Extending the tail end of working lives: How policies shape labour market participation and retirement of older workers

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Abstract

In the last two decades, public pension systems have been geared towards extending working lives and postponing retirement, thus activating older workers in most of the advanced welfare states. When materialized, those outcomes contribute to the sustainability of pension schemes and concurrently, to adequate old age incomes in the face of demographic ageing. In this paper, a comparative time-series—cross-section analysis is performed in order to assess the effects of macro-level institutional *pull*, *push*, and *retention* factors on effective retirement age, cohort-adjusted labour market exit rates, and employment ratio of older workers in 15 OECD countries from 1992 to 2010. The results show that policies matter: pension system parameters setting incentives for working longer are significant determinants of retirement age and labour market participation of elderly. However, effects of push and pull factors are in part different for women and men. Most notably, though, the overall orientation of social policies over the life course matters: a greater weight of social investment in human capital and public services clearly supports the extension of working live even at its tail end. Our analysis thus provides evidence on the importance of the institutional social policy design over the whole life course in extending working lives and postponing retirement.

Keywords: Pension policy, retirement incentives, activation paradigm, early exit, labour market policies

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1. Introduction

The past two decades have witnessed a multitude of pension system reforms in all advanced welfare states. Achieving sustainability in the face of fiscal pressures which are caused by demographic ageing has been the key driver for the majority of the reforms, while tools for reaching this goal have varied both in the course of the years and across countries. The latest reform wave has been more homogeneously characterized by reforms which aim at postponing retirement and extending working lives in almost all countries, though (Ebbinghaus 2012; OECD 2015). The most important parametric reforms in this direction include raising the statutory retirement age, restricting or abandoning early retirement schemes and other paths to retirement, setting financial incentives for working beyond the official retirement age as well as increasing the contribution or employment period entitling to full pension (Ebbinghaus 2012; D'Addio 2014). Consequently, the link between length of working life, life-time earnings and the adequacy of old-age income level is strengthening. To put it in another way, old-age income security has become more dependent on labour market participation and its intensity during the working age, but even more importantly, at the tail end of working life.

The type of predominant pension reforms in past two decades and their emphasized goals reflect the greater picture of welfare state transformation towards the so-called activation paradigm (Bonoli 2013; Hemerijck 2013). However, both theoretical debate and comparative empirical evidence is scarce on how pension system reforms gear pension schemes towards activation as a whole, and in which ways pension policies match with and determine patterns of expected activation outcomes, namely higher labour market participation and later retirement (see for example Ebbinghaus 2006, 2012; Hofäcker 2010; D'Addio et al. 2010). Studying the effects and the success of pension policies aiming at extending working lives from a comparative perspective is essential for at least two reasons. First, the anticipated effects for enhancing the sustainability of pension schemes which should result from increasing statutory retirement ages and scaling down incentives to early exit are dependent on the actual outcomes in terms of postponed retirement and higher activity rates of older workers. Second, these outcomes also determine the degree to which pension schemes are able to fulfil their primary tasks in providing adequate income security and preventing old age poverty.

Previous literature emphasizes the multitude of micro- and macro-level factors determining whether a person is still actively participating in the labour market in her or his late 50s and 60s, and when she or he retires (see for example Hofäcker et al. 2016; Ebbinghaus/Radl 2015). At the macro-level, both pension and labour market policies set important incentives for work continuation. Together with broader economic and labour market features, such incentives stemming from pension and unemployment schemes have been discussed as "push" and "pull" factors determining early exit from labour market (Ebbinghaus 2012; Ebbinghaus/Hofäcker 2013). Furthermore, "retention" factors such as active labour market policies and social services offering public alternatives to care work have gained attention lately with regard to their potential to promote labour market attachment of older persons. Together with retention policies, pension and unemployment scheme parameters form an important framework for achieving greater and longer labour market participation of elderly and thus extending working lives. However, empirical evidence on the combined pull, push, and retention effects is scarce so far and restricted to case studies and cross-sectional comparisons. Comparative analyses over longer periods of time are still lacking and therefore, the question of whether policies really matter for extending working lives remains unclear.

In this paper, we address this research gap by providing an empirical bird's eye view on the anticipated effects of pull, push, and retention factors for extending working lives in 15 advanced welfare states over past two decades. By applying a macro-comparative perspective, we seek to paint the "bigger picture" on policy effects on extending working lives and, in particular, what role do pension scheme parameters play in this regard. A further aspect which has received little attention in comparative analyses so far is, that pension policies (and also other pull factors) as well as push and retention factors are likely to have a different impact on activity and retirement patterns of men and women, because of the gendered career patterns and their impacts for pension entitlements (Fre-

ricks et al. 2009; Möhring 2015). Therefore, we analyse the activation effects of pension policies separately for women and men.

Our analysis of pull, push, and retention factors on activation outcomes of older workers follows a three-fold division of dependent variables and therefore includes i) effective retirement age, ii) relative cohort-adjusted exit rate from labour force at the age of 60-64, and iii) employment ratio for older workers at age of 55-64. These variables cover the main objectives of policies aiming at extending working lives from different angles and they are reported and estimated for men, women and total population. With regard to explanatory factors, our main focus is on institutional pull factors inherent in public pension schemes, but we also consider effects of unemployment benefit incentives, welfare state level retention factors as well as socio-economic structural push factors. In particular, we account for those pension policy parameters which are being seen as crucial incentives for retirement and exit decisions and which also have been subjected to reforms in recent years. The key explanatory factors related to pension policies in our analysis are statutory retirement age, implicit tax rate on continued work, the average level of pension benefits and the qualifying period for pension calculation (Duval 2003; Ebbinghaus 2006, 2010; Ebbinghaus/Hofäcker 2013; Gruber/Wise 1998; Hofäcker 2010; Johnson 2000; OECD 2011). Our analysis focusses on levels of these parameters, thus displaying the long-term effects of the pension system design in activation in older age. By performing a time-series—cross-sectional analysis for 15 advanced welfare states in the period between 1992 and 2010[2], we provide a more comprehensive empirical picture of the effects of pension policies which aim at extending working lives on the intended activation outcomes in several advanced welfare states than has been provided by previous literature. Since we differentiate between gender-specific parameters and their effects, we also contribute to a better understanding of gendered dynamics resulting from activating pension policies.

Our results show that pull incentives in public pension, but also in unemployment schemes, indeed play a decisive role in determining activation outcomes, but they partly affect men and women in different ways. Macro-level push factors are less relevant than expected. In contrast, retention factors, which have largely been neglected in macro-comparative analysis so far, play an important role in activating older workforce: The overall emphasis of the welfare state in social investment-type of policies has a strong positive effect on labour market participation and later retirement of older workers, and the effect is even greater for women. Our analysis thus provides evidence on the importance of social policies over the whole life course in extending working lives and postponing retirement.

In the next chapter, we first discuss recent pension policy trends from the perspective of extending working lives and the activation paradigm, and what we know so far about the impact of institutional context on labour market attachment of older workers. In chapter 3, we present our indicators and data. Main developments of both dependent and independent variables are described in chapter 4. The results of the regression analysis on the effects of pull, push, and retention factors on activation outcomes are presented in chapter 5 and the final chapter closes with a discussion of the findings.

2. Pension policies to extend working lives – a paradigm change towards activating older workers?

2.1 Pension policies and activating older workers

Pension systems in all advanced welfare states have been seriously challenged by demographic ageing. The steeply increasing old age dependency ratio, which will continue rising until 2040s or 2050s according to recent prognoses, causes considerable pressures for public finances (European Commis-

[2] The target population of our analysis are advanced welfare states of the OECD countries. Due to data availability, our sample is restricted to the following 15 countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom and the United States. Because all major types of welfare states and different pension systems are well represented within the sample, our results yield generalizability to a reasonable degree.

sion 2015: 25). More and more people in pensionable age have to be provided for by smaller cohorts of working age, posing a sustainability problem, particularly for pay-as-you-go-systems. Containment of spending for public pensions and achieving sustainability of pension schemes have been the main drivers for pension reforms in Europe since 1995, but the tools for achieving these goals have varied in roughly two reform waves. From mid-1990s until mid-2000s, there was a greater emphasis on systemic reforms such as moving toward defined contribution designs and privately managed funded schemes (see for example Hinrichs/Lynch 2010). In the current reform wave, which began roughly after the financial crisis of 2008, main reform efforts have addressed parameters which seek to extend working lives mainly by raising pensionable ages and closing paths to early retirement, however (European Commission 2015; Ebbinghaus 2012). Although cross-national variation remains, the link between life-time employment record and the level of pension benefits has been strengthened by recent reforms as well. Even without cuts in actual benefit levels, reforms which postpone retirement and emphasize life-time employment have consequences for the adequacy of pension provision. Achieving adequate level of income replacement in old age is more and more dependent on the length of working life and this, in turn, has gendered effects because of the differing employment and earnings patterns of women and men in most of the European welfare states (Frericks et al. 2009; Bettio et al. 2013; European Commission 2016; Kuivalainen et al. 2016).

