

# Eu Social Cit

European Social Citizenship

## The role of social investment in the life course: possible reduction in vulnerability and gender gaps

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# Summary

The paper contributes to the ongoing debate on social investment returns and their measurement. Following the conceptual framework developed by (Vandenbroucke et al., 2021) and its use to depict different social investment strategies in Europe by (Baiocco et al., 2021), we attempt to find out whether these strategies produce different outcomes. Our focus is on the role of social investments in reducing vulnerabilities over the life course, considering the observed outcomes in the areas of education, employment, labour income as well as public consumption and net public transfers. Thus, we refer mainly to social investment outcomes related to strengthening human capital and facilitating labour market transitions. Moreover, we also consider gender aspects, as they matter for life opportunities and risks.

The study is carried out at the national level and makes use of the country clusters distinguished by (Baiocco et al., 2021). The two methodological approaches were applied in searching response to the main research questions:

- (1) Do different social investment strategies relate to different outcomes defined in terms of generational economy?
- (2) How do different social investment strategies and access to formal and informal childcare relate to the gender gaps in the labour markets?

Firstly, the National Transfer Accounts (NTA) data allow to reveal how welfare state policies shape the life course of women and men discussed in terms of generational economy variables (the first research question). Secondly, the special dataset was created to analyse labour market inequalities by gender and some domains of vulnerabilities that can be prevented by social investment: unemployment, poverty, and health at old age and limited access to early childhood education and care services. Here, panel regression models were a default method.

Findings of the NTA approach show that the three types of social investment strategies considered are associated with different outcomes by gender, depicted in differently structured life trajectories. In the cluster 1 with developed social investment policies, both women and men show higher labour market attachment, higher lifetime earnings and longer working careers. The gender gap is the smallest in total consumption, as well as public education consumption. In the other two clusters, where social investment policies are less developed, the age profiles of wages indicate more

vulnerability on the labour market, particularly in old age, and a lower lifetime income. More reliance on welfare policies is noticed there. Gender gaps in public education consumption are also larger. In the cluster 3 the relative public education consumption is smaller, compared to the other two clusters. It is also worth noting differences in gender gaps in relation to labour income.

Regarding the second research question, the role of social investment strategies in reducing the labour market gender gaps was confirmed. In particular, the better provision and use of the early childcare and education do not only contribute to early investment in human capital, but also to lowering gender gaps in the labour market. However, various childcare indicators show different effects for the employment and pay gender gaps, revealing that the associations between selected indicators of this type of social investment and gender gaps in the labour market are not always straightforward. To explore them, more insights are needed in the labour market structures and economic activity patterns over the life course on one hand, and formal and informal childcare arrangements on the second hand. As informal care arrangements reflect also social perception about obligations for childcare, the cultural context needs to be accounted for also.

The study provides a description of the current and historical relationships between gender gaps on the labour market and different social investment strategies, but they do not offer causal explanations.

## Role of social investment in the life course: reducing vulnerability and gender gaps

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<b>Work package</b>	<p>EuSocialCit is an interdisciplinary research project aiming to support the EU in strengthening social rights and European social citizenship. It evaluates the current state of social rights in Europe and their relationship to social inequalities, gender inequalities, poverty, and precariousness, and diagnoses the shortcomings of current policies and institutions at the level of individual countries and the EU.</p> <p>The EuSocialCit project focusses on three domains in which social rights are important: the empowerment of citizens (e.g., education and activation), fair working conditions and social inclusion. Each of these domains are respectively studied as part of WP3, WP4 and WP5.</p> <p>This report is produced as part of WP3 which is entitled “<i>empowerment through social investment</i>”. This WP focuses on social rights that are associated with the aspiration of empowerment: rights that enable citizens not only to fully share in the social heritage, but also to further develop this heritage.</p>
<b>Web address</b>	For more information about the EuSocialCit project, please visit <a href="http://www.eusocialcit.eu">www.eusocialcit.eu</a> . EuSocialCit’s output can also be found in its community on Zenodo: <a href="https://zenodo.org/communities/eusocialcit">https://zenodo.org/communities/eusocialcit</a> .

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# 1. Introduction

For a long time, the welfare systems in Europe were based on the three foundations: family, work, and welfare. However, these institutions became a source of vulnerability, due to their inadequate evolution related to global developments (Esping-Andersen, 1999). 'New' social risks have been brought about by both labour market transformations and societal changes, generated by demographic ageing, gender and family changes, increased ethnic and cultural diversity of societies and imposed welfare state reforms resulted in social investment policies (Esping-Andersen, 2002, Bonoli, 2007; Hemerijck, 2013; Morel et al., 2012).

The main goal of social investment policies is to improve people's life chances by preparing and supporting individuals to face emerging risks. These policies refer to investment in skills and education (from early education to learning of the adults), active labour market programmes, supporting parents and other carers in their care obligations as well as services which capacitate and enable independent living with increasing fragility and disabilities. Social investment supports the social citizenship by advancing social rights, which are exercised by individuals through the access to power (normative, instrumental and enforcement) resources that guarantee access to social rights (Vandenbroucke et al., 2021). The emerging new risk affect people at different stages of their life courses, however particularly at early and late stages of life (Blossfeld et al., 2005; Schröder-Butterfill & Marianti, 2006; Hudson, 2016). In this working paper we combine three perspectives: social investment, a life course and vulnerability. One of the goals of social investment policies is to empower citizens to deal with the risks of vulnerability that emerge at different life stages.

The life course research is an interdisciplinary framework that has developed as the mainstream approach in social and psychological sciences since the 1980s (Mortimer & Shanahan, 2002). As underlined by (Mayer, 2009) and (Shanahan et al., 2016) it is currently a mature strand of research widespread in social sciences, with the longitudinal data collection and analysis becoming a gold standard for quantitative social science. The institutions in the life course context are one of the important areas of research in the life course framework (Kohli, 2007; Mayer, 2005, 2009), including in particular the structure of the life course of men and women (Anxo et al. 2010, Diewald, 2016, Hagestad & Dykstra, 2016).

The vulnerability research, originated from environmental vulnerability and has extended to social and psychological vulnerabilities. The definition proposed by (Spini et al., 2017) is a lack of resources in one or more life domains, which given a specific context, places individuals or groups at a major risk of experiencing (1) negative consequences related to the sources of stress, (2) the inability to cope effectively with stressors, and (3) inability to recover from the stressor or to take advantage of opportunities before a given deadline.

Both life course and vulnerability research are interested in how interindividual differences and social inequalities are constructed, while the social citizenship approach focuses on the access to resources that can reduce the inequalities and enhance abilities to cope with the negative stressors. This definition is based on the idea that a life course is a process that involves gaining and losing resources as well as chronic stress or stress related to the critical events or life transitions. These resources include biological, psychological, social resources of individuals as well as power resources.

Our study focuses on the role of social investments in reducing vulnerabilities over the life course, considering the observed outcomes in the areas of education, employment, labour income as well as public consumption and net public transfers. Thus, we refer mainly to social investment outcomes related to strengthening human capital and facilitating labour market transitions.

We also consider gender aspects, as they matter for life opportunities and risks: gender differences are visible in the family life, education, labour market, health, and social relations. Gender issues, such as reconciliation of work and family life are also inherent to the social investment strategy (Kvist, 2015). Our analysis is carried out at the national level and makes use of the country clusters, developed by (Baiocco et al., 2021) to depict different social investment strategies in Europe. They identified the three groups of countries, which constitute the main comparative framework for our study.

The study is driven by the two main research questions:

- (3) Do different social investment strategies relate to different outcomes defined in terms of generational economy?

Here, we investigate the age profiles (separately for men and women) of labour income, consumption, lifecycle deficit as well as public transfers and public consumption developed using the National Transfer Accounts methodology (Lee & Mason, 2011; Population Division. Department of Economic and Social Affairs. United Nations, 2013) in the AGENTA project (Istenič et al., 2016).



(4) How different social investment strategies and the access to formal and informal childcare relates to the gender gaps on the labour markets?

Here, we explore gender inequalities in the labour market and possible impacts of childcare on the employment and pay gender gaps at different stages of the life course. Thus, we aim to find a link between social investment outputs and women's labour market vulnerability.

Our study might be located within the debate about social investment returns and their measurement, especially when considering views exchanged recently (Plavgo & Hemerijck, 2020; Parolin & Van Lancker, 2021; Hemerijck & Plavgo, 2021). Similarly, to the approach by Plavgo & Hemerijck (2020), we focus on a macro level to investigate whether cross-country differences in social investment policies are associated with different life outcomes (defined here in terms of generational economy and gender gaps in the labour market). Our cross-sectional study refers predominantly to the country-clustering according to social investment strategies by (Baiocco et al., 2021), which employs the multidimensionality of welfare provision concept. Therefore, we follow this conceptualisation, clarified additionally by Hemerijck & Plavgo (2021: 312-313). Moreover, the life course perspective applied reflects our conviction that possible social investment effects need to be captured within a broad time frame, also mentioned in this debate.

The paper is structured as follows. First, we present a brief literature review related to a life course perspective on vulnerability and social investment. Then, we describe our methodology and data. In the subsequent section we discuss the results. The concluding remarks close the paper.

## 2. Literature review

### 2.1 Life course perspective on vulnerability

The dynamic framework of vulnerability from a life course perspective proposed by (Spini et al., 2013) is based on the four main concepts: resources, stressors, outcomes and contexts. They define vulnerability as a lack of resources, which in a defined context, places individuals or groups at major risks of experiencing negative consequences in their life course. Such a definition is compatible with the social rights approach, and the notion of power resources that are important to ensure the citizens' access to social rights.

In the past decades, the developed countries experience significant changes: shift to the post-industrial economies and societies, globalization, changing lifestyles. (Spini et al., 2013) list the five general features of growing uncertainty: (i) new social risks, including family discontinuities and increased demand for flexibility on the labour market; (ii) individualisation and biographisation paradox, understood as a decline of physical and mental health related to the long-term exposure to pressures and stress by people being agents of their own life course; (iii) diffusion of stress across life domains and between related individuals in a context of contingent life courses; (iv) welfare state dilemmas, as welfare institutions as a result of declining resources or political will are less able to provide an efficient response to the new social risks and (v) persistent and growing inequalities.

The new forms of insecurity and instability are mainly seen related to the three foundations of European societies: work, family and welfare (Ranci, 2009; Bennett et al., 2019).

In the case of work, the break of the industrial wage-earner model leads to the weakening of the labour market function as the principal mechanism of social integration. The labour market vulnerability is shaped by various forces, including globalisation, technological change, as well as intersection of work and family lives, including care responsibilities and need for flexible hours (Saunders, 2003). The vulnerable workers include groups that have limited access to social protection and welfare institution due to their type of work (self-employed, non-standard workers) or because of their lack of awareness or reluctance to use their rights, as they fear to lose their jobs or people with a history of low-wage jobs or instable employment (Saunders, 2003; Spasova et al., 2017). The job insecurity frequently

affects young workers, who have limited work experience, affecting their transition to stable employment and frequently leaving the *scarring effect* for the later stages of their life courses (Arulampalam, 2001; Arulampalam et al., 2001; Schmillen & Umkehrer, 2017). The labour vulnerability can be measured by comparing employment rates, labour market status or subjective job insecurity (Marx & Picot, 2020). As shown by (Scicchitano et al., 2020) using the example of Italian workers, there is a pay gap between secure and insecure workers, with the sticky floor phenomenon. In our analysis we focus on the employment gaps at different stages of the life course, as one of the most used measures of labour market vulnerability. The labour market vulnerability correlates also with social policy preferences expressed by households, from the perspective of their economic dependence (Häusermann et al., 2016).

The families in Europe are also changing. The gradual weakening of kinship support networks as a consequence of new demographic trends and of the reorganization of households is another source of vulnerability that emerges in the life courses of people (Ranci, 2009). Family-related behaviours have become highly complex and depict increasingly diverse family biographies. They are marked by delayed entry to adulthood, diverging patterns of family formation and dissolution, and 'diverse, delayed and below replacement' fertility (Frejka & Sobotka, 2008; Olah et al., 2018). In result, beside still the dominant model of married couple with children different family types are frequent: cohabiting couple, single parents, reconstituted families, Living-Apart-Together unions and the so-called patchwork families (Kvist, 2015).

Changing patterns of family-related demographic behaviours have also been accompanied by changes in the organisation of family life, including family relations, gender roles, and family values. An increasing 'family fluidity' reflects a fundamental shift in the social organisation of intimacy and social contacts, increasing individualisation and growing diversity of the partnership forms (Daly, 2005; Saraceno, 2008). Moreover, extended longevity results in the verticalization of kinship networks. The evolution of kinship relationships transforms the nature of kinship ties and exchanges within and between generations, challenging the established norms about filial responsibilities, shaped by country-specific economic, cultural, and institutional settings (Daly, 2005; Saraceno, 2008; Hagestad & Dykstra, 2016).

In parallel, increasing female labour force participation and evolving expectations on women's and men's behaviours in the society-imposed shifts in a division of labour and care responsibilities between women and men as well as their rights and obligations within and outside families (Manson & Jensen,

1995). Balancing between individualisation and family solidarity, the family model has been transformed and male breadwinning has been gradually replaced by sharing economic provision between women and men. The traditional male breadwinner model is still persisting in many countries, and many families also adopt the one and a half income models to reconcile work and family obligations, with women working part-time. Furthermore, the dual-earner model is increasingly practised (Olah et al., 2018), particularly among young couples without children (Pavolini & Ranci, 2010). However, the transition to a dual earner-dual career model is still not completed, and the unequal distribution of responsibilities within the household still concerns many couples. This “incomplete revolution” is another source of vulnerability, particularly in case of women (Esping-Andersen, 2009).

The third source of vulnerability is the rigidity of welfare systems that are slowly adapting to the emerging risk profiles. There are main four processes that are of particular importance: social risks related to the balancing of employment and family obligations, particularly for women with low skills; population ageing and demographic change, including the increased share of older people that require care, that leads to a rising tension between care responsibilities and employment; labour market changes including the demand for increased and new skills; shift towards private sector in response to the pressures experienced by the public systems (Taylor-Gooby, 2004). The dominant social protection model is based on the notion of full integration on the labour market and frequently based on the social contributions levied on wages. With the labour market changes and new risk profiles, these traditional systems are not organized to provide adequate responses (Esping-Andersen, 1999). The first demographic dividend that was a main driver behind the development of the welfare systems in Europe is no longer available (Mason et al., 2016).

The new social risks are the source of social vulnerability that people are exposed to at different stages of life course. (Ranci et al., 2014) characterise those vulnerabilities as: an uncertain access to fundamental material resources (a wage and/or welfare benefits) and/or by the fragility of the family and community social networks. It is characterized a resources deficit and an exposure to social disorganization, that can lead to the instability of everyday life. As a result, the autonomy and capacity of individuals and families for self-determination can be affected by uncertainty that can lead to the risk of exclusion. Furthermore, it can translate to reduction of opportunities in later stages of the life course. As they underline, the reduction of opportunities stems not only from the scarcity of resources tout court, as by the instability of the mechanisms used to obtain them. Ensuring access to power

resources, that in turn support individuals to build their individual and social resources is therefore one way to reduce the potential vulnerability.

