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Social Investment, Employment Outcomes and Policy and Institutional Complementarities: A Comparative Analysis across 26 OECD countries*

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Abstract

Social investment has become a widely debated topic in the comparative welfare state literature. To date, there are, however, only a couple of systematic comparative empirical analyses that focus on the employment outcomes associated with social investment. This study contributes to the social investment literature by empirically analysing the extent to which variation in employment outcomes across 26 OECD countries over the period 1990-2010 can be explained by effort on five social investment policies using time-series cross-sectional analyses. Apart from focusing on employment rates, we additionally explore associations with qualitative aspects of the employment outcomes relying on novel indicators. The analyses account for theoretically relevant confounding variables that were omitted in existing studies, notably labour market institutions. We find robust evidence for a positive association between effort on active labour market policies and employment rates. For other policies we obtain mixed results, dependent on the employment outcome being studied. Subsequently, we explore the role of policy and institutional complementarities in the assessment of the employment effects of social investment policies. We show how social investment policies interact and how their effect is moderated by effort on other policies. Additionally, our analysis shows that the complementarity of social investment policies varies across welfare state regimes. Finally, explorative analyses suggest that there are positive synergies between more and better jobs, which could in part be attributable to effort on social investment.

JEL codes: H53, I38, J21

Keywords: employment, job quality, social investment, policy complementarity, institutional complementarity, diminishing marginal returns, comparative welfare state analysis, social expenditure, social policy

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1. Introduction

For over twenty years, realising higher levels of employment has been at the heart of EU strategies such as the European Employment Strategy (1997), Lisbon Strategy (2000) and Europe 2020 (2010). In 2011, Vandenbroucke *et al*. (2011) claimed that in order to attain such employment and productivity growth, a social investment perspective on social policy was required. To realise these goals, the European Commission launched the Social Investment Package in 2013. In it, the European Commission advocated a 'new approach', which involves "investing in social policies, services and cash benefits which both activate and enable" (2013, p. 10). Specifically, the Commission *urged* member states to "better reflect social investment in the allocation of resources [by] putting greater focus on policies such as (child)care, education, trainings, active labour market policies, housing support, rehabilitation and health services" (2013, p. 9). This strategy is in line with the broader academic discourse on the sustainability of the welfare state and future of social policy, which describes the need of reorienting social policy towards programmes aimed at activation and human capital development in order to prepare individuals for the new social risks of the service-based economy (Iversen and Wren 1998; Armingeon and Bonoli 2006; Bonoli 2013; Hemerijck 2013).

Even though social investment has been presented as a promising strategy to raise employment, reduce poverty and realise economic growth, it is likely to entail political challenges with regard to the actual reallocation of public resources. Because of that, most studies have focused on the extent to which social investment policies have actually been adopted across different welfare states (Hudson and Kühner 2009; Hemerijck 2013; Kvist 2013; Kuitto 2016; Ronchi 2018). Systematic comparative analyses of the outcomes of social investment policies that, unlike country-case studies and policy-specific studies, enable one to control for confounding factors are limited. They have either focused on redistributive effects (Van Vliet and Wang 2015; Noël 2018) or study the relationship with employment by making pooled comparisons *between* countries (Nelson and Stephens 2012; Taylor-Gooby *et al*. 2015). Nevertheless, expenditures on social investment and employment rates display similar trajectories over the period 1990-2010 in most OECD countries (see Figure A1). Although developments in employment are largely driven by the state of the economy, employment trends are also affected by changes in social policy. For OECD countries we indeed find a positive cross-country correlation between expenditures on social investment and employment over time ($r = 0.50$; $p < 0.01$; see Figure A2).

In this paper we further probe the relationship between social investment and employment outcomes using pooled time-series cross-section regression analyses based on a within-country design. To date there are only two studies that systematically analyse whether the evolution of expenditures on social investment policies within countries over time affects employment. Nevertheless, these studies have focused on only a brief selection of social investment policies (Hemerijck *et al*. 2016) or considered overall spending on services (Ahn and Kim 2015), making it hard or even impossible to consider the effectiveness of different individual policies provided through both cash benefits and services. Moreover, most empirical studies have not accounted for policy complementarities, whilst it has been stressed in the social investment literature that the outcomes of policies depend on their complementarity and the institutional context (e.g. Bouget *et al*. 2015; Hemerijck *et al*. 2016; Dräbing and Nelson 2017).

In addition, there has been increasing interest in more qualitative aspects of the employment outcomes realised. While the realisation of not just more, but also better jobs has been on the policy agenda for over twenty years (e.g. European Council 2000; OECD 2003; 2014a; 2018a; 2019), it has hardly figured as subject of study within the literature on social investment. To the best of our knowledge, Nelson and Stephens (2012) are the only scholars who examine whether social investment is capable of producing high-quality jobs. In this study, we also examine whether effort on social investment policies is associated with betters jobs.

In sum, this study aims to complement the aforementioned studies as well as country-case studies and policy-specific studies by empirically analysing the association between effort on social investment policies and employment outcomes in 26 OECD countries over the period 1990-2010. As such, it seeks to make three contributions. First, we estimate the employment effects of five social investment policies widely discussed in the social investment literature: active labour market policies (ALMPs), care for the elderly and frail, early childhood policies, education, and maternity and parental leave. We account for the role of other labour market policies and institutions that figure prominently in the literature on employment but were not or only partly incorporated in the aforementioned studies, such as unemployment benefits, employment protection legislation, trade union density, and income taxes (Bradley and Stephens 2007). Second, the study examines the role of policy complementarities and institutional complementarity in the assessment of the employment outcomes of social investment policies. Third, the study explores whether there are any signs of positive synergies between more and better jobs.

We find that there is significant heterogeneity between these policies with regard to the employment outcomes, which has important implications for the understanding of social

investment policy development. Further, we show that the effect of specific policies on employment is moderated by effort on other policies and that the complementarity of policies varies across welfare state regimes. Using several proxies for job quality we additionally find that there are signs of positive synergies between more and better jobs, which could in part be attributable to effort on some of the social investment policies.

2. Literature review and theory

2.1 Literature on the social investment state and social investment policies

Throughout the 1990s, social investment arose as a product of new ideas regarding the role of social policy and its relation to the economy. While it largely departed from deregulatory economic thinking dominant throughout the 1980s and 1990s, it to some extent also reflects its critique on the post-war welfare state for its focus on redistributive and passive social policies. The term social investment state was first coined by Antony Giddens (1998) who advocated a 'Third Way' that synthesises 'neoliberalism' and the post-war welfare state. This was to be realised through a shift from protecting people against labour market risks to integrating people into the labour market and creating a society of 'responsible risk takers'. Welfare expenditures ought to be concentrated on human capital investment and governments should emphasise life-long education to develop cognitive and emotional competence: "The guideline is investment in *human capital* wherever possible, rather than in the direct provision of economic maintenance. In place of the welfare state we should put the *social investment state*, operating in the context of a positive welfare society" (Giddens 1998, p. 117 – emphasis added).

Another early pioneer concerns James Midgley (1999; Midgley and Tang 2001), who argued that unlike traditional redistributive social welfare, social investment or development(al) welfare is capable of fostering economic growth by generating positive rates of return to the economy. This requires a focus on programmes that enhance human capital and facilitate and enable economic and social inclusion, such as investments in human capital, employment programmes and the removal of barriers to economic participation. In contrast to the neoliberal view, which generally considers social policy a rigidity that impedes employment and economic growth and therefore requires retrenchment, advocates of social investment see social policies as a productive factor.

This view is also reflected in more recent literature on social investment. The social investment state has, for example, been defined as "an institution that puts the emphasis less on income replacement and more on the promotion of labour market participation through activation and investment in human capital" (Bonoli and Natali 2012, p. 9). Instead of a safety

net, it provides a 'trampoline' (Jenson and Saint-Martin 2003) that involves policies aimed at preparing individuals, families and societies to respond to the new risks of the competitive knowledge economy, rather than policies aimed at repairing damages after the occurrence of personal or economic crises (Morel *et al*. 2012; Hemerijck *et al*. 2016). Accordingly, the social investment approach has been formulated in terms of the reallocation of expenditures on passive transfers to expenditures on activating and capacitating policies such as education, life-long learning, and ALMPs (Esping-Andersen *et al*. 2002; Armingeon and Bonoli 2006).[4] Consequently, most empirical studies have tended to exclusively concentrate on ALMPs and early childhood education and care (ECEC) (Bonoli 2013; Hemerijck *et al*. 2016), although some have also considered additional policies such as education (Nelson and Stephens 2012) and parental leave and life-long learning (Taylor-Gooby *et al*. 2015). Moreover, the focus of these studies has predominantly been confined to European and OECD countries.

More recently, scholars have also started to focus on social investment initiatives outside of Europe and the OECD in regions such as Latin America, the Caribbean, and (South-East) Asia (e.g. Jenson 2010; Garritzmann *et al*. 2017; forthcoming; Midgley *et al*. 2017). This expansion in the number of countries studied inevitably entailed a broadening of the scope of policies considered social investments. While a lot of social investment policies in Europe are provided through services, conditional cash transfers are for instance common social programmes to mitigate poverty and develop human capital in Latin America (e.g. Valencia Lomelí 2008). More broadly, social investment is therefore also understood as a future-oriented approach that aims to prepare, support, and equip individuals in a way that increases their chance to participate in the knowledge-based economy and reduces their future risks of income loss and poverty by creating, mobilising and preserving skills and human capital (Garritzmann *et al*. 2017 pp. 36-39; cf. De Deken 2014; Kvist 2016). Apart from policies concerned with the reconciliation of work and family, (early childhood) education and ALMPs, such a life-course approach to human capital enhancement is also open to policies concerned with, amongst others, health and disability.

In a comparable manner, Hemerijck (2017a) identifies three complementary functions of social investments over the life course: easing the 'flow' of labour market and life-course

[4] Note that Morel *et al.* (2012, p. 2 – emphasis added) provide a somewhat broader definition of social investment that covers policies "that both invest in *human capital development* (early childhood education and care, education and life-long training) and that help to *make efficient use of human capital* (through policies supporting women's and lone parents 'employment, trough active labour market policies, but also through specific forms of labour market regulation and social protection institutions that promote flexible security), while *fostering greater social inclusion* (notably by facilitating access to the labour market for groups that have traditionally been excluded)".

transitions, raising the quality of the 'stock' of human capital, and operating as stabilisation 'buffer' by offering a safety net. These functions can, in turn, be linked to a broad range of policies that go beyond ALMPs and education (De Deken 2017). More recent studies interested in the extent to which countries allocate resources to social investment have indeed focused on a broader set of policies concerned with different stages of the life course, also including policies such as maternity and parental leave and other family benefits (both cash and in-kind), home-help and care for the elderly, and services for the socially excluded and incapacitated (Kvist 2013; Kuitto 2016; Ronchi 2018). Guided by this literature we distinguish five groups of policies that are capable of mobilising the productive potential of citizens: ALMPs, care for the elderly and frail, early childhood policies, education, and maternity and parental leave. Moreover, these policies, to a large extent provided through services, can be expected to affect employment as well.

2.2 Theorising social investment policies and employment

In general, employment outcomes of social investment policies can be understood in a framework in which employment rates are determined by the demand for and the supply of labour. Demand and supply are driven by cyclical conditions and demographic factors respectively, whereas changes in demand and supply are mediated by labour market institutions and policies.

A first type of social investment policy concerns active labour market policies (ALMPs). ALMPs are, on the one hand, aimed at maintaining labour market participation by preventing people from becoming inactive and protecting human capital. On the other hand, ALMPs are aimed at stimulating employment and participation by bringing unemployed and inactive people back into work (Bonoli 2010). The former is mainly attained through training and activation, whereas the latter is predominantly achieved through subsidised employment and public employment services. From a review of activating policies in OECD countries, Martin and Grubb (2001) concluded that job search assistance is particularly effective, but only when combined with increased monitoring and enforcement through public employment services. Start-up incentives often show positive effects, but apply to a small proportion of the unemployed only, whereas subsidised employment tends to involve substitution effects. In a more recent review of OECD studies Martin (2014) stresses the role of benefit conditionality. These observations are supported by the results of extensive meta-analyses by Kluve (2010) and Card *et al*. (2010; 2017). Public employment services such as job search assistance generally show positive impacts on employability and employment, whereas direct public

employment programmes tend to be less effective. Training programmes focused on human capital accumulation often have the strongest impact, although these positive effects might only manifest themselves throughout the first few years after completing the programme. While the different programmes grouped under ALMPs differ in terms of effectiveness and efficiency, these reviews suggest that they are capable of raising employment. Furthermore, international comparative studies find that ALMPs are positively related to employment rates (Bradley and Stephens 2007; Nelson and Stephens 2012). Hence, we hypothesise that ALMPs are positively associated with employment.

Another social investment policy is care for the elderly and frail (e.g. Greve 2018). It has been found that the provision of informal care to (disabled) elders keeps some people from working entirely, whereas others reconcile work and care by reducing working hours or rearranging work schedules (e.g. Stone and Short 1990). Such negative effects might, however, be relatively small (Ciani 2012) or hold for women only (Ettner 1996; Viitanen 2010). Still, the public provision of care for the elderly and frail can be expected to stimulate labour market participation amongst those people – women in particular – that would otherwise provide such informal care as it enables them to find a work-life balance (Taylor-Gooby 2004). At the same time, since formal care is provided as a service, it can be expected to increase the demand for labour in related jobs in the service sector (Ahn and Kim 2015). Therefore, we conjecture a positive association between care for the elderly and frail on employment.

Furthermore, subsidies on childcare may affect employment rates. Due to the costs associated with childcare, effective wages are affected when childcare is organised through market arrangements. In the absence of publicly funded childcare this leads parents – usually mothers – to leave the labour market in order to care for children (see for an overview: Anderson and Levine 2000). Through expenditures on childcare and early childhood education facilities, governments can stimulate labour market participation. The effectiveness of these policies, however, depends on their institutional design. If public childcare subsidies mainly operate by lowering the price of public childcare below the market clearing price so that public childcare is substituted for private childcare, they can be expected to have little to no effect on the aggregate use of childcare and hence employment (Gustafsson and Stafford 1992). Moreover, in some countries the availability of and access to both private and public childcare tends to be more important than its affordability in explaining labour market effects (Kreyenfeld and Hank 2000; Chevalier and Viitanen 2002; Freeman and Schettkat 2005). As with care for the elderly and frail, another mechanism that could play a role is that expenditures on childcare can simultaneously fuel the demand for caregivers at crèches and kindergartens. Taken together,

we examine the hypothesis that expenditures on early childhood policies are positively associated with employment.

Another policy that has widely been discussed in the literature on social investment concerns education. Both initial education and education during working life can be expected to have a positive effect on the quality of a country's labour force over the medium to long term. At the same time, a skilled and flexible labour force fosters competitiveness and thereby constitutes the key to productive and economic growth in a rapidly changing world (Lundvall and Lorenz 2012). This takes place in an increasingly globalised economy in which knowledge becomes obsolete more rapidly than before and where the need for manual labour power has been replaced by the need for skills relevant to the service-based knowledge economy. In such an economy there is therefore a greater need to invest in education in order to stimulate employment. Such spending can, on the one hand, be expected to increase attainment and thereby facilitate a skilled labour force and, on the other hand, improve the quality of instruction (Nelson and Stephens 2012). In short, expenditures on education essentially concern investments in human capital that increase the chances of finding a job and increase future productive capacity. We hence expect a positive association between education and employment.

Last, childbirth may change the preferences of parents with regard to employment and labour market participation. In the absence of maternity and parental leave arrangements especially women are likely to (temporarily) quit employment. Yet, in the presence of such leave arrangements, people are *ceteris paribus* more likely to utilise this leave period and return to their pre-childbirth job once leave ends (Klerman and Leibowitz 1997). Although parental leave may thereby only delay the return to work or induce mothers that would otherwise find a new job to return to their old job, most empirical studies show that policies foreseeing in paid leave are associated with increases in female employment rates (Ruhm 1998; Akgunduz and Plantenga 2013), albeit often resulting in part-time employment (Rønsen and Sundström 2002; Gutiérez-Domènech 2005). Hence, the hypothesis to be tested is that family policies are positively associated with employment. Nevertheless, more recent studies have shown that long periods of paid leave may reduce returns to work, as a result of which the positive employment effects diminish or even become negative (Jaumotte 2003; Lalive and Zweimüller 2009; Akgunduz and Plantenga 2013).

2.3 Social investment and institutional complementarity

An important insight from the social investment literature is that the outcomes of policies are shaped by their interdependence with other policies. In fact, when introducing the Social Investment Package, the European Commission (2013, p. 3) already acknowledged that the "investment dimension of a specific policy expenditure largely depends on its design features, [its] complementarity with other policies and circumstances in time". Although the complementarity of social investment policies has received increasing attention in recent years (Bouget *et al*. 2015; Hemerijck *et al*. 2016; Dräbing and Nelson 2017), systematic empirical analyses are still scarce at this point.

In the existing literature it has been acknowledged that outcomes of labour market institutions are contingent on cyclical factors (e.g. Abrassart 2015; Benda *et al*. 2018). In the field of labour economics, interactions between labour market institutions have also been studied thoroughly (e.g. Nickell *et al*. 2005; Bassanini and Duval 2009; Thévenon 2016). With respect to social investment specifically, most work centres around the theoretical complementarity of social investment policies over the life course (Hemerijck 2017a; Dräbing and Nelson 2017). Hemerijck *et al*. (2016) are the only ones who empirically test the complementarity of expenditures on two social investment policies, namely ALMPs and ECEC. They argue that their analysis "does suggest some important evidence of institutional complementarities […] where ALMP appears likely to be most effective in promoting employment particularly where polities also have introduced early-childhood assistance that ease the combination of work and family" (*ibid,* p. 48). We believe that such complementarities could apply to other policy combinations as well. For instance, care for the elderly and frail also facilitates the reconciliation of work and family life. In a similar vein, ALMPs could be expected to be more effective in countries that also foresee in care arrangements for (disabled) elders. Likewise, positive (negative) effects of parental and maternity leave might be reinforced (mitigated) when countries foresee in adequate levels of early childhood education and care, thereby easing the transition from temporary leave to work.

2.4 Other factors that affect employment

Apart from social investment policies, there are other factors that may affect employment rates, notably labour market institutions. First, employment protection legislation may be a relevant factor. Lay-off costs associated with employment protection legislation make adjustments of the workforce more costly and thereby mainly affect the dynamics rather than the level of employment. Furthermore, taxes on labour income can be expected to have a negative impact

on employment. Unemployment benefits constitute another relevant factor. Studies investigating the relation between the generosity of unemployment benefits and labour market outcomes suggest that benefit generosity mainly affects the duration of unemployment rather than employment levels in general. Nevertheless, high replacement rates can reduce the scar effects of unemployment by allowing for recovery, resulting in better, longer and more employment over the longer run. Last, industrial relations are of importance as well. Dependent on the bargaining power of trade unions as well as the centralisation of wage bargaining, different effects on employment levels could be expected (Bradley and Stephens 2007).

In addition to institutional factors, socioeconomic conditions also play a role. The size of the dependent population is likely to influence the demand for care and education. When care is provided through informal arrangements, labour market participation can be expected to fall. In contrast, when care is provided through market arrangements, employment rates can be expected to increase. We distinguish between the dependent population below 15 ('youth population') and dependent population above 64 ('aged population') (cf. Huber *et al*. 2008). Furthermore, employment may be influenced by globalisation, because imports and exports affect the demand for labour (Samuelson 1971; Thewissen and Van Vliet 2019). Finally, employment levels depend on the state of the economy and are sensitive to shocks in the demand for labour (Nickell *et al*. 2005).

2.5 Social investment and job quality

Apart from stimulating employment, we believe that social investment could also be expected to affect the kind of employment realised. In the labour economics literature, for example, it has for quite some time been acknowledged that labour market institutions not only affect the number of jobs, but also the quality of employment (e.g. Acemoglu 2001). Intensified policy attention for the quality of employment has also sparked academic interest for this topic in recent years (e.g. Burchell *et al*. 2014), particularly given recent labour market reforms, increases in non-standard employment and the rise of precarious work throughout recent decades (e.g. Kalleberg 2009; Avdagic and Crouch 2015; Hipp *et al*. 2015). Despite this prominent role on the policy agenda (e.g. European Council 2000; OECD 2003; 2014a; 2018a; Acemoglu 2019), the quality of employment has hardly figured as subject of study in the scholarly literature on social investment.[5] To the best of our knowledge, Nelson and Stephens

[5] Instead, several scholars have engaged with unintended consequences or negative side-effects associated with social investment's focus on employment and employability. They argue that this focus might have come at the expense of policies concerned with poverty reduction and the mitigation of inequality and, additionally, claim that

(2012) are the only scholars who examine whether social investment is capable of producing high-quality jobs.

This is somewhat surprising, given the potential of some of the social investment policies with regard to more qualitative aspects of employment. The provision of better training and assistance to the unemployed may, for example, result in better job matches. Likewise, policies concerned with care can be assumed to lead to better employment outcomes in terms of lower involuntary part-time employment rates and lower levels of job strain experienced due to inflexible working hours by enabling workers to reconcile work and family responsibilities. Childcare indeed constitutes one of the main factors studied in relation to part-time work (Hipp *et al*. 2015).

Furthermore, due to structural changes and recent developments with regard to information and communications technology, "service sectors have taken over as the primary engines of output and employment expansion" (Wren 2013, p. 1). Wren *et al*. (2013) find that public investments in education can facilitate employment in ICT-intensive services, which have been typified as high-quality job (Nelson and Stephens 2012). Higher efforts on education might therefore lead to higher employment levels in knowledge-intensive sectors where physical health risk factors are likely to be lower than in other sectors and where workers might at the same time experience higher levels of autonomy and learning opportunities than in, for example, industrial sectors.

3. Data, measures and method

Following the availability of data on all relevant dependent and independent variables, the country sample comprises 26 OECD countries: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom (UK) and the United States (USA). The time series start in 1990. Since data for some of the independent variables is not (yet) available for more recent years, it runs up to 2010. The panel is somewhat unbalanced, since the Central and

social investment might entail Matthew effects by being more beneficial to and accessible for the middle and upper classes rather than more disadvantaged groups (e.g. Cantillon 2011; Vandenbroucke and Vlemincx 2011; Van Kersbergen and Hemerijck 2012; Bonoli *et al*. 2017; see for empirical analyses of such claims: Van Vliet and Wang 2015; Noël 2018).