After a long period of relative stability, attempts to raise the retirement age and reverse the trend of early exit have spread across welfare states after they were first planned in the USA in 1983 (Duval 2003: 9; Ebbinghaus/Hofäcker 2013: 819). Increasing the age of retirement is particularly appealing from the point of view of sustainability because it both increases revenues by increasing the size of working population by retaining older workers and decreases expenditure by reducing the number of beneficiaries in the respective cohorts (Bonoli 2000: 26). Increasing employment rates and reversing the early exit trend were set as targets in the Lisbon Strategy of the European Council in 2001, and have been promoted by further international institutions thereafter (OECD 2006). Pension policy reforms aiming at extending working lives and postponing retirement include different measures which have been implemented in varying ways and compositions. According to D'Addio, reforms can consist of instruments which either mandate working longer or give more choice for people with regard to retirement transitions (D'Addio 2014; see also Ebbinghaus 2006, 2012). Mandating instruments, which in other terms also mean scaling down existing benefits, include i) increasing statutory retirement age, ii) restricting or closing early-retirement schemes, iii) restricting alternative pathways to retirement (such as disability and unemployment retirement trajectories) as well as iv) automatic adjustments which tie benefit levels to length of employment and/or contribution period and life expectancy (setting up qualification period, defining accrual over life-time earnings, linking benefits to life expectation etc.). Instruments giving more choice, in turn, include i) the possibility to combine pension and work without restriction, ii) flexible retirement age with neutral/actuarial benefit formula, and iii) reducing disincentives to work like increasing bonus to defer retirement and setting penalties for early retirement. These kinds of "choice tools" seek to enable flexibility in late career design depending on individual circumstances, options and preferences (D'Addio 2014).

Although pension reforms aiming at postponing labour market exit are considered incremental rather than systemic (Arpaia et al. 2009), they nevertheless pose a paradigmatic change "…following not only from policies to cut cost pressures, but also from a new concept of 'active ageing' and employment growth, replacing earlier policies of labour shedding and redistributing work from the old to the young" (Ebbinghaus 2012: 201; see also Clift 2014: 282). More generally, pension reforms to extend working lives can be seen as part of a bigger picture of paradigmatic change from protective to activating welfare state.[3] The above described reforms, which restrict eligibility to retirement either by increasing the pensionable age, closing early retirement paths or prolonging the qualification period, thus move pension systems towards recommodification of elderly citizens which, in turn,

[3] For more detailed insights on activation and welfare state change, see for example: Esping-Andersen (2002), Morel et al. (2012), Bonoli (2010, 2013), Hemerijck (2013), and Kuitto (2016) on active social policy and social investment welfare state.

implies activation of older workers. There is some evidence that working life prolonging pension reforms would replace rather than complement actual benefit cuts, the latter being politically more risky. However, both lead to stronger reliance of elderly persons on labour market participation and thus in recommodification (Esping-Andersen 1990; cp. de la Porte/Jacobsson 2012 on recommodification effects of activation policies in general). Even more so than in the case of policies targeting younger working age population, the chances of older workers to continue participating at labour market depend on opportunities at labour markets and on individual capabilities. Pension scheme reforms leading to more recommodification at the tail end of working lives require policies which promote "active ageing" more directly, if adequate income protection is to be ensured. Pension policies aiming at extending working lives thus materialize in a nexus consisting of parametric institutional reforms of pension schemes and policies targeted at promoting "active ageing" (for the latter, see for example Walker/Maltby 2012; Boudiny 2013). Despite of the parallels in pension policy and unemployment policies, which strengthen conditionality of benefit eligibility and push recommodifying tendencies in general, pension policies have been considerably less studied from this perspective. In the following, we discuss the institutional context of late retirement and labour market attachment of older workers in more detail with respect to previous literature.

2.2 Institutional context of early retirement and working later

Due to the pressing problem of early retirement, there is a growing body of literature on retirement and late-career patterns and their macro and micro level determinants (Gruber/Wise 1998; Duval 2003; Ebbinghaus 2006; Hofäcker 2010; Ebbinghaus/Hofäcker 2013; Hofäcker et al. 2016; Radl 2013; Ebbinghaus/Radl 2015; Coile 2015). In this research tradition, the macro level factors are often categorized into 'pull', 'push', and 'retention' or 'activation' factors. *Pull factors* refer to those institutional incentives in welfare systems that provide opportunities to leave work early (Ebbinghaus 2006; Hofäcker et al. 2016). Early retirement schemes with only small actuarial reduction, but also other pathways to early retirement (such as unemployment or disability schemes), pose powerful incentives for rational individuals not to continue working until or even after the minimum statutory retirement age (Duval 2003; Ebbinghaus 2006). Low statutory retirement age, high pension benefits as well as eligibility conditions and actuarial rules, which are less connected to long working/contributions periods, pose further pull factors. The pension reforms to extend working lives in the latest reform wave clearly aim at scaling down existing pull incentives especially by increasing the statutory retirement age and restricting early exit routes (Ebbinghaus/Hofäcker 2013: 819).

Previous research shows that pull incentives affect early retirement and low employment rates of elderly likewise (Blöndal/Scarpetta 1999), and that eligibility age is related to employment rate of especially elderly worker cohorts (Duval 2003; Gruber and Wise 2002). However, economic incentives affect workers in different class positions in different ways, leading to a strong class and gender effect on retirement decisions (Radl 2013). Furthermore, Arpaia et al. (2009) find differing effects of pension reforms on the employment rates of men and women.

Irrespective of individual choice based on pull factors, the labour market participation of older workers depends on a multitude of other factors. The most important macro-level factors include *push factors*, referring to structural economic and labour market conditions which impede labour market participation chances of older workforce. They include business cycle shifts, economic restructuring in the course of deindustrialisation, changing occupational structures as well as labour market institutions in different production regimes (Ebbinghaus/Hofäcker 2013; see also Schmitt/Starke 2015). These factors affect older workers potentially more than younger ones, because the skills structure of older cohorts is often less updated to the arising needs (or is not perceived as such). High-skilled workers have a greater probability to continue working, while low-skilled workers exit early either due to economic and labour market situation-related reasons or bad health due to hazardous work (Hofäcker et al. 2015). As with the labour force in general, the state can mitigate the negative effects

of such push factors not only by a posteriori social security measures, but also by measures which seek to enhance the capacities and chances of individuals at the labour market.

The capacitating approach is in the core of the general "activation paradigm" of social policy, but also of the "active ageing" paradigm (Jepsen et al. 2002). So called *retention factors* have become increasingly important for fostering older workers' labour market participation, thus combatting push factors. By means of targeted active labour market measures like life-long learning and training, the capacities of older workers can be enhanced in the face of changing labour market needs (Ebbinghaus/Hofäcker 2013). Employability of older workers and lifelong learning is also part of the European Employment Strategy (Jepsen et al. 2002). However, not only targeted measures for elderly, but also the broader context of welfare policy orientation may lay the foundations for labour market participation chances of elderly; objectives of social investment policies during the whole life course strengthen employability and flexibility of people in all ages (Ebbinghaus 2012: 192; Kuitto 2016). Furthermore, public social services offering care help for children and fragile family members may mediate individual contexts in which long working lives are feasible (Munnell et al. 2015). The importance of social policies at different stages of life for working longer and retiring later have so far received less scholarly attention which is why we explicitly address the retention factors in our study.

According to Ebbinghaus and Hofäcker, pull, push, and retention approaches represent complementary explanations that need to be considered simultaneously in explaining early exit from labour market (2013: 834). This explanatory framework is still widely lacking macro-comparative evidence over time. The empirical analysis in this paper therefore focusses on the system-level policy patterns towards activating older workers in advanced welfare states by looking at how patterns of expected outcomes – effective retirement age, cohort-adjusted exit rate and employment rate or elderly workers aged 55-64 – are related to institutional context of pension system reform parameters since the mid-1990s. In particular, we test whether pull incentives, which are inherent in pension systems and which have been under reform in recent years, indeed have unfolded the expected activating impact on older workers and their retirement decision, and whether the effects are gendered. Furthermore, we also look at whether restrictive unemployment policies and a social investment orientation of welfare states facilitate longer working lives.

