau's Business Register and the LEHD; see, Anja Decressin, Tomeka Hill, Kristin McCue, and Martha Stinson, "The Role of Fringe Benefits in Employer and Workforce Dynamics," in Timothy Dunne, J. Bradford Jensen, and Mark Roberts, eds., *Producer Dynamics: New Evidence from Micro Data*, University of Chicago Press, 2009, pp. 473-505.

affected workers face. I will validate this procedure against pension wealth estimates reported in the HRS. Finally, I will subtract any increases in DC expansions imputed from Schedule H of Form 5500 to estimate the net cost of the DB freeze on workers.[6]

With these data, I will focus on individuals over the age of 55 and split them into two groups: the treated group comprises of workers initially employed at firms that froze their pension plans, while control workers are initially employed at firms with plans that are not frozen. The empirical framework therefore reflects the assumption that employer decisions about pension freezes are not systematically related to employee characteristics that influence retirement or mobility. This identifying assumption is bolstered by survey evidence indicating that firms that hard froze their plans did so primarily to reduce costs in the face of global competition.[7]

Under this assumption, I will provide causal evidence on three policy relevant questions. First, to what extent do reductions in wealth induced by pension freezes cause workers to delay retirement?[8] I will extend this idea using imputed dollar values of the losses imposed on workers by pension freezes to estimate the extensive margin labor supply elasticity for older workers.

Second, are declines in the value of working at hard freezing employers large enough to encourage workers to switch employers? If so, what are the characteristics of the jobs that older workers switch into? Do they seek higher pay, greater physical proximity to their new employers, or other amenities that may allow them to work longer?[9] Under the research design I propose, mobility responses to pension freezes are reactions to offers that workers would have received but otherwise not accepted. As such, job switching behavior among treated workers reveals information about the offer distribution faced by older workers.

Lastly, how are workers' responses influenced by the risk that their employer would enact a freeze? Are anticipatory employment effects (observed in the LEHD) and saving behavior (observed only for HRS respondents) of individuals who are exposed to higher freeze risk different to those exposed to lower risk?

Contribution

This project makes several contributions to the study of work and retirement behavior at older ages. It is the first to provide evidence on the labor market impact of pension policy changes using a comprehensive data set of private DB sponsors. Second, it exploits a new source of variation to provide estimates of the extensive margin labor supply elasticity for older workers. Finally, it reveals previously unobserved information about the types of job offers that older workers receive, thereby shedding light on the state of labor demand for older Americans.

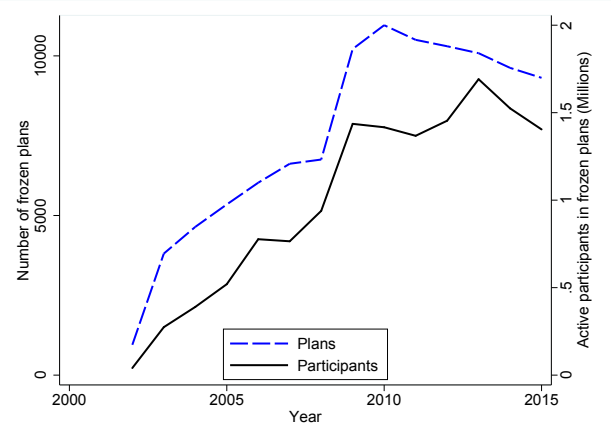
[6] I do not observe individual level plan coverage with these data; instead, I estimate annual coverage probabilities at the employer level using administratively reported figures of plan participants (from Form 5500) and employer size (from the Census Business Register).

[7] See Pension Benefit Guarantee Corporation, "Hard-Frozen Defined Benefit Plans: Findings for 2003-2004 and Preliminary Findings for 2005," August 2008. Hard freezes have been used by both distressed and healthy firms; see, e.g., Alicia Munnell, Francesca Golub-Sass, Francis Vitagliano, and Mauricio Soto, "Why are Healthy Employers Freezing their Pensions," BRRC Issue Brief Number 44, March 2006.

[8] I define retirement in the LEHD as being over the age of 55 and not having worked for an employer for over 2 consecutive years.