The role of national and local policies in shaping vulnerability risks are also analysed in the literature. (Whelan & Maître, 2010) using the EU-SILC data show that the share of vulnerable population is higher, particularly in the post-socialist regimes, which are also identified as a sprouting-up cluster by (Baiocco et al., 2021). The national welfare regimes, however, can be also filtered by the locally specific social, demographic, economic and political features, that differ for example between big cities and smaller ones (Ranci et al., 2014). While this is outside the scope of our analysis, these differences indicate, that the power resources can be delivered differently depending on the local context.

The outburst of the COVID-19 pandemic revealed new risks that contribute to the increased exposure to vulnerabilities. Lockdown measures, including school and business closures lead to the rising inequalities in access to education, as well as exposure to the labour market risks, particularly those with non-standard employment (Settersten et al., 2020).

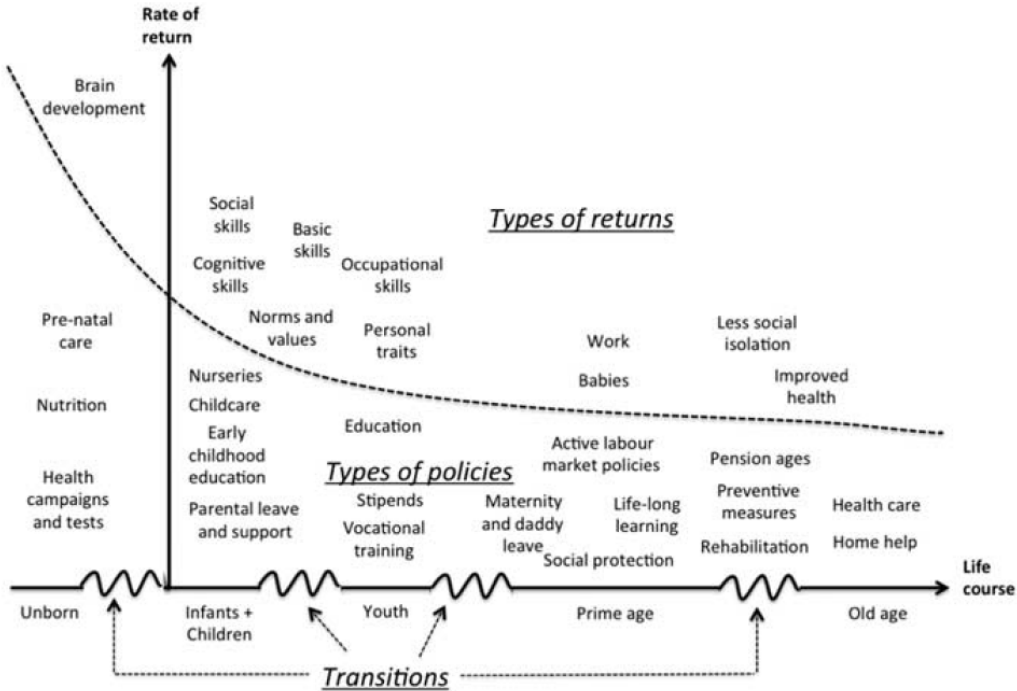
## 2.2 Life course perspective of social investment

Social investment policies can be targeted at particular life course stages as well as overlap in terms of life course effect (Kuitto, 2016; Hemerijck, 2017; Plavgo & Hemerijck, 2020). The particular types of policies are aimed to generate different types of returns, which also depend on the stage of the life course, as shown in (Kvist, 2015).

At the prenatal stages, the health policies addressed to pregnant girls and women, particularly in situation of high-risk factors can support healthy development of the fetus. Lack of such policies can lead to problems such as bad brain development, cardiovascular diseases, or diabetes in adult life (Barker, 1998; Hannon, 2003). Early investment in children is conducive to their skills development and achievements in adolescent and adult lives (Heckman, 1999, 2006, 2008; Felfe & Lalive, 2018; Shuey & Kankaraš, 2018). The returns on investments in early development are the highest for children from disadvantaged background, who are exposed to vulnerabilities (Heckman, 2006; Havnes & Mogstad, 2011a; Magnuson & Duncan, 2016; Blossfeld et al., 2017). A broad range of studies on effects of early learning and long-term outcomes strongly supports that ensuring the right to a quality childcare is one of the most powerful social investment policies. Following the life course perspective, investment in students' skills is important to improve overall outcome, but also reduce the share of underachieving

students, which is also underlined in the EU education and training goals (European Commission, 2021). As shown by (Hanushek & Woessmann, 2012), better students' achievements are conducive to higher economic growth, which is an important return to social investment policies.

The transition from education to the employment can be seen as a “checkpoint” of the efficiency of social investment in early life stages. During the prime age, social investment policies are aimed at supporting access to good quality work, which is important both for individual life chances, reducing health and labour market risks, such as unemployment or precarious employment (Marmot et al., 2012; Plavgo & Hemerijck, 2020). Active labour market policies, access to lifelong learning and social protection are a social investment that prevents exposure to vulnerabilities (Kvist, 2015).



Source: Kvist, 2015

One of the benchmarks of the assessment of the social investment returns is an employment rate, including the population in working age, but also at specific stages of the life course (including the age of entry to the labour force and older workers). The active ageing policies are a synonym of the social investment for the elderly (Kvist, 2015).

The life trajectories of people are diverse – their family, education, work, social relations vary by age, sex, migrant status, social class as well as socio-economic environment, including the social investment strategies. One of the important examples of differences in life course are gender differences, that are visible in the economic life course (Kvist, 2015). Namely, women consume more and contribute less to public policy in the economic terms, while at the same time they also contribute more to the household economy (Gál et al., 2016; Vargha et al., 2015). According to the life course perspective, social investment measures should be taken at earlier stages to better share care and housework, to establish equal opportunities in the labour market and alter norms and values in society about gender, care and work (Kvist, 2015). Therefore, we investigate the life course perspective on social investment considering gender differences and gender gaps.

## 3. Data and methodology

### 3.1 Economic lifecycle

In the analysis of the economic lifecycle, we use the data on the age profiles of the national transfer accounts (NTA). National Transfer Accounts (NTA) aim to improve our understanding of the economic consequences of demographic changes by introducing demographic information into the System of National Accounts.

The European NTA 2010 data, developed within the EU-funded project AGENTA<sup>1</sup> provide comprehensive and detailed age- and gender-specific economic data on income, transfers, consumption and saving in the year 2010 for 25 EU countries (Istenič et al., 2016). The NTA database has been prepared by extensive calculations data coming from existing administrative, demographic and survey data, including the income (EU-SILC) and the household budget surveys from the harmonised Eurostat data for 2010. The harmonisation ensures that the estimated age profiles are comparable and reflect differences in public institutions and welfare regimes between countries. These data allow to study relationships between age, economic activity, and the organisation of intergenerational transfers, including public ones.

In the NTA approach, at each age ( $x$ ) individuals have a certain level of consumption. Those who are economically active finance their consumption from the labour income ( $Y^l$ ). If the labour income is not sufficient, the lifecycle deficit ( $LCD$ ) appears. The LCD is financed from net transfers (public and private), that is a difference between transfers received and paid ( $\tau^+(x) - \tau^-(x)$ ) by age as well as the reallocation of resources ( $Y^A(x) - S(x)$ ). This is expressed by the following equation:

- $LCD(x)$  –lifecycle deficit,
- $C(x)$  –consumption, comprising public and private consumption that is used for health, education, and other purposes,
- $Y^l(x)$  –labour income,
- $\tau^+(x)$  –transfers received (public and private),

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<sup>1</sup> The project “Ageing Europe: An application of National Transfer Accounts (NTA) for explaining and projecting trends in public finances (AGENTA) was financed under the 7th Framework Programme.



$\tau^-(x)$	–transfers paid (public or private),
$Y^A(x)$	–income from assets,
$S(x)$	–savings.

The working-age people (generations) earn income, which is used to finance their consumption, but also generate transfers that are used to finance the consumption of both children and the senior generations, either directly through private transfers or indirectly by using public transfers. How much is provided as public transfers and public consumption is determined to a large extent by the existing welfare state institutions (Chłoń-Domińczak et al., 2019).

For our analyses we consider the age and gender profiles of labour income, consumption, the resulting lifecycle deficit as well as public transfers. The public transfers inflows and outflows, which can be seen as outcomes of social investment and welfare policies, are assessed according to the NTA manual (United Nations Department of Economic and Social Affairs Population Division, 2013: 113). Public transfer inflows include flows received by the beneficiaries of all public programmes, broadly measured to include cash transfers and all in-kind transfers defined to be equivalent to public consumption. In-kind transfers regard both public goods and services that are readily assignable to individuals, e.g., public education (from pre-schools to higher education) or publicly provided health care, and collective goods and services including government administration, public safety, and national defence. Public transfer outflows are defined as current flows from each age group (or the rest of the world) that fund public transfer inflows, including taxes, social contributions, and grants to the government. At each age, we can assess the net public transfers reflecting the social investment perspective at the specific stages of the life course. They include investment in education and care at early stages of life, and net transfers of women and men in the childbearing and childrearing age, relevant for supporting reconciliation of work and family lives. The larger net inflows received by women also indicate the lower public transfer outflows (Kvist, 2015).

Using the national NTA data estimated for 2010, we have developed the average profiles of countries grouped as proposed by (Baiocco et al., 2021). They identified the three groups of countries according to their social investment strategies:

Cluster 1: **All-in cluster**, with countries that have high expenditure in all areas of social investment. They provide universal access to childcare facilities and generous leave policies (Germany, Finland, Sweden, Denmark, France, Belgium, and Luxembourg), as well as those that do not provide universal access, but offer generous leave policies (Austria and the Netherlands). With regards to education

policies, the length of universal education ranges from 8 to 11 years. Many countries in this group also provide universal free access to education (Scandinavian countries and Germany), while in Austria there are relatively small fees. Higher education fees in France, Belgium, Luxembourg, and the Netherlands are paid by students, and students' grants cover less than half of the students. The active labour market policies are widely available to both employed and unemployed people.

Cluster 2: **Stripped-down strategy**, comprising Portugal, Italy, Malta, Cyprus, and Ireland. These countries are characterized by medium spending in main areas of social investment, with social investment orientation toward later ages. They do not provide universal access to childcare, and the income replacement for the leave policies is relatively low. The period of compulsory education is between 9 and 11 years. Cyprus and Malta have high coverage of higher education, while Ireland, Italy and Portugal have high annual fees for tertiary education. Activation measures for working-age population are strict in Italy and Malta.

Cluster 3: **Sprouting-up cluster** comprising countries in Central and Eastern Europe (Poland, Hungary, Czech Republic, Estonia, Latvia, Lithuania) as well as Southern Europe (Bulgaria, Romania, Slovenia, Croatia, Greece, and Spain) is characterized by low to medium overall expenditure in all areas of social investment. The coverage of the ECEC policies is relatively high for children aged 3 years and more, accompanied by higher parental leave spending compared to childcare services. The compulsory education ranges from 7 years in Bulgaria to 10 years in Lithuania. Access to higher education varies, with free access to higher education in Greece and mixed policies in the rest of countries. These countries also have mixed approach to the ALMPs.

To investigate how these social investment strategies are associated with life course patterns, we analyse separately the age profiles for men and women as well as the gender gap at each age averaged for countries in each of the clusters.

## 3.2 Social investment and gender gaps in the labour market

The analysis of gender inequalities in the labour market and their changes concerning social investments outcomes requires the indicators that measure them across countries and in time. Therefore, we created a dataset that includes both indicators of labour market inequalities and some measures referring to three areas/domains of vulnerabilities that can be prevented by social investment: unemployment, poverty, and health at old age and a limited access to early childhood education and care services. These indicators have been observed in different countries over time, so

panel regression models are a default method of finding the relationships between labour market inequalities and other measures.

As indicators of gender inequalities in the labour market two indicators have been selected: the gender employment gap and the gender pay gap. The gender employment gap (GEG) shows differences in employment rates between men and women. Apart from the measure provided by EUROSTAT for the whole working-age population, additional indicators are also provided to reflect gender gaps at different stages of the life course, which are depicted by age: 15-24, 25-49 and 50-64 years. These indicators have been obtained by subtracting the employment rate for women from the employment rate for men for each age group. The gender pay gap (GPG) is available in EUROSTAT data in unadjusted form, which means that this measure does not account for different characteristics of women and men. To partially consider the fact that measures used are raw due to a lack of characteristics by gender, we include in each regression a tertiary education gap, so the difference in rates of tertiary-educated women and tertiary-educated men is considered.

Unemployment is measured with two indicators: the actual unemployment rate (calculated in addition separately for the three age groups: 15-24, 25-49, 50-64), and the long-term unemployment rate (as well in the three age groups).

Poverty is represented by the gender gap in the two indicators which refer to probabilities of being at risk of poverty or social exclusion and in-work at-risk-of-poverty. The former is the difference between the percentages of males and females being at risk of poverty or social exclusion while the latter is defined as the difference between males and females in-work at-risk-of-poverty rates. These measures are also provided for the total population, and the three age groups separately.

The health status of the elderly is depicted by the number of expected healthy life years at age 65 (Healthy Life Years – HLY), the subjective indicator based on the EU-SILC data. The gap between men and women is provided.

Potential relationships between labour market inequalities and poverty have been analysed using two indicators. First, the share of the employed persons who experience the risk of poverty. The second indicator refers to all persons in the population and their probability of being at risk of poverty or social exclusion. However, in this analysis we do not use the raw indicators that can be influenced by many country-specific factors but differences between values of the indicators for men and women in each

country and each year. So, we use indicators that reflect the relative frequency of poverty among men in comparison to women instead of the measures which describe poverty in each country in general. In our analysis, we have also added important control variables like the difference between the healthy life years at age 65 between women and men and the statutory retirement age.

Finally, we put our interest also in childcare support. Therefore, we look at indicators of access to care and education services and their relationship to employment and pay gaps. We focus on formal and informal services for small children, and namely, we collect data on the average number of weekly hours of formal services and other types of care (childminders or grandparents). Eight indicators provided by EUROSTAT and based on EU-SILC data are used. The variables are provided for two age groups separately: children aged 0-3 and 3 to minimum compulsory school age. Additionally, the averages are provided for all children (including those who do not use formal or informal care), and only for those who use this type of care. The averages on the total population are treated as coverage indicators of such type of care services, while averages that consider only those who use care service for at least one hour as indicators of usage intensity.

Table 1 presents comparisons between mean values of four variables regarding formal and informal care which refer to: coverage (the average number of hours including those who do not use it at all, with zeros) and usage intensity for children below 3 years. Histograms of these variables are available in Appendix 2.

Looking at means, we can see that the differences in coverage and usage intensity between formal and informal care are significant for all variables considered, with a leading role of formal care. Usage intensity of formal care is much higher among older kids than those below 3 years. If formal care is used, then its usage intensity is similar for children below 3 years and older than 3 years. Informal care is much less popular among older kids in terms of coverage and usage intensity, which might be driven by the fact that in most countries in the sample formal care services are predominantly provided by the state and less expensive for parents.

The average number of hours of formal care among children with at least one hour of it is equal to around 30 hours which is only 75% of the full-time work week. Lacking 10 hours can be a result of part-time work of parents (mainly mothers) and usage of informal care.