3. Data

3.1 Dependent variables of activation outcomes

In order to gain comprehensive insight of activation outcomes, we include three outcome variables as our dependent variables: effective retirement age, cohort-adjusted exit rate and employment ratio of older workers. By looking at these three different measures of labour market attachment status of older persons, we get a more comprehensive picture of employment and retirement at the tail end of working life than when concentrating in only one aspect. All outcome variables are available for female and male subpopulations as well as total population.[4] *Effective retirement age*, which is the average effective age at which people withdraw from the labour force and start receiving pension (even if not full), is an important indicator of retirement behaviour. Besides giving information on the average age of entering retirement, this indicator also shows the discrepancy between statutory retirement age and actual retirement age.

Our second outcome variable is *cohort-adjusted exit rate*, which captures the relation of workers belonging to a specific age-cohort from the labour market (for further details and calculation of the relation, see Ebbinghaus 2006: 278).[5] Furthermore and because we are interested in gendered patterns of activation of older workers, it is important to account for the fact that, in many countries,

[4] Data for all dependent variables is taken from the OECD.Stat database (OECD 2015).

[5] Our method of calculation for exit ratios differs from Ebbinghaus in one important aspect, since we used participation ratios instead of employment ratios. The former captures labour market exit, whereas the latter also comprises unemployment.

the labour market participation of women is higher in younger cohorts. Therefore, without the cohort-adjustment, we would not be able to differentiate between the "real" increase in exit rates of older women and the cohort effect due to increasing labour market attachment.

The third dependent variable is the *employment ratio of older workers aged 55-64*. This variable captures the labour market participation of persons in the later years of their working lives to a high degree.[6] Depending on the pension system and its benefit conditions, working in these last years before retirement can be very important for individuals, especially when they experienced temporally interrupted working life histories due to unemployment, sickness, or maternity. Employment rate in this age group also gives important indication of the overall labour market attachment of older workers and its gender-specific variance.

3.2 Independent variables: Pull, push, and retention factors

Our analysis focusses on those pension and unemployment benefit parameters which clearly can be linked with activation targets and reduction of pull incentives to retire, thus affecting individual decisions (deliberately or economically compelled) to exit the labour market or lowering the incentives of taking a job as approaching retirement. Because of our interest in the institutional parameters on retirement and activity patterns over time and across countries, the operationalization of these factors is strongly determined by availability and quality of macro-level comparable time-series data. The pension policy parameters in this analysis include four main determinants: i) gender-specific statutory retirement age, ii) qualification periods for pension eligibility, iii) levels of pension benefits, and iv) implicit tax rate on continued work.[7] In operationalizing the first three variables, which reflect terms of regular old-age pension schemes, we rely on time-series data provided by the Comparative Welfare Entitlements Dataset (CWED2) (Scruggs et al. 2016).

A key variable capturing pension reforms is the gender-specific statutory retirement age, which we call *pensionable age*. For comparative purposes, pensionable ages for men and women are available from CWED2. For the overall population we calculated the mean of both variables. These variables capture the "normal" statutory retirement age without exceptions, e.g. specific occupational regulations. Where statutory retirement age has a range, the mean or the lower limit for public minimum pension is applied (for example 65 for Finland, where statutory retirement age ranges from 63-68). We expect the pensionable age to be the most discerned parameter affecting people's retirement decision and therefore, higher pensionable ages to lead to higher effective retirement ages. This is also the argument most clearly expressed and discussed in the context of recent pension reforms to extend working lives. Within our sample, the average pensionable age for men had risen about half a year and for women about one year from the beginning of our period of observation until 2010 (see Table A1 in the Appendix).

The level of earnings-related pension benefits is captured via income replacement rates. A generous average level of benefits may set incentives to exit from labour force before retirement age or not to continue working thereafter, because the expected level of own pension income is perceived to be adequate. Notice that the national average replacement rate is not the same as the actual expected replacement rate of an individual and therefore, it rather measures the perception of the national pension benefit level as an incentive than concrete individual gains of continued work. The *standard pension replacement rate* is the rate of wage compensation provided by public earnings-related pen-

[6] This does not account for countries in which the statutory retirement age is higher than 65 years, as it is the case in Norway or Denmark until 2005.

[7] There is a great complexity of the instruments of making longer working pay in different earnings-related pension systems, in particular with respect to accrual rules, which we cannot measure in a cross-country, time-series manner. The four major features included in our analysis, however, are prevalent in all pension systems and cover the main pull factors. They also gain considerably more visibility in the publicity than more complex mechanisms and thus probably have a greater weight in people's retirement decisions. More detailed measures, albeit not for time series, are provided among others by Ebbinghaus 2006 and Ebbinghaus/Hofäcker 2013.

sion schemes in relation to the income of the last twelve months before labour market exit.[8] This theoretical replacement rate is calculated for certain type cases representing average income households.[9] On average, pension replacement rates had risen by 1.2 percentage points during our period of observation (Table A1). Another pension scheme parameter setting incentives for working life length is the *qualification period* required for full pension benefits. As provided by CWED2, qualification period measures the number of years of pension insurance to be considered fully covered without any subtractions or reductions of the standard pension benefit.[10] We assume that a long qualification period constitutes a powerful incentive for working longer especially if all years and/or earnings count for pension accrual. Qualification period for gaining full pension had increased by 1.5 years on average in our sample (Table A1).

As an indicator for the incentives set by early retirement schemes to quit working, we include the implicit tax rate on continued work developed by Duval (2003).[11] The implicit tax rate reflects the marginal benefit of continued work at a certain age (in our case, the age of 60), or put another way around, the marginal cost of retiring early. Provided that an individual is eligible for pension and that receiving pension benefit cannot be combined with earnings from work, there is an implicit tax on continued working if the pension system is not actuarially neutral (that is, the cost in terms of foregone pensions and contributions paid during the period of continued working is not offset by an increase in future pension; Duval 2003: 18). The higher the implicit tax on continued work, the greater is the incentive to exit labour force earlier. Due to closing or restricting of early retirement paths in many of our sample countries, the implicit tax to continued work had lowered considerably from the beginning of the 1990s until 2010 (see Table A1).

For unemployment policies with potential impact on late-career labour market attachment and retirement transitions, we focus on benefit duration and levels of unemployment replacement rates. Indicators for unemployment policy are also taken from CWED2. The variable *unemployment benefit duration* contains the number of weeks of benefit entitlement excluding times of means-tested assistance. Since one of our main dependent variables takes account of the older workers aged 55-64 and the theoretical maximum of receiving unemployment benefits in that lifespan is ten years, we restricted the maximum duration to 520 weeks.[12] Similar to the standard pension replacement rate the *unemployment replacement rate* is the ratio of the benefit that compensates the income prior to the job loss. Again, we take the same three mid-income household types into account. We assume that longer unemployment duration and more generous benefits constitute incentives for not entering labour force anew once getting unemployed in later stage of the career and thus should have a negative impact on extending working lives.

For retention factors, we include a measure of the *social investment orientation* of a welfare state in the analysis. As discussed above, social investment policies over the life course cumulate and update human capital and thereby enhance the labour market chances of individuals also at the later stages of their lives. Additionally, public social services ease labour market participation of women, who

[8] All standard pensions considered in CWED2 exclusively include mandatory public programs. Thus, the pension schemes exclude occupational pensions as well as mandatory private savings schemes.

[9] See the CWED2 codebook for a detailed description of the coding rules and the notional type case assumptions (Scruggs et al. 2014). The mid-income replacement rate used in this analysis is calculated as the average of replacement rates of the following household types: i) a single person with 100 percentage income of the average production worker (APW), ii) a couple with 100+0 percentage APW wage, and iii) a couple with 100+50 percentage of the APW wage. The row data of eight different household types will be soon available at www.cwed2.org, allowing for analysis of benefit generosity at different income levels and family constellations.

[10] If no qualification applies to the calculation of the standard benefit within a country (e.g. the Netherlands), the variable is coded with zero.

[11] We would like to thank Romain Duval for providing access to the implicit tax rate data. Data for later years is taken from OECD (2012).

[12] This only affects the duration of unemployment benefits in Belgium, which otherwise have no restriction in duration.

traditionally have carried the main responsibility for care of family members in need (Morel et al. 2012). We use the social investment policy measure developed by Kuitto (2016) which indicates the relation of public expenditure on social investment policies to expenditure on compensating social policies (that is, mainly income-replacing cash benefits such as unemployment benefits and pension benefits). Social investment spending includes public expenditure in education, social services for families, active labour market policies (ALMP), social services for disabled and socially excluded as well as social services for elderly and survivors. We assume that employment ratio of older workers and effective retirement age is higher and early exit rate is lower in countries with a stronger social investment orientation.