Eastern European countries are observed for shorter time spans and data on some of the independent variables is available for shorter time spans in some countries.[6]

3.1 Dependent variables

The dependent variable in the first part of this study is the employment rate, or employment to population ratio, expressed as the share of employed people as a percentage of the population (cf. Bradley and Stephens 2007):

$$\text{employment rate}_{i,j} = \frac{\text{total employed}_{i,j}}{\text{population}_{i,j}} \times 100 \quad (1)$$

whereby i refers to a specific age group in country j. Acknowledging the possibly disturbing effects of extended periods of schooling and early retirement on employment, this study focuses on the population of prime working age (25-54) (e.g. Kenworthy 2017; Kvist 2017). Besides, we believe that social investment is most likely to affect people within this age group and their employment decision rather than those still in education or just entering the labour market following education (15-24) or approaching retirement (55-64). We, however, also estimate regression models for the entire population of working age (15-64).

In the second party of our study we focus on qualitative aspects of the employment outcomes realised that have figured in literature on non-standard employment and the social investment literature. Specifically, we use the following proxies of job quality: the share of employees working full-time as a percentage of all employees, the share of employees working part-time involuntarily as a percentage of all employees working part-time, the share of employees with a permanent contract as a percentage of all employees with either a permanent or temporary contract (e.g. Kalleberg 2000; Hipp *et al*. 2015), and the share of employees working in knowledge-intensive sectors as a percentage of all employees (Nelson and Stephens 2012). Again we focus on the population of prime working age, although data on employment by sector does not distinguish between ages and is therefore only available for all people in employment.

[6] Data on all the variables is available since 1990 for the following countries: DNK, FIN, FRA, IRL, NLD, NOR, ESP, SWE, GBR, and USA. For other countries data for all the variables is available since later years: 1991 for JPN; 1992 for BEL and PRT; 1995 for CAN; 1996 for DEU; 1998 for AUS, AUT, CZE and POL; 1999 for NZL and CHE; 2000 for HUN and the SVK; 2005 for ITA; and 2006 for EST and SVN. Note that the panel is characterised by gaps in 1992, 1993, 1995 and 1996 in most of the countries due to a lack of data on expenditures on education by education level, as a result of which effort on education cannot be calculated.

3.2 Independent variables

Our independent variables of interest concern effort on the five social investment policies. The operationalisation of the variables strongly follows Vandenbroucke and Vleminckx (2011).[7] We measure social investment effort using a disaggregated spending approach, whereby expenditures on a specific programme are corrected for the number of beneficiaries as expenditures are partly driven by need. Next, these measures are related to GDP per capita, in order to allow for comparison across countries and over time.[8] To obtain expenditures on a programme we use the sum of public and mandatory private expenditures available from the OECD's Social Expenditure (SOCX), Labour Market Programmes, and Education and Training databases. Since there is no data available on the number of beneficiaries of the different policies for the years considered here, we rely on proxies.[9] The precise expenditure categories and beneficiary groups used are listed in Table 1.

Table 1 Operationalisation of effort on different social investment policies

Active labour market policies	**Care for elderly and frail**	**Early childhood policies**	**Education**	**Maternity and parental leave**
PES and administration; Training; Employment incentives; Start-up incentives	Residential care / home-help services; Other benefits in kind; Residential care / home-help services; Other benefits in kind	Early childhood education and care; Home help / accommodation; Other benefits in kind	Total expenditures on educational institutions (primary-tertiary)	Maternity and parental leave
LMP: 6-10 6-20 6-40 6-70	SOCX: 1-2-1 1-2-2 3-2-1 3-2-3	SOCX: 5-2-1 5-2-2 5-2-3		SOCX: 5-1-2
Unemployed	Population aged ≥65	Children aged 0-5	Students enrolled	Children aged 0
GDP per capita				

In operationalising effort on ALMPs we focus on programmes that clearly reflect social investment aspects such as activation and human capital development. Following Bonoli (2012) we only consider programmes associated with his categories 'upskilling' and 'employment assistance' (Bonoli 2010). We correct these for the number of unemployed. Better data on the

[7] Note that Ronchi (2016) also adopted a highly similar approach in his Social Investment Welfare Expenditure data set using data from Eurostat (ESSPROS).

[8] See Scarpetta (1996) and Van Vliet and Koster (2011).

[9] In its Social Benefit Recipients Database (SOCR), the OECD provides recipient stocks by social protection branch (old-age, disability, unemployment and poverty) and at progamme level. In some countries, stocks on relevant programmes are, however, missing. Moreover, the data is available since 2007 only and does not cover all the policies and programmes studied here.

number of beneficiaries has been available for a short while (cf. Clasen *et al*. 2016). The OECD Labour Market Programmes database provides data on participant stocks in all active labour market programmes, except for public employment services as this is not characterised by individual participation but serves participants in all programmes. For most European countries, these data are available since 1998 only. For non-European countries, data is either not available or for more recent years only. In addition, there are quite a lot of missing values for some of the programmes.

Under care for the elderly and frail we group all in-kind old age and incapacity-related benefits, except for expenditures on rehabilitation services. Since we do not have data on the number of incapacitated individuals due to disability, occupational injury and disease or sickness, we correct these expenditures for the number of people aged 65 and above, only. Note that this probably overestimates effort by countries on this social investment policy, because the beneficiary group we define here only partly covers the entire beneficiary group. The denominator of effort on care for the elderly and frail (the beneficiary group, which covers all people of old age but does *not* include people receiving incapacity-related benefits) is smaller than it should be given the programmes included in the numerator (expenditures on old age *and* incapacity-related services). Nevertheless, there seems to be no reason to believe that this involves any bias, because we assume that there are no structural differences in the number of incapacitated individuals across countries and over time.

We rely on a rather inclusive definition of early childhood policies, that not only includes ECEC, but also other in-kind services targeted at parents of young children such as home-help. Note that it excludes passive transfers such as child allowances. Since expenditures on ECEC in the SOCX database have already been adjusted for cross-national differences in the compulsory age of entry into primary school so that they refer to children aged 0-5 only (Adema *et al*. 2011, p. 92)[10], overall effort on early childhood policies has also been corrected to refer to children aged 0-5 specifically.

Expenditures on education cover expenditures on primary, secondary and tertiary education. As far as we know, no adequate time-series cross-country data for expenditures on education during working life is available. Data on enrolment by education level from the same OECD Education and Training Database are used to obtain effort per student. Maternity and

[10] For several countries expenditures on ECEC before 1998 exclude expenditures on pre-primary education. These expenditures were therefore included. In order to grant comparability over time, these expenditures were also adjusted so that they refer to children aged 0-5 by excluding expenditures on pre-primary education for 6-years olds in some (Nordic) countries and including expenditures on primary education for 4-year olds in some (Anglo-Saxon) countries.

parental leave comprises expenditures on these leave arrangements. Since entitlement is connected to childbirth, we correct these expenditures for the number of new-born children: the number of children aged 0. Indirectly this also captures institutional aspect such as the number of (paid) weeks of maternity and parental leave (e.g. Gauthier 2011), as countries with more generous leave arrangements also score higher on our indicator of effort on maternity and parental leave.[11]

It should be noted that social expenditure indicators have some limitations. First, expenditure-based measures may not capture institutional characteristics of welfare programmes (Siegel 2007; De Deken 2014). Moreover, some countries are characterised by internal heterogeneity in terms of social programmes, for example due to territorial differences. According to Ciccia and Javornik (2019, p. 2) focusing on the national level "is particularly problematic for the study of social investment-type policies such as childcare, education and labour market policies for which decentralised implementation, financing and delivery are the norm". This caveat notwithstanding, there is relatively little variation in the characteristics determining eligibility for and access to social investment policies like eldercare, childcare, and education. Benefits received through these policies do usually not depend on past earning and payments. Besides, education programmes are likely to experience small cross-country variation in terms of entitlement due to universal access to primary and lower secondary schools. For such welfare programmes, social expenditures do constitute an adequate measure (Jensen 2011). Nevertheless Adema *et al*. (2011, p. 92) acknowledge that recording public support for childcare is often difficult in countries (other than the Nordic ones) where local governments play a role in financing childcare services. Furthermore, variation in expenditures across or within countries may not only reflect policy preferences, but may also be the result of different demographic compositions and economic trends (Van Vliet 2010; Jensen 2011). Note that our operationalisations of effort on social investment policies address these demographic and economic aspects. Despite these limitations, an important advantage of using disaggregated expenditure measures constitutes the fact that it provides a bird-eye overview, which enables one to identify the diverse spending priorities both across and within countries (Castles 2009).

For the strictness of employment protection legislation (EPL) we use the OECD indicators (version 1) and similar indicators compiled by Avdagic (2012) for some of the

[11] Effort on maternity parental leave and the generosity of maternity and parental leave (operationalised as the sum of the number of weeks of maternity and parental leave, both weighted by level of cash benefits received during this period of leave as a percentage of the female average production worker wage available from Gauthier 2011) are quite strongly correlated: $r = 0.69$, $p < 0.01$. Note that these data are, however, not available for the six Central and Eastern European countries.

Central and Eastern European countries not covered by the OECD. Overall EPL is calculated as the unweighted average of EPL for regular and temporary contracts. Data on the tax wedge and the net replacement rate of unemployment benefits for the average production worker is retrieved from Van Vliet and Caminada (2012). Information about industrial relations comes from Visser (2016). For the computation of the relative shares of the dependent population we rely on UN population figures. Globalisation is measured through capital and trade openness: the sum of inward and outward FDI flows and imports and exports respectively as a share of GDP using OECD data. We include real GDP per capita as an additional control for the state of the economy. Last, we control for shocks in the demand for labour following Nickell *et al*. (2005, p. 10; cf. Been and Van Vliet 2017), who operationalise this as the residuals obtained when regressing employment on its own lags and lags of real GDP and real labour costs per employee. The operationalisation of all variables, the sources used, and descriptive statistics are presented in Table A1.

3.3 Method

To examine the relationship between effort on social investment policies and employment outcomes pooled time-series cross-section regression analyses are conducted. We estimate the following equation:

$$y_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t-1} + \sum_k \gamma_k w_{k,i,t-1} + \sum_m \delta_m z_{m,i,t-1} + \upsilon_i + \lambda_t + \varepsilon_{i,t} \quad (2)$$

where $x_{j,it-1}$ are j main independent variables, the social investment policies, $w_{k,it-1}$ represent k institutional control variables, $z_{m,it-1}$ are m socioeconomic control variables, and $\varepsilon_{i,t}$ is the error term. Based on the results of several diagnostic tests, outlined in Appendix 1, we include both country and year fixed effects, modelled through υ_i and λ_t respectively. When examining complementarity the equation is augmented with a multiplicative interaction term. In order to address spatial correlation of the errors, panel heteroscedasticity and autocorrelation we use panel-corrected standard errors (PCSE) and Prais-Winsten transformation (Beck and Katz 1995).

We use one year lags for our independent variables. While some social investment policies can be expected to have rather direct, short-term impacts, others only reveal their impact over the medium or long term. Yet, this might be more applicable to distributive and inequality effects than employment effects (Verbist 2017). Policies for which longer timer

horizons are particularly relevant concern education (early childhood as well as primary to tertiary) and, to a somewhat lesser extent, some active labour market programmes. In the short term, education might even have a negative impact on the supply of labour as people participate in education instead of the labour market (Verbist 2017). Despite the fact that the life-course perspective figures centrally in the social investment literature, it should be noted that measuring long-term returns is analytically difficult and possibly even impossible or undesirable (Hemerijck *et al*. 2016). Our analysis technique, using one year lags for the independent variables, limits us to the estimation of short-term effects. While we acknowledge that using a longer time horizon is desirable for some of the social investment policies we would, however, not know of a more appropriate method capable of doing that with the data at hand.

4. Results

4.1 Descriptive results

Figure A1 shows that there is variation in employment rates across countries and over time. Employment is particularly high (nearly 85%) in the Nordic countries as well as in Switzerland and the Czech Republic. In Southern European countries like Italy and Spain as well as in Ireland employment levels have been considerably lower (around 60-70%). Over time employment rates have risen in practically all countries, albeit to different degrees. In several countries this is predominantly the result of increases in female labour market participation. The Netherlands and Ireland stand out because of the large increases they experienced in both overall and female employment. Male employment rates show a more volatile development over time, characterised by both increases and decreases. Nevertheless, male employment exhibits substantially less variation as rates are on average 85-90% in all countries except for some of the Central and Eastern European. The Czech Republic and Estonia are the only countries that show decreases in overall employment, which is to a large extent due to the fact that their labour markets were affected by their postsocialist transition. Following the economic crisis, decreases can be observed in nearly all countries after 2008. Again, there is a lot of variation in the magnitude of these changes.

Figure A2 shows that there is variation in social investment expenditures across countries and over time as well, whereby the Nordic countries stand out as the most generous spenders when it comes to overall spending on social investment. However, patterns in other country groups tend to be less clear. Table 2 hence presents *effort* on the five social investment policies separately. As will be elaborated below, this shows that different types of welfare states

Table 2 Effort on social investment policies (per recipient as a share of GDP per capita), 1990-2010

	Active labour market policies per unemployed				Care for the elderly and frail per person aged ≥65				Early childhood policies per child aged 0-5				Primary, secondary and tertiary education per student enrolled				Maternity and parental leave per child aged 0			
	1990	2000	2010	Change 1990-2010	1990	2000	2010	Change 1990-2010	1990	2000	2010	Change 1990-2010	1990	2000	2010	Change 1990-2010	1990	2000	2010	Change 1990-2010
Australia	5.2	7.2	8.4	3.1	5.3	13.6	8.4	3.0	5.8	7.3	9.9	4.1	—	17.3	21.9	4.6	0.0	2.4	9.4	9.4
Austria	17.9	26.5	30.6	12.7	2.4	4.2	5.4	3.0	4.8	6.5	11.3	6.5	26.8	27.3	28.3	1.5	38.4	38.7	16.6	–21.8
Belgium	14.4	17.4	13.8	–0.6	0.2	2.3	3.5	3.4	7.8	10.6	15.0	7.3	24.2	21.7	25.4	1.2	13.1	16.6	18.9	5.8
Canada	11.1	8.9	6.4	–4.6	0.0	0.0	0.0	0.0	0.8	2.0	3.4	2.6	27.3	25.1	30.4	3.2	7.8	10.7	24.9	17.1
Czech Republic	5.9	3.2	5.5	–0.4	3.3	4.3	2.0	–1.4	—	8.3	8.1	–0.1	22.8	18.0	22.2	–0.6	30.4	67.9	81.7	51.4
Denmark	16.7	56.4	35.1	18.4	17.5	17.1	20.6	3.1	24.6	25.3	31.2	6.6	29.7	29.4	30.6	0.9	36.1	41.9	47.0	10.9
Estonia	—	1.5	2.6	1.1	—	2.7	2.2	–0.5	—	3.9	6.1	2.2	—	21.5	29.0	7.5	—	51.2	127.5	76.3
Finland	28.0	13.8	19.5	–8.5	8.3	8.1	11.0	2.8	17.6	17.7	23.2	5.6	30.9	22.3	25.1	–5.8	83.0	62.0	62.4	–20.6
France	14.9	15.6	20.7	5.8	3.9	2.2	2.8	–1.1	19.0	20.2	16.9	–2.1	24.3	25.3	27.6	3.3	23.4	29.7	23.9	0.6
Germany	31.0	23.2	22.3	–8.7	1.3	2.9	2.6	1.3	10.5	12.5	18.4	8.0	25.6	23.9	25.7	0.1	24.8	26.5	34.8	10.0
Hungary	11.5	9.4	5.3	–6.2	—	5.0	4.5	–0.5	—	18.9	20.3	1.4	28.9	21.7	19.8	–9.1	—	53.4	79.7	26.3
Ireland	16.9	23.2	9.8	–7.0	3.7	2.0	5.3	1.6	3.4	4.8	9.4	6.0	16.9	16.6	24.8	7.9	5.2	3.5	11.9	6.7
Italy	—	17.7	11.8	–5.9	0.7	0.8	1.0	0.2	9.4	10.1	11.7	2.3	25.2	24.6	25.5	0.4	9.6	13.1	20.3	10.7
Japan	29.0	10.4	8.0	–21.0	1.6	4.9	7.9	6.3	12.9	17.2	23.0	10.1	20.2	24.0	30.0	9.8	6.8	10.8	20.7	13.9
Netherlands	16.0	36.6	21.8	5.8	3.9	4.6	6.0	2.0	10.7	9.5	12.6	1.9	25.0	22.4	26.2	1.2	0.0	0.0	0.0	0.0
New Zealand	18.4	13.7	7.2	–11.2	0.9	0.0	0.3	–0.5	—	6.9	12.7	5.8	—	20.9	23.8	2.9	0.0	0.0	4.9	4.9
Norway	22.5	28.3	23.3	0.8	13.3	15.5	14.9	1.7	10.8	14.5	23.3	12.4	25.8	21.7	23.2	–2.6	26.3	59.7	47.7	21.3
Poland	4.0	2.1	10.2	6.2	2.1	0.3	1.6	–0.5	—	2.8	9.0	6.2	—	19.5	25.2	5.7	20.5	30.8	29.2	8.7
Portugal	17.0	26.6	11.1	–5.9	0.2	0.3	0.6	0.4	2.4	6.2	8.2	5.7	19.8	23.7	25.5	5.7	6.6	10.7	30.9	24.3
Slovak Republic	7.2	1.8	3.8	–3.4	5.0	5.4	5.2	0.2	—	7.7	7.4	–0.4	—	17.6	20.8	3.2	45.6	63.7	54.9	9.3
Slovenia	—	3.8	10.1	6.3	—	1.8	1.8	0.1	—	11.1	8.8	–2.2	—	26.2	27.4	1.2	—	60.7	67.8	7.1
Spain	9.9	10.2	7.4	–2.5	1.3	1.6	4.9	3.6	6.3	11.7	13.2	6.9	20.8	22.1	26.7	5.9	6.1	13.4	32.2	26.0
Sweden	110.1	45.7	19.6	–90.5	8.1	20.7	22.1	14.0	28.8	21.3	28.3	–0.5	28.8	23.8	24.7	–4.1	73.3	64.2	60.0	–13.3
Switzerland	7.8	21.8	15.1	7.4	3.2	4.3	4.7	1.5	3.2	3.7	5.5	2.4	28.2	27.3	28.7	0.5	6.5	7.5	11.1	4.6
United Kingdom	10.8	7.4	8.8	–1.9	3.2	4.0	5.9	2.8	8.9	10.8	19.2	10.2	19.7	16.1	26.6	7.0	6.7	6.2	12.3	5.6
United States	5.9	5.2	1.9	–4.0	0.3	0.3	0.2	–0.1	5.2	7.8	8.2	3.0	21.3	28.0	29.0	7.7	0.0	0.0	0.0	0.0

Liberal	11.4	10.9	7.1	–4.3	2.2	3.3	3.4	1.1	4.8	6.6	10.5	5.6	21.3	20.7	26.1	4.8	3.3	3.8	10.6	7.3
Conservative	18.7	21.7	18.9	0.2	2.4	3.6	4.7	2.4	9.8	11.5	14.7	4.8	24.9	24.6	27.4	2.5	16.1	18.5	18.0	1.9
Nordic	44.3	36.0	24.4	–19.9	11.8	15.3	17.2	5.4	20.5	19.7	26.5	6.0	28.8	24.3	25.9	–2.9	54.7	57.0	54.3	–0.4
Mediterranean	13.4	18.2	10.1	–3.3	0.7	0.9	2.2	1.4	6.0	9.3	11.0	5.0	21.9	23.5	25.9	4.0	7.4	12.4	27.8	20.3
Central and Eastern European	7.1	3.6	6.2	–0.9	3.5	3.2	2.9	–0.6	—	8.8	10.0	1.2	25.8	20.7	24.1	–1.8	32.2	54.6	73.5	41.3
Overall mean	18.8	16.8	13.1	–5.7	3.9	5.0	5.6	1.7	10.2	10.7	14.0	3.9	24.6	22.6	25.9	1.3	20.4	28.7	35.8	15.4
Standard deviation	21.3	13.8	8.6	–12.7	4.3	5.6	5.8	1.5	7.6	6.2	7.3	–0.2	3.9	3.6	2.9	–1.0	22.6	24.4	30.2	7.6
Coefficient of variation	1.1	0.8	0.7	–0.5	1.1	1.1	1.0	–0.1	0.7	0.6	0.5	–0.2	0.2	0.2	0.1	–0.1	1.1	0.9	0.8	–0.3

Notes: For some countries data are around 1990 or 2000:
AUS and SVK 1990 refer to 1994; CZE 1990 refers to 1993; EST and SVN 2000 refer to 2003; HUN and POL 1990 refer to 1992; ITA 2000 refers to 2004; CHE 1990 refers to 1991;
CZE 1990 refers to 1995; EST and HUN 2000 refer to 1999; SVK 1990 refers to 1995; SVN 2000 refers to 1996;
AUS, BEL, CHE 1990 refer to 1991; CZE and POL 2000 refer to 1997; EST, HUN and SVK 2000 refer to 1999; DEU 1990 refers to 1993; NZL 2000 refers to 1998; SVN 2000 refers to 1996
EST and HUN 2000 refer to 1999; SVK 2000 refers to 1995; SVN 2000 refers to 1996
AUS, NZL and POL 2000 refer to 1997; CAN and CZE 1990 refer to 1994; EST and SVN 2000 refer to 2005; DEU 1990 refers to 1995; HUN, PRT and CHE 1990 refer to 1991; SVK 2000 refers to 1999.

Source: OECD Labour Market Programmes Database, OECD Social Expenditure Database, OECD Education and Training Database and own calculations.

prioritise different kinds of social investment policies. Across countries efforts on four of the five social investment policies have converged towards a higher level over time, which is indicated by decreases in the coefficients of variation while overall means have increased. Remarkably, social investment oriented ALMPs are the only policies for which effort in terms of expenditures per recipient has decreased. Nevertheless, the data exhibits great variation in terms of the level of effort and changes thereof. The Nordic countries are the most generous when it comes to effort on ALMPs, both historically and in more recent years. Some conservative welfare states such as Austria, France, Germany and the Netherlands attain similar levels of effort, whilst efforts in liberal and Central Eastern European are relatively low.

With regard to effort on policies related to care, the Nordic countries again stand out as most generous in terms of effort per recipient. When it comes to care for the old and young population, efforts by liberal, Mediterranean and Central Eastern European countries are quite similar. Efforts by conservative welfare states are somewhat more generous, but nowhere near those found in Nordic welfare states. Note, however, that there is a lot of variation within these groups of welfare states. With respect to maternity and parental leave, the data show that Central and Eastern European countries have overtaken the Nordic countries in terms of resources allocated to every recipient. In recent years, liberal and Mediterranean welfare states have also increased their efforts on this policy, but they still rank amongst countries with relatively low efforts, which also includes most of the conservative welfare states. Efforts on education exhibit the least variation across countries, as indicated by the relatively low standard deviations and coefficients of variation, which have even decreased over time. This convergence is to a large extent the result of catch-up amongst some of the countries that were traditionally characterised by lower efforts on education.