**Table 1. Descriptive statistics of care variables and comparison between formal and informal care**

AVERAGE number of hours	<i>Formal care</i>	<i>Informal care</i>	<i>T-test</i> <i>(H0: different means)</i>
	<i>Mean (std dev)</i>	<i>Mean (std dev)</i>	<i>p-value</i>
Coverage: children below 3 years (total)	<b>8.48</b> (6.28)	<b>7.12</b> (5.82)	0.0013
Usage intensity: children below 3 years (with at least 1 hour of care)	<b>30.11</b> (7.06)	<b>22.47</b> (7.93)	0.0000
Coverage: children from 3 years to minimum compulsory school age (total)	<b>25.26</b> (6.35)	<b>5.24</b> (4.14)	0.0000
Usage intensity: children from 3 years to minimum compulsory school age (with at least 1 hour of care)	<b>31.30</b> (5.61)	<b>17.03</b> (6.75)	0.0000

Notes: Table presents mean values, standard deviations, and T-test p-values of childcare variables. Columns (1) and (2) shows the average number of hours (in the parentheses standard deviation of hours) calculated for the whole sample of countries and years. Column (3) shows p-values of t-test comparing the same type of variable for formal and informal care.

Table 2 presents how formal and informal care are combined for both groups of children by referring to the results of the correlation analysis. When it comes to coverage variables, formal care, and informal care of both younger (below 3 years) and older (between 3 and minimum compulsory school

age) children substitute each other<sup>2</sup>, while for the intensity of usage formal care is complementary to informal care.

**Table 2. Correlation between the average number of hours of formal and informal care**

AVERAGE number of hours	Children below 3 years	
Correlation coefficients (p-value)	Informal care (total)	Informal care: (with at least 1 hour of informal care)
Formal care (total)	<b>-0.1129</b> (0.0254)	0.2271 (0.0000)
Formal care (with at least 1 hour of formal care)	0.0313 (0.0000)	<b>0.4347</b> (0.0000)
AVERAGE number of hours	Children from 3 years to minimum compulsory school age	
Correlation coefficients (p-value)	Informal care (total)	Informal care: (with at least 1 hour of informal care)
Formal care (total)	<b>-0.4221</b> (0.0000)	-0.1643 (0.0000)
Formal care (with at least 1 hour of formal care)	-0.1737 (0.0010)	<b>0.2753</b> (0.0000)

Notes: Table presents correlation coefficients with p-values between formal and informal care variables (measured by the average number of hours of each type of care service).

In total, our analyses include data from 2005 to 2019 for 27 countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden, United Kingdom.

We present our result also considering findings regarding country clusters described in the publication (Baiocco et al., 2021) by running additionally analyses for these groups of countries clustered.

Our focus is on the relationship between social investment and gender inequality in the labour market from the life-course perspective. Therefore, using panel regressions with country and time fixed effects, we look at how changes in the outputs of social investment related to unemployment, poverty, and childcare provision translate into changes of employment and pay gaps by gender.

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<sup>2</sup> This substitution effect between the subsidized childcare and informal childcare was found by Haves & Mogstad (2011b) when analysing the childcare reform in Norway. This effect was referred to in explaining why the subsidized childcare revealed only little causal effect on the maternal employment.

## 4. Results

### 4.1 Economic lifecycle

For each of the variables selected for our study, we compare the age profiles of men and women separately for the three identified clusters. Next, we refer to the gender gap, understood as a difference between values of a given variable for men and women. All profiles are presented in the normalised way, that is compared to the average income of people aged 30-49 at the country level, which ensures the cross-national comparability. This means that in case of consumption variables we look at the share of the average income used for a selected consumption measure. It should be noted that in countries, where nominal income is relatively high, a smaller proportion of labour income is used for consumption, while a larger proportion is directed towards savings.

#### **Labour income**

Our analysis starts with the comparison of age profiles of labour income. The age profiles of labour income of men and women as well as the age-specific gender gap are presented Figure 2. As regards men, the differences are seen at both ends of the labour market career, particularly in countries included into the cluster 3. At younger ages, labour income of men increases faster in these countries, which indicates the earlier labour market entry. However, the age profile starts to decline at relatively early ages, leading to much lower normalised labour income for a significant part of the life course. Women show the similar patterns, but at a smaller scale.

Women in the cluster 1 have higher income at the final stages of their labour market careers, compared to the other two clusters. The age profile of labour income is slightly flatter for women in the cluster 2 from age 40 to 60 years, which suggests relatively lower wage and/or lower labour market participation, compared to women in the other clusters.

In all clusters, labour income of men is higher than the one of women. However, several observations are worth underlining. In the cluster 1, the gender gap in labour income is smaller at younger age but increases sharply for women in the late 20s. This seems to reflect that with starting families and childbearing women become less involved on the labour market. In the cluster 2, the gender gap is higher for women after age of 50 years, which corresponds to the observed lower income of women at these ages. The shape of the age-specific gender gap in the cluster 3 is different. The gender gap is

lower for people at higher ages, which is mainly due to the lower income of men, compared to the other clusters. Moreover, the gender gap is the largest among younger persons (between 20 and 30) in all clusters, which can be an outcome of women's later entry to the labour market and their prolonged participation in the education, but also their lower participation on the labour market.

### **Consumption**

The consumption age profiles are relatively flat with a slight decline around the age of completing the formal education, that is at ages when public consumption on education declines (Figure 3). There are cluster differences in the relative level of consumption – in the first group of countries both men and women consume less almost in their entire life course than people in other clusters, relative to the average income of people in prime age group. This indicates that the labour income of people in countries in the cluster 1 is sufficient to higher rates of either savings or transfers to other generations (both public and private). However, at the end of the life course consumption is increasing due to a higher public health consumption (discussed later). The highest share of income is consumed in the cluster 3 countries, revealing that there is less potential for savings and/or intergenerational transfers. The gender gap in consumption is relatively small. Nevertheless, it is worth noting that women consume more than men for most of the stages of the life course, starting from school children (aged 12) to the mid- and late-60s. The gap is highest for women at age 18-30 years, which results from higher consumption on health and education (discussed later in the text). The gender differences for most of the life course are the highest in the cluster 3 countries.

### **Lifecycle deficit**

Patterns of the lifecycle deficit (LCD) result from the differences in both labour income and consumption. They are presented in Figure 4.

The age profile of the LCD of men in the countries clustered in the first group shows a smaller deficit at young ages. The transition to lifecycle surplus, interpreted as an entry to the economic productivity age, is around age 25 in all clusters, however the level of the LCD surplus during the productive age differs across clusters. The largest is displayed in the cluster 1 while men in the cluster 3 have the smaller lifecycle surplus. This surplus can be seen as a potential for intergenerational transfers, including the financing of social investment. Furthermore, the lifecycle surplus in the cluster 1 continues until older age, compared to the other two clusters.



In case of women, in the cluster 1 we observe the earlier transition to the productive age and the later transition to economic dependency at older age. The LCD age profile for the two remaining clusters is similar, with exception of the older age, when the LCD is smaller in the cluster 2.

The LDC gender gap also confirms differences between the three clusters of countries. At young ages, the gender gap is largest in the cluster 3, while at the older age it is larger for the countries of the cluster 1 and 2.

### **Net public transfers**

A part of consumption at younger and older ages is financed from the net public transfers – the difference between public transfers (both in cash and in kind) received by people at each age and taxes and contributions that are paid based on the labour income. The net public transfers are presented in Figure 5.

Differences in the net public transfers between country clusters start around age 25 and are visible over the later stages of the life course. During the economically productive age net public transfers are negative, as people receive fewer public benefits (cash and in-kind) compared to the taxes and contribution they pay. Net public transfers received at older ages are larger than the ones received by children. If we interpret the latter as mainly social investment (in education and health) and the latter as welfare transfers (mainly pensions and health care), this indicates still pro-elderly welfare expenditure orientation of the public transfers (Gál et al., 2016). In oldest age groups, men (and women) in the first cluster receive more net transfers, which is related to health-care consumption (discussed later).

Men in the cluster 1 on average are net payers for the longest age span (until age 62), while in the remaining clusters this age is lower – around 60 years. Men from the cluster 3 generate the smallest transfer surplus. The size of the net transfers surplus during the productive age indicates the potential for financing public policies, including the social investment.

In case of women, the shape of the age-specific net transfers is more similar between clusters. In all clusters, the average net payments are smaller compared to men. It is also worth noting that women in the cluster 1, similarly to men, are net payers for a longer age span.

The gender gap in net public transfers starts around age of 18 years and increases till nearly age of 50-55 years and remains visible for almost all older ages. During the stages of the life course associated with economic activity, the gender gap is negative – the net payments from men are higher than from women. The gender gap is the largest in the cluster 1 and the smallest in the cluster 3. In the older ages the gender gap becomes positive the in the cluster 2 and 3, indicating that men receive (net) more transfers than women, while its value is close to zero in the cluster 1.

### **Public transfer inflows**

The age profiles of public transfer inflows are presented in Figure 6. When looking at this variable, we also see the differences between clusters that reveal in the adult stages of the life course. Both men and women around ages 20 to 50 in the cluster 1 of countries receive the higher public transfers than people in the other country groups. Around a transition to retirement, we see increasing transfers, particularly in the cluster 2, consistently with the fact that this group of countries focuses their social policies on the elderly. At the final stages of the life course again the public inflows are the highest in the cluster 1.

The gender gap shows that women benefit slightly more from public transfers in the age span between 18 and around 40 years. This can be explained by the public consumption on education and health, which is discussed below. At older age, men receive through public transfers more than women, mainly due to their higher pension transfers, but also due to the higher consumption of health care.

From the social investment perspective, it is also worth to study the two components of public transfers: public consumption on education and public consumption on health.

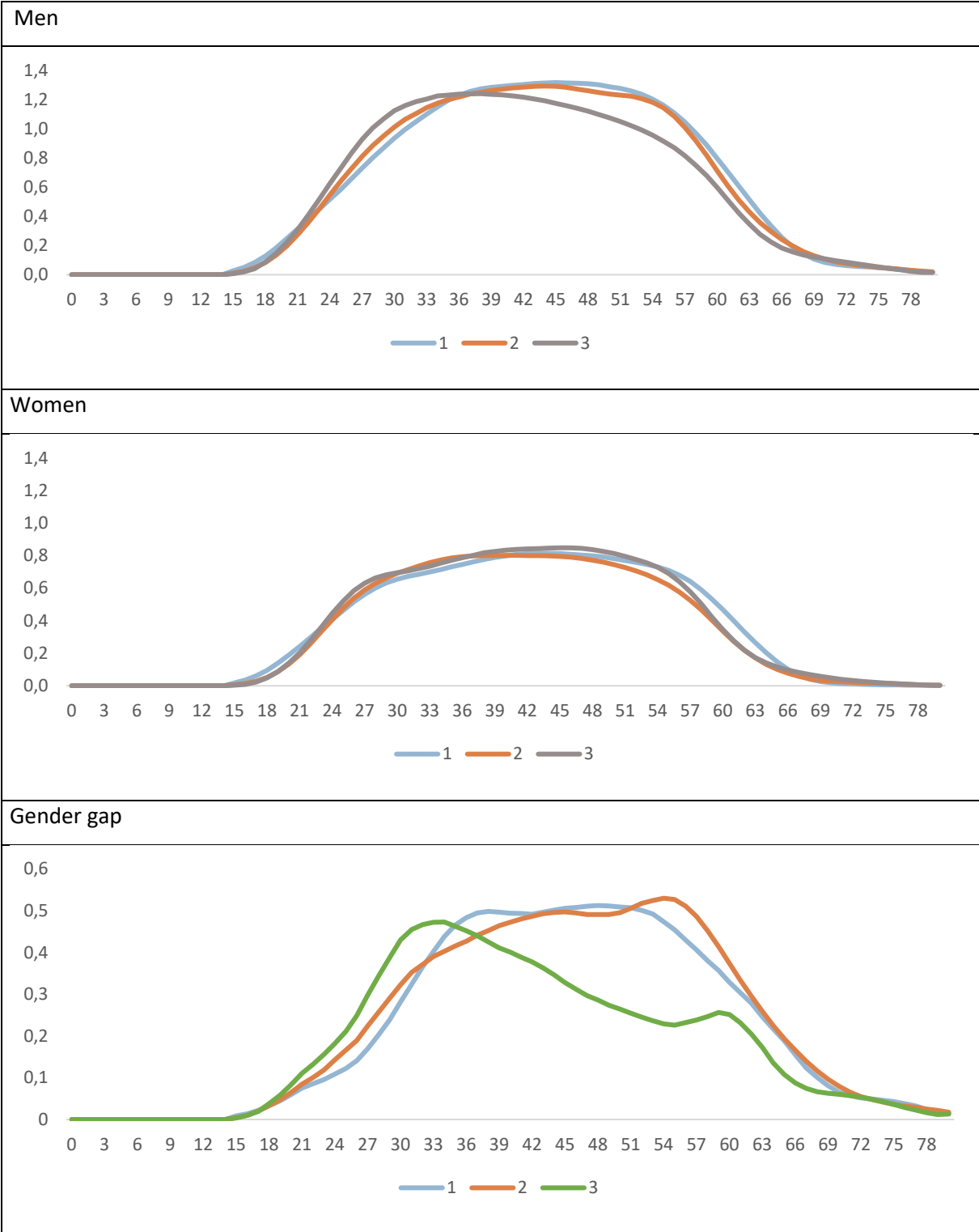
The **public consumption on education** (Figure 7) is concentrated at early stages of the life course, which corresponds to the respective age of initial, general, or vocational education as well as higher education. The public consumption on education starts around age 3, with an access to the pre-school education and increases steeply until the school entry age. The age profiles indicate that per-capita expenditure is highest around ages 12-18, that is during the secondary education and then starts to fall at ages associated with higher education (which is not compulsory). The same age profiles also show differences between country clusters. Young men in the cluster 2 consume more public education (in relation to wages) until age 18, compared to other clusters, which may indicate higher coverage of vocational education. As regards women the consumption of public education is smaller compared to other clusters. The opposite situation is observed in the cluster 3. In addition, the cluster

1 countries reveal public education spending also on adults, which is also in line with their social investment strategies.

The gender gap shows that women consume more public education benefits, particularly between ages 15 and 24. This finding indicates that in all country clusters women present higher participation in education, particularly at higher education levels. The gender gap is higher in the cluster 2 and 3. It may be explained by social investment policies promoting participation in higher education among countries comprising the cluster 1.

The **public consumption on health** (Figure 8) also differs between country clusters. It is the highest in the cluster 1 for almost all ages. Differences between country groups increase with age. This shows that countries that have high social investment spending also allocate more financial resources to health policies. The age profile of the gender gap in public consumption on health shows that women consume more public health in the childbearing age. This finding can be interpreted as social investment in health of both mothers and children. The gender gap at this stage of the life course is the largest in the cluster 1 of countries. At older ages, men consume more public spending on health than women. At this life stage, the difference is the largest in the cluster 3, that is among countries characterized by lower life expectancy, its distinctive difference in favour of women, and poorer health, particularly among the older people.