All independent variables discussed above represent policy parameters. In contrast, the following macro-level push factors consist of economic and labour market-related structural factors. We include the *unemployment rate*[13] as an indicator for economic cycles that directly affects individuals at the labour market. The overall chances of finding a job in a struggling economy with high overall unemployment rates are especially difficult for older people. Thus, we assume that this variable has a strong influence on employment rates of older workers and include unemployment rates for women and men separately in order to capture gender specific effects. The *degree of deindustrialisation*[14], which is measured as the ratio of employment in the service sector of total employment, may be an important factor when considering the impact of changing labour markets and job and skill profiles on older workers (Blossfeld et al. 2011). We include the total ratio of employment in the service sector, as well as the ratio of women and men, respectively. Finally, we also control for overall business cycle effects by including *GDP growth*[15].

4. Activation outcome trends of older workers

A look at the general trends of our outcome variables reveals that older workers indeed participate in the labour market to a higher degree and that they retire later. There is considerable variance both across countries' levels and developments as well as between men and women, though. Differences between the trends of the three variables also reflect the fact that the goals of activation policies are multiple and that outcomes with regard to one objective may be reached more successfully than others. Table 1 shows the development of effective retirement age during our period of analysis, from 1992 to 2010. On average, effective retirement age has increased by 0.67 years, the increase being greater among women. However, the trend is mixed. In Switzerland, but also in Austria, France (both gender) as well as Italy and Japan (men), persons retire earlier than before. The increase in retirement age has been most notable in Belgium and the Netherlands, but also in Germany, where women retire on average 2.14 later in 2010 than mid-1990s. Effective retirement age remains the highest in Japan, followed by the United States, Sweden and Switzerland. At the low end, in Austria and France, people retire over three years earlier than the average of our sample. Neither the level nor the trend follows the lines of distinct welfare regimes, although retirement ages tend to be higher in the social-democratic and liberal welfare states than in conservative-corporatists and Southern European welfare states. However, variation in retirement ages in Europe is higher for women, which might be a consequence of differing labour market participation patterns of women in different welfare regimes.

[13] Data is taken from Eurostat (2016a).
[14] Data is taken from Eurostat (2016b).
[15] Data is taken from World Bank (2016).

Table 1: Development of effective retirement age, 1992-2010.

	Male			*Female*			*Total*		
	Start	End	Δ	Start	End	Δ	Start	End	Δ
Austria	60.31	59.72	-0.59	58.87	57.80	-1.07	59.59	58.76	-0.83
Belgium	57.94	60.86	2.92	55.47	58.98	3.51	56.70	59.92	3.22
Finland	60.85	61.57	0.73	60.04	61.52	1.48	60.44	61.55	1.11
France	59.82	58.65	-1.17	60.11	59.44	-0.67	59.97	59.05	-0.92
Germany	60.30	61.97	1.67	59.04	61.18	2.14	59.67	61.57	1.90
Ireland	63.31	63.44	0.13	63.31	63.85	0.53	63.31	63.64	0.33
Italy	61.01	60.61	-0.39	58.46	59.01	0.55	59.73	59.81	0.08
Japan	71.16	70.06	-1.10	66.48	67.05	0.57	68.82	68.55	-0.27
Netherlands	60.57	62.93	2.36	58.92	61.43	2.51	59.74	62.18	2.44
Norway	63.95	64.20	0.25	63.69	63.75	0.05	63.82	63.97	0.15
Spain	61.52	62.31	0.79	64.13	63.05	-1.09	62.83	62.68	-0.15
Sweden	63.53	65.44	1.91	62.26	63.28	1.01	62.90	64.36	1.46
Switzerland	67.08	65.44	-1.64	66.15	63.59	-2.56	66.62	64.51	-2.10
United Kingdom	62.54	64.14	1.60	60.16	61.89	1.73	61.35	63.01	1.66
United States	64.79	65.57	0.77	64.43	65.33	0.90	64.61	65.45	0.84
Mean	62.63	63.25	0.62	61.49	62.21	0.72	62.06	62.73	0.67
SD	3.18	2.56	1.57	3.30	2.86	1.37	3.14	2.65	1.40

Note: Years for start and end values differ. See table A2 for information on samples. Source: OECD (2015).

The picture of both relative exit rate (Table 2) and employment rate of older workers (Table 3) is more coherent. On average, the cohort-adjusted relative exit rate has decreased by 9.6 percentage points, the decrease being somewhat higher among men than women. The Netherlands, Germany and Finland have most impressingly managed to lower the relative exit rates of persons aged 60-64. At the same time, increases in employment ratios of people aged 55-64 and in particular in those of women in these countries are the highest within the sample. In accordance with effective retirement ages, relative exit rates vary considerably across countries, the highest rate in 2010 being in France where 72.5 percentages of 60-64 years old have left the labour force permanently. In contrast, only 21 percentages of the same age group has exited labour force in Japan, 22.7 in the United States and 23.1 in Norway.

The gender gap in older age labour market activity has been narrowing especially with respect to the labour market participation of older workers. While the employment ratio of older workers aged 55-64 has increased by 10.6 percentage points on average, the growth in employment is much higher among women (14.7) than men (6). This is to a great extend due to the overall cohort effect of increasing female labour market participation, but although gender gaps still remain, they are getting much smaller among the older workforce, too. In the long run, higher attachment of women to labour markets and longer working lives are one of the key factors combatting old-age income inequality between the two sexes (Frericks et al. 2009; Kuivalainen et al. 2016; Radl 2013). The overall increase in employment rates in this age group also simply lays the foundations for later retirement; the more older persons belong to the active labour force, the more can also continue working later.

Table 2: Development of relative exit rates for age group 60-64 years, 1992—2010.

	Male			*Female*			*Total*		
	Start	End	Δ	Start	End	Δ	Start	End	Δ
Austria	73.66	52.97	-20.68	70.93	61.26	-9.68	73.00	56.41	-16.58
Belgium	64.49	52.73	-11.76	70.93	55.55	-15.38	66.52	53.96	-12.57
Finland	54.52	35.63	-18.89	63.16	42.04	-21.12	58.90	38.96	-19.94
France	77.37	73.65	-3.72	70.78	70.21	-0.57	74.69	72.15	-2.54
Germany	62.38	34.68	-27.70	72.71	45.04	-27.67	66.34	39.41	-26.93
Ireland	29.02	26.45	-2.57	32.89	27.45	-5.44	30.42	26.93	-3.50
Italy	48.74	46.63	-2.10	52.84	62.13	9.29	50.19	52.57	2.38
Japan	18.16	18.82	0.66	24.50	23.71	-0.79	20.94	20.96	0.02
Netherlands	64.77	35.57	-29.20	70.99	39.55	-31.44	66.43	37.20	-29.23
Norway	25.37	22.88	-2.49	26.63	23.15	-3.48	25.82	23.05	-2.78
Spain	39.59	38.19	-1.40	25.89	27.85	1.96	36.95	34.81	-2.14
Sweden	28.97	16.99	-11.97	33.55	25.23	-8.32	31.30	20.99	-10.31
Switzerland	23.84	21.20	-2.64	37.60	34.61	-2.99	30.12	27.30	-2.82
United Kingdom	33.81	25.35	-8.46	55.83	46.23	-9.60	43.16	35.00	-8.16
United States	31.45	22.66	-8.79	30.19	22.70	-7.49	31.12	22.73	-8.39
Mean	44.11	34.07	-10.05	48.56	39.65	-8.91	46.22	36.66	-9.56
SD	19.73	15.85	9.79	19.57	15.95	11.07	18.95	15.27	9.73

Note: Years for start and end values differ. See table A2 for information on samples. Source: OECD.Stats, own calculations.

Table 3: Development of employment ratios of older workers, aged 55-64 years, 1992—2010.