4.2 Regression results

The variation in both employment rates and efforts on social investment policies is further examined using regression analyses. The results are presented in Table 3, in which we build up our preferred model step by step. We start by including our control variables and country and year fixed effects only. As expected, the results indicate that taxes on labour are negatively associated with employment rates. This corresponds with the idea that taxes discourage employment. Real GDP per capita, shocks in labour demand and trade openness are all positively correlated with employment. We also obtain a positive estimate for the dependent population above 64, which seems a bit surprising. In contrast to what one might expect, our results indicate that ageing populations are associated with higher employment amongst the

Table 3 Regressions of employment and effort on social investment policies, 1990-2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Effort on social investment policies									
Active labour market policies$_{t-1}$		0.11***					0.13***	0.13***	0.14***
		(0.01)					(0.01)	(0.02)	(0.02)
Care for the elderly and frail$_{t-1}$			–0.20***				0.17**	0.18***	0.11*
			(0.04)				(0.07)	(0.05)	(0.07)
Early childhood policies$_{t-1}$				0.01			–0.04	–0.08**	–0.07
				(0.04)			(0.04)	(0.03)	(0.05)
Education$_{t-1}$					–0.08*		–0.05	–0.11	–0.14**
					(0.04)		(0.05)	(0.08)	(0.06)
Maternity and parental leave$_{t-1}$						–0.02*	–0.03**	0.01	–0.04***
						(0.01)	(0.01)	(0.01)	(0.01)
Labour market institutions									
Employment protection legislation$_{t-1}$	0.46	–0.18	0.25	0.47	0.51	0.44	–0.05	–0.40*	–0.15
	(0.34)	(0.36)	(0.35)	(0.31)	(0.32)	(0.34)	(0.44)	(0.24)	(0.46)
Tax wedge$_{t-1}$	–0.12***	–0.11***	–0.13***	–0.10***	–0.10**	–0.13***	–0.12***	0.01	–0.13***
	(0.03)	(0.03)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
Unemployment benefits$_{t-1}$	–0.01	–0.02	–0.02	0.01	0.02	–0.01	–0.00	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Trade union density$_{t-1}$	0.04	0.04	0.04	0.05	0.08**	0.04	0.07**	0.03*	0.09*
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.05)
Coordination of wage bargaining$_{t-1}$	0.16	0.14	0.16	0.16	0.18	0.16	0.20	–0.51**	0.32*
	(0.11)	(0.11)	(0.11)	(0.12)	(0.14)	(0.11)	(0.14)	(0.24)	(0.17)
Socioeconomic factors									
Dependent population <15$_{t-1}$	–0.13	–0.19	–0.09	–0.55***	–0.58***	–0.15	–0.71***	–0.34***	–0.78***
	(0.16)	(0.16)	(0.17)	(0.16)	(0.19)	(0.16)	(0.14)	(0.12)	(0.16)
Dependent population ≥65$_{t-1}$	0.87***	0.75***	0.84***	0.68***	0.61**	0.87***	0.54***	0.10	0.12
	(0.20)	(0.18)	(0.20)	(0.22)	(0.26)	(0.20)	(0.20)	(0.15)	(0.14)
Capital openness$_{t-1}$	0.01	0.00	0.00	0.00	0.00	0.01	–0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade openess$_{t-1}$	0.02***	0.02***	0.02***	0.02**	0.02***	0.02**	0.02**	0.01	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Real GDP per capita$_{t-1}$	0.39***	0.34***	0.36***	0.36***	0.33***	0.38***	0.28***	0.22***	0.14***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.08)	(0.06)	(0.07)	(0.06)	(0.05)
Shocks in labour demand	38.61***	39.53***	37.82***	34.13***	35.74***	36.84***	34.87***	40.54**	50.19***
	(6.49)	(6.75)	(6.60)	(7.68)	(10.10)	(6.58)	(10.36)	(18.31)	(14.31)
Constant	62.63***	65.79***	64.91***	73.61***	74.86***	63.29***	78.53***	76.77***	87.59***
	(5.73)	(5.81)	(5.83)	(5.76)	(7.23)	(5.61)	(6.06)	(4.13)	(5.58)
Number of observations	483	463	479	410	357	479	339	339	339
Adjusted R-squared	0.981	0.984	0.981	0.987	0.990	0.981	0.991	0.982	0.990
Rho	0.685	0.684	0.679	0.668	0.683	0.685	0.622	0.855	0.634
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Notes: Model 7 concerns what we refer to as our 'preferred model'; panel-corrected standard errors in parentheses;
* $p < 0.1$, * $p < 0.05$, *** $p < 0.01$

population of prime working age. This suggests that prime age workers do not quit work in order to care for the elderly and frail. A potential explanation for this result could be that countries that experience ageing populations implement policies aimed at raising the carrying capacity of the welfare state (such as social investment policies, not modelled here yet) or that ageing populations positively affect demand for labour in certain service sectors (such as care), thereby resulting in higher employment.

In models 2-6 we augment the previous model with effort on one single social investment policy at a time. This leaves most of the control variables unaffected. Only when including effort on education, the positive estimate for union density becomes statistically significant (model 5), whilst the negative estimate for the dependent population below 15 becomes statistically significant when including effort on policies concerned with education (models 4 and 5). Model 7 concerns our preferred model in which we include all five social investment policies at the same time. This shows that the estimates obtained for efforts on care for the elderly and frail and education are contingent on the inclusion of other social investment policies. When including the other social investment policies, the negative coefficient for effort on education is no longer statistically significant. Likewise, the negative estimate obtained for effort on care for the elderly and frail in model 2 becomes positive when controlling for the other social investment policies.[12] A supplementary analysis (Table A2) in which we exclude one social investment policy at a time shows that we only find a negative estimate for effort on care for the elderly and frail when effort on social investment oriented ALMPs are excluded ($r = 0.51$, $p < 0.01$). The negative estimate for effort on education is only found when excluding effort on maternity and parental leave ($r = 0.12$, $p < 0.05$).

As hypothesised, our preferred model based on a within-country design indicates that effort on social investment oriented ALMPs is positively associated with employment. More specifically, a one percentage point increase in expenditures on ALMPs per unemployed as a share of GDP per capita is associated with a 0.13 percentage point increase in the employment rate. To illustrate, the more generous effort on ALMPs per unemployed in 2009 (approximately €6,880) compared to 2008 (approximately €6,330) in Germany, amounting to an increase of approximately €550 per unemployed (an increase of approximately 2.6 percentage points), is

[12] Additional analysis show that the different signs are not the result of using a different sample due to a loss of observations when including more variables in the model. When estimating model 3 with the same 339 observations as those used for our preferred model (7) we also obtain a negative estimate.

predicted to increase employment by (2.577 × 0.135 =) 0.348 percentage points, which is the equivalent of an additional 121,000 people aged 25-54 being employed.[13]

The positive association found for effort on care for the elderly and frail is in line with studies describing the manner in which the in-kind public provision of care and benefits that increase access to the private provision of care for frail and older people create formal care markets that facilitate labour market participation of people that would otherwise provide informal care (Taylor-Gooby 2004; Simonazzi 2009). Effort on care for elderly and frail relatives indeed seems to enable people that would otherwise provide such (informal) care to find a better work-life balance and thereby participate on the labour market. For effort on early childhood policies we find no significant correlation. This result suggests that at the macro level early childhood policies do not succeed in stimulating employment rates. However, the result could potentially also be explained by rather recent findings in the literature, which show that (female) labour supply elasticities have decreased due to increasing participation (e.g. Blau and Kahn 2007; Heim 2007; Bargain *et al*. 2014). According to Fitzpatrick (2010) not finding a statistically significant effect (unlike older studies that did find positive effects) might be due to the fact that the population of working women has changed. For effort on education we find no significant coefficient. This is probably due to the short time horizon being studied here, which is inherent to our analysis technique. Furthermore, maternity and parental leave are found to be negatively associated with employment. Although this result is not in line with the main theoretical argument, it seems to align with the observation that more generous and particularly long leave policies decrease labour market attachment and hence induce labour market exits (Jaumotte 2003; Lalive and Zweimüller 2009).[14]

When using a simple pooled regression by leaving out the country and year fixed effects we obtain model 8. It shows that countries with high efforts on social investment oriented ALMPs and care for the elderly and frail tend to have higher employment rates amongst the population of prime working age. In contrast, high efforts on early childhood policies are associated with lower employment levels. This is somewhat surprising, because Nordic

[13] In 2009 the employment rate in Germany was (28,094,000 ÷ 34,771,000) × 100% = 80.80%. The predicted increase of 0.348% would result in an employment rate of 80.80 + 0.348 = 81.14%. Given the overall population of prime working age, this would involve (34,771,000 × 0.8114 =) 28,215,000 people being employed, which is an increase of (28,215,000 – 28,094,000 ≈) 121,100 people.

[14] At the same time, labour supply elasticities are likely to be relatively low in these countries given the high employment rates. Still, one would expect to find little or no effect in that case rather than a negative coefficient (cf. Fitzpatrick 2010). The negative association might also be a data issue, because respondents to the labour force who were on maternity or parental leave might have indicated that they did not work during the reference period, despite being formally employed, and thereby incorrectly be classified as not employed.

countries are well known for high employment levels – particularly amongst women – which are often attributed to the generosity of ECEC in these countries.[15]

Turning to labour market institutions, we find that countries with stricter EPL tend to have lower employment rates due to lower labour market flexibility. While stronger unions are generally associated with higher wage demands and, consequently, lower employment levels, our results suggest that higher union density stimulates employment. Although this challenges insights from right-to-manage models of wage bargaining, which resemble centralised bargaining, it corresponds with insights from efficient contracts models, which resemble more decentralised levels of bargaining (e.g. Oswald 1985). On average, bargaining takes place at rather decentralised levels.[16] The negative coefficient for the centralisation of wage bargaining further supports this explanation. In addition, the pooled regression model suggests that the size of the aged population and level of trade openness do not matter with regard to employment, whereas the fixed effects model suggested that *changes* in the values of these variables within countries do affect employment.

Model 9 concerns a within country analysis that does not control for year specific employment effects by leaving out time fixed effects (which, for example, capture economic conditions not captured by any of the other variables in the model). In comparison to our preferred model we obtain similar results for all the social investment policies except for effort on education. In contrast to our preferred model with both country and year fixed effects and the simple pooled regression model we now find a statistically significant, negative association. Besides, the estimates for the dependent population and trade openness are no longer statistically significant, whereas we do obtain a significant coefficient for the centralisation of wage bargaining.

4.3 Robustness checks and additional analyses

We have conducted a wide range of additional analyses to examine the robustness of our results. As indicated by the result in Appendix 2, our estimates for the five social investment policies are robust to slightly different operationalisations of effort on these policies. The signs are always in the same direction, except when replacing effort on education by educational attainment (cf. Nelson and Stephens 2012) and effort on maternity and parental leave by the

[15] However, the coefficient fails to reach statistical significance when either effort on ALMPs ($r = 0.50$; $p < 0.01$) or effort on care for the elderly and frail ($r = 0.74$; $p < 0.01$) is not included. In that case we do obtain a negative, statistically significant coefficient for effort on education ($r = 0.31$; $p < 0.01$).

[16] The average value of the centralisation of wage bargaining is 2.8. A value of 2 corresponds with mixed industry and firm-level bargaining, whereas a value of 3 indicates industry bargaining with no or irregular pattern setting.

institutional generosity of leave arrangements. When using on these alternative measures we obtain estimates that are in line with the theoretical expectations outlined instead. The positive, statistically significant estimate for effort on social investment oriented ALMPs is always replicated. In addition, only in a model with substantially lower numbers of observations we fail to find a statistically significant estimate for effort on care for the elderly and frail. Estimates for effort on early childhood policies are never statistically significant, whereas the negative estimates for effort on education are neither statistically significant in nearly all models. Finally, the statistically significant, negative estimate for effort on maternity and parental leave is also replicated in all models, except when using the institutional generosity of leave arrangements. In that case we obtain a positive estimate.

We also estimated our preferred model again including additional variables to test for omitted variable bias (Appendix 3). All our results are replicated. Only when including both educational attainment and effort on education the negative estimate for the latter becomes statistically significant, but we obtain a statistically significant positive estimate for the former. Additionally, the use of slightly more conservative standard errors robust to cross-sectional dependence (Driscoll-Kraay standard errors) and the use of a different estimation technique capable of capturing both short-term transitory effects and long-term structural effects (error-correction models) lead to substantively similar results (Appendix 4).

Finally, we repeated our analysis by focusing on the population of working age instead of prime working ages. Besides, we estimated separate models for men and women, because there is a vast literature that describes that labour supply elasticities of men and women are different (see for an overview and meta-analysis: Evers *et al.* 2008). When focusing on these slightly different groups we obtain rather similar results (Appendix 5).

4.4 Policy complementarities

Within the social investment literature different scholars have paid attention to what are generally called 'institutional complementarities'. Although it is possible to discern two types of institutional complementarities the term has been used to describe both. On the one hand individual policies can have complementary effects over the life course. Such temporal complementarities result from the fact that policies positively affect individual opportunities at a certain stage of the life course and thereby improve the effectiveness of other policies at a later stage. Early childhood policies concern a clear example. By stimulating cognitive development such programmes can magnify the positive effects of policies concerned with skill acquisition at later stages of the life course, such as education throughout middle childhood and

adolescence and training programmes during adulthood. On the other hand policies can complement each other by being targeted toward the same goal. Within the literature these institutional complementarities have also been referred to as 'life-course synergies' and 'policy synergies' (Hemerijck *et al*. 2016) or complementarity 'between' and 'within' the different functions (flow, stock and buffer) of social investment (Dräbing and Nelson 2017).

The characteristics of our data do not enable us to examine cumulative effects of individual policies over the life course. We are therefore interested in the second type of institutional complementarity here, which has also been examined by Hemerijck *et al*. (2016) and partly by Thévenon (2016). Although the complementarity of individual policies is partly a matter of institutional design, we only test whether simultaneous efforts on certain policy combinations have a complementary effect on employment outcomes. In order to avoid ambiguity we have therefore preferred to refer to 'policy complementarities' rather than 'institutional complementarities'. We analyse the complementarity of social policies by augmenting our regressions with interaction effects. As the inclusion of multiplicative interaction terms affects the interpretation of constitutive terms (Braumoeller 204; Brambor *et al*. 2006; Franzese and Kam 2007), we examine the interaction effects using marginal effect plots.[17] We have systematically considered all possible interactions and summarised the results obtained for the population of prime working age in Table 4.[18]

As shown by this table we obtain statistically significant interaction effects for just two policy combinations: those between effort on social investment oriented ALMPs, on the one hand, and effort on care for the elderly and frail and early childhood policies, on the other hand. For several of the other interactions effects there are signs of interaction as marginal effects clearly change across the range of the moderating variable. These changes in marginal effect are, however, not statistically significant, because the upper (lower) border of the confidence interval on the left side of the figure (lower range of the moderating variable) overlaps with the lower (upper) border of the confidence interval on the right side of the figure (upper range of the moderating variable). Moreover, marginal effects are often not statistically different from zero in these cases.

Note that other scholars obtained rather similar results when using this approach. Hemerijck *et al*. (2016) examined the institutional complementarity of ALMPs and ECEC with

[17] Following conventions, the range of the moderating variable excludes the lower and upper five per cent of observations.

[18] We conducted this analysis using employment rates of the male and female population of prime working age as dependent variable as well. The results are highly similar and summarised in Table A8.

Table 4 Interaction effects for effort on social investment policies

Statistically significant interaction effects	Interaction effects that are not statistically significant because the marginal effect …	
	… does not change significantly	… is never distinguishable from zero
ALMPs × care for the elderly and frail	ALMPs × education	Early childhood policies × maternity and parental leave
ALMPs × early childhood policies	ALMPs × maternity and parental leave	Education × maternity and parental leave
	Care for the elderly and frail × early childhood policies[1]	
	Care for the elderly and frail × education[2]	
	Care for the elderly and frail × maternity and parental leave[3]	
	Early childhood policies × education[4]	

Notes: All marginal effects plots are computed using 95% confidence intervals;
An interaction effect is considered statistically significant if the marginal effect is distinguishable from zero for at least some values of the moderating policy *and* if the change in marginal effect over the range of the moderating variable is statistically significant;
For several interactions we find that the marginal effect is distinguishable from zero for all or some values of the moderating policy, but they are not statistically significant because the upper (lower) confidence interval of the marginal effect at lower range of the moderating variable overlap with the lower (upper) confidence interval at higher range of moderating variable

[1] The marginal effect is indistinguishable from zero when effort on care for the elderly and frail is less than approximately 5% and more than approximately 25% of GDP per capita (min. = 1.32%; mean = 12.38%; max. = 32.40%);

[2] The marginal effect is indistinguishable from zero when effort on education is more than approximately 22% of GDP per capita (mean = 23.92%);

[3] The marginal effect is indistinguishable from zero when effort on maternity and parental leave is more than approximately 17% of GDP per capita (mean = 22.76);

[4] The marginal effect is indistinguishable from zero when effort on education is less than approximately 22% of GDP per capita (mean = 23.92%)

Figure 1 Interaction effect of effort on ALMPs and care for the elderly and frail

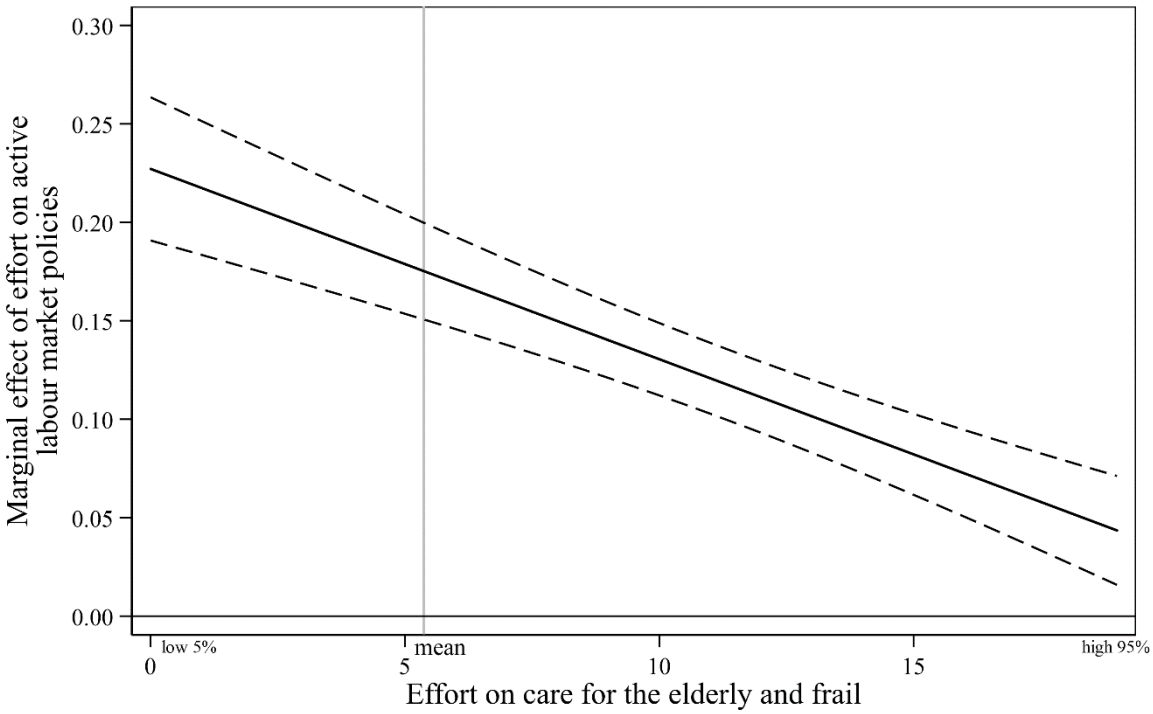
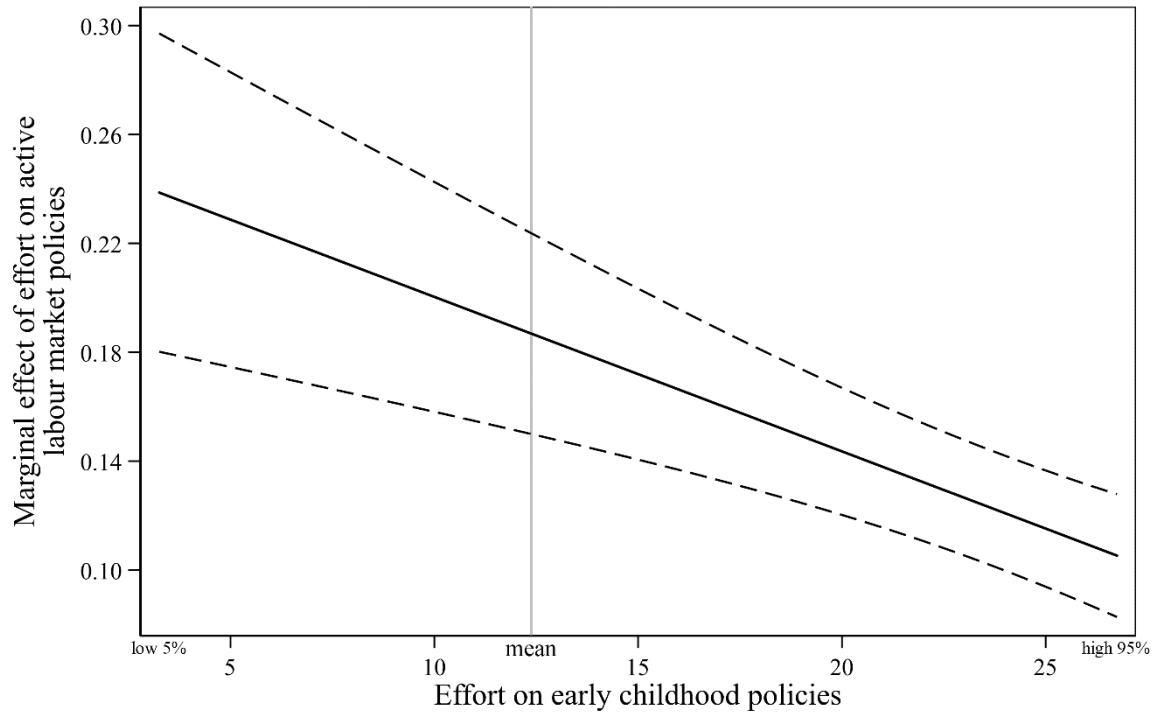


Figure 2 Interaction effect of effort on ALMPs and early childhood policies



regard to employment rates for a comparable time-series cross section of countries using an interaction between the two policies and find that they "tend to interact positively though not significantly with one another in their implications for national employment rates" (p. 76). Similarly, Thévenon (2017) examined the interplay between five policies (spending on leave and birth grants per childbirth, spending on family benefits, spending on childcare services, weeks of paid leave, and enrolment in formal childcare) with regard to female employment by augmenting his baseline model with all possible policy interactions. The results obtained from this approach likewise "provide little evidence that policies complement each other ... [although this] lack of statistical significance regarding many of the 'paired interaction terms' does not necessarily mean that institutions do not interact." (pp. 483-484).