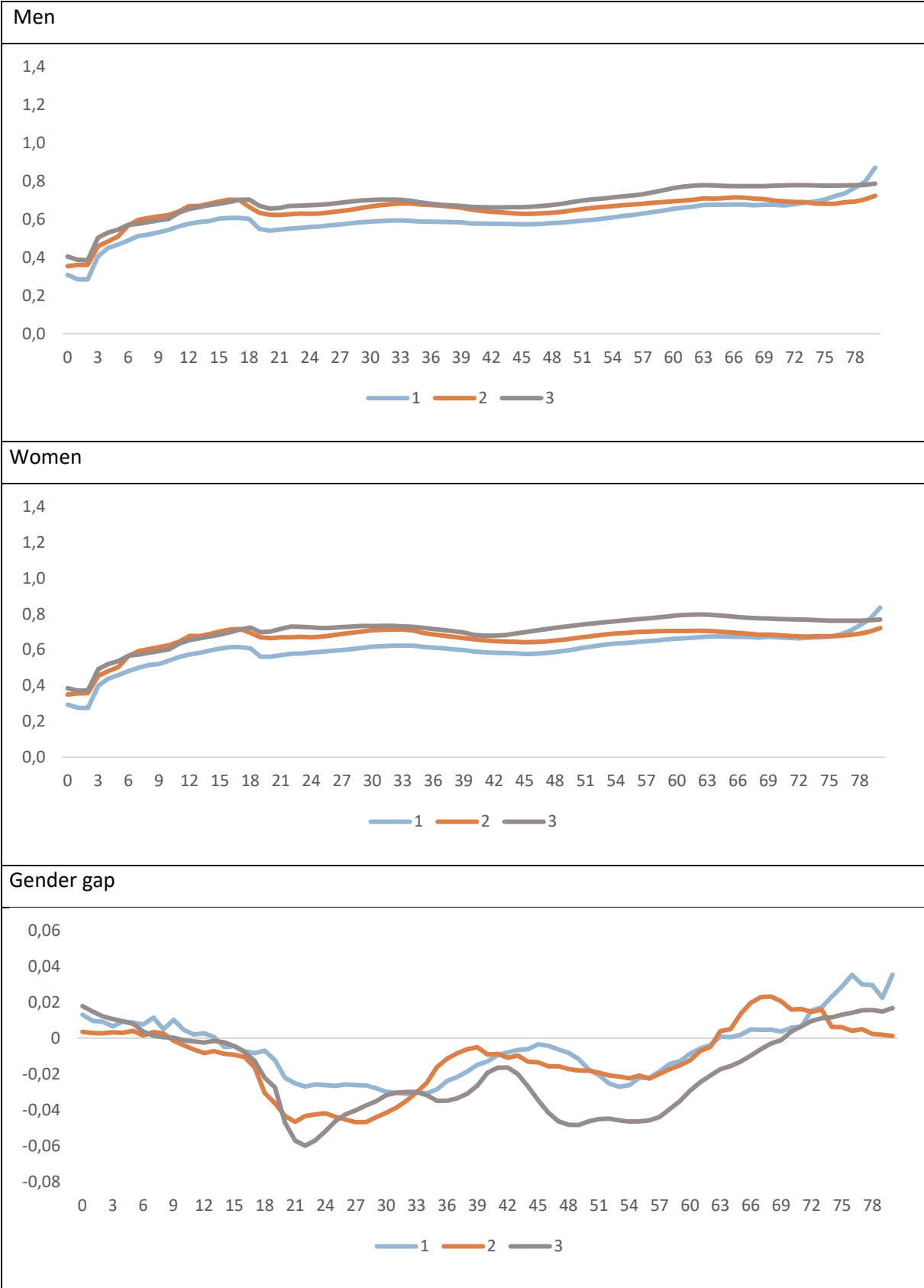
**Figure 2. Normalised age profile of labour income by social investment strategy country clusters**



Note: Normalisation is based on the average income of people in ages 30-49

Source: Own calculations using AGENTA database

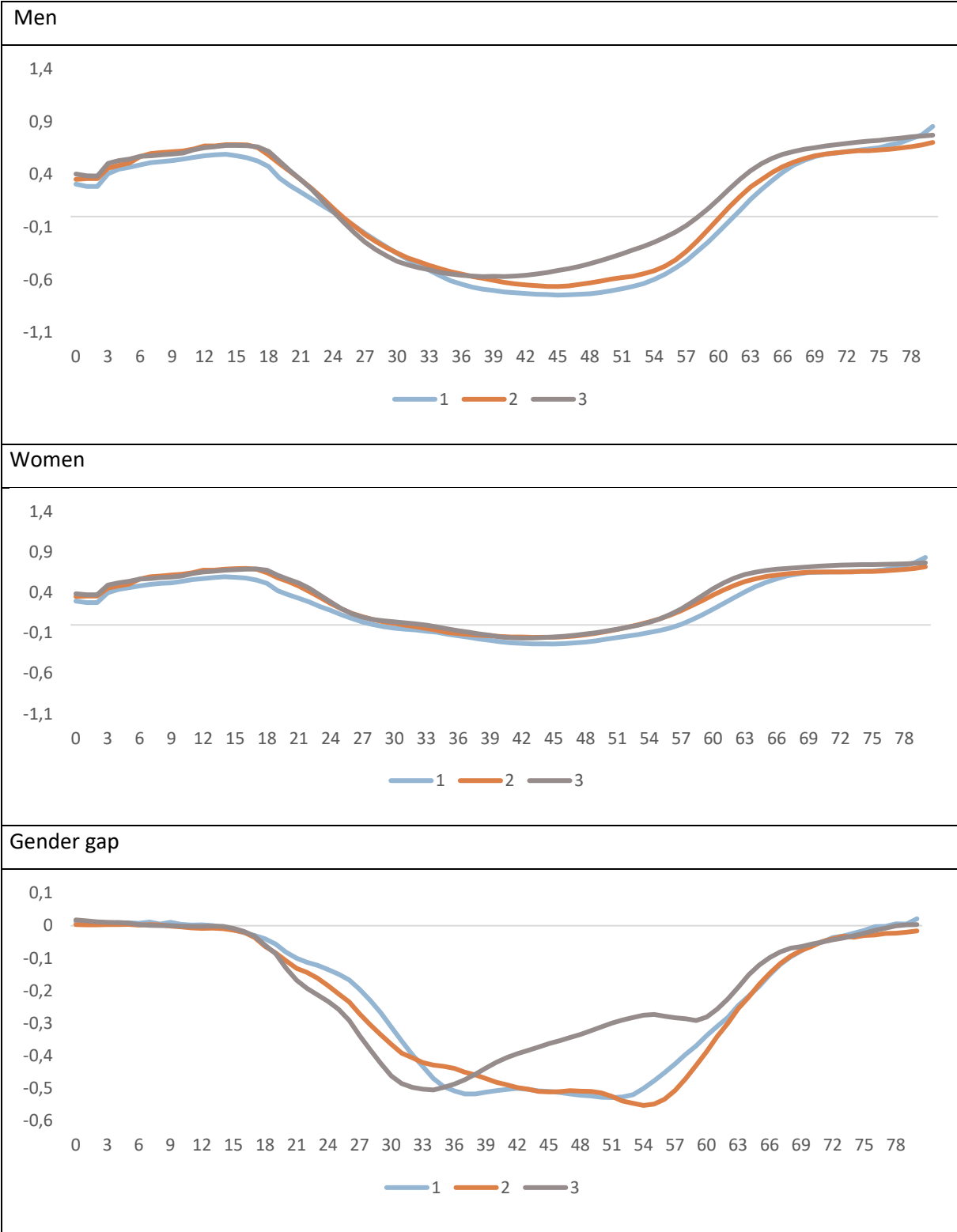
**Figure 3. Normalised age profile of consumption by social investment strategy country clusters**



Note: Normalisation is based on the average income of people in ages 30-49

Source: Own calculations using AGENTA database

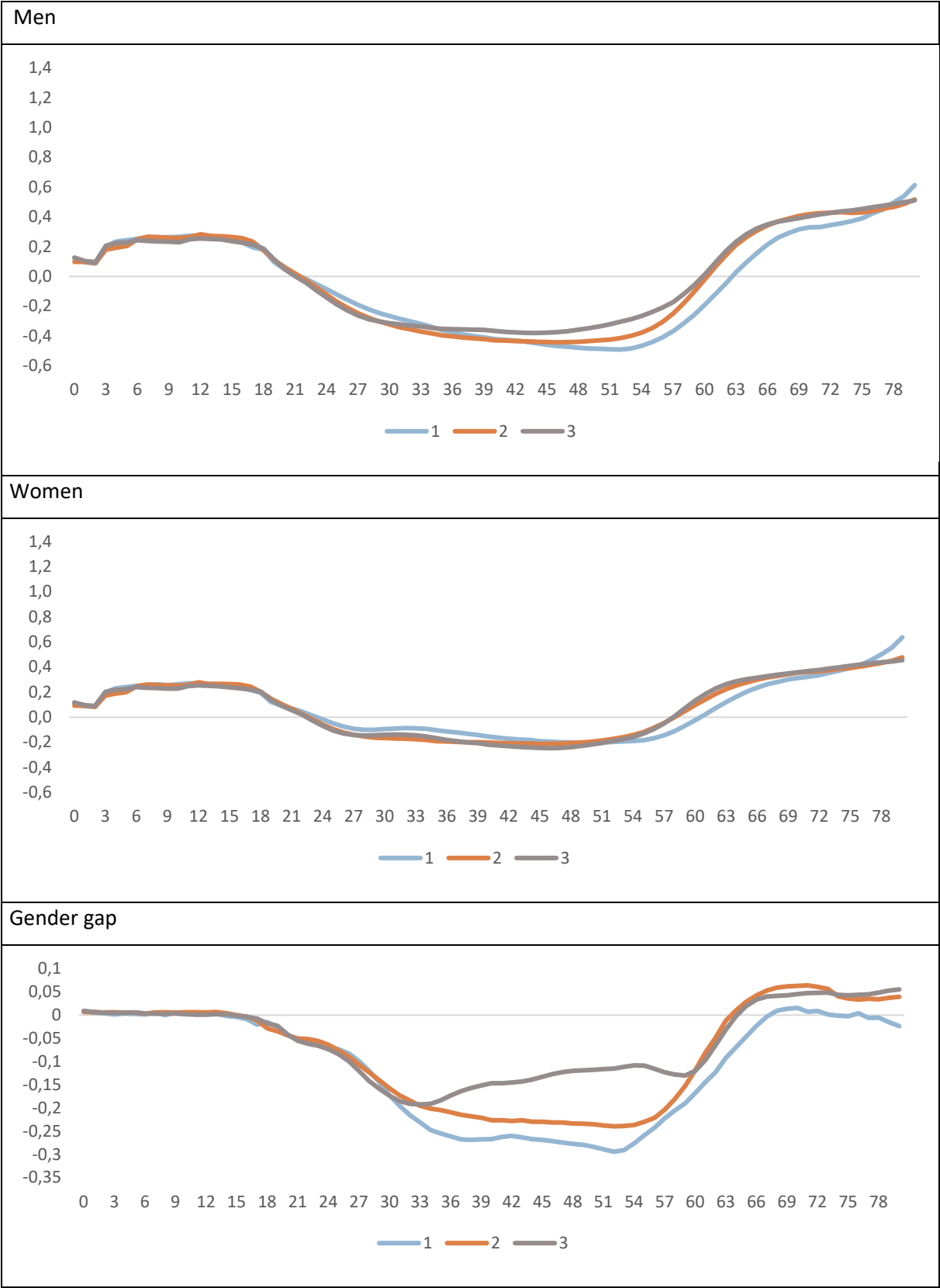
**Figure 4. Normalised age profile of lifecycle deficit by social investment strategy country clusters**



Note: Normalisation is based on the average income of people in ages 30-49

Source: Own calculations using AGENTA database

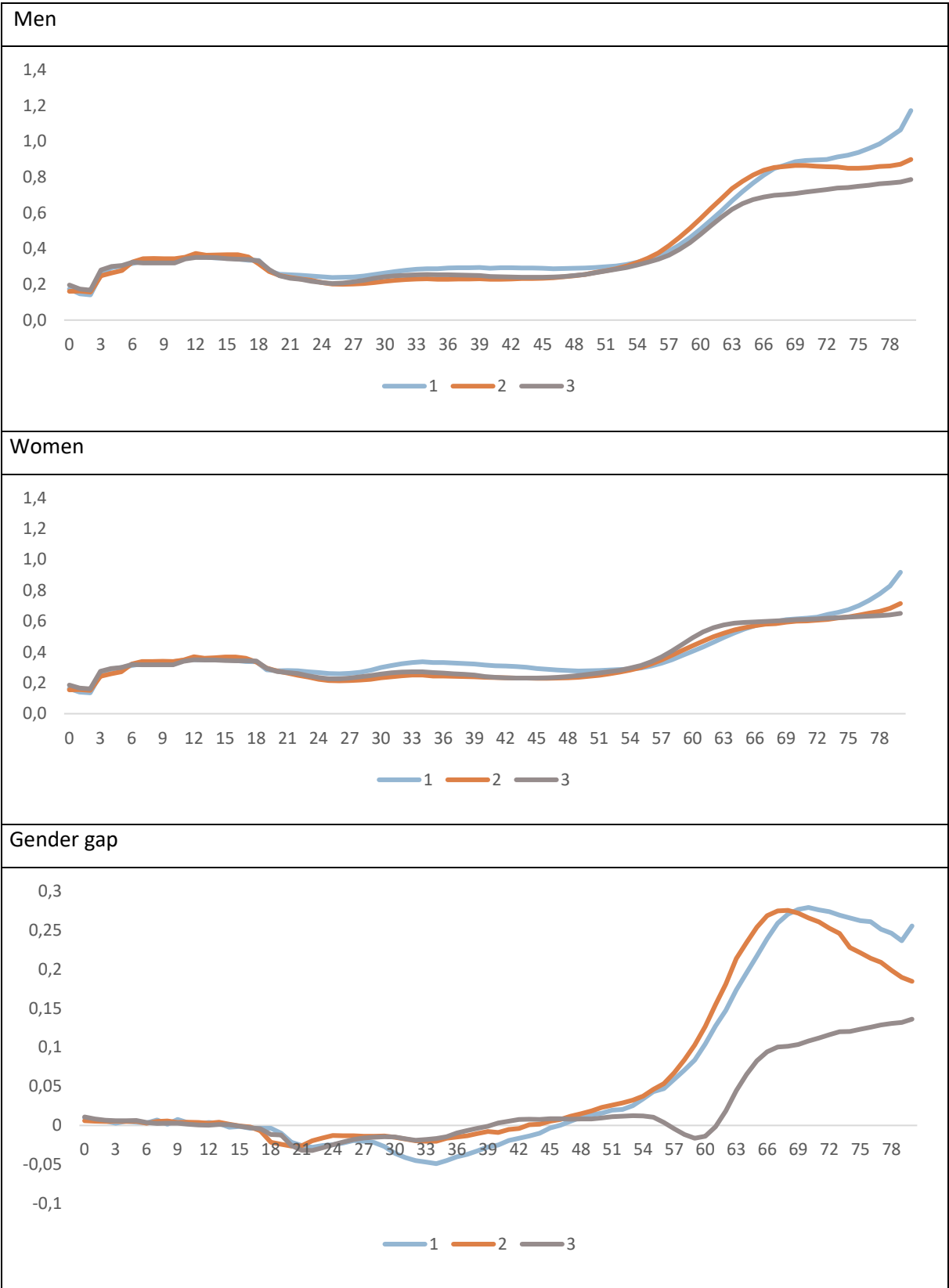
**Figure 5. Normalised age profile of net public transfers by social investment strategy country clusters**