	Male			*Female*			*Total*		
	Start	End	Δ	Start	End	Δ	Start	End	Δ
Austria	41.20	49.90	8.70	17.20	33.00	15.80	28.80	41.20	12.40
Belgium	31.80	45.60	13.80	12.40	29.20	16.80	21.90	37.30	15.40
Finland	39.50	55.60	16.10	34.90	56.90	22.00	37.00	56.20	19.20
France	35.70	41.50	5.80	24.40	35.70	11.30	29.80	38.50	8.70
Germany	47.80	65.00	17.20	28.20	50.50	22.30	37.90	57.70	19.80
Ireland	59.60	58.20	-1.40	16.50	42.10	25.60	37.90	50.20	12.30
Italy	48.00	47.60	-0.40	14.10	26.10	12.00	30.20	36.50	6.30
Japan	81.20	78.80	-2.40	47.20	52.10	4.90	63.70	65.20	1.50
Netherlands	41.70	64.50	22.80	16.20	42.80	26.60	28.70	53.70	25.00
Norway	71.40	72.20	0.80	58.90	65.00	6.10	65.20	68.60	3.40
Spain	55.00	54.50	-0.50	18.60	33.10	14.50	36.00	43.50	7.50
Sweden	72.00	74.00	2.00	63.20	66.90	3.70	67.30	70.40	3.10
Switzerland	78.10	77.60	-0.50	47.70	58.50	10.80	62.40	68.00	5.60
United Kingdom	58.30	65.10	6.80	37.30	49.50	12.20	47.60	57.20	9.60
United States	63.10	64.40	1.30	44.60	56.40	11.80	53.40	60.30	6.90
Mean	55.16	61.12	5.96	31.87	46.55	14.68	43.16	53.73	10.56
SD	15.80	11.78	7.99	16.98	13.07	7.15	15.45	11.90	6.85

Note: Years for start and end values differ. See table A2 for information on samples. Source: Eurostat (2016a).

5. Effects of policy incentives on activation outcomes

5.1 Methodology and model

To estimate the impact of the parameters of pull, push, and retention factors presented above, we analyse 15 advanced welfare states from 1992 until 2010[16] with a time-series–cross-section regression with panel corrected standard errors (Beck/Katz 1995; Plümper et al. 2005). Estimation of the coefficients is conducted by Prais-Winsten regressions with panel specific autocorrelation structure. These specifications ensure that estimated coefficients and their standard errors will be unbiased and unaffected by panel specific characteristics.[17] We estimate the effect of ten pull, push and retention factors on our dependent variables measuring activation outcomes of older workers for different subsets of the population (men, women, and total population). This adds up to a total of nine models. All models include the identical set of matched independent variables, which were lagged by one year, yielding the following equation:

$$\begin{aligned}\text{Outcome (subset)}_{i,t} = \beta_0 &+ \beta_1 \text{Pensionable age (subset)}_{i,t-1} \\ &+ \beta_2 \text{Qualification period}_{i,t-1} \\ &+ \beta_3 \text{Std. pension replacement rate}_{i,t-1} \\ &+ \beta_4 \text{Implicit tax rate}_{i,t-1} \\ &+ \beta_5 \text{Unemp. benefit duration}_{i,t-1} \\ &+ \beta_6 \text{Unemp. replacement rate}_{i,t-1} \\ &+ \beta_7 \text{Investment/Compensation ratio}_{i,t-1} \\ &+ \beta_8 \text{Unemp. rate (subset)}_{i,t-1} \\ &+ \beta_9 \text{Deindustrialisation (subset)}_{i,t-1} \\ &+ \beta_{10} \text{GPD growth}_{i,t} \\ &+ \sum_{d=1}^{n-1} \beta_d \text{Year dummies} + \varepsilon_{i,t}\end{aligned}$$

As indicated in the equation, all models include period fixed effects to cover common shocks. Furthermore, we specified all models with alternative specifications, which rendered robust results (see tables A4 to A5 in the appendix).

5.2 Results

To test our theoretical propositions, we estimate nine models, which are presented in Table 4. In each model the same set of exogenous variables is incorporated to ensure comparability. All models estimate the impact of pull, push, and retention factors on our three dependent variables operationalizing activation outcomes of men, women, and total population.

[16] Data availability and therefore panel length varies across the variables and countries. The starting and end years as well as number of observations per country are presented in Table A2 in the Appendix.

[17] Since our panels are unbalanced and the degree of autocorrelation distinctly varies between them, we use a panel-specific approach for calculation of the autocorrelation parameter ρ (rho).

Table 4: The influence of push, pull, and retention effects on effective retirement age, relative exit ratios and employment ratios in Europe, 1992—2010.

	Effective retirement age			Relative exit ratios (60-64 years)			Employment ratios (55-64 years)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Pull factors									
Pension policy parameters									
Pensionable age (subset) $_{t-1}$	0.381***	0.567***	0.533***	-2.142**	-3.449***	-2.728***	1.630***	1.014***	1.901***
	(0.072)	(0.088)	(0.066)	(0.802)	(0.561)	(0.603)	(0.367)	(0.280)	(0.360)
Qualification period $_{t-1}$	0.022+	-0.029	-0.023+	-0.094	-0.062	0.073	0.055	0.448***	0.201***
	(0.013)	(0.028)	(0.014)	(0.091)	(0.125)	(0.096)	(0.038)	(0.047)	(0.049)
Std. pension repl. rate $_{t-1}$	-0.042**	-0.007	-0.022+	0.024	-0.116	0.085	0.014	0.039	0.134*
	(0.016)	(0.018)	(0.013)	(0.096)	(0.109)	(0.083)	(0.055)	(0.050)	(0.058)
Implicit tax rate $_{t-1}$	-1.243*	-2.311***	-1.629***	7.867*	7.994*	6.452+	-8.648***	-7.591**	-9.974***
	(0.535)	(0.559)	(0.426)	(3.866)	(4.057)	(3.361)	(1.902)	(2.359)	(1.872)
Unemployment policy parameters									
Unemp. benefit duration $_{t-1}$	-0.001	-0.001	0.000	0.001	-0.000	0.002	-0.004+	-0.009***	-0.005+
	(0.001)	(0.001)	(0.001)	(0.007)	(0.004)	(0.006)	(0.003)	(0.003)	(0.003)
Unemp. replacement rate $_{t-1}$	-0.008	-0.016	-0.033**	0.117+	0.231**	0.186**	-0.046	0.173***	0.004
	(0.012)	(0.020)	(0.012)	(0.062)	(0.086)	(0.065)	(0.050)	(0.036)	(0.048)
Retention factor									
Investment/compensation ratio	3.117***	2.440*	3.151***	-20.971***	-24.556***	-21.693**	22.061***	40.013***	33.363***
	(0.736)	(1.041)	(0.801)	(6.316)	(7.252)	(6.732)	(3.536)	(4.654)	(3.549)
Push factors									
Unemployment rate (subset) $_{t-1}$	-0.005	-0.048	-0.019	0.468*	0.304	0.351+	-0.452***	-0.693***	-0.557***
	(0.030)	(0.042)	(0.029)	(0.192)	(0.245)	(0.181)	(0.094)	(0.148)	(0.103)
Deindustrialisation (subset) $_{t-1}$	-0.022	-0.252***	-0.138***	0.020	0.367	0.446*	-0.140	0.500**	0.397**
	(0.032)	(0.055)	(0.030)	(0.172)	(0.385)	(0.202)	(0.096)	(0.193)	(0.122)
GDP growth	-0.023	0.038	0.010	-0.235*	-0.192	-0.218+	0.078	-0.016	0.001
	(0.024)	(0.030)	(0.022)	(0.109)	(0.203)	(0.119)	(0.070)	(0.134)	(0.097)
Constant	40.306***	48.749***	39.913***	178.951***	238.751***	175.860***	-47.291+	-111.13***	-127.71***
	(4.836)	(6.957)	(4.762)	(53.815)	(43.713)	(44.790)	(25.714)	(22.572)	(27.459)
Adj. R2	0.998	0.997	0.999	0.801	0.946	0.871	0.938	0.917	0.966
RMSE	0.532	0.606	0.468	2.469	3.184	2.327	1.627	2.090	1.711
N	250	250	250	250	250	250	250	250	250
No. of countries	15	15	15	15	15	15	15	15	15

Note: Time-series—cross-section coefficients with unbalanced panels and panel-corrected standard errors (in parentheses). Period effects not shown. S*ubset* indicates that parameters are matched with the corresponding subset (female, male, and total) of the dependent variable. * p<0.05, ** p<0.01, *** p<0.001.