We have presented the marginal effect plots of our significant interactions in Figure 1 and Figure 2. The second interaction, that between effort on social investment oriented ALMPs and childhood policies, was examined by Hemerijck *et al*. (2016) as well. They argue that ALMPs are more effective in stimulating employment when countries foresee in childcare, thereby enabling labour market entrants or newly hired employees to reconcile work and family. A similar argument can be assumed to apply to effort on care for the elderly and frail – the first interaction. Figures 1 and 2 seem to challenge this argument. The marginal effects of effort on ALMPs on employment are positive in both cases, but get smaller at higher levels of effort on care for the elderly and frail and effort on early childhood policies respectively. This suggests that in the presence of relatively high efforts on care for the elderly and frail and early childhood policies, part of the positive association between ALMPs and employment is captured by these policies, as the provision of care also stimulates employment. Instead of a complementary effect, which would involve upward sloping marginal effects, our results suggest diminishing marginal returns.

These results could potentially be understood in terms of 'limits of growth' as well. Particularly Nordic welfare states are known for their generous efforts on policies concerned with care, on the one hand, and high (female) employment rates, on the other hand. Studies have found that (female) labour supply elasticities have decreased over time due to increasing participation (Blau and Kahn 2007; Heim 2007). Moreover, countries with higher participation rates have smaller elasticities (Bargain *et al*. 2014). This might explain why the positive effects are smaller in countries characterised by high efforts. In order to further examine this issue we distinguish our policy interaction across welfare state regimes as well.

4.5 Policy complementarities and institutional complementarity across welfare state regimes

To further scrutinise the policy complementarities associated with social investment, we also examine the interaction effects across different welfare state regimes. The question whether social investment "delivers the wished-for socio-economic outcomes (…) [depends] on the institutional and economic context of [countries] that greatly differ from each other" (Ronchi 2018, p. 16). For instance, relatively distinct regimes have been distinguished with regard to the provision and financing of care services for children and the elderly (Anttonen and Sipilä 1996; Daly and Lewis 2000; Bettio and Plantenga 2004). Interestingly, such regimes are found to be associated with different employment models (e.g. Simonazzi 2009). So, by distinguishing between welfare regimes, it is possible to examine whether the complementarity of policy combinations is contingent on broader configurations of institutional characteristics.

The idea that the effect of individual institutions is contingent on the entire framework of institutions can be traced to Bassanini and Duval (2009), who estimate a non-linear specification in which each institution of their empirical model is interacted with the overall institutional framework, defined as the sum of direct effects of all institutions. Thévenon (2016) implemented this approach to examine whether the effect of individual policy instruments is contingent on the overall institutional framework. Subsequently, he examines whether the effects of policies differ across countries by interacting the policy variables with regime dummies. Instead of estimating the non-linear specification suggested by Bassanini and Duval (2009) we built on our multiplicative interactions of two policies. We adopt an approach quite similar to Thévenon (2016) by distinguishing our interaction effects across welfare state regimes, which is implemented by interacting our policy interactions with welfare state dummies that capture common characteristics of welfare states belonging to the same regime. Again, the results of these interactions are presented using marginal effect plots.

In Figure 3 and Figure 4 we distinguish the interactions presented in Figure 1 and Figure 2 distinguished by welfare regime. We display only these interactions for two reasons. First, this concerns the interactions for which we obtained statistically significant findings when focusing on the entire sample of countries. Second, these interactions are also only ones that provide statistically significant results by welfare state regime. For the other policy interactions marginal effects are generally not significantly different from zero in any of the welfare states regimes, marginal effects are significantly different from zero in only one or a few of the regimes for certain levels of effort on the moderating policies, or the marginal effects do not change significantly over the range of the moderating policies.

Figure 3 Interaction effect of effort on ALMPs and CEF by welfare state regime

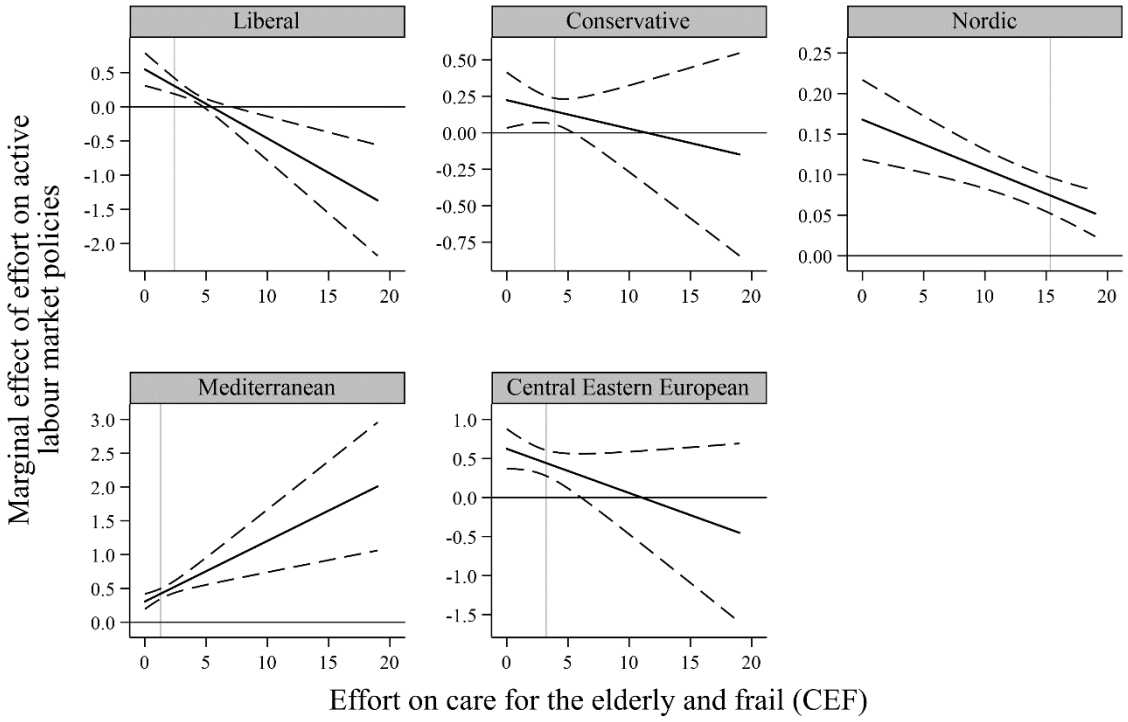
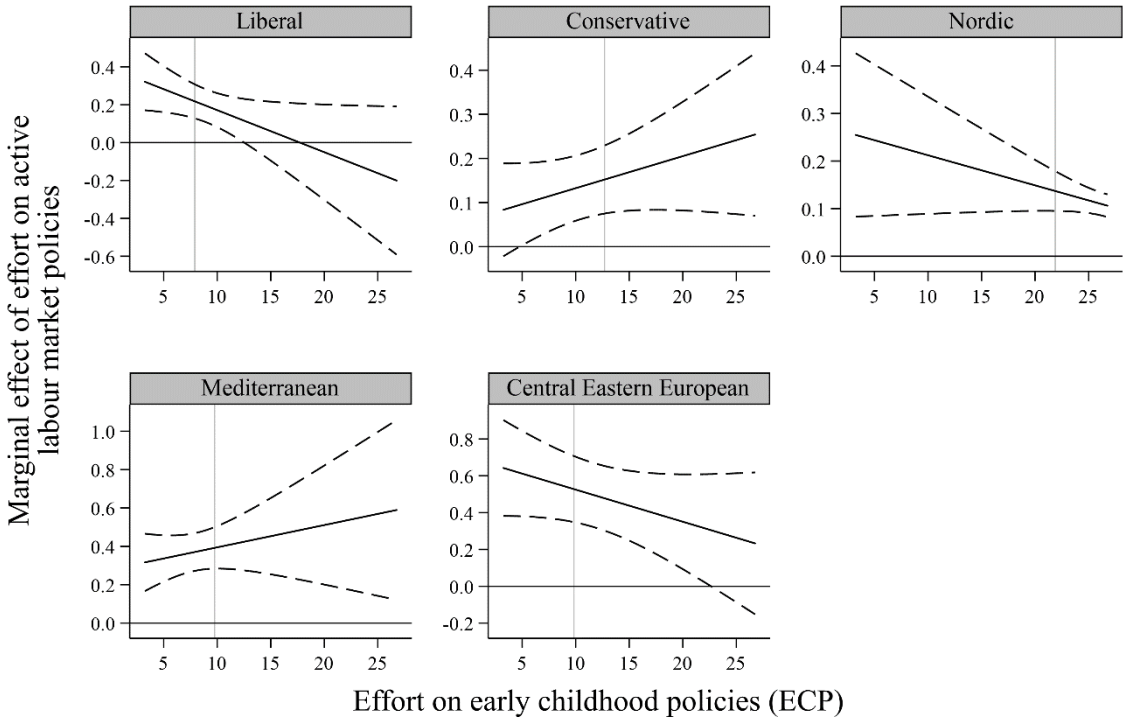


Figure 4 Interaction effect of effort on ALMPs and ECP by welfare state regime



Note that Figure 1 and Figure 2 suggest diminishing marginal returns of effort on ALMPs as effort on care for the elderly and frail and early childhood policies intensify. Figure 3 shows that this finding holds across all welfare states, except the Mediterranean ones. Likewise, Figure 4 shows that these diminishing marginal returns hold across all welfare states, except the conservative and Mediterranean where we do find the complementary interaction effect described by Hemerijck *et al*. (2016). Conservative welfare states have been characterised by limited availability of childcare (Flynn 2017), which could therefore explain the observed Mediterranean welfare states have been characterised by traditionally low levels of employment – particularly amongst women – that thereby offer stronger potential for social investment policies (Hemerijck 2017b), especially considering the fact that these countries are characterised by larger elasticities of labour supply (Bargain *et al*. 2014).

The figures presented here show that it is easier to disentangle interaction effects when focusing on specific groups of welfare states. More generally, the figures show that the complementarity of policies varies across regimes. The variety of the interaction plots *across* regimes (irrespective of the policy interaction being studied) stresses that the way in which policies interact is contingent on the underlying institutions associated with different welfare state regimes. Further, it is worth stressing that the interaction plots suggest positive but diminishing marginal returns for the Nordic welfare states. This does not come as a great surprise as the descriptive data and cited literature all show that these welfare states are the most generous when it comes to the provision of (service-oriented) social investment policies and at the same time experience the highest levels of (female) labour market participation. In such countries, the potential of higher efforts on these policies is therefore limited. Hence the lower likelihood of finding complementary effects. This, moreover, suggest that, given underlying institutional configurations, optimal levels of effort exist when it comes to the generosity of social investment policies.

4.6 Social investment and the kind of employment realised

In the second part of our time-series cross-section regression analysis we focus on outcomes that have been discussed in literature on non-standard employment (part-time employment and temporary employment; Kalleberg 2000; Hipp *et al*. 2015) or were studied before in the social investment literature (employment in knowledge-intensive sectors; Nelson and Stephens 2012). In addition, we also examine the relationship between social investment and indices of job quality. Given the lack of time-series of cross-sectional data, these analyses are not suited for inferential analyses and based on bivariate correlation plots instead.

4.6.1 Full-time employment

We first examine whether social investment is associated with the extent to which people work either full-time or part-time. Part-time work is often associated with low paid or low status jobs (Kalleberg 2000) and could therefore constitute a proxy of low quality jobs. The first column of Table 5 presents the results obtained when regressing the share of full-time employees as a percentage of the sum of both full-time and part-time employees on effort on social investment policies as well as the labour market institutions and socioeconomic factors considered before. Hence, we investigate the extent to which the aforementioned factors are capable of explaining variation in the prevalence of full-time employment[19].

For effort on care for the elderly and frail we obtain a negative coefficient. In combination with the previous results in Table 3, this suggests that effort on this policy is associated with higher employment levels, albeit higher incidences of part-time employment. In combination with the negative estimates for the aged population, this result could be interpreted as follows: increased effort on the public provision of care for the elderly and frail enables people who would otherwise take care of these people to enter the labour market, but given continued care responsibilities they reconcile work and family by working part-time. The results for effort on early childhood policies seem to suggest that increased effort on the public provision of care for young children allows employees to increase their labour market participation along the intensive margin by working full-time instead of part-time.

We do not find any statistically significant associations for effort on education. This does not come as a surprise, because education mainly concerns investments in human capital that enable one to participate, irrespective of the intensity of such participation (unlike other social investment policies that affect the work-life balance). With respect to maternity and parental leave we obtain positive associations with full-time employment shares. A potential explanation could be that such leave arrangements enable mothers to return to their pre-childbirth (full-time) job, instead of finding a new job that is more likely to entail a reduced working week given changed preferences now that they have a child.

For some of the control variables we obtain interesting results as well. Higher levels of EPL tend to involve relatively more full-time employment, whereas the positive coefficient estimates for the tax wedge suggest that income effects outweigh substitution effects associated

[19] When regressing the share of part-time employees on the same set of variables we obtain similar estimates, but the signs are opposite. These results have not been presented, because they are interchangeable: a positive (negative) sign in relation to full-time employment entails a negative (positive) sign with regard to part-time employment.

with the taxation of labour income. In contrast, favourable economic conditions are associated with a lower share of full-time employment.

4.6.2 Involuntary part-time employment

Next we explore whether social investment policies are capable of explaining variation in the prevalence of involuntary part-time employment. This is probably a better indicator of the quality of employment than simply the share of people working part-time, because people might work part-time voluntarily or even prefer part-time work over full-time work as it allows them to reconcile work and family. In this respect Kalleberg (2000), however, found that most of the increase in part-time work throughout the last decades is the result of increasing numbers of employees that would prefer to work full-time. Note that the number of observations for this model is substantially lower than for the previous model. This is to a large extent due to the fact that these regressions exclude Switzerland, because of a lack of data on involuntary part-time employment.

The negative estimate obtained for effort on social investment oriented ALMPs substantiates the proposition that these policies are capable of realising better employment outcomes. For all the other social investment policies we fail to obtain any statistically significant coefficients. In addition to the results obtained for EPL in relation to the share of employees working full-time, the results from this model suggest that employment protection not only leads to lower levels of part-time employment, but also lower levels of *involuntary* part-time employment. This might be the result of the better bargaining positions that protected workers ('insiders') acquire vis-à-vis their employers due to employment protection. Again, we obtain a negative estimate for real GDP per capita. This result is not very surprising, because people are classified as working part-time involuntarily if they usually work full-time but work part-time because of economic slack, usually work part-time but work fewer hours than usual because of economic slack or work part-time because full-time work could not be found (OECD 2014a).

4.6.3 Permanency of the job

Subsequently we examine whether efforts on social investment policies are associated with the quality of employment in terms of permanency of the job. The lower number of observations is due to the fact that there is no data on employment by contract type for the USA. As witnessed from the third column of Table 5 we hardly obtain any statistically significant correlations between effort on social investment policies and the share of employees with a permanent

Table 5 Regressions of the kind of employment realised and effort on social investment policies, 1990-2010

	Full-time employment	Involuntary part-time employment	Permanent employment	Employment in knowledge-intensive sectors
Effort on social investment policies				
Active labour market policies$_{t-1}$	0.00	–0.47***	–0.03	–0.02***
	(0.01)	(0.13)	(0.02)	(0.01)
Care for the elderly and frail$_{t-1}$	–0.20**	–0.05	0.10	0.06
	(0.08)	(0.58)	(0.10)	(0.04)
Early childhood policies$_{t-1}$	0.07*	–0.33	–0.03	0.03*
	(0.04)	(0.29)	(0.05)	(0.02)
Education$_{t-1}$	–0.03	0.30	–0.04	0.08***
	(0.04)	(0.28)	(0.05)	(0.02)
Maternity and parental leave$_{t-1}$	0.01*	0.02	0.01	0.01
	(0.01)	(0.06)	(0.01)	(0.01)
Labour market institutions				
Employment protection legislation$_{t-1}$	0.60***	–8.82*	–0.69	0.60***
	(0.23)	(4.58)	(0.53)	(0.21)
Tax wedge$_{t-1}$	0.11***	0.19	–0.01	–0.06***
	(0.04)	(0.38)	(0.06)	(0.02)
Unemployment benefits$_{t-1}$	–0.03	–0.27	0.00	0.01
	(0.02)	(0.27)	(0.03)	(0.01)
Trade union density$_{t-1}$	–0.02	–0.49	–0.05	–0.00
	(0.03)	(0.32)	(0.05)	(0.02)
Coordination of wage bargaining$_{t-1}$	0.02	–0.59	–0.13	–0.22***
	(0.17)	(1.26)	(0.15)	(0.08)
Socioeconomic factors				
Young dependent population <15$_{t-1}$	0.20	–0.38	0.36*	0.49***
	(0.16)	(1.07)	(0.19)	(0.07)
Old dependent population ≥65$_{t-1}$	–0.73***	–1.07	–0.32*	0.45***
	(0.14)	(1.26)	(0.16)	(0.08)
Capital openess$_{t-1}$	0.00	0.01	–0.00	–0.00
	(0.00)	(0.04)	(0.00)	(0.00)
Trade openness$_{t-1}$	–0.03***	–0.06	0.01	0.01*
	(0.01)	(0.07)	(0.01)	(0.00)
Real GDP per capita$_{t-1}$	–0.11**	–0.68**	0.13**	–0.04
	(0.05)	(0.27)	(0.05)	(0.03)
Shocks in labour demand	10.38	–45.54	0.53	–5.87
	(6.39)	(66.59)	(10.23)	(4.94)
Constant	89.23***	91.20**	93.82***	18.99***
	(5.30)	(41.51)	(5.47)	(2.74)
Number of observations	334	301	294	317
Adjusted R-squared	0.997	0.678	0.995	0.995
Rho	0.560	0.524	0.590	0.609

Notes: All regression include country and year fixed effects (not presented here); panel-corrected standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

contract. This might not be of great surprise given that most studies on temporary employment have exclusively focused on the role of employment protection (Hipp *et al*. 2015). For most of our control variables we neither find statistically significant correlations. Based on the statistically significant estimate of GDP per capita it seems that employers are more likely to hire workers on a permanent contract when economic conditions are positive.

4.6.4 Employment in knowledge-intensive sectors

The fourth column of Table 5 presents a model in which we examine the relationship between effort on social investment policies and the share of employees working in knowledge-intensive sectors, following Nelson and Stephens (2012).[20] The negative coefficient estimate for ALMPs suggests that despite the positive employment effects associated with effort on these policies, these programmes are less focused on the type of sector in which employment is realised. At the same time there might be some self-selection amongst participants of active labour market programmes as well. If people working in sectors that are not knowledge-intensive tend to experience higher incidences of unemployment, these sectors will also be characterised by relatively higher employment increases as a results of participation in these programmes. Interestingly, we obtain positive coefficient estimates for effort on early childhood policies and education. According to these results, policies aimed at human capital development are

[20] According to Eurostat and the OECD (2017d) the following ISIC Rev. 4 (Rev. 3.1) and NACE Rev. 2 (1.1) divisions are considered knowledge-intensive sectors (high-tech manufacturing and knowledge-intensive services): Manufacture of basic pharmaceutical products and pharmaceutical preparations (21), Manufacture of computer, electronic and optical products (26), Water transport (50), Air transport (51), Information and communication (58 to 63, category J), Financial and insurance activities (64 to 66, K), Professional, scientific and technical activities (69 to 75, M), Employment activities (78), Public administration and defence and compulsory social security (84 to 88, O), and Arts, entertainment and recreation (90 to 93, R).
We calculated the share of employees working in knowledge-intensive sectors as the share of employees working in these divisions as a percentage of all employees using data from the OECD Database for Structural Analysis (STAN) (OECD 2011; 2018b). Note that for some countries data on certain divisions is not available (21 and 78 for Estonia, 78 for Ireland and 90 to 93 for New Zealand), whereas for some countries data is based on an older (regional) classification (Canada and USA prior to 1998, Japan, and Switzerland prior to 2009).
Both exclusive ($r = 0.76$; $p < 0.01$) and inclusive ($r = 0.79$; $p < 0.01$) operationalisations of employment in knowledge-intensive *services* based on EU KLEMS data (the November 2009 release updated in March 2011 – see O'Mahony and Timmer 2009) are strongly correlated with our measure of employment in knowledge-intensive sectors. The exclusive definition (e.g. Hope and Martelli 2019) refers to people engaged with divisions 64 (Post and telecommunications), 65 to 67 (Finance and insurance) and 71 to 74 (Renting of machinery and equipment and other business activities), whereas the inclusive definition (Wren 2013) captures the share of people employed in services classified as dynamic and ICT intensive, which includes sectors I (Transport, storage and communications; 60 to 64), J (Financial intermediation; 65 to 67) and K (Real estates, renting and business activities; 70 to 74). Note that apart from employment in knowledge-intensive sectors, our measure additionally includes employment in high-tech manufacturing, which is also knowledge-intensive (e.g. Rohrbach 2009), as well as services that are less ICT intensive (non-dynamic services such as Community, social and personal services and 'welfare' services such as Public administration, Education, Health and Social work – Wren 2013). We decided not to base our indicator on EU KLEMS, because consistent time series are available up to 2007 only and it provides no data for Canada, New Zealand, Norway and Switzerland.

associated with higher employment in knowledge-intensive sectors. This suggests that such policies indeed affect the *quality* of employment (by improving the stock of human capital) instead of the *quantity* (for which we obtained practically no statistically significant results).

The positive estimates for the aged and young population might have to do with the fact that our measure of employment in knowledge-intensive sectors includes education (ISIC Rev. 4 division 85; Section P), human health activities (division 86), residential care activities (division 87) and social work activities without accommodation (division 88) (together Section Q). These estimates might therefore reflect a demographic effect: the larger the share of the dependent population, the higher the demand for services for these people and thus the higher the level of employment in sectors providing such services. Note that more open economies tend to be associated with higher rates of employment in knowledge-intensive sectors. Stronger employment protection and employment in knowledge-intensive sectors are also positively correlated. There is a high chance that regimes characterised by strong protection foster investments in human capital – and thereby positively affect employment in knowledge-intensive sectors – by firms as the relatively lower job separation and job finding rates in such regimes guarantee prolonged job tenure.