Note: Normalisation is based on the average income of people in ages 30-49

Source: Own calculations using AGENTA database

**Figure 6. Normalised age profile of public transfers inflows by social investment strategy country clusters**

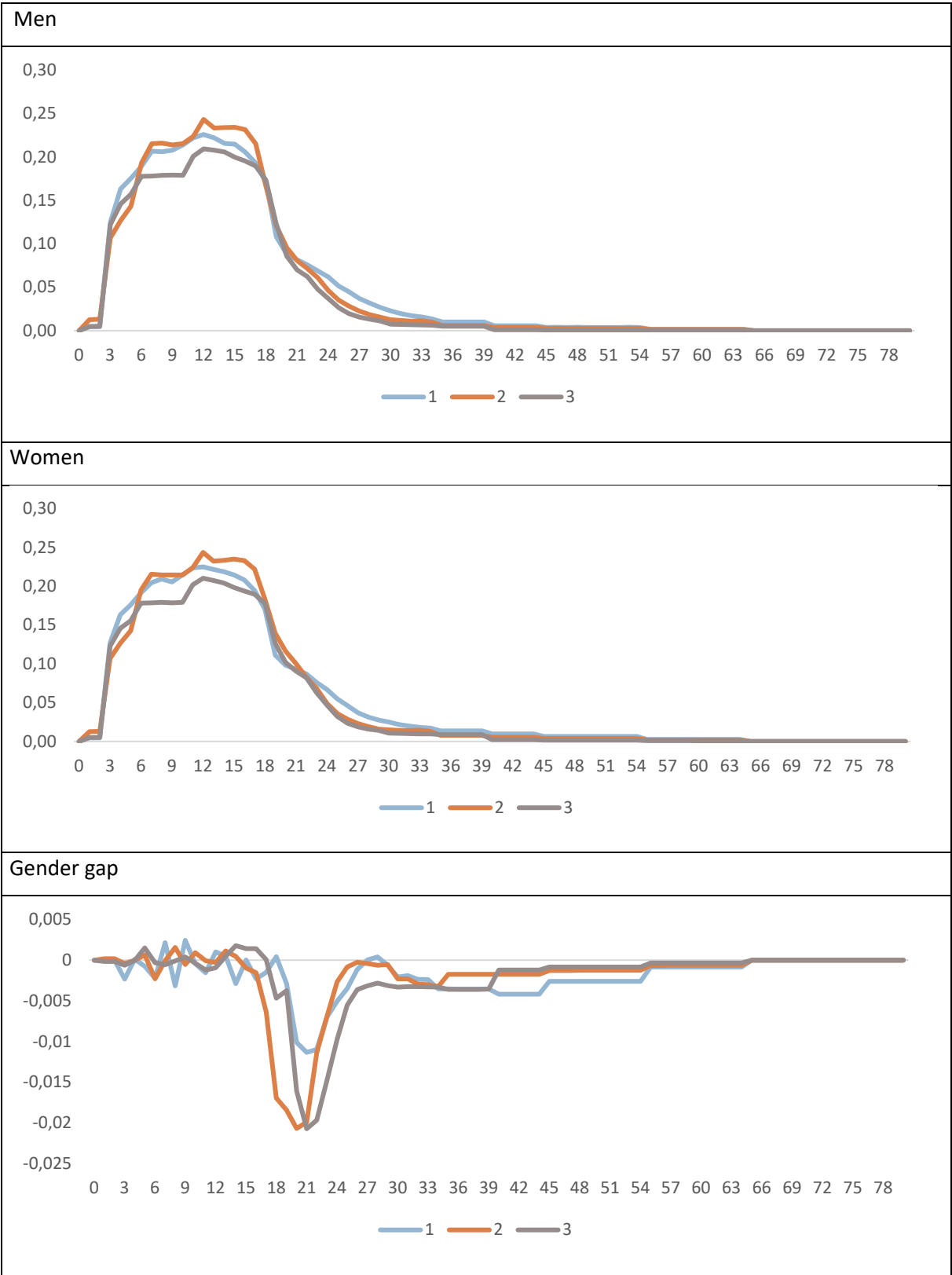


Note: Normalisation is based on the average income of people in ages 30-49

Source: Own calculations using AGENTA database



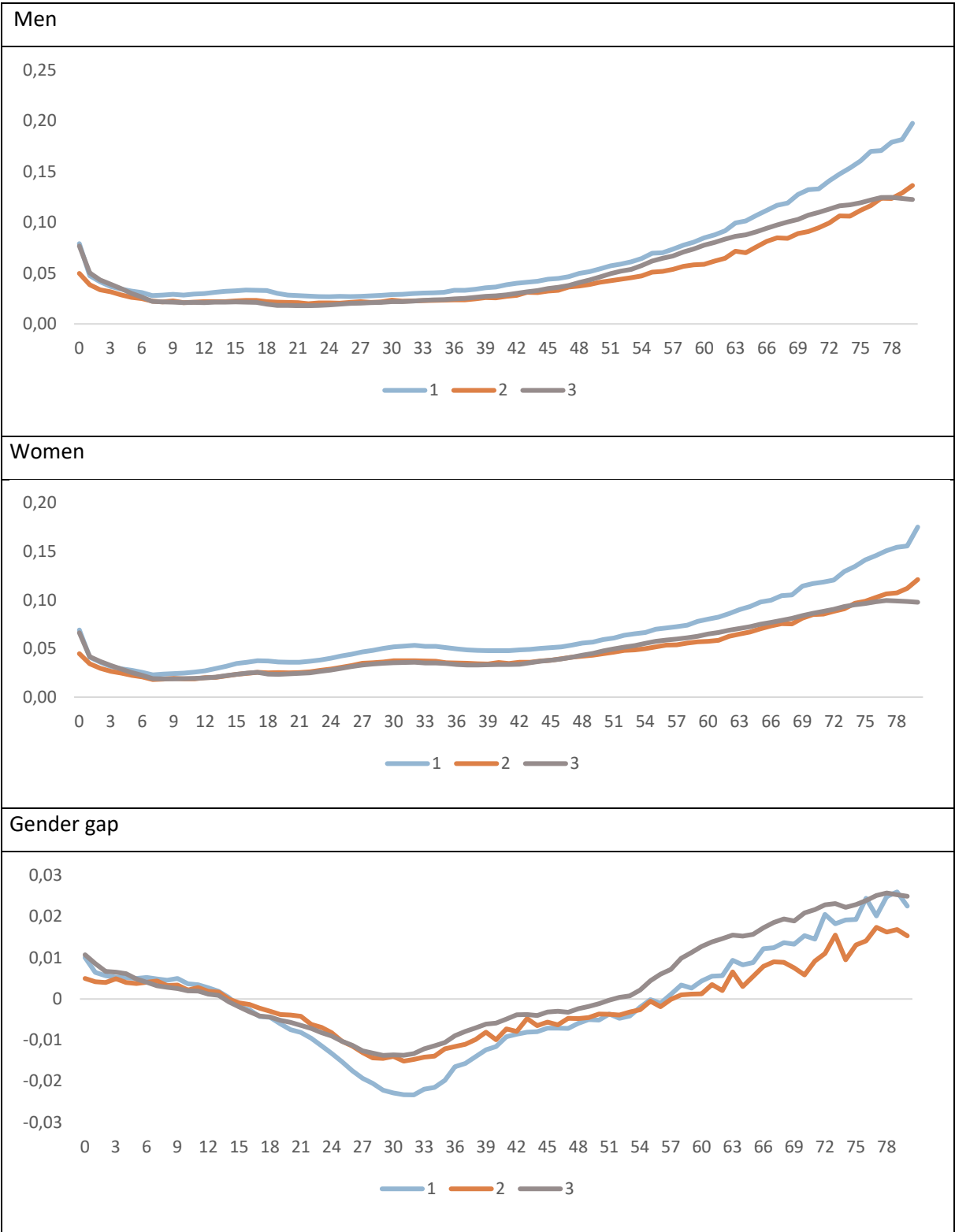
**Figure 7. Normalised age profile of public consumption on education by social investment strategy country clusters**



Note: Normalisation is based on the average income of people in ages 30-49

Source: Own calculations using AGENTA database

**Figure 8. Normalised age profile of public consumption on health by social investment strategy country clusters**



Note: Normalisation is based on the average income of people in ages 30-49

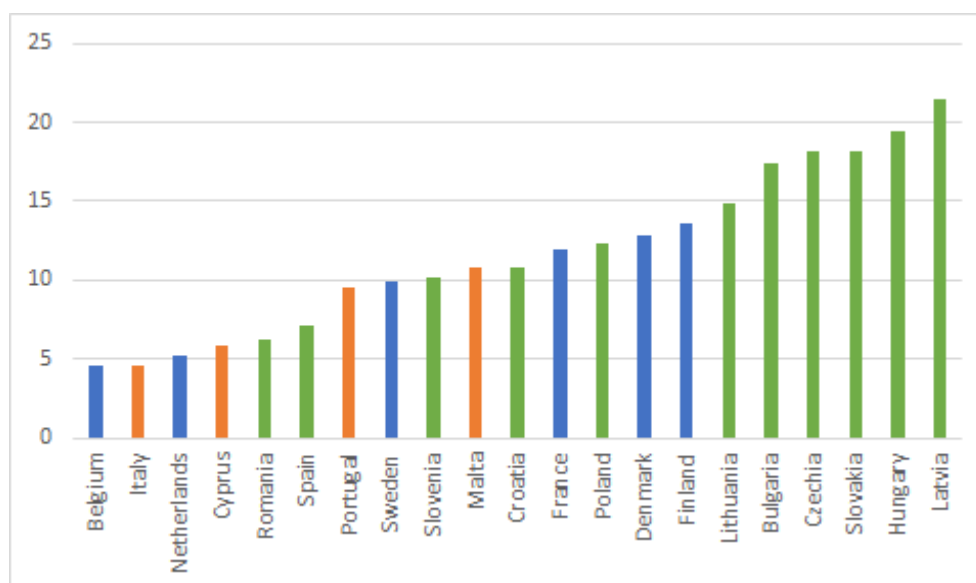
Source: Own calculations using AGENTA database

## 4.2 Gender pay gap at different life course stages and childcare: a country analysis

As shown in the previous section, there is a large gender gap in labour income between men and women. This gap is a result of both the pay gap as well as the gap in the labour force participation. The gender pay gap, particularly in the prime-age group, may discourage employment and lead to the reduced potential for social investment.

First, we study the raw gender pay gap (GPG) only i.e., differences in hourly wages of men and women expressed as a percentage of male hourly wages for people in age 25-44 years. There are **large cross-country differences in the values of this gap** – from slightly below 5% in Belgium and Italy to close to and over 20% in Czechia, Slovakia, Hungary, and Latvia (Figure 9). Overall, the Central and Eastern European countries (CEE) tend to have higher raw differences in pay of men and women. They belong to the third cluster of countries grouped according to their social investment strategies.

**Figure 9. Raw GPG in EU countries among aged 25-44, 2019**



Source: Own calculations based on Eurostat data.

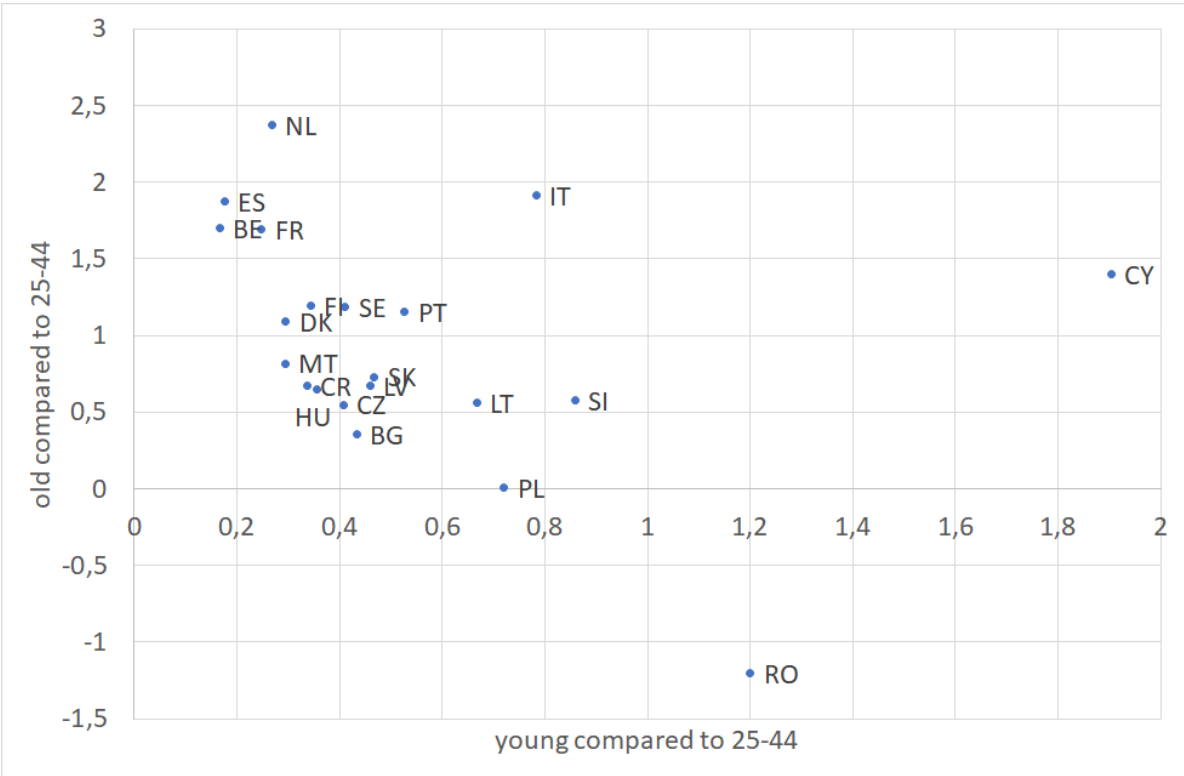
To compare the gender pay gap at different stages of the life course the age-specific indicators have been calculated: for young persons (19-24 years old), prime age people (at age 25-44 years) and older workers (aged 55-64 years).

In almost all EU countries GPGs among young people are lower than among the prime-aged (Figure 10). Romania and Cyprus are the only exceptions - the gap among young men and women is much higher than the gap in wages among prime-age men and women. This may however be due to selection into employment, as both Cyprus and Romania have relatively low prime age female activity rates.

The GPGs among older workers (55-64) are more heterogenous across the EU countries, though the interesting pattern emerges: in the CEE countries, the pay gaps among older workers are much lower compared to prime-age workers. Western European countries are much more likely to display gender pay gaps which are much higher among older workers compared to prime age men and women. The difference is substantial: in the Netherlands, the gap in pay among older men and women is almost threefold the prime-age gap. In Poland, the value of the pay gap among older workers is the same as among prime-age workers.

Thus, gender pay gaps are small at older age in the countries belonging to cluster 3, whereas are much higher in the countries from the cluster 1 and 2. We investigate these observations deeper in sections 4.3.2 and 4.4.4.