The first four parameters in our models represent the pension policy parameters of the pull factors. Unanimously, statutory retirement ages significantly affect the dependent variables operationalizing activation outcomes. All else being equal, when the statutory retirement age is increased by one year, effective retirement ages for men are on average 4.6 months higher, relative exit ratios are 2.1 percentage points (p.p.) lower, and employment ratios are 1.6 p.p. higher. For women, an increase of one year of the statutory retirement age translates into a significant increase of about 6.8 months for effective retirement ages, 3.5 p.p. lower exit ratios, and a 1 p.p. higher employment rates.[18] For total population, these effects are also present, translating into an average of 6.4 months later retirement, 2.7 p.p. lower exit ratios, and 1.9 p.p. higher employment rates of older workers with each additional year of statutory retirement age. All these effects are significant on the $p < 0.1\%$-level. Additionally, we find these effects to be curvilinear and decreasing when levels retirement ages are already high, because an increase would have not such a big impact as on lower levels of statutory retirement ages, pointing to a reversed u-shaped relationship between those variables.[19]
The length of the qualification period for full pension has mixed effects on effective retirement ages for men and women. While there seems to be a slightly positive effect on later retirement for men, the effect for women is reversed, albeit insignificant. However, for the total sample we observe a negative effect on retirement ages. Furthermore, qualification periods have no effect on exit ratios. However, when looking at employment ratios, lengths of contribution periods have a significant positive effect on employment ratios of women. Older female workers at the age of 55 to 64 are more frequently employed when contribution periods for full public pensions are longer, indicating that qualification periods exert higher pressure on women to stay longer in employment. For men, this effect is only marginal and insignificant, pointing to a substantial difference in the effect of qualification periods on gender. This points to the fact that, in contrast to men, women have to reach a reasonable level of pension entitlements in later years due to career breaks and nonstandard work biographies earlier in the life course (Arpaia et al. 2009: 25).

Regarding replacement rates for public pensions, the evidence is mixed. The average level of wage compensation in case of retirement exclusively lowers effective retirement ages for men and has no significant effect on women. This may indicate that men are more likely to exit from labour market into retirement when wage compensation is comparably generous. For exit ratios, we could not find any non-stochastic effect of replacement rates. Considering employment ratios of older workers, we found that higher replacement rates correlate with higher labour market attachment, but only for total population.

Implicit tax rates on continued work have a uniform significant effect on our dependent variables: the higher the implicit tax on continued work, the lower are effective retirement ages, the greater are the relative exit ratios, and the lower are the employment ratios of older workers, with standard errors being remarkably low. The incentives for labour market exit set by early retirement schemes and other routes for retiring before the statutory retirement age thus have a striking effect on labour market activity rates of older persons.

Unemployment benefit duration as well as replacement rates constitute the pull effects of labour market policies in our models. The former exerts a negative on employment ratios of older workers, indicating a possible disincentive for taking up jobs when income replacement is guaranteed over a longer time span. Higher replacement rates for unemployment benefits correlate with lower retirement ages and higher exit rates for total population. Interestingly, higher benefits also correlate with higher employment ratios, but exclusively for women. This correlation may has its origin in the generous benefit schemes of the Nordic countries with comparatively higher employment rates, as opposed to Continental and Mediterranean countries with comparatively lower replacement rates and far lower employment rates of older workers, especially for women.

[18] We would like to point out that we are not comparing the estimates of independent variable across multiple models, because this would be methodically inaccurate, since all models have different dependent variables.
[19] See additional analyses in table A3 included in the Appendix.

The ratio of expenditure for social investment-type of social policies compared with income-compensating policies represents the retention factor in our models. Social investment orientation exerts a unanimously significant effect on all dependent variables. A higher ratio towards investment and activation policies clearly correlates with higher retirement ages, lower exit ratios, and higher employment ratios of older workers. The estimated standard errors are remarkably low, especially in the models estimating employment ratios, and the effect remains even when checking against possible country and welfare regime effects which might co-vary with the outcomes we examine. These findings are in line with our assumption that retention factors prove to be effective in keeping older workers in work, investment in human capital over the life course presumably having positive effects for the labour force participation of older workers, too (Walker/Maltby 2012; Boudiny 2013).

Finally, we examine the effect of economic push factors. Unsurprisingly, overall unemployment rates have a uniform significant impact on employment rates of older workers. More intriguingly, unemployment rates have a significantly positive effect on exit rates of men, which can also be observed for total population. For women, this effect is positive, yet insignificant. The predominance of service sector employment has mixed effects, especially in regard to gender: The higher the degree of deindustrialization, the lower are effective retirement ages for women and total population, the higher are total exit ratios, and the higher are employment ratios of older women and total older workforce. However, these effects are not observed for men, since their activation outcomes seem to be totally unaffected by levels of deindustrialisation in our models. Economic growth has mainly no impacts on our outcome variables, with the exception of exit ratios for men and total population. In periods of economic growth, exit ratios of older male workers decline and vice versa, indicating that especially male employment seems to be more prone to business cycles.

Summing up, our analysis provides multifarious evidence of the importance of policy incentives in extending working lives. More specifically, for pull factors, statutory retirement age has a consistent effect of causing higher effective retirement ages, lower exit ratios, and higher employment ratios of older workers. This implies that a higher statutory retirement age indeed sets incentives for older workers to stay in work and to exit the labour force at a later point in life. Additionally, this effect is complemented by lower implicit tax ratios that prolong retirement and coincide with lower exit rates and higher employment rates of older workers. These findings show that parametric reforms of public pension schemes have substantial effects on the aggregated characteristics of labour market outcomes. Additionally, we could only find marginal evidence for unemployment-to-pension transition of older workers caused by unemployment policies. Considering labour market retention, we could find clear evidence that shifting the overall focus of social policy to social investment and activation over the whole life course clearly has an impact on labour market outcomes of older workers. Economic push factors showed mixed results in our models, but we discovered two interesting dynamics: While deindustrialisation seems to matter for activation outcomes for older women, men are more affected by economic growth. However, this result needs further investigation and is only marginally supported by our models.

6. Conclusion

In this paper, we have examined the effects of macro-level institutional *pull*, *push,* and *retention* factors on effective retirement age, cohort-adjusted labour market exit rates, and employment ratio of older workers in 15 OECD countries from 1992 to 2010. A time-series—cross-section analysis revealed that policies do matter for labour market outcomes. In particular, pension system parameters as well as social investment strategies can effectively extend working lives. In detail, our analysis has four major findings: *First*, pension system parameters have a profound impact on labour market activation outcomes, as both a higher statutory retirement age and a longer qualification period for standard pensions increase effective retirement ages and employment ratios of older workers. Furthermore, incentives to continue working set by restricted access to early retirement provide a powerful explanation to later retirement and labour market attachment at older ages. These results con-

firm the findings by Duval (2003) and Johnson (2000) and transform them to the most recent time period.

Second, both generous levels of pension benefits and unemployment benefit duration cause lower levels of employment ratios for older people, thus forming negative incentives to continue working. While the former hints at the possibility that there might be a payoff of generous replacement rates compensating earlier labour market exit, the latter indicates a possible incentive for an unemployment-to-pension transition, enabled by longer durations of unemployment benefit payments. Both effects may reflect the perception of the national generosity of pension and unemployment benefits rather than rational calculations of the personal (future) benefit levels.

Third, the overall orientation of a welfare state towards social investment proves to be effective in preventing early exit and raising employment for older workers by making older people both more flexible and employable. This is probably the most novel aspect of our findings, since it underlines the relevance of social investment policies not only for activating persons in their core working age, but also promoting effectively older workers' labour market attachment. As with younger cohorts, this has the advantage that in case of unemployment, older individuals supported by investment policies are enabled to be more flexible at finding new jobs and simultaneously, they do not additionally burden social security schemes with disbursements for compensatory benefits (cp. Kuitto 2016). Furthermore, the strong empirical evidence on the impact of social investment policies points to the importance of social policies over the whole life course for individual's labour market attachment also at the tail end of the working live. At the macro level, social investment policies promote employment, and with the demographic ageing, the gains of the positive effects on older workers' labour market attachment found in this study will even become more important from the view of the national economy. At the same time, this calls for further research on the components which actually drive the positive effects of social investment policies. Is it because of greater emphasis on education from the early childhood on, is it ALMP measures, or is it relief from care responsibilities during the life course resulting from public social services that matters?[20] Or is it the culture of labour market participation rooted in welfare models which emphasize social investment?[21]

Finally, pull, push, and retention factors have in part different effects on late labour market attachment of women and men. Pension policy incentives tend to be more important for women's retirement decisions and employment at later stage, possibly because they have to compensate pension accrual losses caused by career breaks and non-standard employment at earlier stages in their lives. Retention factors seem to be more important for extending women's working lives, too. In line with the arguments by the proponents of the social investment paradigm, investment in human capital and capacitating people thus seems to pay out throughout the life course and be particularly important for women (Esping-Andersen 2002, 2009).

The empirical models and the investigated policies thus confirm the assumed dynamics of pull and retention factors (and to a lesser extent to the push factors) for extending working lives (Cp. Ebbinghaus/Hofäcker 2013). Our analysis also has its shortcomings, though. Due to data availability, the sample is unbalanced and restricted to 15 countries with different starting points, with the earliest beginning in 1992. Yet, since we are looking at the impact of levels of parameters on labour market outcomes, reforms that took place in the years before that time span are covered indirectly. Looking forward, many countries have implemented further activating pension reforms after 2010 and the effects of these intensified reforms are not covered by our analysis. Furthermore, our analysis exclusively captures the influence of macro-economic variables on labour market outcomes, thus neglecting the – certainly important – influence of individual characteristics of labour market participants and their decision to retire at a certain point in life that maybe differs from the statutory retirement

[20] For this study, we also tested the effect of ALMP expenditure as well as participation rates in life-long learning measures, yet without significant effects in our models.