4.7.5 Indices of job quality

Finally, we also examine the relationship between effort on social investment policies and indices of job quality. Although several quantitative comparable measures of job quality exist by now, geographical coverage is limited and for most indicators cross-sections of data are available for limited points of time (see for an overview: Muñoz de Bustillo *et al*. 2011). As a result of this, the available observations are too few to conduct statistical analysis. The following analyses are therefore predominantly descriptive and based on bivariate correlations.

An indicator that covers several dimensions of job quality and that is available for a relatively large cross-section of countries is the European Job Quality Index (EJQI) (Leschke *et al*. 2008). The EJQI is a normalised index of wages and five non-wage dimensions: forms of employment and job security, working time and work-life balance, working conditions, skills and career development, and collective interest representation. Unfortunately, the geographical coverage of this indicator is confined to EU member states only. The indicator is available for three points of time: 2005 (Leschke and Watt 2008), 2010 (Leschke *et al*. 2012), and 2015 (Piasna 2017). The underlying (disaggregated) data are, however, not publicly available.[21] In

[21] Further, Leschke and Watt (2008) summarise the EJQI for 2005 using a figure. The exact values can hence not be retrieved for this year.

addition, the index has been further crystallised over time, whereby slightly different specifications have been used. Consequently, the different versions cannot directly be contrasted. These caveats notwithstanding, overall EJQI indices rounded to two decimals are available for 2010 and 2015 from Leschke *et al*. (2012) and Piasna (2017). Since previous analyses were focused on the period 1990-2010 we use the EJQI for 2010, which is available for 20 EU countries.

As stated previously, the EU and OECD have concentrated economic and labour market policy towards realising 'more and better jobs'. Figure 5 presents a bivariate scatterplot of employment rates for the population or prime working age and the EJQI, both for the year 2010. This figure suggests that there are indeed positive synergies between more and better jobs (r = 0.45; $p < 0.05$).[22] Subsequently we have plotted a bivariate correlation of job quality in the year 2010 and average expenditures on social investment over the period 1990-2010 in Figure 6. This shows a positive cross-country correlation between average expenditures on social investment policies throughout the period 1990-2010 and 2010 levels of job quality, which suggests that social investment policies are not only associated with more, but also better jobs ($r = 0.67$; $p < 0.01$).[23]

Recently, the OECD has also started to study job quality using quantitative indicators. As a part of this, the 2014 Employment Outlook (OECD 2014b) introduced the OECD Job Quality Framework. Additional details about this framework are provided by Cazes *et al*. (2015). The framework approaches job quality along three broad dimensions and a total of ten items: earnings quality (average earnings and earnings inequality), labour market security (with regard to both unemployment risk and insurance), and quality of the work environment measured by the incidence of job strain among employees (covering job demands: physical health risk factors, long working hours, and inflexibility of working hours; and job resources: work autonomy and learning opportunities, training and learning, and opportunities for career advancement). For European countries data on indicators that together constitute job strain is from the European Working Conditions Survey, which has been conducted every five years since 1990. For non-European countries, data is from the Work Orientations module of the International Social Survey Program for which waves were conducted in 1989, 1997, 2005 and 2015 (Cazes *et al*. 2015).

[22] Without Denmark, the Netherlands and Sweden the positive correlation remains, although it is less strong and no longer statistically significant ($r = 0.23$; $p > 0.1$). When additionally excluding Greece the correlation is still positive, but very weak and insignificant ($r = 0.08$; $p > 0.1$).

[23] When excluding the Nordic welfare states (Denmark, Finland and Sweden) and Greece the correlation remains, although it is less strong ($r = 0.44$; $p < 0.1$).

Figure 5 Job quality and employment, 2010

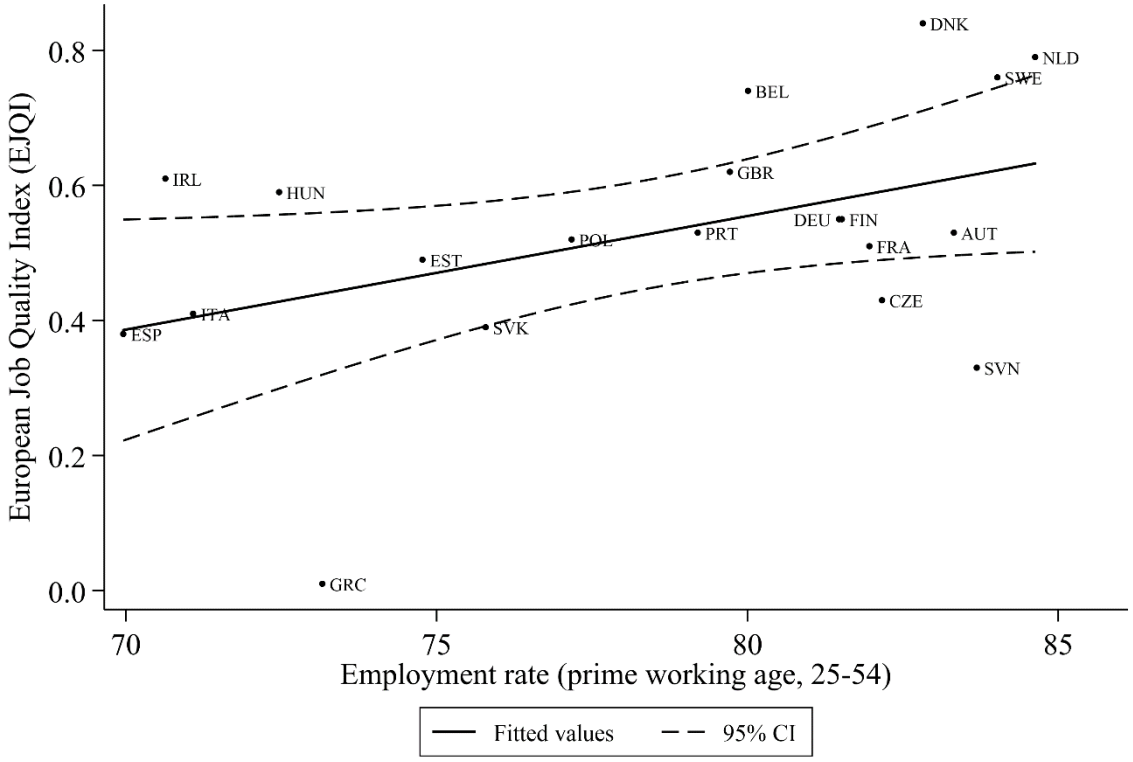
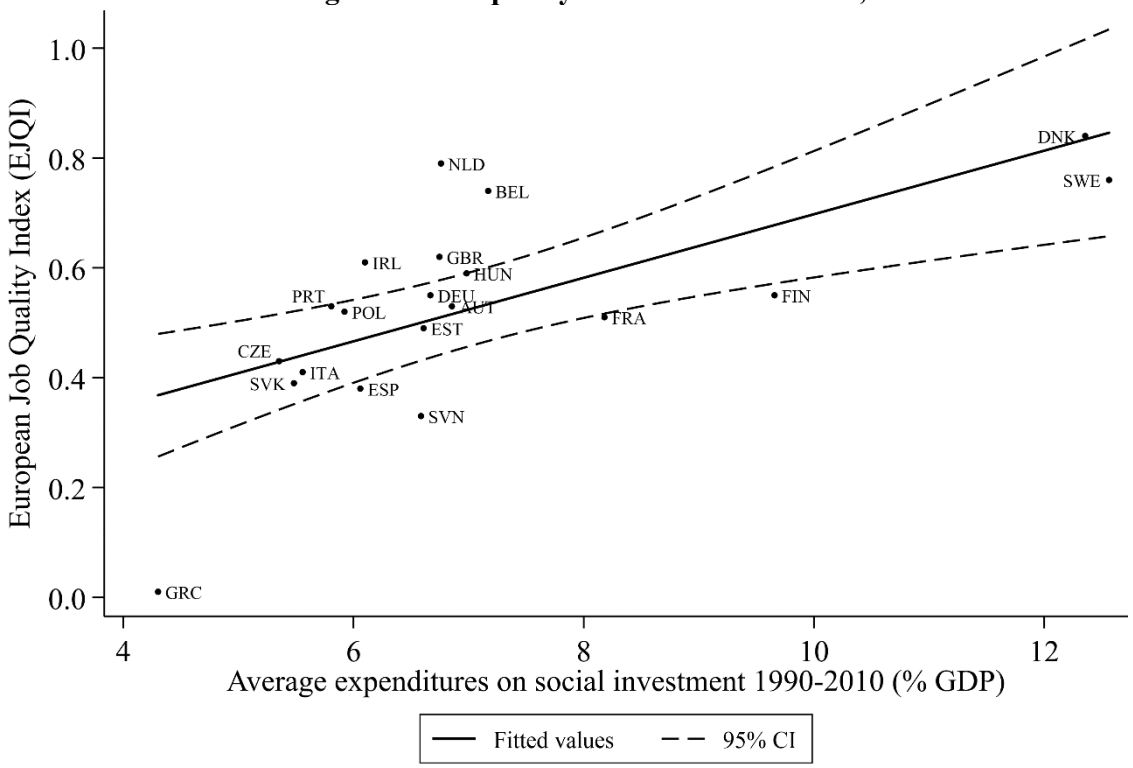


Figure 6 Job quality and social investment, 2010



A serious caveat of the OECD framework, which also applies to several other indicators (Muñoz de Bustillo *et al*. 2011), is that it provides no aggregate measure of job quality but only offers a system of indicators. Both OECD (2014a) and Cazes *et al*. (2015) provide relative rankings of countries for the three main dimensions instead of an overall score. This obviously limits the extent to which analysts can make comparisons across countries. We address this gap by creating a composite index of job quality in the years 2010 using the data collected within the OECD Job Quality Framework. Available data on the three dimensions were first normalised. Given the lack of data on job strain for non-European countries in 2010, the available data for the year 2005 are used for these countries instead. Data on the three dimensions is available for 27 OECD countries. In comparison to the 26 OECD countries studied for the regression analyses this excludes Switzerland and additionally includes Greece and Korea. Subsequently, an overall index was calculated by subtracting the normalised values for labour market insecurity and the quality of the work environment (both negatively framed items in the OECD framework) from the normalised value for earnings quality (which is positive framed). This yields a variable with a range from –1.57 to 0.87. In order to obtain a more meaningful index, these values have also been normalised, resulting in a *relative* job index that ranges from zero to one whereby higher values indicate better job quality. For EU member states this index of job quality for OECD countries is strongly correlated to the EJQI ($r = 0.71$, $p < 0.01$).

Figure 7 again provides a bivariate scatterplot of employment rates for the population or prime working age and the OECD index of relative job quality, both for the year 2010. Like Figure 5, this suggests that there are positive synergies between more and better jobs ($r = 0.69$; $p < 0.01$).[24] Subsequently we have also plotted a bivariate correlation of average expenditures on social investment over the period 1990-2010 and our indicator of job quality in Figure 8. Once more, the positive cross-country correlation between average expenditures on social investment throughout the period 1990-2010 and 2010 levels of job quality suggests that social investment policies are not only associated with more, but also with better jobs ($r = 0.62$; $p < 0.01$). [25]

[24] Even when excluding the main outliers Denmark, Greece, the Netherlands and Norway, the positive correlation remains ($r = 0.56$; $p < 0.01$).

[25] Without the Nordic welfare states (Denmark, Finland, Norway and Sweden) the positive correlation remains, although it is less strong ($r = 0.52$; $p < 0.05$). When additionally excluding Greece the correlation becomes even less strong, but it remains statistically significant ($r = 0.39$; $p < 0.1$).

Figure 7 Job quality and employment, 2010

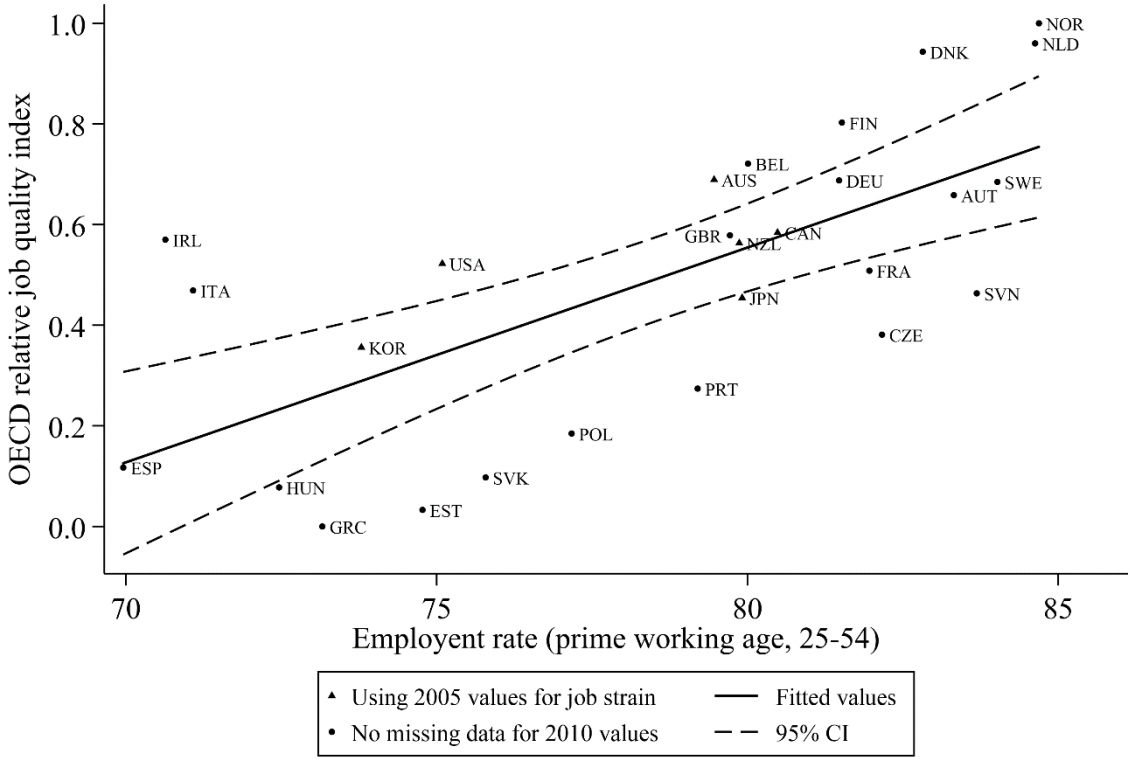
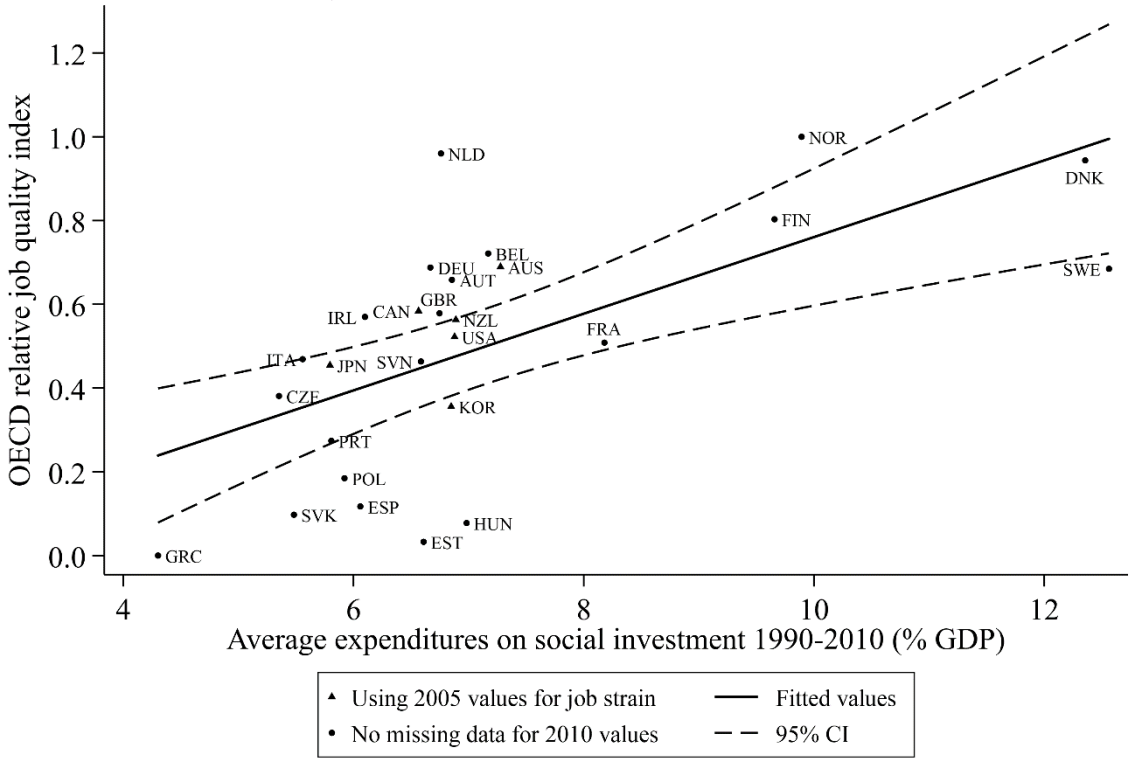


Figure 8 Job quality and social investment, 2010



5. Conclusion and discussion

Our comparative analysis provides varied mixed results for the positive employment effects hypothesised for the different social investment policies. In general, we find partial signs of positive associations between effort on social investments policies and employment outcomes, but there is heterogeneity amongst the different social investment policies and the outcomes being considered. Regarding the level of employment, we obtain positive estimates for effort on social investment oriented ALMPs and care for the elderly and frail, whereas we obtain negative estimates for effort on maternity and parental leave. These associations are robust to different operationalisations of the social investment policies as well as different model specifications and estimation techniques. For effort on education we generally fail to obtain statistically significant effects. We practically never obtain any statistically significant coefficient estimates for early childhood policies. Note that while our findings do not provide support for all the positive associations discussed in the literature, they do corroborate earlier findings. For example, Bradley and Stephens (2007) and Nelson and Stephens (2012) found positive associations between ALMPs and employment as well, whereas Hemerijck *et al*. (2016), for instance, also fail to find a positive correlation between expenditures on early childhood policies and employment.

Another contribution of our study concerns the examination of policy and institutional complementarities. Although the interactions between policies and the underlying institutions have been stressed in the social investment literature, such empirical tests of complementarity are still limited. Hemerijck *et al*. (2016) constitute a notable exception, but solely investigate the complementarity of two policies and remain rather inconclusive by stating that the "much talked-about interaction does not shine through clearly" (p. 76). We contribute to this literature by systematically examining the complementarity of all combinations of the social investment policies we distinguish. Our examination of policy complementarities indicates that, out of the ten combinations of two social investment policies, few show signs of interaction at all. If the policies do show signs of interaction, the marginal effects often do not indicate statistically significant changes along the range of the moderating policies. Only for ALMPs we observe marginal effects that change significantly as effort on the moderating policies changes. In general, our interaction plots suggest diminishing marginal returns: as effort on the moderating policies increases, the marginal effect of effort on ALMPs diminishes. We believe this might mean that part of the positive association between ALMPs and employment is captured by the moderating policies, because these are also aimed at increasing labour market participation and stimulating employment.

Additional analyses that distinguish these policy interactions across welfare state regimes indicate that the way in which policies interact is contingent on the underlying institutions associated with these different welfare regimes. With regard to the interaction between ALMPs and early childhood policies, we do for instance find complementary effects for Mediterranean and conservative welfare states. This more closely resembles the conclusion drawn by Hemerijck *et al*. (2016). Moreover, these regimes have been considered as the regimes with the most potential for social investment (Hemerijck 2017b; Kazepov and Ranci 2016). In addition, distinguishing these interactions by welfare state regimes gives reason to believe that potential effects of social investment policies are smaller in countries with high employment rates that – as a result thereof – tend to have relatively small elasticities of labour supply (Bargain *et al*. 2014).

Finally, we explore whether there are any signs of positive synergies between more and better jobs. Due to a lack of adequate time-series cross-sections of data, we use proxies of job quality to statistically examine whether there are positive associations between effort on social investment policies and qualitative aspects of the employment outcomes realised. These analyses yield few statistically significant estimates for the different social investment policies. Nevertheless, the results give reason to believe that more generous effort on ALMPs might result in better job matches in terms of the number of hours worked per week. In addition, the analyses suggest that effort on care for the elderly and frail enables people to enter the labour market, albeit by working part-time. The same seems to hold for effort on early childhood policies. Besides, it seems that leave arrangements enable mothers to return to their pre-childbirth (full-time) job, instead of finding a new (part-time) job after giving birth. Furthermore, we obtain results that are comparable to those from Nelson and Stephens (2012) when it comes to the correlation between employment in knowledge-intensive sectors and effort on early childhood policies and education. In combination with previous results, this gives reason to believe that policies targeted at human capital development are positively associated with the quality of the labour force and hence the sectors in which people find a job rather than the overall number of people being employed.

Apart from using proxies of job quality we also conduct analysis with two international indices of job quality. These explorative analyses based on bivariate correlations suggest that there are positive synergies between more and better jobs. Moreover, they show that contemporaneous values of job quality are correlated with effort on social investment policies throughout the preceding two decades.

Together, these findings have important implications for the understanding of social investment policy development. The life-course perspective of social investment is to some extent characterised by temporal mismatches between efforts and their returns. This not only complicates the estimation of outcomes attributable to some social investment policies, but also requires a high degree of 'political patience' (Ferrera 2016) that may not always be forthcoming. Yet, this problem does not equally apply to all policies, as effort on ALMPs for instance yield positive effects in the short run. Another point is that although social investment has been regarded an effective response to new social risks and the challenges faced by welfare states, the fiscal and political leeway for these responses has been increasingly limited as a result of budget constraints in a post-crisis era of austerity. Under such conditions, the reallocation of expenditures on passive transfers to expenditures on social investment policies is likely to entail substitution. Due to conflictive preferences, public support for such reallocation may be lacking (e.g. Garritzmann *et al*. 2018). As a result, further development and implementation of social investment policies is likely to be characterised by political decisions and trade-offs (Armingeon and Bonoli 2006; Bonoli and Natali 2012; Garritzmann *et al*. forthcoming). In addition, our findings regarding the varying complementarity across welfare state regimes suggest that the broader design of social policy and the institutional framework matter with regard to the outcomes that might be realised. A more country-specific approach that acknowledges differences in institutional, cultural and economic context might hence be desired when it comes to the promotion and implementation of social investment policies (cf. Bouget *et al*. 2015).

Finally, two important limitations of our study need to be acknowledged. First, a substantial part of complementarity between policies stems from institutional design which is only partly captured by the current indicators measuring effort on the different policies. Qualitative analysis of institutional design should provide deeper insight into the complementarity between social investment policies. Second, social investment policies may yield substantial effects for specific groups (e.g. young parents) which would not be revealed in analyses of aggregated employment outcomes. Future analyses of disaggregated or micro data should provide more insight on this point.