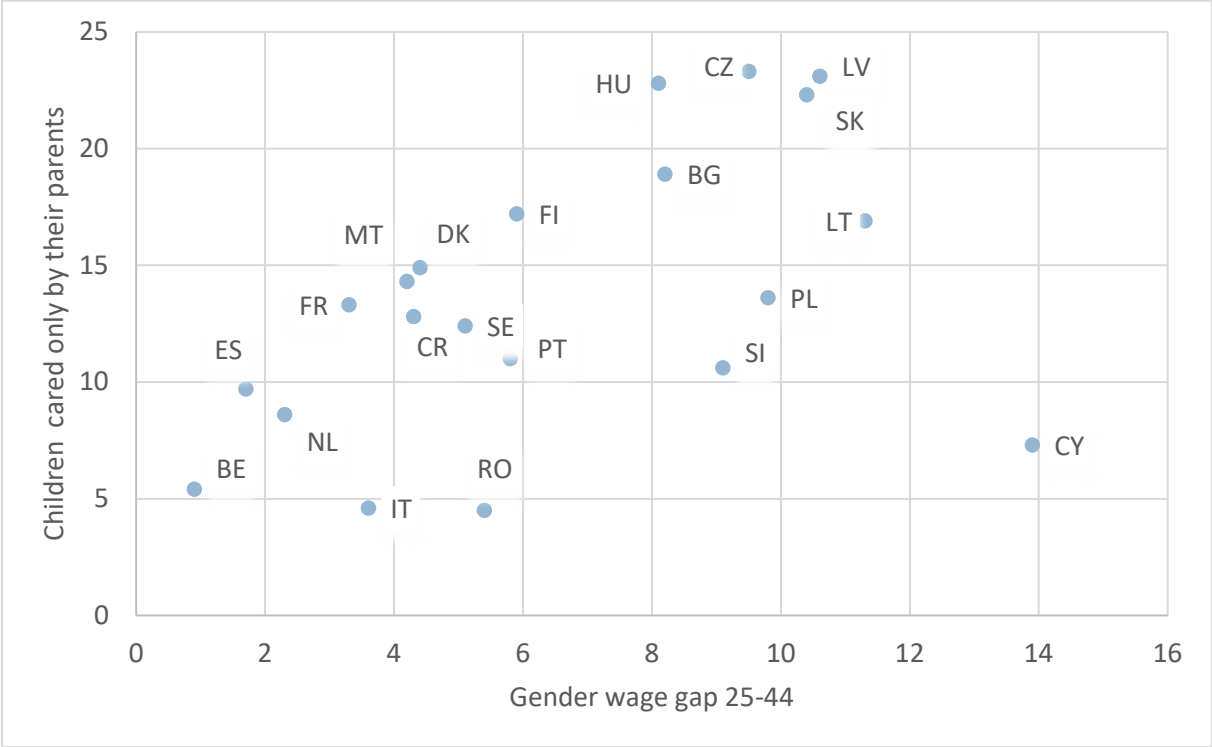
**Figure 10. Raw GPG in EU countries, old and young age groups compared to those in age group 25-44 years**



Source: Own calculations based on Eurostat data.

Countries that have higher pay gaps (both among young and prime age workers) tend to have higher shares of young children (up to 3) who are taken care of only by their parents (Figure 11). The correlation is strong (0.55).

**Figure 11. Raw GPG and childcare in the EU countries**



Source: Own calculations based on Eurostat data.

We also find a weak positive correlation between old age pension replacement rate and the 55-64 gender pay gap. This means that the larger gender pay gaps are observed in countries that have more generous pension systems.

### 4.3 Social investment and gender gaps in the labour market

To search for interdependencies between two selected indicators of the labour market gender inequality (the employment and pay gaps) and choose domains of vulnerabilities to be prevented by social investments over the life course, the panel regression approach has been applied. The three types of models have been specified by use of relevant variables described in Section 3.2. First, we show the model results for the entire sample of the working-age population with a focus on the gender employment gap and the unadjusted gender pay gap. Secondly, we provide insights on how these interdependencies differ between country clusters that reflect types of social investment policies

(Baiocco et al., 2021). Finally, we present both general and cluster-based results and discuss them focusing on gender gaps calculated for the age groups: young (between 18 and 25), prime-aged (25-49), and older (50-65). However, due to limited access to unadjusted pay gaps for age groups in EUROSTAT our analysis has been performed only for the gender employment gap.

#### 4.3.1 Employment gap, pay gap and indicators of social investment

The most general results cover the gender gaps for the whole working age (15-64) population (Table 3). The control variables include unemployment rates among young, prime-aged, and older workers and the outputs of social investments related to unemployment (long-term unemployment), poverty (gender gaps in poverty indicators), and human capital (childcare, gaps in the tertiary educational attainment of women and men, gender gaps in health at an older age). As it was presented in the chapter 3.2 the formal and informal care coverage are substitutes but the intensity of use of informal care (if it is used) seems to be complementary to formal care. That is why in each case we have also analysed the alternative model specification with an interaction between formal care and informal care use.

We observe that the chosen control variables are statistically significantly associated with gender differences in employment and pay. A larger share of tertiary-educated women than men is linked to both lower gender gaps in employment and pay. The estimated parameter related to the actual unemployment rate reflects the business cycle and is consistent with the added worker theory. When the unemployment rate is higher the gender inequality is lower because it means lower and more volatile household income. In such a situation, more women enter the labour market. Men also tend to work more frequently in sectors more exposed to the business cycle (market sectors) while women are more frequently employed in non-market services (health care, education, etc.) less vulnerable to the business cycle. As a result, during the economic downturn, relatively more men become unemployed and their flexible wage components are also more reduced. The explanation is different when we consider long-term unemployment. It is positively correlated with labour market inequality as usually women more frequently experience long-term unemployment. It seems interesting that the gender pay gap is strongly correlated with the long-term unemployment of young people indicating that difficulties in entering the labour market by young people reduce more wage prospects of women. At the same time, the gender employment gap is strongly correlated with long-term unemployment in the pre-retirement age, highlighting how important is the work involvement of that subpopulation for gender inequality in the labour market. The gender difference in the risk of poverty and social exclusion

is negatively correlated with both gender gaps in employment and wage, so it confirms that smaller gaps lead to improvement in the income situation of women in comparison to men. The gender gap in healthy life years at age 65 is negatively correlated with the employment gap. Here the causality is not clear. Better health can both influence the labour market activity of women (lowering the gender employment gap) and more years without severe health limitations. However, relatively longer labour market careers (lower gender employment gaps) can be the cause of a wider difference between the life expectancy of women than men. In the defined contribution pension system longer life expectancy leads to smaller pension benefits, so the relatively higher life expectancy can be considered as stimulating for labour market participation and lowering gender employment gap.

**Table 3. Panel regression analysis: GEG, GPG and social investment indicators**

	(1)	(2)	(3)	(4)
	Gender Employment Gap		Gender Pay Gap	
VARIABLES	without interactions	with interactions	without interactions	with interactions
Unemployment rate among young (15-24)	<b>-0.063*</b>	<b>-0.063*</b>	0.043	0.040
	(0.036)	(0.036)	(0.064)	(0.064)
Unemployment rate among prime age people (25-49)	<b>-0.410***</b>	<b>-0.421***</b>	<b>-0.384*</b>	<b>-0.370*</b>
	(0.114)	(0.115)	(0.201)	(0.198)
Unemployment rate among older people (50-64)	0.047	0.050	0.218	0.219
	(0.099)	(0.099)	(0.180)	(0.177)
Long term unemployment rate among young (15-24)	-0.008	-0.008	<b>0.124***</b>	<b>0.131***</b>
	(0.023)	(0.023)	(0.035)	(0.035)
Long term unemployment rate among prime age people (25-49)	-0.011	-0.006	-0.061	<b>-0.075*</b>
	(0.029)	(0.029)	(0.040)	(0.040)
Long term unemployment rate among older (50-64)	<b>0.044**</b>	<b>0.040*</b>	0.029	0.041

	(1)	(2)	(3)	(4)
	Gender Employment Gap		Gender Pay Gap	
VARIABLES	without interactions	with interactions	without interactions	with interactions
	(0.022)	(0.022)	(0.031)	(0.031)
Gap in probability of being at risk of poverty or social exclusion (male – female)	<b>-0.161*</b>	<b>-0.157*</b>	<b>-0.301**</b>	<b>-0.300**</b>
	(0.082)	(0.082)	(0.137)	(0.135)
Gap in In-work at-risk-of-poverty rate (male – female)	0.070	0.070	-0.195	-0.196
	(0.078)	(0.078)	(0.135)	(0.133)
Gap in expected healthy life years at age 65 (male – female)	<b>-0.281*</b>	<b>-0.294*</b>	-0.062	-0.042
	(0.161)	(0.161)	(0.263)	(0.261)
Formal care – coverage – children below 3 years	<b>-0.103***</b>	<b>-0.101***</b>	<b>-0.107*</b>	<b>-0.102*</b>
	(0.036)	(0.036)	(0.062)	(0.062)
Formal care – intensity – children below 3 years	-0.032	-0.113	0.085	<b>0.332***</b>
	(0.032)	(0.075)	(0.053)	(0.124)
Formal care – coverage – children between 3 years old and minimum compulsory school age	<b>0.083*</b>	<b>0.085**</b>	0.125	0.109
	(0.042)	(0.042)	(0.078)	(0.077)
Formal care – intensity – children between 3 years old and minimum compulsory school age	<b>-0.261***</b>	<b>-0.356***</b>	-0.045	0.184
	(0.062)	(0.100)	(0.106)	(0.167)
Informal care – coverage – children below 3 years	-0.079	-0.068	0.023	-0.008
	(0.051)	(0.051)	(0.089)	(0.088)



	(1)	(2)	(3)	(4)
	Gender Employment Gap		Gender Pay Gap	
VARIABLES	without interactions	with interactions	without interactions	with interactions
Informal care – intensity – children below 3 years	-0.014	-0.155	<b>-0.157***</b>	0.261
	(0.027)	(0.115)	(0.045)	(0.186)
Informal care – coverage – children between 3 years old and minimum compulsory school age	<b>0.154***</b>	<b>0.142**</b>	-0.054	-0.019
	(0.056)	(0.056)	(0.096)	(0.095)
Informal care – intensity – children between 3 years old and minimum compulsory school age	0.011	-0.180	-0.014	<b>0.450*</b>
	(0.025)	(0.160)	(0.042)	(0.263)
Formal care # Informal care – intensity – children below 3 years		0.004		<b>-0.012**</b>
		(0.003)		(0.005)
Formal care # Informal care – intensity – children between 3 years and minimum compulsory school age		0.005		<b>-0.013*</b>
		(0.005)		(0.008)
Difference in the share of female and male population with tertiary education	<b>-0.526***</b>	<b>-0.515***</b>	<b>-0.357***</b>	<b>-0.437***</b>
	(0.049)	(0.050)	(0.088)	(0.093)
Constant	25.186***	31.217***	15.268***	-0.650
	(1.934)	(3.502)	(3.540)	(5.909)
Observations	334	334	324	324
R-squared	0.780	0.783	0.239	0.269
Number of countries	25	25	27	27

Notes: Results of panel regressions with country-year fixed effects.

The results regarding childcare services mostly show the expected associations. When it comes to smaller children (below 3 years old), the better access (coverage) to formal care is associated with the lower gender employment gap. There is no such effect observed for the coverage of informal care. More intensive usage of caring services does not change the employment gap at all – here the complementarity between formal and informal care seems to work. For older children, from 3 years old to minimum compulsory school age, an increase in the intensity of usage of formal care matters for lowering the gender employment gap. Increasing coverage of informal care which comes together with the higher gender employment gap seems to be counterintuitive. However, keeping in mind that informal care includes also care provided by grandparents, predominantly by grandmothers, the increase in the gender employment gap is no longer puzzling. This intuition is confirmed by the results of the regression for the gender employment gap displayed separately for three age groups – the positive correlation occurs only for those older than 50 years. There is no positive effect for the prime-aged workers. These findings might be concluded that the better coverage of care for children older than 3 years old does not result in an additional employment effect for mothers, but it seems to be correlated with more care provided by grandmothers and thus lower female employment in pre-retirement age. Still, we need to remember that formal care constitutes the main type of service provided to older children.

The effects of better access to childcare services are smaller for the gender pay gap. Regression results show that increasing coverage of formal care for younger children goes together with lower gender wage differences. Also, interactions of these two types of care services are positively associated with the pay gaps.

The interdependency between formal childcare and women's employment, in particular mothers' employment, is moderated by the interplay of formal and informal care coverage. If there is a strong substitution between formal care and informal care, zero or little increases in the overall use of childcare and women's/mothers' labour supply might be observed. Such findings refer to effects of the extended public care services in Norway by Haves & Mogstad (2011b). The extent of crowding out other care forms by formal/public services seems to depend on types of services constitutive for both forms of care, especially for informal care. Without insights how informal care is structured i.e., who provides care for children, are there mostly paid or unpaid carers, etc., it is rather difficult to provide reasonable explanation for counterintuitive findings about relationships between better access to formal/public care services and women's labour supply. In addition, it should be noted that informal

care arrangements reflect also social perception about obligations for childcare. Therefore, one can conclude the cultural context also matters.

#### 4.3.2 Gender employment and pay gaps and social investment strategies—differences between countries

The results for all countries can hide important interdependencies which might be linked to social investment strategies among countries. Therefore, the three clusters of countries defined by (Baiocco et al., 2021) have been used in our modelling approach to investigate the links between different social investment strategies and gender employment and pay gaps. The tables present the results for each of the three clusters referring to the two specifications: with and without interactions between variables that describe formal care.

Table 4 shows that indeed the social investment strategies are related to gender inequality in employment and pay. In the cluster 1, which groups mainly Scandinavian countries and after 2013 also Germany and France, the actual unemployment rate in the prime age group shows the strongest negative correlation with the gender employment gap. This relationship is also observed in the cluster 3, comprising mostly the CEE countries. However, in the former cluster there is a strong, positive correlation of the actual unemployment rate of people in the pre-retirement age with the gender employment gap. In the cluster 2 and 3, this relationship no longer holds, but it is replaced by a positive correlation of long-term unemployment rate among people in the pre-retirement age. Also, differences in healthy life years at age 65 between women and men are associated with higher employment gap in the cluster 1. It should be noted that this gap is observed in the cluster characterised by the highest participation rates of people aged 50+ (both men and women). In the cluster 2, which covers mainly South European countries and France, Germany (until 2013) and Poland (between 2009 and 2013), the unemployment rates among younger persons are correlated with the lower employment gaps. The poverty variables are important only in the second cluster (mainly Southern Europe). More frequent social exclusion among men in comparison to women is correlated with the narrower gender employment gap. It seems to be reasonable, but the causality can be in both directions. In contrast to that, the higher the male-female gap of in-work poverty the wider is the gender employment gap. It can be explained by the selection of top skilled women to employment if the gender employment gap is relatively high.