[21] Recall that we also controlled for unit fixed effects and welfare regimes while testing the robustness of our models. The effect of social investment orientation is independent from this.

age. Future studies could circumvent these shortcomings by conducting a multilevel analysis capturing the influence of both the individual and the policy dimension by linking micro and macro data on the individual decision to retire.

Concluding, when taking a systemic view, recent pension reforms aiming at extending working lives and postponing retirement pose a clear shift towards recommodifying older workforce and activating them to participate at the labour market as long as possible. This policy seems to have materialized as purposed when looking at the big picture. However, pension policies leading to recommodification of older workers also pose a serious challenge for adequacy of pensions. Adequate pension provision will only materialize in the future if longer working careers will become reality for an overreaching majority of the people – a fact which is recognized also by international organizations, all above by the EU. Parallel efforts to capacitate as many people as possible to work in old age are needed, including life-long learning, rehabilitation and overall preventive health care. Furthermore, change in attitudes towards older employees and more flexible employment conditions for elderly are needed. However, extending working lives at their tail end is but only one dimension of ensuring pension adequacy; youth unemployment, late entry in the labour market, female inactivity, and disability to work are major concerns for achieving full pension rights in the environment of ever tightening tides between contribution periods and pension rights. Pension system features which correct for unpaid periods outside the labour market (for example, due to parenting, education, other care responsibilities and unemployment) by means of at least partial pension accrual during such periods will also be of importance for achieving adequate pensions. Labour market dualisation not only challenges adequacy of earnings-related pensions, but also leads to a greater divide between those entitled to pensions in their own right and those forced to rely on minimum pensions and social assistance. In the long run, the current activation turn of pension policies thus intensifies the ties between pension policy, labour market policy, and the wider context of social policy. Sustainability and adequacy remain thereby an equation with sensitive balance. In addition to pension policies as such, retention factors, in particular social investment policies, may help in retaining the balance.

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Appendix

Table A1: Descriptive statistics of the independent variables

Variable	Obs	Mean	SD	Start	End	Min	Max
Pull factors							
Pension policy parameters							
Pensionable age (male) $_{t-1}$	250	64.00	2.10	63.67	64.21	60.00	67.00
Pensionable age (female) $_{t-1}$	250	62.76	2.80	62.19	63.17	55.00	67.00
Pensionable age (total) $_{t-1}$	250	63.38	2.27	62.93	63.69	57.50	67.00
Qualification period $_{t-1}$	250	34.05	11.66	33.94	35.43	0.00	45.00
Std. pension replacement rate $_{t-1}$	250	66.08	13.25	65.20	66.41	42.44	106.40
Implicit tax rate $_{t-1}$	250	0.40	0.27	0.54	0.19	0.02	1.05
Unemployment policy parameters							
Unemp. benefit duration $_{t-1}$	250	94.04	116.76	99.50	95.46	21.00	520.00
Unemp. replacement rate $_{t-1}$	250	67.15	13.07	67.57	67.57	33.35	93.55
Retention factor							
Invest./comp. ratio $_{t-1}$	250	0.63	0.20	0.56	0.66	0.31	1.15
Push factors							
Unemployment rate (male) $_{t-1}$	250	7.05	3.32	6.82	8.43	1.64	18.10
Unemployment rate (female) $_{t-1}$	250	8.26	4.84	8.70	7.76	2.40	28.90
Unemployment rate (total) $_{t-1}$	250	7.52	3.67	7.49	8.12	2.24	22.00
Deindustrialisation (male) $_{t-1}$	250	58.10	5.50	54.21	62.70	47.20	71.30
Deindustrialisation (female) $_{t-1}$	250	83.48	5.40	79.22	87.82	66.70	91.90
Deindustrialisation (total) $_{t-1}$	250	69.18	5.57	64.62	74.20	56.30	80.90
GDP growth	250	1.65	2.53	0.60	1.76	-8.71	10.07

Sources: CWED2 (Scruggs et al. 2016), Duval (2003), Eurostat, and OECD.Stats.

Table A2: Final length of panels in descriptive statistics and regression sample

Country	N	Starting year	End year
Austria	11	2000[A]	2010
Belgium	15	1996[B]	2010
Finland	19	1992	2010
France	14	1992	2005[B]
Germany	15	1996[C]	2010
Ireland	19	1992	2010
Italy	19	1992	2010
Japan	17	1994[B]	2010
Netherlands	19	1992	2010
Norway	11	2000[D]	2010
Spain	19	1992	2010
Sweden	19	1992	2010
Switzerland	15	1996[A,D]	2010
United Kingdom	19	1992	2010
United States	19	1992	2010
Total	250	1992	2010

Note: Missing data on: A, exit rates; B, implicit tax ratios; C, effective retirement ages; and D, employment ratios.

Table A3: Including a second-order polynomial for all subsets of pensionable age.

	Effective retirement age			Relative exit ratios (60-64 years)			Employment ratios (55-64 years)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Pull factors									
Pension policy parameters									
Pensionable age (subset) $_{t-1}$	0.285**	0.439***	0.540***	-2.502**	-3.748***	-3.579***	1.244	1.586***	2.555***
	(0.093)	(0.078)	(0.088)	(0.784)	(0.523)	(0.831)	(0.804)	(0.285)	(0.483)
(Pensionable age (subset) $_{t-1}$)^2	-0.066*	-0.039*	-0.006	-0.111	-0.229*	-0.308	-0.154	0.232***	0.286
	(0.032)	(0.017)	(0.024)	(0.215)	(0.108)	(0.190)	(0.280)	(0.068)	(0.178)
Qualification period $_{t-1}$	0.029*	-0.036	-0.020	-0.081	-0.072	0.048	0.057	0.494***	0.208***
	(0.014)	(0.023)	(0.015)	(0.093)	(0.118)	(0.102)	(0.039)	(0.050)	(0.043)
Std. pension replacement rate $_{t-1}$	-0.037*	-0.006	-0.020	0.042	-0.100	0.064	0.019	0.012	0.126*
	(0.016)	(0.016)	(0.012)	(0.096)	(0.106)	(0.081)	(0.054)	(0.050)	(0.054)
Implicit tax rate $_{t-1}$	-1.294*	-1.949***	-1.580***	7.914*	9.012*	6.232+	-8.785***	-8.914***	-9.586***
	(0.556)	(0.477)	(0.419)	(3.964)	(3.928)	(3.311)	(1.838)	(2.373)	(1.791)
Unemployment policy parameters									
Unemp. benefit duration $_{t-1}$	0.000	-0.001*	0.000	0.001	-0.000	0.002	-0.004	-0.008**	-0.004
	(0.001)	(0.001)	(0.001)	(0.007)	(0.004)	(0.006)	(0.003)	(0.003)	(0.003)
Unemp. replacement rate $_{t-1}$	-0.011	-0.030+	-0.033**	0.118+	0.239**	0.153*	-0.051	0.191***	0.028
	(0.013)	(0.016)	(0.012)	(0.064)	(0.083)	(0.064)	(0.047)	(0.038)	(0.046)
Retention factor									
Investment/compensation ratio	4.057***	3.673***	3.385***	-19.893***	-21.637**	-20.292**	22.150***	37.126***	33.006***
	(0.879)	(1.007)	(0.844)	(5.840)	(7.237)	(6.406)	(3.530)	(4.258)	(3.359)
Push factors									
Unemployment rate (subset) $_{t-1}$	-0.013	-0.039	-0.019	0.461*	0.282	0.358+	-0.463***	-0.707***	-0.527***
	(0.030)	(0.041)	(0.030)	(0.191)	(0.246)	(0.183)	(0.092)	(0.140)	(0.099)
Deindustrialisation (subset) $_{t-1}$	-0.008	-0.253***	-0.132***	0.004	0.287	0.375+	-0.130	0.645***	0.353***
	(0.032)	(0.048)	(0.033)	(0.177)	(0.376)	(0.215)	(0.096)	(0.175)	(0.102)
GDP growth	-0.021	0.033	0.011	-0.230*	-0.186	-0.198+	0.079	-0.027	-0.010
	(0.024)	(0.030)	(0.022)	(0.111)	(0.200)	(0.120)	(0.070)	(0.127)	(0.094)
Constant	63.386***	85.074***	72.973***	40.285***	27.789	11.837	57.147***	-59.874***	-8.098
	(1.942)	(3.655)	(2.033)	(11.978)	(34.341)	(14.332)	(5.958)	(15.374)	(6.571)
R2	0.998	0.998	0.999	0.820	0.951	0.882	0.945	0.929	0.971
Adj. R2	0.997	0.998	0.999	0.796	0.945	0.866	0.937	0.920	0.967
RMSE	0.528	0.612	0.468	2.463	3.180	2.293	1.630	2.056	1.693
N	250	250	250	250	250	250	250	250	250
No. of countries	15	15	15	15	15	15	15	15	15

Note: The term *subset* indicates that these parameters are matched with the corresponding subset (female, male, and total) of the dependent variable. Pensionable age and its second-order polynomial are demeaned (the mean of the variable is subtracted). Period effects not shown. Panel-corrected standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

Table A4: Robustness checks for all models. No unit or period effects included.

