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## Labour Economics

journal homepage: [www.elsevier.com/locate/labeco](http://www.elsevier.com/locate/labeco)Pension incentives and early retirement<sup>☆</sup>Barbara Engels<sup>a</sup>, Johannes Geyer<sup>b,\*</sup>, Peter Haan<sup>b,c</sup><sup>a</sup> *IW Köln, Konrad-Adenauer-Ufer 21, Köln 50668, Germany*<sup>b</sup> *DIW Berlin, Mohrenstr. 58, Berlin 10117, Germany*<sup>c</sup> *FU Berlin, Fachbereich Wirtschaftswissenschaft, Garystr. 21, 14195 Berlin, Germany*

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## ABSTRACT

In this paper we exploit a cohort-specific pension reform to estimate the labour market effects of changes in the financial incentives to retire. In particular, we analyse the effects of the introduction of cohort-specific deductions for early retirement on female retirement, employment and unemployment. For the empirical analysis we use high-quality administrative data from the German pension insurance. We present evidence for sizeable labour market effects. In addition to direct effects on women older than 60 we find important anticipation effects before reaching the pension eligibility age. Overall we document that the pension reform leads to a postponement of retirement, an increase in employment and a shifting in unemployment over age rather than a substitution into unemployment.

## 1. Introduction

Ageing populations present significant challenges for public pension systems. Therefore, most OECD countries have revised their retirement policies since the 1990s in order to encourage longer working lives, thus alleviating the decline of the working age population (OECD, 2006, 2011). Reforms include tighter qualifying conditions and increases in the pension eligibility age, the introduction of actuarial deductions for early retirement, increases in the normal retirement age (NRA), i.e. the age at which people can first draw full benefits without actuarial deductions,<sup>1</sup> increases in the statutory retirement age, or a combination of these policies.

The effectiveness of pension reforms strongly depends on the induced labour market effects, in particular the impact on employment and retirement. Therefore, it is crucial to empirically evaluate these policies and to quantify their labour market effects. It is the aim of this paper to provide novel insights on this important issue. More specifically, we estimate the labour market effects of a pension reform that

introduced actuarial deductions for early retirement in combination with an increase in the NRA. We quantify the impact on employment, retirement, and the take-up of disability or unemployment benefits. A pension reform induces direct labour market effects for individuals who reach the pension eligibility age. In addition, pension reform might lead to anticipation effects for individuals before reaching that age. For example, individuals might increase employment prior to the age of pension eligibility in order to compensate for the reduced generosity of the pension system. Moreover, there is convincing empirical evidence that individuals use unemployment benefits or disability pensions as a substitution for, or a bridge into, retirement (e.g., Duggan et al., 2007, Coe and Haverstick, 2010, Grogger and Wunsch, 2012, Giesecke and Kind, 2013, Staubli and Zweimüller, 2013, Atalay and Barrett, 2015 or Inderbitzin et al., 2016). Therefore, in order to capture the full labour market effects of the pension reform, in this paper we analyse both the labour market effects before (“anticipation effect”) and after (“direct effect”) reaching the pension eligibility age.

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<sup>1</sup> This definition of the NRA is equal to the OECD definition of the “pensionable age” (OECD, 2011, p. 20). In contrast to the NRA, the statutory retirement age is not necessarily the first age at which an individual receives full pensions. For example, in this paper we analyse a reform that increased the NRA for women in Germany from 60 to 65, while the statutory retirement age remained constant at 65.

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The identification of the effects of the pension system on the labour market is challenging. One central problem is that decisions on the labour market are likely to be influenced by unobserved individual factors that are correlated with the financial incentives of the pension system (e.g. Chan and Stevens, 2004 or Hanel and Riphahn, 2012). For example, individual social security wealth, which is a measure of financial retirement incentives, depends on the working and earnings history of each individual. Therefore, the interpretation of estimated employment effects obtained in commonly used regressions that use cross-sectional variation in the social security wealth requires strong assumptions (Gruber and Wise, 2004).

In this paper, we propose a different estimation strategy and directly exploit exogenous cohort-specific variation in the introduction of actuarial deductions for early retirement. Specifically, we focus on the 1992 pension reform in Germany that increased the NRA and introduced deductions for early retirement for women born after December 1939. The estimation is based on high-quality administrative data from the German public pension insurance. For the identification, we exploit the following variation: women born before January 1940 could retire without deduction from age 60 onwards, while for women born in subsequent months through December 1944 deductions were gradually introduced by month of birth. Thus, all cohorts born between January 1940 and December 1944 were affected by the reform in different ways. In addition, the NRA was gradually increased from the age of 60 to the age of 65, while both the pension eligibility age (60) and the statutory retirement age (65) remained constant.<sup>2</sup>

This specific design allows us to estimate the direct effect and the anticipation effect (behavioural reaction before reaching age 60, i.e. the age of pension eligibility) of the pension reform. First, in order to estimate the direct effect of the pension reform on labour market outcomes, we exploit the cohort-specific age pattern of the deductions and estimate the effects of deductions on retirement, employment, and unemployment. Second, in order to account for both the direct effect and the anticipation effect, we focus on the impact of the reform on the retirement age as well as the time spent in employment and unemployment (duration) between 55 and 65 years of age. These outcomes include the behaviour of individuals before and after reaching the pension eligibility age. For the identification of the overall effect, we follow the estimation approach proposed by Mastrobuoni (2009).