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Table A1 Dependent and explanatory variables for 26 OECD countries, 1990-2010

Variable	Measure		N	Mean	SD	Source(s)
Dependent variables						
Employment rate (prime working age)	People aged 25-54 in employment as a share of the total population aged 25-54	Total	538	78.33	5.66	OECD (2017a)
		Male	538	86.58	4.27	
		Female	538	70.08	9.41	
Employment rate (working age)	People aged 15-64 in employment as a share of the total population aged 15-64	Total	538	66.40	7.26	OECD (2017a)
		Male	538	73.87	6.29	
		Female	538	58.98	9.54	
Labour market participation rate (prime working age)	People aged 25-54 active on the labour market (employed or formally unemployed) as a share of the total population aged 25-54	Total	538	83.93	4.54	OECD (2017a)
		Male	538	92.31	2.34	
		Female	538	75.56	8.73	
Labour market participation rate (working age)	People aged 15-64 active on the labour market (employed or formally unemployed) as a share of the total population aged 15-64	Total	538	71.97	6.01	OECD (2017a)
		Male	538	79.76	4.83	
		Female	538	64.21	8.49	
Full-time employment rate (prime working age)	People aged 25-54 working full-time as a share all people aged 25-54 working either full-time or part-time	Total	498	87.67	6.58	OECD (2017a)
		Male	498	96.35	1.50	
		Female	498	76.57	13.75	
Full-time employment rate (working age)	People aged 15-64 working full-time as a share all people aged 15-64 working either full-time or part-time	Total	498	85.43	7.23	OECD (2017a)
		Male	498	93.68	3.15	
		Female	498	74.92	13.15	
Part-time employment rate (prime working age)	People aged 25-54 working part-time as a share all people aged 25-54 working either full-time or part-time	Total	498	12.33	6.58	OECD (2017a)
		Male	498	3.65	1.50	
		Female	498	23.43	13.75	
Part-time employment rate (working age)	People aged 15-64 working part-time as a share all people aged 15-64 working either full-time or part-time	Total	498	14.57	7.23	OECD (2017a)
		Male	498	6.32	3.15	
		Female	498	25.08	13.15	
Involuntary part-time employment rate (prime working age)	People aged 25-54 working part-time involuntarily as a share all people aged 25-54 working part-time	Total	431	27.38	14.68	OECD (2017a)
		Male	431	36.07	16.20	
		Female	431	25.94	15.71	

Involuntary part-time employment rate (working age)	People aged 15-64 working part-time involuntarily as a share all people aged 15-64 working part-time	Total	431	24.43	12.14	OECD (2017a)
		Male	431	27.53	13.36	
		Female	430	23.80	12.94	
Permanent contract rate (prime working age)	People aged 25-54 with a permanent contract as a share of all employees aged 25-54	Total	421	91.17	5.83	OECD (2017a)
		Male	421	92.58	5.74	
		Female	421	89.36	6.63	
Permanent contract rate (working age)	People aged 15-64 with a permanent contract as a share of all employees aged 15-64	Total	421	88.25	6.56	OECD (2017a)
		Male	421	89.54	6.37	
		Female	421	86.59	7.31	
Employment in knowledge-intensive sectors rate	People working in knowledge-intensive sectors as a share of all employees in the entire economy ('number of persons engaged – total employment', EMPN)		473	38.15	7.21	OECD (2018b) OECD (2011)
Independent variables						
Effort on active labour market policies	Sum of public and mandatory private expenditures on active labour market policies per unemployed as a share of GDP per capita		506	15.71	12.48	OECD (2018c) OECD (2017a)
Effort on care for the elderly and frail	Sum of public and mandatory private expenditures on care for the elderly and frail per adult aged 65 and older as a share of GDP per capita		531	5.01	5.51	OECD (2016a) UN DESA (2017)
Effort on early childhood policies	Sum of public and mandatory private expenditures on early childhood policies per child aged 0-5 as a share of GDP per capita		453	12.03	6.96	OECD (2016a); UN DESA (2017)
Effort on education	Sum of expenditures from public, private and international sources on primary, secondary and tertiary education per student enrolled as a share of GDP per capita		392	24.09	3.76	OECD (2014c) OECD (2014d)
Effort on maternity and parental leave	Sum of public and mandatory private expenditures on maternity and parental leave per child aged 0 as a share of GDP per capita		536	26.99	24.04	OECD (2016a); UN DESA (2017)
Employment protection legislation	Summary indicator of employment protection legislation based on the average of protection for regular contracts (12 indicators) and temporary contracts (6 indicators)		557	1.89	0.88	OECD (2016b) Avdagic (2012)
Tax wedge	Amount of income taxes and social security contributions paid by the average production worker as a share of his gross wage; average of two family situations		532	20.84	7.25	Van Vliet and Caminada (2012)
Unemployment benefits	Net replacement rate of unemployment benefits during the initial phase of unemployment; average of two family situations		529	59.28	14.14	Van Vliet and Caminada (2012)
Union density	Number of trade union members as a share of all wage and salary earners		560	34.74	20.43	Visser (2016)

Wage coordination	Five-point indicator of the coordination of wage setting: 5 = economy wide bargaining by peak associations 4 = mixed economy-wide and industry bargaining 3 = industry bargaining with no or irregular pattern setting 2 = mixed industry and firm-level bargaining 1 = fragmented bargaining		561	2.83	1.37	Visser (2016)
Dependent population <15	Population younger than 15 as a share of the total population		572	17.95	3.25	UN DESA (2017)
Dependent population ≥65	Population aged 65 and older as a share of the total population		572	14.62	2.33	UN DESA (2017)
Capital openness	Sum of inward and outward flows of foreign direct investment as a share of GDP		541	6.62	11.74	OECD (2017b)
Trade openness	Sum of exports and imports as a share of GDP		562	83.39	59.18	OECD (2017c)
Real GDP per capita (÷ 1000)	Gross domestic product in 2010 constant PPP US dollar per capita		562	26.15	11.42	OECD (2017c) ; UN DESA (2017)
Shocks in labour demand (× 1000)	The residual obtained when regressing the natural log of total employment on three lags of logged values of total employment, the log of real GDP and the log of real labour costs per employee by country (Nickell *et al*. 2005)	Prime working age	512	0.08	7.80	OECD (2017a)
		Working age	512	0.04	9.17	OECD (2017c)

Table A2 Regressions of employment and effort on social investment policies, 1990-2010

	(1)	(2)	(3)	(4)	(5)	(6)
Effort on social investment policies						
Active labour market policies$_{t-1}$		0.12***	0.13***	0.12***	0.13***	0.13***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Care for the elderly and frail$_{t-1}$	–0.22***		0.15**	0.14**	0.18***	0.17**
	(0.06)		(0.07)	(0.06)	(0.07)	(0.07)
Early childhood policies$_{t-1}$	0.04	–0.01		–0.04	–0.04	–0.04
	(0.04)	(0.04)		(0.03)	(0.05)	(0.04)
Education$_{t-1}$	–0.05	–0.05	–0.07		–0.10**	–0.05
	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)
Maternity and parental leave$_{t-1}$	–0.03*	–0.03**	–0.03**	–0.03**		–0.03**
	(0.01)	(0.01)	(0.01)	(0.01)		(0.01)
Labour market institutions						
Employment protection legislation$_{t-1}$	0.09	–0.22	–0.13	0.02	0.05	–0.05
	(0.38)	(0.44)	(0.43)	(0.35)	(0.43)	(0.44)
Tax wedge$_{t-1}$	–0.12***	–0.11***	–0.12***	–0.11***	–0.11***	–0.12***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Unemployment benefits$_{t-1}$	0.01	–0.01	–0.00	–0.01	–0.00	–0.00
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
Trade union density$_{t-1}$	0.07*	0.05	0.08**	0.06*	0.07*	0.07**
	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Coordination of wage bargaining$_{t-1}$	0.21	0.16	0.20	0.14	0.19	0.20
	(0.14)	(0.13)	(0.14)	(0.12)	(0.13)	(0.14)
Socioeconomic factors						
Dependent population <15$_{t-1}$	–0.54***	–0.65***	–0.70***	–0.64***	–0.72***	–0.71***
	(0.17)	(0.16)	(0.15)	(0.14)	(0.15)	(0.14)
Dependent population ≥65$_{t-1}$	0.53*	0.49**	0.52***	0.59***	0.55***	0.54***
	(0.27)	(0.21)	(0.19)	(0.19)	(0.21)	(0.20)
Capital openness$_{t-1}$	–0.00	–0.00	0.00	0.00	–0.00	–0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade openness$_{t-1}$	0.02**	0.01**	0.02**	0.02**	0.02***	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Real GDP per capita$_{t-1}$	0.28***	0.26***	0.28***	0.31***	0.29***	0.28***
	(0.08)	(0.07)	(0.07)	(0.06)	(0.07)	(0.07)
Shocks in labour demand	32.60***	33.09***	35.93***	35.02***	36.24***	34.87***
	(10.41)	(9.97)	(9.85)	(7.88)	(10.65)	(10.36)
Constant	78.92***	80.68***	78.38***	75.52***	78.67***	78.53***
	(7.02)	(5.97)	(5.92)	(5.58)	(6.40)	(6.06)
Number of observations	350	339	344	395	339	339
Adjusted R-squared	0.990	0.992	0.991	0.989	0.991	0.991
Rho	0.661	0.665	0.631	0.654	0.631	0.622
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Panel-corrected standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3 Interaction effects for effort on social investment policies

Statistically significant interaction effects	Interaction effects that are not statistically significant because the marginal effect …	
	… does not change significantly	… is never distinguishable from zero
Male population of prime working age		
ALMPs × care for the elderly and frail[1] ALMPs × early childhood policies	ALMPs × education ALMPs × maternity and parental leave Care for the elderly and frail × early childhood policies[2] Early childhood policies × education[3] Education × maternity and parental leave	Care for the elderly and frail × education Care for the elderly and frail × maternity and parental leave Early childhood policies × maternity and parental leave
Female population of prime working age		
ALMPs × care for the elderly and frail[4]	ALMPs × early childhood policies ALMPs × education ALMPs × maternity and parental leave Care for the elderly and frail × early childhood policies[5] Care for the elderly and frail × education[6] Care for the elderly and frail × maternity and parental leave[7]	Early childhood policies × education Early childhood policies × maternity and parental leave Education × maternity and parental leave

Notes: All marginal effects plots are computed using 95% confidence intervals;
An interaction effect is considered statistically significant if the marginal effect is distinguishable from zero for at least some values of the moderating policy *and* if the change in marginal effect over the range of the moderating variable is statistically significant;
For several interactions we find that the marginal effect is distinguishable from zero for all or some values of the moderating policy, but they are not statistically significant because the upper (lower) confidence interval of the marginal effect at lower range of the moderating variable overlap with the lower (upper) confidence interval at higher range of moderating variable

[1] The marginal effect is indistinguishable from zero when effort on care for the elderly and frail is more than approximately 20% of GDP per capita (upper 95% of observations);

[2] The marginal effect is indistinguishable from zero when effort on early childhood policies is more than approximately 21% of GDP per capita;

[3] The marginal effect is indistinguishable from zero when effort on education is less than approximately 20% of GDP per capita;

[4] The marginal effect is indistinguishable from zero when effort on care for the elderly and frail is more than approximately 20% of GDP per capita (upper 95% of observations);

[5] The marginal effect is indistinguishable from zero when effort on early childhood policies is more than approximately 18% of GDP per capita;

[6] The marginal effect is indistinguishable from zero when effort on education is less than approximately 22% of GDP per capita only;

[7] The marginal effect is indistinguishable from zero when effort on maternity and parental leave is more than approximately 55% of GDP per capita

Figure A1 Employment and social investment, 1990-2010

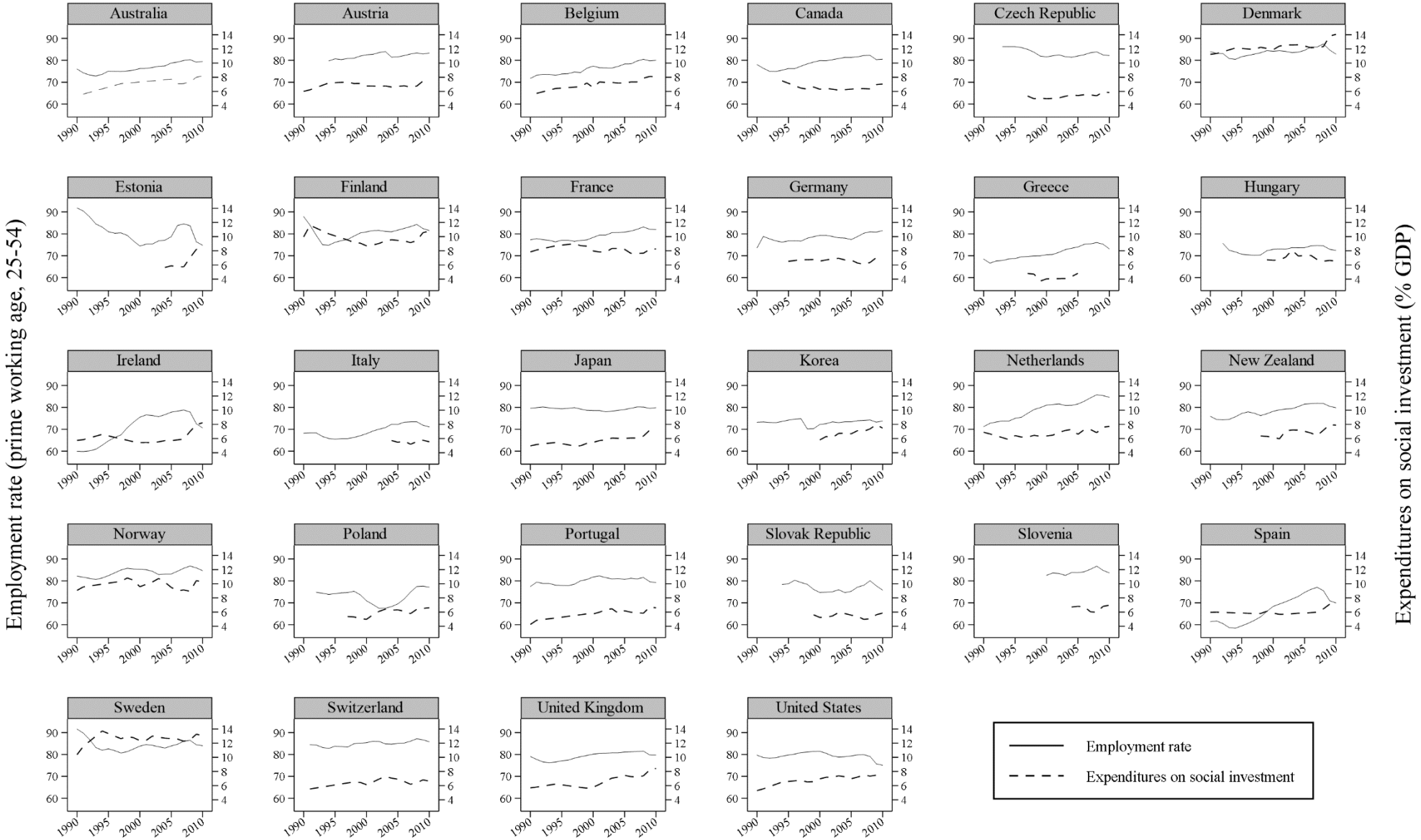
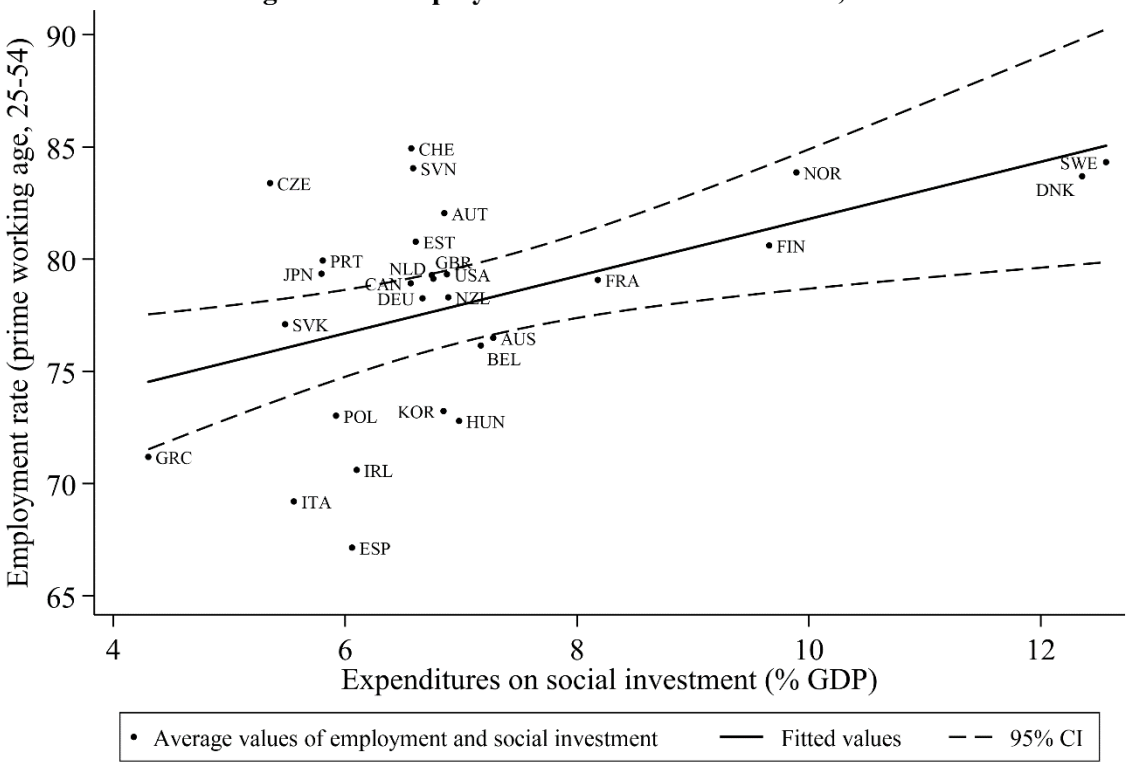


Figure A2 Employment and social investment, 1990-2010



Appendix 1: Diagnostic tests

An *F*-test suggests that the inclusion of country fixed effects suits the data better than simply pooling all data ($F = 46.65$, $p < 0.01$). A Breusch-Pagan LM test for random effects rejects the null hypothesis that the variance across panels is zero ($X^2 = 594.16$, $p < 0.01$), therefore preferring the use of random effects over simply pooling. A Hausman test, nevertheless, indicates that specifying a random effects model is likely to yield inconsistent coefficients ($X^2 = 46.86$, $p < 0.01$). The fixed effects model is hence the preferred specification. An *F*-test suggests that the additional inclusion of year fixed effects significantly improves the model ($F = 2.79$, $p < 0.01$). Therefore, our preferred model includes country fixed effects to address omitted variables bias and cross-sectional heterogeneity of the intercepts as well as time fixed effects to account for unobserved time-varying shocks that affect all countries similarly.

Several tests indicate that the data exhibits heteroscedasticity and serial correlation.[26] The use of panel-corrected standard errors (PCSE) constitutes a conventional estimation technique commonly used to address simultaneous spatial correlation of the errors and panel heteroscedasticity (Beck and Katz 1995). To correct for autocorrelation and to produce serially independent errors, the error term $\varepsilon_{i,t}$ is allowed to follow an AR(1) process, which specifies that there is first order autocorrelation within the panels. Specifying the AR(1) process, known as Prais-Winsten transformation, was preferred to the incorporation of a lagged dependent variable to address autocorrelation, because that (1) may obscure the relationship between the independent variables of substantive interest and the dependent variable by suppressing the power of other independent variables, (2) may in combination with the inclusion of unit fixed effects lead to a Nickell bias given the relatively small T, and (3) may overestimate the effect of the independent variables given the relatively high autoregressive parameter obtained for the error term (Wilkins 2017).

Due to the focus on short-term effects, one year lags are used for all variables, except for shocks in labour demand, because it captures shocks that follow from regressing employment on its own lags. The use of one year lags can also be justified by that assumption

[26] A Wald test for groupwise heteroscedasticity ($X^2 = 4598.00$, $p < 0.01$) and Breusch-Pagan test for heteroscedasticity ($X^2 = 16.99$, $p < 0.01$) both indicate the presence of heteroscedasticity. In addition, Wooldridge's test for autocorrelation indicates the presence of first-order serial correlation ($F = 71.52$, $p < 0.01$). A modified Bhargava, Franzini and Narendranathan (1982) Durbin-Watson test for serial correlation in the model with unit and time fixed effects derives the same conclusion as the obtained value ($DW_{BFN} = 0.405$) is outside the lower and upper bounds of the critical values that can be used to test against the alternative of positive autocorrelation. See, however, Born and Breitung (2016) for the limitations of these tests). A Cumby-Huizinga test for multiple orders of autocorrelation with strictly exogenous regressors robust to heteroscedasticity even indicates the presence of serial correlation up to two lags ($X^2 = 49.87$, $p < 0.01$, $X^2 = 24.83$, $p < 0.01$) when including both unit and time fixed effects.

that policy, institutional and socioeconomic changes need some time to take effect and reveal themselves through changes in the (dependent) variable(s) that are affected. Moreover, lags are also commonly used to mitigate simultaneity (endogeneity) or reverse causality bias (see for a discussion: Reed 2015; Bellemare *et al*. 2017).

Appendix 2: Robustness checks using different operationalisations of effort on social investment policies

To test the robustness of our results several subsequent analysis have been conducted in which slightly different indicators are used for some of the variables (Table A4), in which we include an additional indicator to test for omitted variable bias (Table A5), or where we use a different estimation technique (Tables A5 and A6). In order to facilitate comparison of the results obtained from the different models, the first column of Table A4 presents our preferred model. The second column presents the results we obtained when using only public expenditures (instead of the sum of public and mandatory private expenditures) for all social investment variables except for effort on education (as this would result in a major loss of observations). This excludes social programmes stipulated by legislation but operated through the private sectors such as payments by employers to sick employees as well as maternity and parental leave benefits and services financed by employers (Adema *et al*. 2011). Such programmes are however not very prevalent for the countries and period studied here. It is therefore not surprising that all results are replicated. In model 3 we include the sum of all active labour market programmes instead of only those programmes that reflect social investment aspects. This does not affect the estimates of our preferred model. In model 4 we use our original indicator of effort on ALMPs, but distinguish between the two categories 'upskilling' (training) and 'employment assistance' described by Bonoli (2010). Our results show that both training and employment assistance are positively associated with employment. In addition, none of our estimates – apart from the centralisation of wage bargaining – are affected.