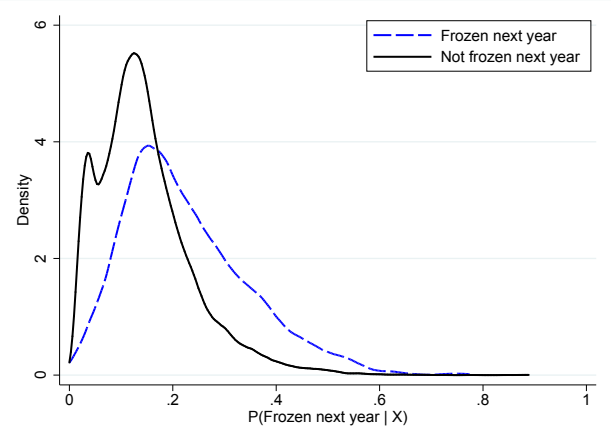
[9] I will measure proximity using geocoded worker and employer addresses in the LEHD. Treated workers may transition into bridge jobs that pay less but afford greater flexibility and thereby allow for extended labor force participation. I obtain information on hours flexibility from the HRS.

Figure 1: Private sector DB hard freezes (2002-2015)



Notes: These series are computed using 2002-2015 IRS Form 5500 micro data. Hard frozen DB plans are identified through reporting code "1I" which was first required in 2002. Because of the new reporting requirement, data for 2002 likely include freezes that occured in prior years.

Figure 2: One-year-ahead probability of a hard freeze



Notes: I predict the likelihood of one-year-ahead hard freezes using a logit model where the conditioning set **X** includes 3 lags of the funding ratio (plan assets/plan liabilities), 3 lags of rates of return on plan assets, 3 lags of the total number of plan participants, whether the plan covers unionized employees, industry fixed effects, plan age fixed effects, and actuarial reporting method fixed effects. I estimate the model with data drawn from 1999-2007 IRS Form 5500 filings.

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Education

Ph.D. Candidate in Economics, University of Michigan
M.A. Economics, University of Michigan, 2016
B.A. Economics with Honors, Grinnell College, 2008

Research Fields

Primary: Labor economics, macroeconomics
Secondary: Applied econometrics

Research Experience and Other Employment

2016-	Survey Research Center, University of Michigan: Graduate Student Research Assistant for Prof. Matthew Shapiro
2011-2013	Becker Friedman Institute, University of Chicago: Research Assistant for Prof. Steven Levitt and Prof. Chad Syverson
2011	Compass Lexecon, Chicago, Analyst
2008-2011	Law and Economics Consulting Group, Chicago, Research Analyst

Teaching Experience

Fall 2014	Graduate Student Instructor, Principles of Macroeconomics
Winter 2015	Graduate Student Instructor, Principles of Macroeconomics
Fall 2015	Head Graduate Student Instructor, Intermediate Macroeconomics

Honors, Scholarships, and Fellowships

2017	F. Thomas Juster Economic Behavior Research Award
2013	William Haber Pre-Doctoral Fellowship
2013, 2015	Humane Studies Fellowship, Institute for Humane Studies
2008	Phi Beta Kappa
2008	Gilbert DeBartolo Memorial Prize in Economics, Grinnell College
2008	Gilbert DeBartolo Scholarship, Grinnell College
2008	Harold A. Fletcher Honor Scholarship, Grinnell College
2007-08	Joseph F. Wall Scholarship, Grinnell College

Working papers

Coming home: The consequences of deployment to Iraq and Afghanistan. October 2015. Revised January 2017.

Flypaper effects in fiscal expansions: Evidence from the ARRA. April 2015.

Research in progress

What are the labor supply and mobility effects of lost retirement income? Evidence from widespread pension freezes

Creating the CenHRS: A new method of probabilistic linkage of employers in survey and administrative data, with John Abowd, Margaret Levenstein, Kristin McCue, Ann Rodgers, Trivellore Raghunathan, Matthew Shapiro, and Nada Wasi.