Our approach follows several studies that rely on exogenous cohort-specific variation in pension reforms to estimate the labour market effects of pension reforms. For example, Mastrobuoni (2009) focuses on the increase of the NRA in the US to estimate the effect on retirement age. Since the reform was introduced in different steps, it affected adjacent cohorts differently. Similarly, Staubli and Zweimüller (2013) use cohort-specific variation in the implementation of an increase in the pension eligibility age in Austria to estimate the employment and fiscal effects of this reform. They find a modest increase in employment and a substantial increase in registered unemployment for both men and women. They do not find large effects on disability take-up. Manoli and Weber (2016), analysing the same reform, show that employment effects are mainly explained by individuals who keep their pre-retirement jobs longer. Atalay and Barrett (2015) analyse a reform in Australia that gradually increased the pension eligibility age for women from 60 to 65. Since the Australian pension system follows a non-contributory scheme, they are able to identify the effect of the reduction in social security wealth on employment behaviour. Hanel (2012) analyse a Swiss reform that increased the NRA for

<sup>2</sup> Several studies use this specific pension reform as additional variation in the context of option-value models (e.g. Hanel, 2010). The identification of these models still partly relies on cross-sectional variation and requires structural assumptions. Moreover, some studies used option-value models to evaluate this reform *ex ante*, e.g. Siddiqui (1997), Börsch-Supan (2000), Berkel and Börsch-Supan (2004).

women. They find relatively large effects on employment comparable to the findings in Mastrobuoni (2009) for the US (for the Swiss reform, see also Lalive and Staubli (2015)). Our paper is also related to another strand of literature that focuses on programme substitution effects, e.g. between unemployment insurance, disability, and retirement if the attractiveness of one of these programmes changes in comparison to the other programmes (e.g. Duggan et al., 2007; Karlström et al., 2008; Li and Maestas, 2008; Coe and Haverstick, 2010; Staubli, 2011; Borghans et al., 2014).

The empirical results provide evidence for sizeable labour market effects. In particular, for women older than 60 years who are directly affected by the pension reform we find that an increase in the deductions by one percentage point reduces the average retirement rate by about 1.9 percentage points, increases employment by about 1 percentage point, and leads to substitution effects into unemployment of about 0.9 percentage points. The results also show that the effect of deductions on retirement is non-linear and follows a concave function; specifically, we find that the introduction of modest deductions already has an important effect. Furthermore, the results document that anticipation effects are important. First, we show that the anticipation effect reinforces the direct effect on retirement and employment; we find that due to the pension reform, employment prior to the age of 60 years increases whereas during the same period retirement is reduced. Moreover, when additionally including women younger than 60, the substitution effects into unemployment show an interesting pattern. We find that prior to the age of 60 unemployment is reduced whereas after the age of 60 unemployment increases. Thus, the effect of the pension reform is close to zero over the full period between the ages 55 and 65. Hence, our results suggest that the pension reform induces a shifting in unemployment periods before retirement rather than a stronger substitution into unemployment. This shifting is consistent with previous empirical evidence that unemployment is often used as a bridge into retirement. Finally, our analysis documents interesting effect heterogeneity. The size of the reform effects differ by East and West Germany, by the previous employment history, and by the presence of children.

The paper is structured as follows. In Section 2 we describe the institutional background and the pension reform of 1992. We present the data and provide descriptive statistics in Section 3. The empirical models are presented in Section 4. Section 5 provides estimation results. Section 6 concludes.

## 2. Institutional background

In this section, we provide a brief overview of the German pension system and discuss in detail how the 1992 pension reform affected the different cohorts over time. Moreover, we provide evidence how the pension system interacts with other social security programmes and highlight potential substitution patterns between the different programmes.

### 2.1. Germany's pension system

The statutory public pension system covers all private and public sector employees. It provides old-age pensions, disability pensions, and survivors benefits. Depending on the number of years of contributions and other qualifying conditions, the pensionable age is between 60 and 65 for the cohorts under study (1938–1944).<sup>3</sup> In addition, people who are not able to work due to severe health conditions can retire before

<sup>3</sup> This is different for later birth cohorts. In 1999, the pension for women was abolished for cohorts born after 1951 (see Geyer and Welteke, 2017, for an analysis of that reform). Since 2012, the statutory retirement age has gradually increased from 65 to 67 due to a reform in 2007.

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