

The Transitional Labor Market Consequences of a Pension Reform

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In the past three decades most OECD countries increased the statutory retirement age in an effort to restore the long-term financial sustainability of social security threatened by population aging. The U.S. is following this trend by committing to gradually adjust the full retirement age from 66 to 67 by 2022 and the Congressional Budget Office has also suggested raising the statutory age to 70 to help reduce the budget deficit between 2017 and 2026 (CBO, 2016). Most European countries have implemented similar measures since 2000 (Carone et al., 2016). There exists a rich literature about the labor supply effects of pension reforms that raise the early or full retirement age (e.g. Mastrobuoni (2009), Behaghel and Blau (2012), Staubli and Zweimüller (2013), Vestad (2013), Cribb et al. (2016), Seibold (2016), Lalive et al. (2017)). These papers document higher observed retirement ages and bunching at statutory retirement ages, suggesting that these policies are effective in encouraging elderly labor force participation. There is far less evidence on demand-driven labor market effects of this type of reforms. Insofar as higher statutory retirement ages induce workers to delay retirement, they increase the retention of senior employees who were on the cusp of retirement under previous rules. As a consequence of increased retention, firms may adjust labor demand.

This paper studies how firms respond to an increase in the retention of older workers caused by higher statutory retirement ages and how labor demand adjustments impact public finances. We employ previously unused administrative data and exploit the features of an Italian pension reform. In the first part of the paper we ask whether and how employers change their demand for labor, revealing the degree of substitutability between workers of different ages. In the second part we show that labor demand adjustments affect the earning trajectories and the take-up of other social insurance programs of the co-workers of retained senior employees. We then incorporate these demand-driven behavioral responses into the estimation of the fiscal externality of the reform, i.e. the share of mechanical savings in pension outlays that is lost due to behavioral responses. This improves upon the existing literature, which focuses on the behavioral responses of older workers only.

Addressing these issues poses two main identification challenges. First, most pension reforms are anticipated, which makes it hard to isolate firm's responses due to confounding anticipation effects. Second, the extent to which a firm is affected by higher statutory retirement ages in the short run depends on its share of older workers. Firms with a high concentration of younger workers cannot serve as credible controls since a firm's workforce demographics is strongly correlated with labor demand trends. We address both identification issues by exploiting the unanticipated *Fornero* pension reform enacted by a newly appointed technical government in Italy in December 2011. The reform entered into effect in January 2012, which left little room for anticipatory effects, and gradually raised age and contribution requirements for old-age and seniority pensions. It induced heterogeneous changes in years until pension eligibility across otherwise similar senior workers, depending on their gender, age and years of qualifying retirement contributions. We leverage this feature of the reform. Drawing on previously unexploited full contribution histories for private sector employees of small-medium firms, we compute each worker's expected retirement date under pre- and post-reform rules. We restrict attention to workers who were on the cusp of retirement under the old rules on the date the reform was passed. Depending on idiosyncratic differences in the gender, age and contribution histories within this narrow set of employees, employers face a different change in the average expected retirement date of senior workers at the firm. We use this change as our treatment and show that its intensity is not related to firm broad demographics or to other observable firm characteristics in the pre-reform period and, most importantly, it does not predict differences in labor demand pre-trends. This measure has also a direct economic interpretation as the change in the retention rate of retirees (measured in years). To ease the interpretation of our estimates, we also use the treatment to instrument for the number of senior workers whose retirement date is postponed by one year or more, which on the other hand is endogenous. We are therefore able to estimate the causal effect of retaining an additional

older worker on firm labor demand.

To investigate the short-run effects of the reform, we estimate a dynamic difference-in-difference model with a continuous treatment over the period 2009-2015, comparing labor demand of differentially treated firms before and after the reform. Based on matched employer-employee records, we look at firm labor demand adjustments along two main margins: separations from incumbent workers and external hiring. Our results document that senior retained employees, younger co-workers and external hires are at least partially substitutable. The degree of substitutability seems larger with middle-aged individuals in the same occupation group. Indeed, we find that more intensely treated firms fire more permanent employees in the post-reform period: an additional retained worker at the firm causes 0.06 more layoffs, which corresponds to a 13% increase with respect to the average number of layoffs pre-reform. Layoffs do not involve only senior employees who were expected to retire soon, but also middle-aged (aged 35-55) and other older (aged above 55) workers. Hiring is only modestly reduced (by 3.2% of the average pre-reform figure) and its decline is largely explained by reductions in new hires of temporary middle-aged and young (aged below 35) workers. The effect on both dismissals and hiring is concentrated on incumbent workers or external hires who share the same occupation group (blue-collar, white-collar or manager) as senior retained employees. We further show that firms only respond in the short-run to the increase in the retention rate of senior workers on the cusp of retirement, whereas the change in the residual working life of younger employees does not matter. As a consequence, the post-reform dynamics of dismissals and hiring exhibit an inverse U-shape and effects fade away as older workers eventually leave the firm at the end of our sample period.