Table 4. Panel regression analysis within clusters: GEG and social investment indicators

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Employment Gap					
VARIABLES	Cluster 1 <sup>+</sup>		Cluster 2 <sup>+</sup>		Cluster 3 <sup>+</sup>	
	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
Unemployment rate among young (15-24)	0.038	0.048	<b>-0.202***</b>	<b>-0.173***</b>	0.068	0.052
	(0.104)	(0.106)	(0.063)	(0.065)	(0.062)	(0.062)
Unemployment rate among prime-aged people (25-49)	-1.465***	-1.470***	0.000	-0.135	-0.437**	-0.381*
	(0.412)	(0.429)	(0.159)	(0.173)	(0.198)	(0.200)
Unemployment rate among older (50-64)	0.926***	0.945***	-0.202	-0.123	-0.045	-0.057
	(0.284)	(0.287)	(0.154)	(0.160)	(0.153)	(0.153)
Long term unemployment rate among young (15-24)	0.098	0.091	0.046	0.053	-0.029	-0.037
	(0.067)	(0.068)	(0.037)	(0.037)	(0.030)	(0.031)
Long term unemployment rate among prime-aged people (25-49)	0.066	0.052	-0.003	-0.036	-0.038	-0.026
	(0.046)	(0.047)	(0.060)	(0.062)	(0.035)	(0.036)
Long term unemployment rate among older (50-64)	-0.018	-0.016	0.086*	0.098**	0.068**	0.062*
	(0.036)	(0.036)	(0.044)	(0.044)	(0.032)	(0.033)
Gap in probability of being at risk of poverty or social	-0.152	-0.157	-0.379**	-0.300*	-0.051	-0.052

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Employment Gap					
VARIABLES	Cluster 1†		Cluster 2†		Cluster 3†	
exclusion (female - male)						
	(0.143)	(0.143)	(0.154)	(0.158)	(0.108)	(0.109)
Gap in In-work at-risk-of-poverty rate (male-female)	-0.091	-0.097	0.508***	0.471***	-0.027	-0.023
	(0.161)	(0.161)	(0.150)	(0.150)	(0.110)	(0.110)
Gap in expected healthy life years at age 65 (male - female)	0.470**	0.439*	-0.307	-0.267	-0.310	-0.321
	(0.217)	(0.225)	(0.288)	(0.286)	(0.261)	(0.261)
Formal care – coverage – children below 3 years	0.033	0.019	-0.017	0.016	0.044	0.062
	(0.048)	(0.049)	(0.113)	(0.113)	(0.074)	(0.076)
Formal care – intensity – children below 3 years	<b>-0.129**</b>	<b>-0.274**</b>	-0.041	0.186	-0.037	-0.065
	(0.061)	(0.123)	(0.074)	(0.230)	(0.035)	(0.098)
Formal care – coverage – children between 3 years old and minimum compulsory school age	-0.047	-0.037	0.058	0.072	0.053	0.060
	(0.131)	(0.131)	(0.109)	(0.108)	(0.055)	(0.056)
Formal care – intensity – children between 3 years old	<b>-0.424***</b>	<b>-0.534***</b>	0.029	-0.436	-0.037	-0.186

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Employment Gap					
VARIABLES	Cluster 1†		Cluster 2†		Cluster 3†	
and minimum compulsory school age						
	(0.133)	(0.191)	(0.168)	(0.294)	(0.084)	(0.143)
Informal care – coverage – children below 3 years	-0.099	-0.030	-0.034	-0.031	-0.075	-0.034
	(0.145)	(0.164)	(0.104)	(0.103)	(0.070)	(0.076)
Informal care – intensity – children below 3 years	<b>0.064**</b>	-0.250	-0.083	0.175	0.008	-0.063
	(0.027)	(0.236)	(0.081)	(0.262)	(0.044)	(0.175)
Informal care – coverage – children between 3 years old and minimum compulsory school age	0.093	0.029	-0.078	-0.226	<b>0.309***</b>	<b>0.283***</b>
	(0.149)	(0.169)	(0.196)	(0.209)	(0.064)	(0.066)
Informal care – intensity – children between 3 years old and minimum compulsory school age	-0.024	-0.220	0.114*	-0.538	-0.058	-0.384
	(0.025)	(0.338)	(0.067)	(0.345)	(0.039)	(0.250)
Formal care # Informal care – intensity – children below 3 years		0.010		-0.008		0.002

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Employment Gap					
VARIABLES	Cluster 1†		Cluster 2†		Cluster 3†	
		(0.007)		(0.008)		(0.005)
Formal care # Informal care – intensity – children between 3 years and minimum compulsory school age		0.006		0.023*		0.009
		(0.010)		(0.012)		(0.007)
Difference in share of female and male population with tertiary education	-0.422***	-0.463***	-0.634***	-0.627***	-0.429***	-0.428***
	(0.092)	(0.094)	(0.096)	(0.096)	(0.068)	(0.068)
Constant	26.352***	34.535***	16.488***	24.116***	17.491***	23.607***
	(3.389)	(7.028)	(3.666)	(8.779)	(3.705)	(5.348)
Observations	87	87	110	110	123	123
R-squared	0.819	0.826	0.897	0.902	0.717	0.725
Number of countries	9	9	12	12	12	12

Note: Clusters have been defined as follows: Cluster 1 - Sweden, Denmark, Finland, Netherlands, Austria, Luxembourg, Ireland (until 2008), Germany (after 2008), France (after 2013), Belgium (after 2013); Cluster 2 - Italy, Portugal, Cyprus, Ireland (after 2008), Germany (until 2008), France (until 2013), Belgium (until 2013), Spain (until 2013), Greece (until 2013), Slovenia (until 2013), Poland (between 2009 and 2013), Estonia (between 2009 and 2013); Cluster 3 – Lithuania, Latvia, Estonia (until 2008 and after 2013), Poland (until 2008 and after 2013), Czechia, Slovakia, Hungary, Croatia, Bulgaria, Romania, Greece (after 2013), Slovenia (after 2013), Spain (after 2013).

Providing the results of regression analyses across clusters shows that the interdependencies studied greatly depend on the group of countries that we consider. The effects of changes in formal and informal care, significant for all countries, mostly lose their significance for smaller groups of countries. The only exception is the lowering effect of formal care intensity of children in both age groups on the gender employment gap in the cluster 1 where the access to formal care is already the largest. The higher coverage of informal care for children older than 3 increases the gender employment gap in the

cluster 3 showing that this type of care is more likely to reduce the labour market participation of older females especially rather than to support paid work of young mothers.

These results show that women's employment effects of extended access to formal care and its intensity of use need to be related to the context. Supposed increases in women's employment depend not only on levels and structures of women's labour force attachment but also on existing shortages in formal care<sup>3</sup> and informal childcare arrangements. Moreover, heterogeneous reactions by different groups of women can also contribute to observed childcare effects for overall women's employment. We will refer to this issue making use of the life course perspective.

More puzzling childcare effects can be observed for the gender pay gap (GPG) within the clusters (Table 5). In the cluster 1, the larger access to both formal and informal care is not correlated with pay differences between women and men. In the cluster 2 and 3 more intensive care for children older than 3 years correlates with a larger pay gap. This can indicate that a need for a double income seems to be higher among low-skilled population, leading to higher employment of women and the demand for higher intensity of childcare.

The results also indicate both differences and similarities between groups of countries concerning variables that explain the gender pay gap. For example, current unemployment seems to be a powerful explanatory variable only in the cluster 2, but a higher long-term unemployment is correlated with a wider gender pay gap in all clusters. A higher frequency of poverty among men in all clusters is correlated with a lower gender pay gap but in-work poverty male-female gap is positively correlated with the pay gap in the clusters 1 and 2 but negatively correlated in the cluster 3.

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<sup>3</sup> Brilli et al. (2016) showed that employment effects were higher in Italian provinces with larger shortages in public care services.



**Table 5. Panel regression analysis: the unadjusted gender pay gap and social investment indicators**

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Pay Gap					
VARIABLES	Cluster 1		Cluster 2		Cluster 3	
	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
Unemployment rate among young (15-24)	0.123	0.145	0.366***	0.372***	-0.190*	-0.158
	(0.124)	(0.122)	(0.111)	(0.112)	(0.114)	(0.114)
Unemployment rate among prime-aged people (25-49)	-0.766	-0.718	-1.155***	-1.085***	0.269	0.149
	(0.519)	(0.510)	(0.310)	(0.316)	(0.413)	(0.414)
Unemployment rate among older (50-64)	-0.104	-0.259	0.084	-0.010	0.427	0.464
	(0.382)	(0.378)	(0.264)	(0.262)	(0.330)	(0.331)
Long term unemployment rate among young (15-24)	0.163**	0.174**	0.234***	0.225***	-0.055	-0.034
	(0.067)	(0.066)	(0.061)	(0.059)	(0.056)	(0.056)
Long term unemployment rate among prime-aged people (25-49)	0.095*	0.118**	0.092	0.069	0.214***	0.172**
	(0.050)	(0.051)	(0.099)	(0.100)	(0.069)	(0.071)
Long term unemployment rate among older (50-64)	0.007	0.006	-0.047	-0.022	-0.126*	-0.101
	(0.033)	(0.032)	(0.072)	(0.071)	(0.065)	(0.065)
Gap in probability of being at risk of poverty or social	-0.333*	-0.311*	-0.718***	-0.679***	-0.888***	-0.882***

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Pay Gap					
VARIABLES	Cluster 1		Cluster 2		Cluster 3	
exclusion (male – female)						
	(0.171)	(0.167)	(0.246)	(0.250)	(0.196)	(0.195)
Gap in In-work at-risk-of-poverty rate (male – female)	0.348*	0.337*	0.425*	0.516**	-0.460**	-0.471**
	(0.185)	(0.180)	(0.254)	(0.252)	(0.199)	(0.197)
Gap in expected healthy life years at age 65 (male – female)	0.146	0.394	-0.591	-0.602	0.039	0.137
	(0.249)	(0.265)	(0.472)	(0.461)	(0.493)	(0.489)
Formal care – coverage – children below 3 years	0.076	0.061	-0.207	-0.245	-0.097	-0.133
	(0.053)	(0.052)	(0.177)	(0.177)	(0.144)	(0.147)
Formal care – intensity – children below 3 years	-0.011	0.065	-0.299**	0.282	0.102*	0.170
	(0.086)	(0.178)	(0.117)	(0.348)	(0.061)	(0.172)
Formal care – coverage – children between 3 years old and minimum compulsory school age	-0.262*	-0.257*	-0.326	-0.401	-0.073	-0.082
	(0.144)	(0.140)	(0.292)	(0.285)	(0.101)	(0.101)
Formal care – intensity – children between 3 years old and minimum compulsory school age	-0.100	0.404	0.796**	1.278**	0.367**	0.677**

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Pay Gap					
VARIABLES	Cluster 1		Cluster 2		Cluster 3	
	(0.177)	(0.281)	(0.315)	(0.576)	(0.164)	(0.257)
Informal care – coverage – children below 3 years	-0.044	0.115	-0.166	-0.125	0.002	-0.108
	(0.151)	(0.176)	(0.170)	(0.166)	(0.135)	(0.148)
Informal care – intensity – children below 3 years	-0.093***	-0.009	0.057	0.756*	-0.069	0.097
	(0.033)	(0.311)	(0.123)	(0.399)	(0.078)	(0.313)
Informal care – coverage – children between 3 years old and minimum compulsory school age	0.034	-0.131	-0.388	-0.442	-0.343***	-0.271**
	(0.153)	(0.179)	(0.336)	(0.330)	(0.118)	(0.122)
Informal care – intensity – children between 3 years old and minimum compulsory school age	0.028	1.061**	-0.087	0.520	0.022	0.731*
	(0.030)	(0.461)	(0.158)	(0.778)	(0.071)	(0.434)
Formal care # Informal care – intensity – children below 3 years		-0.003		-0.022*		-0.004
		(0.009)		(0.012)		(0.008)
Formal care # Informal care – intensity – children between 3 years and minimum		-0.030**		-0.016		-0.020*

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender Pay Gap					
VARIABLES	Cluster 1		Cluster 2		Cluster 3	
compulsory school age						
		(0.014)		(0.024)		(0.012)
Difference in share of female and male population with tertiary education	-0.544***	-0.446***	-0.433**	-0.485***	0.111	0.080
	(0.107)	(0.112)	(0.179)	(0.174)	(0.141)	(0.140)
Constant	26.130***	6.327	4.343	-28.810	-2.144	-15.113
	(4.213)	(10.197)	(7.996)	(17.308)	(7.052)	(9.577)
Observations	79	79	94	94	111	111
R-squared	0.842	0.857	0.571	0.609	0.463	0.489
Number of countries	9	9	11	11	12	12

### 4.3.3 Gender employment gap in the life course perspective

To gain more insight into the interdependencies considered at the subsequent stages of the life course the regression models have been estimated for the three age groups of employed.

Regarding the control variables, it should be noticed that the correlations in all age groups, all clusters and all model specifications are robust concerning the current unemployment rate and popularity of tertiary education attainment of women in comparison to men which narrow the male-female employment gap (Tables 6-8). The variables that describe poverty seems to be mainly correlated with employment gaps in pre-retirement age and regarding the in-work poverty gap also with the prime age group.

Our focus is on effects of childcare provision. For the youngest workers, the larger coverage of formal care of children below 3 years is associated with a lower gender employment gap. Interestingly, the effect is significant only in the cluster 3, suggesting that - in line with findings by Brilli et.al (2016) - this

may be especially important for the group of countries where the provision of these services is still low (Table 6). It should be noted that women in the cluster 3 countries who become mothers are younger than in other clusters. The gap increasing effect is observed for the coverage variable of informal care for the smallest children, but this effect is significant only in the whole sample (all countries considered).

As expected, the access to formal care (coverage and intensity) has the largest effect for the prime-aged group of workers (Table 7). The effects are large and significant for the cluster 1, where the access to formal care is common and the intensive usage is typical. This shows that both access and intensity of use of formal childcare are linked to the size of the gender employment gap. The results for informal care are less likely to be significant and the effects are mixed.

Obligations of taking care of small children (below minimum compulsory school age) are associated with a lower gender employment gap (for parents) and a higher one (if a grandmother takes care of children). This second effect is visible for informal care of children between 3 and minimum compulsory school age, especially in the cluster 3. Our results also indicate that even the direction of correlations depends strongly on country specificities (country clusters). For example, informal childcare can be provided not only by grandparents but by persons of pre-retirement age who work without a formal contract, but their work is measured in the Labour Force Survey. This can explain that the coverage of informal care of youngest children is associated with a lower gender employment gap of the group of workers 50+ (Table 8).