	Effective retirement age			Relative exit ratios (60-64 years)			Employment ratios (55-64 years)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Pull factors									
Pension policy parameters									
Pensionable age (subset) $_{t-1}$	0.391***	0.514***	0.560***	-2.246***	-2.676***	-2.279***	1.514***	0.292	1.505***
	(0.069)	(0.087)	(0.065)	(0.620)	(0.511)	(0.495)	(0.305)	(0.279)	(0.328)
Qualification period $_{t-1}$	0.015	-0.012	-0.019+	-0.131	-0.104	-0.115	0.083*	0.404***	0.190***
	(0.012)	(0.022)	(0.011)	(0.091)	(0.100)	(0.098)	(0.038)	(0.046)	(0.038)
Std. pension replacement rate $_{t-1}$	-0.033*	0.002	-0.011	-0.015	-0.183+	-0.015	0.009	-0.014	0.114*
	(0.015)	(0.019)	(0.012)	(0.086)	(0.105)	(0.081)	(0.054)	(0.048)	(0.056)
Implicit tax rate $_{t-1}$	-1.486**	-2.800***	-2.234***	13.042***	13.668***	11.445***	-11.385***	-8.704***	-10.652***
	(0.452)	(0.466)	(0.357)	(3.350)	(2.954)	(2.962)	(1.590)	(2.480)	(1.884)
Unemployment policy parameters									
Unemp. benefit duration $_{t-1}$	-0.001+	-0.001+	-0.000	0.003	0.001	0.003	-0.006*	-0.008**	-0.006*
	(0.001)	(0.001)	(0.001)	(0.006)	(0.004)	(0.005)	(0.002)	(0.003)	(0.003)
Unemp. replacement rate $_{t-1}$	-0.015	-0.022	-0.055***	0.086	0.188*	0.121*	0.002	0.229***	0.056
	(0.011)	(0.019)	(0.011)	(0.062)	(0.086)	(0.061)	(0.056)	(0.035)	(0.049)
Retention factor									
Investment/compensation ratio	2.942***	2.406*	2.673***	-20.155***	-23.348***	-18.431***	21.143***	40.563***	30.919***
	(0.754)	(1.061)	(0.760)	(4.856)	(6.962)	(5.457)	(2.944)	(4.342)	(3.398)
Push factors									
Unemployment rate (subset) $_{t-1}$	0.021	-0.024	-0.000	0.380*	0.262	0.483**	-0.381***	-0.403**	-0.339***
	(0.027)	(0.042)	(0.024)	(0.177)	(0.218)	(0.162)	(0.099)	(0.131)	(0.099)
Deindustrialisation (subset) $_{t-1}$	-0.030	-0.144***	-0.067***	-0.086	-0.056	-0.177	-0.100	0.610***	0.316***
	(0.027)	(0.039)	(0.020)	(0.163)	(0.241)	(0.166)	(0.082)	(0.122)	(0.078)
GDP growth	-0.010	0.030+	0.007	-0.112	0.023	-0.063	0.131*	0.068	0.058
	(0.020)	(0.016)	(0.013)	(0.069)	(0.092)	(0.069)	(0.053)	(0.055)	(0.061)
Constant	40.031***	42.698***	34.830***	195.862***	234.260***	203.920***	-44.787*	-78.153***	-100.867***
	(4.762)	(6.214)	(4.653)	(40.287)	(33.753)	(32.289)	(20.746)	(18.271)	(22.830)
Adj. R2	0.998	0.996	0.999	0.854	0.948	0.923	0.980	0.914	0.962
RMSE	0.550	0.603	0.461	2.625	3.218	2.394	1.670	2.166	1.750
N	250	250	250	250	250	250	250	250	250
No. of countries	15	15	15	15	15	15	15	15	15

Note: The term *subset* indicates that these parameters are matched with the corresponding subset (female, male, and total) of the dependent variable. Panel-corrected standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

Table A5: Robustness checks for all models. Unit and period fixed effects included.

	Effective retirement age			Relative exit ratios (60-64 years)			Employment ratios (55-64 years)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Pull factors									
Pension policy parameters									
Pensionable age (subset) $_{t-1}$	0.307**	0.238*	0.249**	-0.690	-0.167	-0.950	-1.723***	-0.526	-1.014+
	(0.095)	(0.113)	(0.087)	(0.946)	(0.544)	(0.849)	(0.514)	(0.348)	(0.525)
Qualification period $_{t-1}$	0.012	-0.029	-0.013	-0.008	0.051	0.011	-0.037	-0.029	-0.034
	(0.020)	(0.026)	(0.018)	(0.070)	(0.172)	(0.075)	(0.034)	(0.040)	(0.023)
Std. pension replacement rate $_{t-1}$	-0.049**	0.011	-0.020	0.227**	0.040	0.185**	-0.046	0.034	-0.012
	(0.016)	(0.018)	(0.014)	(0.074)	(0.084)	(0.068)	(0.046)	(0.038)	(0.038)
Implicit tax rate $_{t-1}$	-0.286	-1.545***	-0.824**	12.085***	1.977	7.961***	-8.127***	-6.207***	-6.978***
	(0.256)	(0.419)	(0.253)	(2.356)	(1.869)	(2.085)	(1.226)	(0.837)	(1.039)
Unemployment policy parameters									
Unemp. benefit duration $_{t-1}$	0.001+	0.001+	0.001*	-0.002	0.002	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.007)	(0.005)	(0.006)	(0.002)	(0.002)	(0.002)
Unemp. replacement rate $_{t-1}$	0.003	-0.005	-0.003	-0.083	0.015	-0.072	-0.011	0.048	0.013
	(0.011)	(0.016)	(0.011)	(0.062)	(0.090)	(0.068)	(0.038)	(0.041)	(0.038)
Retention factor									
Investment/compensation ratio	4.905***	1.975+	3.594***	-15.718***	-20.002***	-13.834**	3.685	2.801	2.357
	(0.943)	(1.018)	(0.796)	(4.734)	(5.454)	(5.364)	(2.658)	(2.203)	(2.482)
Push factors									
Unemployment rate (subset) $_{t-1}$	-0.043+	-0.031	-0.020	0.740***	0.375*	0.510***	-0.681***	-0.278***	-0.506***
	(0.025)	(0.028)	(0.025)	(0.114)	(0.157)	(0.097)	(0.072)	(0.084)	(0.066)
Deindustrialisation (subset) $_{t-1}$	0.059	-0.109+	-0.030	-0.432*	1.292***	0.258	0.081	-0.313*	0.048
	(0.042)	(0.058)	(0.045)	(0.194)	(0.280)	(0.226)	(0.138)	(0.141)	(0.137)
GDP growth	-0.039+	0.027	-0.003	-0.227*	-0.162	-0.232**	0.057	-0.064	-0.010
	(0.020)	(0.027)	(0.019)	(0.096)	(0.166)	(0.090)	(0.060)	(0.068)	(0.056)
Constant	38.271***	53.345***	46.754***	120.983*	-18.540	102.876+	159.580***	68.260**	93.604**
	(6.765)	(8.421)	(6.787)	(60.731)	(32.964)	(55.225)	(34.346)	(22.046)	(34.531)
Adj. R2	0.999	0.998	0.999	0.981	0.979	0.978	0.993	0.992	0.992
RMSE	0.446	0.548	0.419	2.145	2.670	1.914	1.307	1.122	1.065
N	250	250	250	250	250	250	250	250	250
No. of countries	15	15	15	15	15	15	15	15	15

Note: The term *subset* indicates that these parameters are matched with the corresponding subset (female, male, and total) of the dependent variable. Unit and period effects included, but not shown. Panel-corrected standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.