Imputation versus instrumentation: estimating regression models using linked data, with Matthew Shapiro

What does luck have to do with it? The true costs of labor market entry in recessions, with Parag Mahajan

Refereeing

American Economic Journal: Economic Policy

Presentations (includes scheduled)

ASA Joint Statistical Meetings, Vancouver, BC, August 2018
University of Michigan, Labor Lunch, May 2017
Midwest Economics Association, Evanston, IL, March 2016
University of Michigan, Labor Lunch, October 2015

Computer Skills

Stata, SAS, Matlab, Mathematica, R, SQL

Other

Special Sworn Status, U.S. Census Bureau, 2016-present

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Matthew D. Shapiro
Lawrence R. Klein Collegiate Professor of Economics
Research Professor, Institute for Social Research

December 2017

Dear Colleagues:

I am delighted recommend **Dhiren Patki** for the **NBER Pre-Doctoral Fellowship on the Economics of an Aging Workforce**. I have known Patki since he took my second-year PhD course in macroeconomics. Since then he has been consulting with me on his research and working as a graduate student research assistant and collaborator on the CenHRS project.

Patki is an outstanding candidate for fellowship support. He is the most promising student overall who I am currently working with, and will be a candidate for top jobs in economics once he completes his PhD. His work to data and proposed work are very strongly aligned with the aims of this fellowship, so I strongly and enthusiastically recommend him.

Let me start by describing Patki's work on the CenHRS because it is an important predicate to his proposed work. Through Patki's work on the project, he has experience with doing complex analysis with linked administrative data that is at the core of his proposal. The CenHRS project is linking the HRS to Census data. The aim is to match Census records on the employers and coworkers of HRS respondents in order to better understand how characteristics of workplaces affect decisions to continue work in lifetime jobs, to seek alternative "bridge jobs," or to retire. Patki has been a research assistant on the CenHRS project for several years. He is rapidly becoming a full partner in the project. He has been deeply engaged in the CenHRS's effort to develop statistical techniques to do probabilistic record linkage between HRS-reported employer and the Census Business Register. Patki has programmed and implemented a model estimated using the LASSO; he has taken the lead in producing diagnostics for the model; and will participate in writing research papers documenting the model and trying to demonstrate for economists the importance of taking probabilistic matching seriously.

Patki has been remarkably effective in this work. He has taught himself the relevant statistical techniques; he has written and implemented effective code; he has produced valuable model diagnostics. He is thus participating in the type of data creation that many economists will use in the future: using large-scale, non-designed dataset in tandem with surveys. He will be a coauthor of methodological papers arising from this work.

The specific research proposal that Patki outlines in the proposal will analyze how freezes in defined benefit (DB) pension plans affect decisions to work late in life and other decisions such as how much to save. He will link the Department of Labor's Form 5500 (F5500) with the Census Business Register and the Longitudinal Employer Household Dynamics (LEHD) dataset.

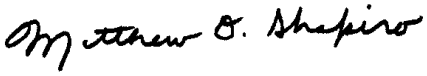
The research design will exploit changes in pension offerings to identify labor supply responses. The data are sufficiently rich to allow comparison of firms that had such transitions with those that did not, but are otherwise similar. As he describes in his proposal, pension freezes can be anticipated, so his work will go beyond the standard event studies framework to include both anticipation effects and structural modeling of the response. He highlights that there are multiple margins of adjustment to consider. A pension freeze is a wealth shock, which generally leads to working longer. It also has substitution effects because the return to working on the current job falls owing to reduced pension accruals. This can lead to earlier retirement, or search for alternative employment.

These margins can be studies at scale using Census data where the outcome variable is employment. The research will also use the CenHRS infrastructure to look for effects of wealth accumulation for HRS respondents affected by pension freezes. The administrative linkage will provide much better information about the pension freeze than is provided by HRS respondents directly.

Patki's research question and research plan are well-conceived. I have strong confidence that he will implement these plans and produce high-impact research.

As stated at the outset, Dhiren Patki is an outstanding candidate for the NBER Pre-Doctoral Fellowship on the Economics of an Aging Workforce. He has the skill and effectiveness to make excellent use of the support. He will rank among the best graduate students Michigan has trained on a multi-year basis. I therefore give him my strongest recommendation for this award.

Sincerely,



Matthew D. Shapiro
University of Michigan