In model 5 we use a more inclusive definition of care for the elderly and frail, which also includes expenditures on rehabilitation services.[27] Originally we did not consider such services social investments, because they are focused on 'repairing' personal damages instead of 'preparing' individuals for new social risks. Nevertheless, these services do prepare and support people to participate on the labour market again by mobilising and preserving skills and human capital, which would qualify them as social investment following the definition of Garritzmann *et al*. (2017). Again, our results are replicated. When using a more exclusive definition of early childhood policies that covers ECEC only, we obtain identical results (model 6). In model 7 we examined the effect of using an alternative indicator for effort on education. In order to model the long-term returns of education we follow Nelson and Stephens (2012) and use cumulative average effort on education, calculated by dividing the cumulative sum of

[27] Incapacity-related rehabilitation services are included under category 3-2-3 of the SOCX database.

yearly expenditures per student over period t_n by the number of years n that constitute period t_n.[28] The negative coefficient for effort on education is now statistically significant. In model 8 we have estimated separate effects for effort on primary, secondary and tertiary education.[29] The impact on our results is limited. None of the other social investment policies are affected. Regarding the separate indicators for the different levels of education we obtain negative coefficient estimates, but none of them are statistically significant.

So far we have estimated the employment effects of investments in human capital through effort on education, operationalised as expenditures per student as a share of GDP per capita. As has been noted, the positive effects of education are likely to materialise over the life course. It is therefore not surprising that we do not find any positive effects for education within the year following the (change in) effort. A better indicator might be educational attainment. This captures the quality of the 'stock' of human capital given previous efforts on education, both monetarily and regulatory. In columns 9 and 10 we therefore estimate our preferred model using educational attainment instead of effort on education (cf. Nelson and Stephens 2012).[30] Data on educational attainment by 5-year age group is from Barro and Lee (2013). This series is available at five year intervals over the period 1950-2010. Attainment in intermediate years was estimated using linear interpolation. In line with our dependent variable, we measure educational attainment for the population aged 25-54 specifically. In model 9 we operationalise educational attainment as the number of people aged 25-54 that have *attained* at least primary education as a share of the total population aged 25-54. Model 10 uses the share of people that attained higher education (secondary and tertiary education), whereas model 11 uses a slightly modified operationalisation that measures the number of people aged 25-54 that *completed* primary, secondary or tertiary education as a share of the total population aged 25-54. For our three indicators of educational attainment we obtain positive estimates, which are

[28] Note that our use of *effort* deviates from Nelson and Stephens (2012), who simply focus on cumulative average *expenditures*. Also note that this results in a loss of nine observations.

[29] This leads to an additional loss of fourteen observations as disaggregated expenditure data for education is available for fewer years.

[30] In their analysis Nelson and Stephens (2012) operationalise educational attainment as the average years of education of the population above 25 available from Barro and Lee (2001). Theoretically they "expect the investment variables [cumulative average expenditures on ALMPs, public education and ECEC; all as a percentage of GDP] to operate entirely through their effect on human capital stock [average years of education]", so that the former are not significant when including both the investment variables and stock variable in the regression analysis. Nonetheless, they state that "given the deficiencies of our stock variables, average years of education, this might not be the case" (Nelson and Stephens 2012, p. 214). When including their stock variable instead of the spending variables in model 4, Nelson and Stephens obtain a positive and statistically significant coefficient for average years of education. In their fifth model, that includes all these variables at the same time they no longer find a statistically significant effect for expenditures on education, whilst they obtain a statistically significant, positive effect for educational attainment. As they briefly suggested beforehand, the positive estimates for spending on ALMPs and ECEC remain (*ibid*, p. 220).

Table A4 Robustness checks of regressions of employment and effort on social investment policies, 1990-2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Effort on social investment policies														
Active labour market policies$_{t-1}$	0.13***	**0.13*** **	**0.09*** **		0.13***	0.13***	0.12***	0.13***	0.11***	0.12***	0.12***	0.12***	0.10***	**0.11*** **
	(0.01)	**(0.01)**	**(0.01)**		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	**(0.02)**
Training$_{t-1}$				**0.05** **										
				(0.03)										
Employment assistance$_{t-1}$				**0.21*** **										
				(0.02)										
Care for the elderly and frail$_{t-1}$	0.17**	**0.17** **	0.14**	0.17**	**0.17** **	0.16**	0.15**	0.16*	0.10*	0.15**	0.13**	0.11*	0.11	**0.23** **
	(0.07)	**(0.07)**	(0.07)	(0.07)	**(0.07)**	(0.07)	(0.07)	(0.08)	(0.05)	(0.06)	(0.06)	(0.06)	(0.12)	**(0.10)**
Early childhood policies$_{t-1}$	–0.04	**–0.04**	–0.02	–0.04	–0.03	**–0.01**	–0.03	–0.01	–0.02	–0.04	–0.02	–0.07	**0.01**	**–0.03**
	(0.04)	**(0.04)**	(0.04)	(0.04)	(0.04)	**(0.07)**	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)	(0.05)	**(0.05)**	**(0.04)**
Education$_{t-1}$	–0.05	–0.05	–0.08	–0.03	–0.05	–0.06						0.02	**–0.13** **	**–0.13* **
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)						(0.05)	**(0.06)**	**(0.07)**
Primary$_{t-1}$								**–0.05**						
								(0.04)						
Secondary$_{t-1}$								**–0.04**						
								(0.03)						
Tertiary$_{t-1}$								**–0.00**						
								(0.03)						
Education (cumulative averages) $_{t-1}$							**–0.09*** **							
							(0.03)							
Educational attainment$_{t-1}$									**0.34*** **	**0.06*** **	**0.19*** **			
									(0.08)	**(0.02)**	**(0.05)**			
Maternity and parental leave$_{t-1}$	–0.03**	**–0.03** **	–0.03**	–0.03**	–0.03**	–0.03**	–0.04***	–0.03**	–0.04***	–0.03**	–0.03**		–0.05***	**–0.05*** **
	(0.01)	**(0.01)**	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)		(0.02)	**(0.01)**
Generosity of maternity and parental leave (institutional)$_{t-1}$												**–0.01**		
												(0.01)		
Labour market institutions														
Employment protection legislation$_{t-1}$	–0.05	–0.04	–0.17	–0.01	–0.10	–0.10	0.25	0.30	0.17	0.22	0.17	0.15	1.49**	1.50***
	(0.44)	(0.44)	(0.49)	(0.45)	(0.43)	(0.45)	(0.41)	(0.48)	(0.34)	(0.36)	(0.36)	(0.52)	(0.58)	(0.55)
Tax wedge$_{t-1}$	–0.12***	–0.12***	–0.11***	–0.13***	–0.12***	–0.12***	–0.11***	–0.13***	–0.11***	–0.12***	–0.11***	0.01	–0.12**	–0.11**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.05)	(0.06)	(0.05)
Unemployment benefits$_{t-1}$	–0.00	–0.00	0.01	–0.01	–0.00	–0.00	–0.04	–0.02	0.00	–0.01	–0.01	–0.02	–0.04	–0.04
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)

Trade union density$_{t-1}$	0.07**	0.07**	0.07**	0.07**	0.06*	0.07**	0.06**	0.07*	0.02	0.05	0.04	–0.06	0.06	0.10**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)
Coordination of wage bargaining$_{t-1}$	0.20	0.20	0.19	0.24*	0.20	0.20	0.16	0.19	0.07	0.13	0.10	0.36***	0.54***	0.57***
	(0.14)	(0.14)	(0.13)	(0.14)	(0.14)	(0.14)	(0.14)	(0.15)	(0.11)	(0.12)	(0.11)	(0.12)	(0.17)	(0.17)
Socioeconomic factors														
Dependent population <15$_{t-1}$	–0.71***	–0.71***	–0.78***	–0.65***	–0.71***	–0.71***	–0.61***	–0.76***	–0.34**	–0.55***	–0.41**	–0.77***	–0.30	–0.09
	(0.14)	(0.14)	(0.16)	(0.14)	(0.14)	(0.14)	(0.15)	(0.21)	(0.17)	(0.15)	(0.17)	(0.19)	(0.21)	(0.21)
Dependent population ≥65$_{t-1}$	0.54***	0.54***	0.41*	0.67***	0.53***	0.51***	0.43**	0.49*	0.54***	0.55***	0.52***	0.51**	0.54**	0.67***
	(0.20)	(0.20)	(0.21)	(0.22)	(0.20)	(0.20)	(0.20)	(0.26)	(0.20)	(0.19)	(0.19)	(0.24)	(0.22)	(0.21)
Capital openness$_{t-1}$	–0.00	–0.00	–0.00	–0.00	–0.00	–0.00	–0.00	–0.00	0.00	0.00	0.00	–0.00	–0.00	–0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade openness$_{t-1}$	0.02**	0.02**	0.01**	0.02**	0.02**	0.02**	0.01*	0.02	0.02**	0.01**	0.02**	0.05***	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Real GDP per capita$_{t-1}$	0.28***	0.28***	0.26***	0.29***	0.29***	0.28***	0.28***	0.26***	0.32***	0.31***	0.33***	0.32***	0.06	0.13**
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.10)	(0.06)	(0.06)	(0.07)	(0.06)	(0.07)	(0.07)
Shocks in labour demand	34.87***	34.78***	33.40***	33.90***	35.03***	34.76***	34.94***	35.47***	32.63***	34.95***	33.52***	34.83***	37.25***	42.21***
	(10.36)	(10.37)	(10.10)	(10.53)	(10.41)	(10.33)	(10.34)	(13.34)	(7.80)	(7.82)	(7.78)	(12.00)	(11.84)	(11.96)
Constant	78.53***	78.62***	82.08***	75.36***	78.74***	79.02***	81.72***	81.42***	36.84***	69.18***	53.98***	79.59***	75.76***	62.78***
	(6.06)	(6.05)	(6.10)	(6.41)	(5.96)	(5.99)	(5.48)	(8.68)	(11.33)	(6.04)	(9.09)	(7.39)	(7.20)	(6.73)
Number of observations	339	339	339	339	339	339	330	316	395	395	395	281	278	293
Adjusted R-squared	0.991	0.991	0.992	0.991	0.991	0.991	0.991	0.990	0.990	0.989	0.990	0.993	0.989	0.988
Rho	0.622	0.622	0.656	0.579	0.623	0.618	0.622	0.608	0.671	0.656	0.670	0.624	0.464	0.458

Notes: All regression include country and year fixed effects (not presented here); panel-corrected standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

statistically significant. This at least seems to suggest that higher quality stocks of human capital as a result of (historical) efforts on education are associated with higher employment levels. Moreover, replacing effort on education by indicators on educational attainment leaves all other coefficient estimates unaffected except for trade union density, which is no longer statistically significant.

In model 12 we use a different indicator for effort on maternity and parental leave that captures more of the institutional characteristics instead of effort in terms of expenditures per recipient corrected for GDP per capita. For this indicator, effort is operationalised as the sum of the number of weeks of maternity and parental leave, both weighted by level of cash benefits received during this period of leave as a percentage of the female average production worker wage available from Gauthier (2011). Note that these data are not available for the six Central and Eastern European countries, which entails a loss of 58 observations in comparison to the preferred model. When using this indicator we also obtain a negative coefficient for maternity and parental leave, but it is not statistically significant. Few other variables are affected.

Due to the introduction of a new international classification of education (ISCED1997), there is a break in the series of expenditures on pre-primary education (effort on early childhood education) and primary to tertiary education (effort on education) between 1997 and 1998. When excluding observations from before 1998, entailing a loss of 61 observations, we also obtain slightly different results (model 13). Only for effort on ALMPs the positive correlation is replicated, whereas the negative correlation for effort on education is now statistically significant as well. Model 14 relies exclusively on public expenditures for all social investment policies, including education. It is therefore very comparable to Model 2 but includes 46 observations less as expenditures on education are distinguished by source since the introduction of ISCE1997 only. Although we found that the use of public expenditures instead of the sum of public and mandatory private expenditures for effort on ALMPs, care for the elderly and frail, early childhood policies and maternity and parental leave did not affect our results, we could expect different outcomes when using public expenditures only for effort on education. Whilst public investments in education guarantee universal access to education, large private expenditures often limit access to (higher) education to those families that can afford it, thereby increasing educational inequalities (Busemeyer and Iversen 2014; Busemeyer 2015). Weisstanner and Armingeon (2018) for instance find that public spending on education reduces wage differentials between high and low-educated workers, whereas private spending on education increases them. The results for model 14 are highly similar to the results obtained for our preferred model presented in the first column. The only difference concerns the

statistical significance of effort on education. We now find a statistically significant negative association between *public* effort on primary to tertiary education and employment of the population of prime working age. This result could, however, also be the result of the substantially lower number of observations in this model: the observations included in model 14 are largely the same as those included in model 13 for which we obtain highly similar results.

Although the slightly different operationalisations of our main independent variables lead to slightly different outcomes, our estimates for the five social investment policies seem quite robust. The signs are always in the same direction, except when replacing efforts on education and maternity and parental leave by variables measuring educational attainment and the institutional generosity of leave arrangements. When relying on these measures we obtain estimates that are in line with the theoretical expectations outlined above. When we rely on models purely capturing effort on the social investment policies the positive estimate for effort on social investment oriented ALMPs is always replicated. In addition, only in a model with substantially lower numbers of observations (model 12) we fail to find a statistically significant estimate for effort on care for the elderly and frail. Estimates for effort on early childhood policies are never statistically significant, whereas the negative estimate for effort on maternity and parental leave is also always replicated in these cases.

Appendix 3: Robustness checks using additional independent variables

In order to check the robustness of our preferred model for omitted variable bias, we estimated the model again including additional variables. For convenience we present our preferred model in the first column of Table A5 again.

In the second, third and fourth column we present the results obtained when augmenting our preferred model with our indicators of educational attainment. We follow Nelson and Stephens (2012) here who include both attainment and their 'human capital investment' variables in their final model and "expect the investment variables to operate entirely through their effect on human capital stock and thus not to be significant in this equation" (p. 214). Our estimates for educational attainment are positive and statistically significant in all these models. This is in line with the results from Nelson and Stephens (2012). Besides, the additional inclusion of these variables does not affect the result from our preferred model, except in model 2 where the negative coefficient for effort on education is just statistically significant. This might seem surprising as one might expect the effect of some of the social investment policies to run through better stocks of human capital. Nevertheless, these findings are also in line with Nelson and Stephens (2012) who attribute the fact that their investment variables remain statistically significant to the deficiencies of their stock variable. At the same time, their findings and the findings presented here could also suggest that some of the social investment policies have a direct effect on employment and additionally affect employment through their effect on the quality of human capital over the longer run.

In models 5 and 6 we augment our preferred model with policies that have sometimes been classified as social investments. Some scholars have for instance grouped family allowances under social investment (e.g. Nikolai 2012; Kvist 2013). Since family allowances concern a mere cash transfer, we did not include them in our preferred model, but when including effort on family allowances in model 2 our results are replicated (column 2).[31] The coefficient itself is negative and statistically significant. This negative association is likely to follow from the lump-sum character of family allowances and the income effect associated with that (Jaumotte 2003).

Since rehabilitation services are likely to affect the productive potential of individuals they could also be considered social investment (e.g. Garritzmann *et al*. 2017). In addition to

[31] Expenditures through cash benefits on family allowances are grouped under category 5-1-1 of the SOCX database. Effort on family allowances has been operationalised as the sum of public and mandatory private expenditures on family allowances corrected for the number of eligible children based on age and educational attainment, relative to GDP per capita.

using a more encompassing definition of care for the elderly and frail that includes rehabilitation services for the incapacitated (model 5 in Table A4) we therefore also conduct an analysis in which effort on rehabilitation services is included separately. Model 3 presents the results obtained when including a separate variable for rehabilitation services targeted at the sick, disabled, injured and unemployed.[32] Again, our results are replicated. The coefficient for the variable itself is positive, but not statistically significant.

Although elements of active labour market programmes concerned with availability and job-search conditions and sanctions are generally not considered social investment (Bonoli 2012; Garritzmann *et al*. 2017), it has been argued that such eligibility criteria and sanctions (or 'incentive reinforcement', Bonoli 2010) are effective in activating jobseekers. Recently, a dataset on unemployment conditionality and sanctions has become available (Knotz and Nelson 2015), which makes it possible to examine the role of activation measures. Despite the fact that such elements are more likely to affect unemployment rather than employment and, additionally, are not considered social investment we decided to include them in one of our models as we do not yet know of any comparative analyses using the newly available data. Currently, Knotz and Nelson (2015) only provide three average scores related to unemployment benefit conditions and sanctions (see for more details: Knotz 2018). When using an unweighted mean of scores on availability requirements, job-search and reporting requirements, and sanctions rules, we find that stricter eligibility criteria and sanctions are associated with lower employment (not presented here). This could suggest that these criteria lead some jobseekers to prefer inactivity over unemployment, thereby leading to a lower job finding rate and hence less employment. While the positive estimate for ALMPs is replicated, several other variables are affected by the inclusion of this variable. Effort on care for the elderly and frail and maternity and parental leave are no longer statistically significant, whereas we suddenly obtain a statistically significant, negative, estimate for effort on early childhood policies.

Last, we also estimated a model augmented with the net replacement rate of minimum income benefits (Wang and Van Vliet 2016; Van Vliet and Wang 2019). Although these

[32] We operationalise effort on rehabilitation services as follows. Expenditures on rehabilitation services consists of expenditures on incapacity-related rehabilitation services (category 3-2-3 of the SOCX database) and expenditures on labour market programmes concered with sheltered and supported employment and rehabilitation (category 6-50 of the Labour Market Programmes database). We correct these expenditures for the number of unemployed given a lack of adequate data for people incapacitated due to illness, disability or injury. Subsequently, the amount of expenditures per recipient are related to GDP per capita.

Table A5 Regressions of employment and effort on social investment policies, 1990-2010

	(1)	(2)	(3)	(4)	(5)	(6)
Effort on social investment policies						
Active labour market policies$_{t-1}$	0.13***	0.12***	0.13***	0.13***	0.13***	0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Rehabilitation policies$_{t-1}$						**0.02**
						(0.02)
Care for the elderly and frail$_{t-1}$	0.17**	0.13*	0.19**	0.17**	0.19**	0.18**
	(0.07)	(0.08)	(0.07)	(0.07)	(0.08)	(0.07)
Early childhood policies$_{t-1}$	–0.04	–0.00	–0.03	–0.01	–0.06	–0.04
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Education$_{t-1}$	–0.05	–0.08*	–0.04	–0.07	–0.06	–0.05
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Educational attainment$_{t-1}$		**0.36*** **	**0.09*** **	**0.21*** **		
		(0.08)	**(0.02)**	**(0.05)**		
Family allowances$_{t-1}$					**–0.40*** **	
					(0.12)	
Maternity and parental leave$_{t-1}$	–0.03**	–0.03**	–0.03**	–0.03**	–0.03**	–0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Labour market institutions						
Employment protection legislation$_{t-1}$	–0.05	0.18	0.18	0.11	0.09	–0.11
	(0.44)	(0.46)	(0.46)	(0.46)	(0.44)	(0.47)
Tax wedge$_{t-1}$	–0.12***	–0.12***	–0.13***	–0.12***	–0.14***	–0.12***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Unemployment benefits$_{t-1}$	–0.00	0.01	–0.01	–0.01	0.00	–0.00
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)
Trade union density$_{t-1}$	0.07**	0.02	0.06*	0.04	0.08**	0.07**
	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)
Coordination of wage bargaining$_{t-1}$	0.20	0.11	0.21	0.16	0.10	0.21
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Socioeconomic factors						
Dependent population <15$_{t-1}$	–0.71***	–0.40**	–0.58***	–0.47***	–0.96***	–0.75***
	(0.14)	(0.17)	(0.16)	(0.18)	(0.15)	(0.15)
Dependent population ≥65$_{t-1}$	0.54***	0.51**	0.50**	0.49**	0.46**	0.50**
	(0.20)	(0.20)	(0.20)	(0.21)	(0.23)	(0.21)
Capital openess$_{t-1}$	–0.00	–0.00	–0.00	–0.00	–0.00	–0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade openness$_{t-1}$	0.02**	0.02**	0.02**	0.02**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Real GDP per capita$_{t-1}$	0.28***	0.29***	0.29***	0.31***	0.23***	0.28***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Shocks in labour demand	34.87***	31.98***	35.19***	33.30***	31.88***	34.64***
	(10.36)	(10.76)	(10.41)	(10.73)	(11.14)	(10.36)
Constant	78.53***	38.15***	69.51***	55.27***	88.26***	79.83***
	(6.06)	(11.09)	(7.01)	(9.45)	(6.71)	(6.15)
Number of observations	339	339	339	339	333	339
Adjusted R-squared	0.991	0.992	0.991	0.991	0.992	0.992
Rho	0.622	0.622	0.610	0.612	0.642	0.630

Notes: All regression include country and year fixed effects (not presented here); panel-corrected standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

benefits clearly constitute passive, compensatory benefits, the European Commission has grouped them under social investment as benefits aimed at the prevention of social and labour market exclusion (e.g. Bouget *et al.* 2015). As with unemployment benefits, generous minimum income benefits might induce people to prefer welfare over work, thereby leading to lower employment. Nevertheless, we do not obtain a statistically significant coefficient for this variable. Except for the lack of statistical significance for effort on maternity and parental leave, all results are replicated by this model (not presented here).

Appendix 4: Robustness checks using different analysis techniques

Finally, we test the robustness of our results by using a somewhat different estimation technique. Pesaran's test for cross-sectional dependence indicates that cross-sectional dependence is present when estimating our baseline model without year fixed effects (CD = 8.62, $p = 0.00$).[33] For that reason we estimated the models in columns 7-9 of Table 3 again using Driscoll-Kraay standard errors instead of panel-corrected standard errors. Besides, the AR(1) process is approximated by a finite order MA(2) process. The choice for a maximum of two lags in the autocorrelation structure was informed by the Cumby-Huizinga test, according to which autocorrelation is present up to two lags (when including one or two-way fixed effects).

This approach can be considered slightly more conservative as the standard errors account for heteroscedasticity as well as cross-sectional and temporal dependence (Hoechle 2007). The estimation technique, which extends the Newey-West estimator to a panel context and additionally incorporates cross-sectional correlations is, moreover, not susceptible to deficiencies of covariance matrix estimators that rely on a large T to be consistent (such as the Park-Kmenta FGLS estimator or Beck and Katz' PSCE approach) and typically become inappropriate as the cross-sectional dimension *N* becomes large in comparison to the time dimension *T* (as is the case for our sample). Note that the use of asymptotic Driscoll-Kraay standard errors may result in overoptimistic standard errors, because the estimator is based on large *T* asymptotics. Applying asymptotic errors to panels of relatively large *N* and relatively small *T* is therefore warranted (Hoechle 2007). Small sample adjustment is hence applied to the standard errors.