In the second part of the paper, we study how the reform affects senior workers on the cusp of retirement and younger co-workers by looking at labor earnings as well as the take-up of other social insurance programs. We start by co-workers, associating each of them to the firm where they were incumbent at the reform date and pooling together co-workers who shared incumbency at the same employer, aggregating their labor earnings and income from various social insurance programs. We first document that co-workers who were incumbent in more treated firms exhibit worse labor earnings dynamics in the post-reform period. We estimate that retaining an additional old worker leads to a 18000 euros drop in total labor earnings, including non-work subsidies, collectively received by co-workers, equivalent to 1.6% of the average in the pre-reform period. Second, we show that the relative decline in earnings is moderated when we take into account non-work subsidies. This suggests that part of the observed earning dynamics reflects the effect of the increased hazard of being laid-off. To gauge which share of the earning decline can be imputed to involuntary separations, we combine estimates of the cost of job losses obtained via a matching procedure with the estimates of the effect of the reform on separations. We document that separations explain around half of the earnings drop, while the other half depends on within-firm earnings dynamics. The latter matter more for middle-aged workers, whose earnings loss four years after the reform is mostly explained (70%) by wage patterns within the firm, contrary to what happens to young workers (only 30%). This evidence is consistent with a model where the job ladder at the firm is based on seniority with middle-aged workers being the closest substitute to retained older workers. Finally, we look at the take-up of disability benefits, short-time work subsidies and benefits related to periods of sickness and leave, finding smaller and not always significant effects.

We then replicate the same analysis on workers on the cusp of retirement. We show that when their retirement date is postponed by an extra year they receive higher non-work subsidies and are more likely to receive disability pensions as well as benefits related to period of sickness and leave. However, savings on pension entitlements are far larger than the costs borne by other social insurance programs. On top of that, due to delayed retirement these workers have significantly higher labor

earnings, generating a positive revenue externality from their labor income taxes.

We conclude the paper by estimating the fiscal externality of the reform. While the literature has mostly focused on behavioral responses of senior workers only, we show that behavioral responses of co-workers triggered by labor demand adjustments are important and should not be ignored. We develop an accounting model that allows for spillovers on co-workers and substitution between social insurance programs. We use this framework to estimate the reform's fiscal externality. We find that from one-half to two-third of revenues generated by the reform are lost in the short-run due to the behavioral responses of firms and workers. This result implies that savings on pension outlays due to the increase in the full retirement age are larger than costs borne by other social insurance programs - because of program substitution - and by the tax authority - due to lower labor income earned by co-workers. Moreover, we show that we would estimate a zero fiscal externality if we ignored the spillovers on the co-workers, because higher taxes from increased labor supply offset costs associated to senior workers' increased take-up of other social insurance programs. This is evidence of the fact that labor demand is pivotal to assess the short-term consequences of pension reforms. In the long-run, these costs attenuate whereas structural benefits in terms of the sustainability of the public pension system remain.

Our paper relates to the literature that explores firm responses to unforeseen shocks to their workforce. Jäger (2016) and Jaravel et al. (2017) exploit sudden workers' deaths to investigate how substitutable workers are.¹ While these papers leverage a negative shock to the retention rate, we study a positive one. Moreover, unlike a worker's death, our treatment typically involves more than one incumbent worker, thus providing a larger shock to a firm's workforce. As the shock only affects older employees (in the short-run), it allows to study complementarities across workers of different ages. We relate our findings to labor demand theory and contribute to the understanding of workers' substitutability within firms as studied in models with heterogeneous labor and imperfect labor markets (Cahuc et al. (2008) and Pissarides (2000)). To these, we add evidence on changes in internal labor market dynamics (Baker et al. (1994)).

Many studies investigate how the generosity of one social insurance program affects enrollment in other programs.² Most closely related to our work is Staubli and Zweimüller (2013), which studies the spillovers of a reform increasing the early retirement age on other government programs. We contribute to this literature by showing that changes to social security rules can generate spillovers not only because of the behavioral responses of older workers, but also because of demand-driven adjustments that affect younger co-workers. We also extend the focus to all government programs that transfer resources to retained senior employees and their co-workers.

Our paper also relates to the literature on workforce aging, which has been mostly concerned with the effects on firm performance. Macro-level studies deliver mixed evidence, with the degree of complementarity between older and younger workers, wage setting mechanisms and country-specific labor market institutions each playing a crucial role.³ Lallemand and Rycx (2009), Gobel and Zwick (2010) and Guest and Stewart (2011) provide evidence with matched employer-employee data that a mixed aged workforce enhances productivity.⁴ Several papers have studied the relationship between the employment rates of older and younger cohorts. A recent but limited literature has used micro-data to investigate how pension reforms that raise elderly labor force participation affect demand for new hires. Martins et al. (2009) study a Portuguese pension reform, while Boeri et al. (2017) evaluate the Italian *Fornero* pension reform. Both papers detect a negative effect of pension reforms on new hires. Their identification relies on the strong assumption that firms with different general demographics and

gender compositions have parallel labor demand trends. Our contribution is twofold: we rely on idiosyncratic variation in treatment intensity unrelated to broad firm demographics and we extend the scope of the analysis to multiple labor demand margins and social insurance programs. Firm-level studies are complemented by macro evidence on the relationship between employment in younger and older cohorts. While Gruber and Wise (2010) conclude, based on country case-studies, that the correlation is positive, a recent work by Bertoni and Brunello (2017) that exploits variation in the age structure of Italian local labor markets argues that pension reforms raising the minimum retirement age have a negative effect on youth employment. Exploiting variation in the age structure of the old population across U.S. commuting zones, Mohnen (2017) similarly finds that the retirement slowdown has increased youth unemployment.

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