In columns 4-6 we present the results obtained from implementing this technique, which can be contrasted to the results in the first three columns (which have also been presented in columns 7-9 from Table 3, but note that the order in which we present the models here is different). We first present the results obtained without fixed effects, next using unit fixed effects only, and finally using both unit and time fixed effects. Model 4 shows the results obtained without the inclusion of any fixed effects. In comparison to the model with PCSE and an AR(1) component (model 1), most results are similar. The only difference that stands out is the positive, statistically significant coefficient for maternity and parental leave. For the model including only country fixed effects (models 2 and 5), differences occur for effort on maternity and parental leave only, which is no longer statistically significant.

[33] However, when including both country and year fixed effects, we found no signs of cross-sectional dependence (CD = –1.14, $p = 0.26$).

Table A6 Regressions of employment and effort on social investment policies, 1990-2010

	(1)	(2)	(3)	(4)	(5)	(6)
Effort on social investment policies						
Active labour market policies$_{t-1}$	0.13***	0.14***	0.13***	0.14***	0.14***	0.14***
	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)
Care for the elderly and frail$_{t-1}$	0.18***	0.11*	0.17**	0.15**	0.19**	0.30***
	(0.05)	(0.07)	(0.07)	(0.07)	(0.08)	(0.09)
Early childhood policies$_{t-1}$	–0.08**	–0.07	–0.04	–0.14***	–0.04	–0.03
	(0.03)	(0.05)	(0.04)	(0.03)	(0.05)	(0.05)
Education$_{t-1}$	–0.11	–0.14**	–0.05	0.05	–0.14***	–0.06
	(0.08)	(0.06)	(0.05)	(0.10)	(0.02)	(0.04)
Maternity and parental leave$_{t-1}$	0.01	–0.04***	–0.03**	0.05**	–0.02	–0.02
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Labour market institutions						
Employment protection legislation$_{t-1}$	–0.40*	–0.15	–0.05	–0.05	0.30	0.59
	(0.24)	(0.46)	(0.44)	(0.30)	(0.63)	(0.57)
Tax wedge$_{t-1}$	0.01	–0.13***	–0.12***	0.02	–0.26***	–0.22***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)
Unemployment benefits$_{t-1}$	0.01	0.01	–0.00	0.01	0.01	–0.02
	(0.02)	(0.03)	(0.02)	(0.03)	(0.04)	(0.04)
Trade union density$_{t-1}$	0.03*	0.09*	0.07**	0.04	0.13**	0.09
	(0.02)	(0.05)	(0.03)	(0.03)	(0.06)	(0.06)
Coordination of wage bargaining$_{t-1}$	–0.51**	0.32*	0.20	–1.58***	1.06***	0.97***
	(0.24)	(0.17)	(0.14)	(0.31)	(0.28)	(0.21)
Socioeconomic factors						
Dependent population <15$_{t-1}$	–0.34***	–0.78***	–0.71***	–0.32*	–0.90***	–0.79***
	(0.12)	(0.16)	(0.14)	(0.15)	(0.19)	(0.13)
Dependent population ≥65$_{t-1}$	0.10	0.12	0.54***	0.01	0.19	0.58***
	(0.15)	(0.14)	(0.20)	(0.10)	(0.12)	(0.17)
Capital openess$_{t-1}$	0.00	0.00	–0.00	0.00	0.00	–0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
Trade openness$_{t-1}$	0.01	0.02	0.02**	0.02*	0.03**	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Real GDP per capita$_{t-1}$	0.22***	0.14***	0.28***	0.28***	0.09***	0.24***
	(0.06)	(0.05)	(0.07)	(0.04)	(0.03)	(0.08)
Shocks in labour demand	40.54**	50.19***	34.87***	35.36	66.72***	48.16***
	(18.31)	(14.31)	(10.36)	(32.97)	(11.83)	(11.12)
Constant	76.77***	87.59***	78.53***	73.23***	84.65***	69.01***
	(4.13)	(5.58)	(6.06)	(3.36)	(8.37)	(8.13)
Number of observations	339	339	339	339	339	339
Adjusted R-squared	0.982	0.990	0.991	0.532	0.666	0.712
Rho	0.855	0.634	0.622	n/a	n/a	n/a
Country fixed effects	No	Yes	Yes	No	Yes	Yes
Year fixed effects	No	No	Yes	No	No	Yes

Notes: Panel-corrected (columns 1-3) and Driscoll-Kraay (columns 4-6) standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

We are, however, most interested in columns 3 and 6, which contrast our preferred model and the same model estimated using Driscoll-Kraay standard errors. In the latter we do not find a statistical significant (negative) correlation for effort on maternity and parental leave and unions density, whereas we obtain a positive, statistically significant correlation for the centralisation of wage bargaining. Overall, the use of this estimation technique only marginally affects our original estimates. Effort on maternity and parental leave is the sole social investment policy that is affected. Although significance levels are different, the signs of the coefficients are still in similar directions.

In order to try and focus on longer time horizons relevant for some of the social investment policies, we also estimate a few models based on a different estimation technique that is able to capture short-term transitory effects and long-term structural effects: error-correction models (De Boef and Keele 2008). Given their wide application following the publication by De Boef and Keele, particularly in the field of comparative political economy, error-correction models have been scrutinised in recent years (e.g. Grant and Lebo 2016; Enns *et al*. 2017), amongst others with regard to the issue of unbalanced equations and their application to stationary data and dependent variables bound between an upper and lower limit such as the employment rate studied here. According to Lebo and Grant (2016) boundedness should not lead one to conclude stationarity. Instead, they suggest decision-making should be based on testing of the data using unit root tests and estimates of the order of integration. Such tests are, however, often inconclusive as they have size distortions and low power in small samples. Moreover, results of these test are affected by the choices analysts make with regard to the presence of deterministic trends, the number of lags to consider as well as the appropriate significance levels (e.g. Choi 2015). Besides, testing is even more complicated for bounded time series (Cavaliere and Xu 2014).

The ambiguity associated with these test is also reflected by our data. The Im-Pesaran-Shin unit root test for unbalanced panels suggests that all panels contain a unit root ($\bar{z}_{\tilde{t}}$ = 0.58; p = 0.72), even when including a linear trend ($\bar{z}_{\tilde{t}}$ = –0.90; p = 0.18). Only when using an average lag length of 0.69 in the ADF regressions following AIC the null-hypothesis cannot be rejected, meaning that at least some panels are stationary ($\overline{w_t}$ = –2.19; p = 0.01). If series are non-stationary Lebo and Grant (2016) argue that analysts should closely examine equation balance in order to determine whether the estimation of an error correction model is appropriate. Philips (2018) elaborates the solutions suggested by Lebo and Grant (2016) by using the bounds testing procedure developed by Pesaran, Shin and Smith (2001). This procedure helps analysts to test the existence of a long run relationship between the dependent variable and a set of regressors

when one is certain that the dependent variable is a unit root but uncertain about the dynamic properties of the regressors. This procedure hence requires analysts to establish first whether the dependent variable is non-stationary, by using "a suite of unit root tests and account for the possibility of periodicity, drift, and deterministic trends" (Philips, 2018, p. 232). However, it does not describe what to do if one is uncertain whether the dependent variable is stationary or not. Given the uncertainty about the properties of our dependent variable, the framework by Philips (2018) is therefore not entirely satisfactory.

Recently, Webb *et al*. (2019) provided an alternative approach that analysts can employ to test for the existence of long run relationships between y_t and x_t when there is uncertainty about the dynamic properties of *all* variables, including the dependent variable. Their approach builds on the bounds testing procedure proposed by Pesaran *et al*. (2001) and enables one to test for cointegration between the dependent variable and weakly exogenous regressors using the long run multiplier (LRM). When implementing the procedure described in Webb *et al*. (2019) we cannot reject the null hypothesis of no long run cointegration relationship for all variables, regardless of the dynamic properties of both the dependent variable and the regressors. This leads us to conclude that the error correction model is suited for our analysis. We estimate our error correction model in first differences according to the following equation:

$$\Delta y_{i,t} = \alpha_0 + \alpha_1 y_{i,t-1} + \sum_j \beta_0 \Delta x_{j,i,t} + \sum_j \beta_1 x_{j,i,t-1} + \varepsilon_{i,t} \quad (3)$$

Unlike in our time-series cross-section regressions we do not include country and year fixed effects because of the Nickell (1981) bias this would introduce in our model due to the inclusion of the lagged dependent variable and our relatively short time series ($T = 20$) vis-à-vis the cross-sectional dimension ($N = 26$). Nevertheless, we do apply PCSE and incorporate an AR(1) component for the error term. We impose some restrictions by estimating only long-term effects for variables that rarely change (EPL and the coordination of wage bargaining). We estimate our preferred model with and without shocks in labour demand, because we believe that the way in which this variable was calculated, amongst others by regressing current employment levels on its own lags, might interfere with the model specification chosen here.[34] We present

[34] Note that estimating the regression in error-correction form entails a substantial loss of observations. This is mainly because for several countries the time series are characterised by gaps in the (early) 1990s due to a lack of expenditure data on education. Whilst such gaps involve a loss of just a single observation in the time-series cross-section regressions, they entail a loss of two observations given the specification of variables in differences (instead of levels) in the error-correction model.

our results in a similar manner as Webb *et al.* (2019), whereby the first column of Table A7 presents the coefficients obtained for the lagged independent variables, column two the coefficients for the short-term transitory effects, column three the long-run multiplier $\left(\frac{\beta_1}{-\alpha_1}\right)$ and hence long-term structural effects, and column four the *t*-statistics for the LRM used to determine whether there is a long run relationship between the regressor and our dependent variable.

The results obtained using error-correction models are quite similar to those obtained from our time-series cross-section regressions. There are minor differences between the first model and the second model, which includes our variable capturing shocks in labour demand. Effort on ALMPs is positively associated with employment, both in the short and long term. In line with previous results we also obtain positive signs for the association between effort on care for the elderly and frail and employment in the short run. However, when controlling for shocks in labour demand the corresponding coefficient is not statistically significant. Despite the positive short-term association, the effort on this policy seems to be negatively correlated to employment rates in the long run.

For effort on early childhood policies we obtain positive coefficient estimates as well, although these are statistically not distinguishable from zero in the short run. While short run labour market effects associated with effort on this policy are likely to follow from parents' ability to reconcile work and family, positive long run effects might reflect the benefits that follow from early childhood development. Scholars have for instance found that children participating in early childhood education and care programmes develop cognitive skills that result in better outcomes during adolescence and adulthood in terms of educational attainment and labour market participation (e.g. Heckman *et al*. 2010; Havnes and Mogstad 2011).

For effort on education we obtain negative coefficient estimates, both in the short and long run. The negative short term association is, however, not statistically significant when we do not control for shocks in labour demand. Still, this negative long-run effect is surprising. It might be related to the kind of education that governments invest in. Hanushek *et al*. (2017) for instance find that while investments in vocational (as opposed to general) education have a positive effect on school-to-work transitions and thereby stimulate youth employment, they entail trade-offs. They show that these benefits in terms of increased youth employment are offset by decreased adaptability and hence lower levels of employment following technological change. Unfortunately our data do not enable us to test whether this mechanism might apply, because expenditures cannot be distinguished between general and vocational education.

Further, the negative estimates could follow from the use of effort on education as well. As has been argued above, educational attainment might constitute a better indicator. When we replace effort on education by the share of people aged 25-54 that attained at least primary education we obtain positive long-term effects for effort on ALMPs as well as care for the elderly and frail, early childhood policies and educational attainment itself (not presented here). We obtain no statistically significant estimates with regard to short-term effects of policies related to education.

As for effort on education, we obtain negative coefficients for efforts on and maternity and parental leave whereby the negative short-term association is not statistically significant when we do not control for shocks in labour demand. This negative long-term effect probably relates to the negative effects associated with long leave policies discussed above.

Table A7 Regressions of changes in employment and effort on social investment policies, 1990-2010

	(1)				(2)			
	$x_{i,t-1}$	$\Delta x_{i,t}$	LRM $x_{i,t}$	LRM t-statistic	$x_{i,t-1}$	$\Delta x_{i,t}$	LRM $x_{i,t}$	LRM t-statistic
Employment rate (prime working age)	–0.06**				–0.07***			
	(0.03)				(0.02)			
Effort on social investment policies								
Active labour market policies	0.01*	0.11***	0.14	20.18	0.01	0.07***	0.11	20.24
	(0.01)	(0.02)	(0.01)	(Beyond)	(0.01)	(0.01)	(0.01)	(Beyond)
Care for the elderly and frail	–0.01	0.17*	–0.11	–4.25	–0.01	0.08	–0.08	–4.55
	(0.02)	(0.10)	(0.03)	(Beyond)	(0.02)	(0.08)	(0.02)	(Beyond)
Early childhood policies	0.03	0.03	0.39	13.18	0.01	0.05	0.23	12.28
	(0.03)	(0.05)	(0.03)	(Beyond)	(0.02)	(0.03)	(0.02)	(Beyond)
Education	–0.04*	–0.02	–0.65	–16.97	–0.06***	–0.05**	–0.86	–27.31
	(0.02)	(0.04)	(0.04)	(Beyond)	(0.02)	(0.02)	(0.03)	(Beyond)
Maternity and parental leave	–0.02***	–0.01	–0.24	–23.58	–0.01**	–0.02**	–0.15	–24.30
	(0.01)	(0.01)	(0.01)	(Beyond)	(0.00)	(0.01)	(0.01)	(Beyond)
Labour market institutions								
Employment protection legislation	0.10		1.60	14.59	0.02		0.32	4.93
	(0.09)		(0.11)	(Beyond)	(0.06)		(0.06)	(Beyond)
Tax wedge	0.02	0.01	0.28	11.36	0.02*	0.02	0.33	20.20
	(0.02)	(0.04)	(0.02)	(Beyond)	(0.01)	(0.02)	(0.02)	(Beyond)
Unemployment benefits	0.01	–0.01	0.14	16.40	0.01*	0.01	0.13	30.49
	(0.01)	(0.03)	(0.01)	(Beyond)	(0.00)	(0.02)	(0.00)	(Beyond)
Trade union density	0.01	–0.03	0.11	20.27	0.01	–0.02	0.09	20.72
	(0.01)	(0.09)	(0.01)	(Beyond)	(0.00)	(0.05)	(0.00)	(Beyond)
Coordination of wage bargaining	–0.20**		–3.05	–35.11	–0.18**		–2.69	–43.18
	(0.08)		(0.09)	(Beyond)	(0.07)		(0.06)	(Beyond)
Socioeconomic factors								
Dependent population <15	–0.06	–0.25	–0.90	–14.65	–0.04	0.10	–0.61	–16.70
	(0.05)	(1.04)	(0.06)	(Beyond)	(0.03)	(0.61)	(0.04)	(Beyond)
Dependent population ≥65	0.02	0.21	0.38	9.47	0.03	0.80*	0.39	9.71
	(0.04)	(0.87)	(0.04)	(Beyond)	(0.04)	(0.47)	(0.04)	(Beyond)
Capital openess	–0.00	–0.00	–0.06	–12.60	–0.00	–0.00	–0.03	–10.69
	(0.00)	(0.01)	(0.00)	(Beyond)	(0.00)	(0.00)	(0.00)	(Beyond)

Trade openness	0.00**	0.02**	0.08	24.76	0.00***	0.02***	0.07	41.72
	(0.00)	(0.01)	(0.00)	(Beyond)	(0.00)	(0.01)	(0.00)	(Beyond)
Real GDP per capita	0.01**	0.51***	0.23	23.72	0.02	0.36***	0.25	25.50
	(0.01)	(0.07)	(0.01)	(Beyond)	(0.01)	(0.05)	(0.01)	(Beyond)
Shocks in labour demand					69.48***			
					(5.13)			
Constant	4.72*				5.00***			
	(2.42)				(1.75)			
Number of observations	285				285			
Adjusted R-squared	0.554				0.751			
Rho	0.249				0.450			

Notes: The long-run multiplier (LRM), LM_{SE} and LRM *t*-statistics are all estimated using the delta method and Bewley instrumental variables regressions. The *t*-statistics are reported as "Below" when $|t| < 1.00$, "Between" when $1.00 < |t| < 3.55$, and "Beyond" when $|t| > 3.55$ based on the critical values presented in Table 6 of Webb *et al*. (2019, p. 14). Panel-corrected standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix 5: Expanding the dependent variables in terms of gender, age and type of labour market participation

Hitherto we have exclusively focused on employment outcomes for the entire population of prime working age. There is however a vast literature that describes that labour supply elasticities of men and women are different (see for an overview and meta-analysis: Evers *et al*. 2008). Besides, social investment might yield different effects with regard to male and female employment as well. In columns 2 and 3 of Table A8 we have therefore estimated our preferred model again using the male and female population of prime working age as dependent variables. In comparison to the model for the entire population this shows that the positive correlation between employment and effort on care for the elderly and frail holds for the female population of prime working age whereas male employment rates are not associated with effort on this policy. This makes sense given that women are usually the ones providing care to elderly and frail relatives. We obtain statistically significant, negative coefficient estimates for effort on education and maternity and parental leave in relation to male employment only. These results are puzzling. There seems to be no reason to believe that any effects with regard to education differ between men and women. Besides, maternity and parental leave predominantly affect the female population, which makes it surprising to find a statistically significant coefficient for the male population only, unless cash benefits received by the mother are so generous that they allow male spouses to remain at home as well.

With regard to the control variables, the results obtained for female employment are similar to those obtained for the overall employment. With regard to male employment the tax wedge, aged and young dependent population, trade openness and real GDP per capita are no longer statistically significant. This is probably the result of lower variation in male employment rates over time. Moreover, since men tend to be the main breadwinners of the household and not the main providers of care, they can be expected to be less sensitive in changes in the tax wedge and the size of the aged and young population.

In columns 4-6 we have estimated similar models that refer to the population of working age (15-64) instead of prime working age (24-54). The models are identical to those in columns 1-3, except that shocks in labour demand relate to shocks in demand for the population of working age specifically. The coefficient estimates obtained for these models very closely resemble the estimates obtained for the population of prime working age. For the male population we now obtain statistically significant, positive estimates for effort on care for the elderly, the dependent population above 64 and real GDP per capita. It could be that men do provide care to frail relatives (e.g. their spouses) at higher ages (55-64) as a result of which

Table A8 Regressions of employment and effort on social investment policies, 1990-2010

	Prime working age (25-54)			*Working age (15-64)*		
	(1)	(2) ♂	(3) ♀	(4)	(5) ♂	(6) ♀
Effort on social investment policies						
Active labour market policies$_{t-1}$	0.13***	0.10***	0.17***	0.15***	0.13***	0.17***
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
Care for the elderly and frail$_{t-1}$	0.17**	0.09	0.23**	0.21***	0.18*	0.19**
	(0.07)	(0.11)	(0.09)	(0.07)	(0.10)	(0.08)
Early childhood policies$_{t-1}$	–0.04	–0.05	–0.01	–0.07	–0.07	–0.04
	(0.04)	(0.05)	(0.07)	(0.05)	(0.05)	(0.06)
Education$_{t-1}$	–0.05	–0.17**	0.05	–0.06	–0.14**	0.02
	(0.05)	(0.07)	(0.06)	(0.05)	(0.07)	(0.06)
Maternity and parental leave$_{t-1}$	–0.03**	–0.05**	–0.02	–0.02*	–0.03**	–0.01
	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Labour market institutions						
Employment protection legislation$_{t-1}$	–0.05	0.58	–0.55	–0.38	0.01	–0.66
	(0.44)	(0.47)	(0.62)	(0.41)	(0.43)	(0.53)
Tax wedge$_{t-1}$	–0.12***	–0.06	–0.17***	–0.11***	–0.07	–0.13***
	(0.04)	(0.06)	(0.04)	(0.03)	(0.06)	(0.03)
Unemployment benefits$_{t-1}$	–0.00	–0.02	0.01	0.01	0.01	0.01
	(0.02)	(0.04)	(0.03)	(0.02)	(0.03)	(0.03)
Trade union density$_{t-1}$	0.07**	–0.12**	0.24***	0.06*	–0.08*	0.18***
	(0.03)	(0.05)	(0.06)	(0.03)	(0.04)	(0.05)
Coordination of wage bargaining$_{t-1}$	0.20	0.23	0.12	0.19	0.21	0.03
	(0.14)	(0.27)	(0.26)	(0.15)	(0.26)	(0.21)
Socioeconomic factors						
Dependent population <15$_{t-1}$	–0.71***	–0.35	–1.00***	–0.52***	–0.41	–0.57**
	(0.14)	(0.29)	(0.23)	(0.14)	(0.27)	(0.22)
Dependent population ≥65$_{t-1}$	0.54***	0.01	0.99***	1.04***	0.71***	1.31***
	(0.20)	(0.25)	(0.28)	(0.22)	(0.26)	(0.28)
Capital openess$_{t-1}$	–0.00	0.00	–0.00	–0.00	0.00	–0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade openness$_{t-1}$	0.02**	0.01	0.03*	0.02**	0.01	0.02
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Real GDP per capita$_{t-1}$	0.28***	0.10	0.44***	0.37***	0.24**	0.48***
	(0.07)	(0.12)	(0.08)	(0.07)	(0.11)	(0.08)
Shocks in labour demand	34.87***	33.54**	35.11***	26.68***	29.16***	23.27***
	(10.36)	(15.93)	(9.14)	(8.28)	(10.46)	(7.63)
Constant	78.53***	100.17***	57.79***	60.36***	78.84***	41.89***
	(6.06)	(9.83)	(8.21)	(6.22)	(9.53)	(7.37)
Number of observations	339	339	339	339	339	339
Adjusted R-squared	0.991	0.992	0.982	0.988	0.990	0.982
Rho	0.622	0.590	0.675	0.579	0.610	0.656

Notes: All regression include country and year fixed effects (not presented here); panel-corrected standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

the coefficient turns statistically significant when focusing on the population of working age. For the female population of working age we fail to obtain a statistically significant estimate for trade openness.

Instead of focusing on employment rates, we also ran regressions using labour market participation rates. The numerator used to calculate labour market participation rates is different from the numerator used to calculate employment rates as it includes both those people that are employed and those officially unemployed but looking for a job.[35] Labour market participation is hence broader then employment. We consider this distinction relevant because social investment policies might stimulate labour market participation, but do not necessarily have to result in employment increases if the increased supply of labour is not matched with higher levels of demand. When estimating regression models of labour market participation rates for the total, male and female population of prime working age and working age (not presented here), we find that social investment oriented ALMPs are the only social investment correlated with higher participation rates. Put differently, higher effort on ALMPs is associated with higher labour market participation, but for the other policies we fail to find statistically significant effects.

[35] The denominator is on both cases the population of (prime) working age.

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