**Table 6. Panel regression analysis: GEG among young**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
Unemployment rate among young (15-24)	-0.158***	-0.158***	-0.139*	-0.136	-0.146***	-0.145***	-0.150***	-0.148***
	(0.019)	(0.019)	(0.081)	(0.083)	(0.036)	(0.037)	(0.035)	(0.035)
Long-term unemployment rate among young (15-24)	-0.039**	-0.039**	0.052	0.064	-0.028	-0.030	-0.028	-0.030
	(0.019)	(0.019)	(0.063)	(0.065)	(0.044)	(0.045)	(0.030)	(0.030)
Formal care – coverage – children below 3 years	-0.139***	-0.140***	-0.053	-0.066	0.240	0.231	-0.327***	-0.329***
	(0.046)	(0.046)	(0.062)	(0.065)	(0.179)	(0.182)	(0.117)	(0.119)
Formal care – intensity – children below 3 years	0.106***	0.073	0.103	0.145	-0.051	0.090	0.093*	-0.061
	(0.038)	(0.089)	(0.094)	(0.197)	(0.113)	(0.363)	(0.050)	(0.133)
Formal care – coverage – children between 3 years old and minimum compulsory school age	0.009	0.010	-0.049	-0.005	-0.195	-0.196	0.014	0.043
	(0.053)	(0.053)	(0.153)	(0.157)	(0.167)	(0.170)	(0.087)	(0.087)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
Formal care – intensity – children between 3 years old and minimum compulsory school age	-0.164**	-0.179	-0.063	0.173	0.157	0.190	-0.115	-0.268
	(0.077)	(0.122)	(0.174)	(0.252)	(0.261)	(0.434)	(0.125)	(0.215)
Informal care – coverage – children below 3 years	0.128*	0.131**	0.152	0.202	0.156	0.168	0.075	0.144
	(0.066)	(0.066)	(0.181)	(0.201)	(0.161)	(0.165)	(0.109)	(0.114)
Informal care – intensity – children below 3 years	-0.075**	-0.131	-0.040	0.025	-0.022	0.139	-0.074	-0.392
	(0.035)	(0.140)	(0.044)	(0.369)	(0.121)	(0.406)	(0.067)	(0.253)
Informal care – coverage – children between 3 years old and minimum compulsory school age	-0.088	-0.091	-0.199	-0.258	-0.083	-0.083	0.021	-0.006
	(0.071)	(0.071)	(0.187)	(0.207)	(0.309)	(0.333)	(0.096)	(0.097)
Informal care – intensity – children between 3 years old and minimum compulsory school age	0.025	-0.004	-0.007	0.616	0.039	0.069	0.011	-0.336
	(0.032)	(0.199)	(0.037)	(0.485)	(0.107)	(0.498)	(0.056)	(0.384)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
Formal care # Informal care – intensity – children below 3 years		0.002		-0.002		-0.005		0.009
		(0.004)		(0.011)		(0.013)		(0.007)
Formal care # Informal care – intensity – children between 3 years and minimum compulsory school age		0.001		-0.019		-0.001		0.010
		(0.006)		(0.014)		(0.017)		(0.010)
Difference in share of female and male population with tertiary education	-0.268***	-0.264***	-0.328***	-0.302***	-0.491***	-0.492***	-0.095	-0.089
	(0.055)	(0.055)	(0.097)	(0.100)	(0.140)	(0.141)	(0.093)	(0.093)
Gap in probability of being at risk of poverty or social exclusion (male – female) – young only	-0.019	-0.020	0.064	0.060	0.017	0.012	-0.121*	-0.116*
	(0.033)	(0.033)	(0.050)	(0.051)	(0.066)	(0.068)	(0.063)	(0.063)
Gap in In-work at-risk-of-poverty rate (male – female) – young only	-0.001	-0.001	0.041	0.044	0.022	0.027	-0.021	-0.009
	(0.024)	(0.024)	(0.034)	(0.035)	(0.050)	(0.051)	(0.042)	(0.043)
Constant	14.179***	15.769***	6.343	-3.880	11.177**	5.576	14.820***	24.874***



	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
	(2.080)	(4.222)	(4.183)	(9.403)	(5.266)	(13.662)	(4.543)	(7.408)
Observations	374	374	96	96	111	111	138	138
R-squared	0.483	0.483	0.348	0.364	0.609	0.610	0.392	0.411
Number of countries	28	28	10	10	12	12	13	13

**Table 7. GEG among prime-aged**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
Unemployment rate among prime-aged (25-49)	-0.486***	-0.483***	-0.581***	-0.552***	-0.559***	-0.590***	-0.394***	-0.379***
	(0.058)	(0.058)	(0.126)	(0.132)	(0.057)	(0.055)	(0.054)	(0.054)
Long-term unemployment rate among prime -aged (25-49)	0.017	0.020	0.117***	0.108***	0.087***	0.080***	0.022	0.021
	(0.020)	(0.020)	(0.028)	(0.029)	(0.024)	(0.023)	(0.016)	(0.016)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
Formal care – coverage – children below 3 years	-0.039	-0.037	0.094**	0.083*	-0.100	-0.046	0.103	0.080
	(0.062)	(0.062)	(0.046)	(0.048)	(0.140)	(0.135)	(0.082)	(0.083)
Formal care – intensity – children below 3 years	-0.099*	0.008	-0.109*	-0.251	-0.086	0.129	-0.026	-0.229**
	(0.055)	(0.127)	(0.065)	(0.152)	(0.093)	(0.288)	(0.037)	(0.099)
Formal care – coverage – children between 3 years old and minimum compulsory school age	-0.189**	-0.204***	-0.299**	-0.283**	-0.019	0.052	-0.075	-0.042
	(0.077)	(0.077)	(0.116)	(0.119)	(0.133)	(0.129)	(0.065)	(0.066)
Formal care – intensity – children between 3 years old and minimum compulsory school age	-0.272**	-0.020	-0.333***	-0.360**	0.112	-0.833**	0.073	0.035
	(0.106)	(0.165)	(0.122)	(0.177)	(0.215)	(0.355)	(0.096)	(0.160)
Informal care – coverage – children below 3 years	-0.127	-0.124	-0.098	-0.069	-0.060	-0.088	-0.096	-0.021
	(0.094)	(0.094)	(0.101)	(0.126)	(0.130)	(0.126)	(0.081)	(0.085)
Informal care – intensity – children below 3 years	-0.093*	0.103	0.068**	-0.217	-0.058	0.166	-0.059	-0.467**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
	(0.050)	(0.201)	(0.032)	(0.278)	(0.101)	(0.321)	(0.046)	(0.186)
Informal care – coverage – children between 3 years old and minimum compulsory school age	0.126	0.116	0.124	0.098	-0.103	-0.364	0.130*	0.115
	(0.101)	(0.101)	(0.100)	(0.129)	(0.248)	(0.251)	(0.073)	(0.072)
Informal care – intensity – children between 3 years old and minimum compulsory school age	0.007	0.493*	0.003	-0.008	0.127	-1.132***	-0.001	-0.121
	(0.044)	(0.253)	(0.028)	(0.303)	(0.088)	(0.398)	(0.039)	(0.274)
Formal care # Informal care – intensity – children below 3 years		-0.005		0.009		-0.008		0.011**
		(0.006)		(0.009)		(0.010)		(0.005)
Formal care # Informal care – intensity – children between 3 years and minimum compulsory school age		-0.014*		0.000		0.043***		0.003
		(0.007)		(0.009)		(0.014)		(0.007)
Difference in share of female and male population with tertiary education	-0.391***	-0.405***	-0.459***	-0.460***	-0.610***	-0.574***	-0.197***	-0.187***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions	without interactions	with interactions
	(0.079)	(0.079)	(0.074)	(0.075)	(0.114)	(0.109)	(0.070)	(0.069)
Gap in probability of being at risk of poverty or social exclusion (male – female) – prime -aged only	-0.184	-0.184	-0.039	-0.047	-0.166	-0.168	-0.015	-0.001
	(0.134)	(0.133)	(0.112)	(0.113)	(0.204)	(0.197)	(0.108)	(0.106)
Gap in In-work at-risk-of-poverty rate (male – female) – prime -aged only	0.315**	0.307**	-0.196	-0.184	0.675***	0.580***	0.389***	0.396***
	(0.135)	(0.135)	(0.142)	(0.143)	(0.188)	(0.183)	(0.112)	(0.110)
Constant	35.908***	23.964***	29.102***	34.107***	18.450***	40.547***	15.252***	22.813***
	(2.876)	(5.730)	(2.337)	(6.668)	(4.494)	(10.460)	(3.769)	(5.690)
Observations	396	396	106	106	113	113	148	148
R-squared	0.501	0.509	0.870	0.872	0.806	0.828	0.544	0.567
Number of countries	28	28	10	10	12	12	13	13

**Table 8. GEG among persons in pre-retirement age persons**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	With interactions	without interactions	with interactions
Unemployment rate among older (50-64)	-0.350***	-0.351***	0.217	0.101	-0.506***	-0.513***	-0.286***	-0.270***
	(0.039)	(0.039)	(0.151)	(0.142)	(0.052)	(0.053)	(0.065)	(0.066)
Long-term unemployment older (50-64)	-0.029**	-0.031***	-0.036	-0.050*	0.015	0.015	-0.017	-0.018
	(0.012)	(0.012)	(0.028)	(0.026)	(0.018)	(0.018)	(0.018)	(0.018)
Formal care – coverage – children below 3 years	-0.051	-0.047	-0.013	-0.000	0.078	0.065	0.120	0.128
	(0.040)	(0.040)	(0.061)	(0.056)	(0.110)	(0.112)	(0.093)	(0.095)
Formal care – intensity – children below 3 years	-0.097***	-0.104	-0.159*	-0.363**	-0.069	0.151	-0.096**	-0.137
	(0.035)	(0.080)	(0.089)	(0.173)	(0.075)	(0.232)	(0.043)	(0.114)
Formal care – coverage – children between 3 years old and minimum compulsory school age	0.136***	0.147***	0.085	0.012	0.119	0.128	0.292***	0.304***
	(0.049)	(0.049)	(0.157)	(0.143)	(0.105)	(0.107)	(0.073)	(0.074)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	With interactions	without interactions	with interactions
Formal care – intensity – children between 3 years old and minimum compulsory school age	-0.055	-0.260**	-0.044	-0.717***	-0.117	-0.158	0.169	-0.034
	(0.068)	(0.106)	(0.163)	(0.215)	(0.163)	(0.278)	(0.111)	(0.190)
Informal care – coverage – children below 3 years	-0.079	-0.097	-0.024	-0.299*	0.067	0.086	-0.066	-0.037
	(0.060)	(0.060)	(0.137)	(0.155)	(0.101)	(0.104)	(0.096)	(0.100)
Informal care – intensity – children below 3 years	0.028	0.008	0.026	-0.338	-0.071	0.177	0.066	-0.026
	(0.031)	(0.127)	(0.043)	(0.322)	(0.078)	(0.261)	(0.051)	(0.216)
Informal care – coverage – children between 3 years old and minimum compulsory school age	0.116*	0.134**	-0.019	0.309*	0.091	0.066	0.223***	0.213**
	(0.064)	(0.064)	(0.135)	(0.159)	(0.192)	(0.203)	(0.085)	(0.085)
Informal care – intensity – children between 3 years old and minimum compulsory school age	0.010	-0.392**	-0.041	-1.555***	0.104	0.035	0.037	-0.394
	(0.028)	(0.164)	(0.037)	(0.365)	(0.069)	(0.325)	(0.044)	(0.325)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	With interactions	without interactions	with interactions
Formal care # Informal care – intensity – children below 3 years		0.000		0.012		-0.008		0.002
		(0.004)		(0.010)		(0.008)		(0.006)
Formal care # Informal care – intensity – children between 3 years and minimum compulsory school age		0.012**		0.046***		0.003		0.012
		(0.005)		(0.011)		(0.011)		(0.009)
Difference in share of female and male population with tertiary education	-0.761***	-0.758***	-0.535***	-0.535***	-0.710***	-0.711***	-0.847***	-0.852***
	(0.054)	(0.054)	(0.102)	(0.092)	(0.095)	(0.095)	(0.087)	(0.088)
Gap in probability of being at risk of poverty or social exclusion (male – female) – older only	-0.109***	-0.109***	0.042	-0.017	-0.102**	-0.095*	-0.027	-0.025
	(0.036)	(0.035)	(0.060)	(0.056)	(0.049)	(0.051)	(0.069)	(0.069)
Gap in In-work at-risk-of-poverty rate (male – female) – older only	0.022	-0.007	-0.021	-0.027	0.163**	0.163**	0.108*	0.075
	(0.040)	(0.041)	(0.084)	(0.077)	(0.065)	(0.065)	(0.061)	(0.065)
Constant	22.259***	29.407***	17.798***	47.747***	23.058***	17.114**	8.761**	17.376**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All		Cluster 1		Cluster 2		Cluster 3	
VARIABLES	without interactions	with interactions	without interactions	with interactions	without interactions	With interactions	without interactions	with interactions
	(1.791)	(3.704)	(3.244)	(7.712)	(3.443)	(8.497)	(3.836)	(6.701)
Observations	393	393	105	105	112	112	148	148
R-squared	0.705	0.711	0.435	0.551	0.872	0.873	0.697	0.703
Number of countries	28	28	10	10	12	12	13	13

Source: Own calculations.



## 5. Concluding remarks

The study presented in this paper confirms that countries with different social investment strategies show at the same time different average life course developments, as well as different outcomes for men and women, particularly those related to the labour market. The comparative social investment frame refers to the three types of SI strategies developed by (Baiocco et al., 2021): the all-in strategy, the stripped-down strategy, and the sprouting-up strategy, which are practiced respectively in the three clusters of EU countries.

The applied NTA approach provides findings how welfare state policies shape the life course of women and men discussed in terms of generational economy variables (the first research question). They illustrate that the three types of social investment strategies considered are associated with different outcomes by gender, depicted in differently structured life trajectories. In the countries with developed social investment policies (Cluster 1), including education, active labour market programmes targeted at both employed and unemployed as well as widely available public childcare services, both women and men show higher labour market attachment, higher lifetime earnings and longer working careers. Furthermore, these countries offer generous public policies, including in-kind and cash services (both social investment and other welfare policies), which are also financed by taxes and contributions generated from the high labour income. Consequently, the gender gap in total consumption, as well as public education consumption (depicting social investment in human capital) is the smallest in these countries. In the stripped-down and sprouting-up clusters (Clusters 2 and 3), where social investment policies are less developed, the age profiles of wages indicate more vulnerability on the labour market, particularly during the old age. In these clusters of countries we observe a smaller lifetime income, combined with more reliance on welfare policies. Furthermore, in countries with the stripped-down and the sprouting-up strategies we observe larger gender gaps in public education consumption. At the same time, in the sprouting-up cluster 3 the relative public education consumption is smaller, compared to the other two clusters. It is also worth noting the gender gaps in relation to labour income. The gap is smaller in the sprouting-up cluster 3, but mainly due to the earlier withdrawal of men from the economic activity, resulting in lower labour income at later stages of economic life course, compared to men in the other two clusters of countries. It is worth to underline that the NTA analytical approach proposed meets research suggestions formulated by Hagestad & Dykstra (2016) about more focus given to macro-level factors which structure the life course of men and women.

Regarding the second research question on how different social investment strategies and the access to formal and informal childcare relate to the gender gaps on the labour markets, our findings based on the panel regression models also confirm the role of social investment strategies in reducing the gender gaps. Social investment measures aiming at reducing long-term unemployment also result in lower gender gaps on the labour market. This is also true as regards childcare policies. The better provision and use of the early childcare and education do not only contribute to early investment in human capital, but also by facilitating mothers' employment to lowering gender gaps in the labour market.

However, it is worth to note that various childcare indicators show different effects for the employment and pay gender gaps. Formal childcare indicators matter more for the gender gap in employment than in pay: for children below 3 years the better availability of services is linked to lower gender differences in employment. For children above 3 years the intensity of childcare is relevant and negatively correlated with the employment gap. Informal care, substituting formal services, does not show any significant effect for the gender employment when provided to small children and reduces the gap when given to older children. More intensive use of informal care for children below 3 years is associated with the lower pay gap.

Our results also reveal that the associations between selected indicators of this type of social investment and gender gaps in the labour market are not always straightforward. We found out that more intensive childcare in the stripped-down or sprouting-up clusters of countries is associated with a larger gender pay gap. This can be explained by higher labour market participation of low-skilled women in these countries. At the same time, in the cluster 3 (sprouting up) the larger role of the informal care for children above 3 years plays the higher gender gap at older ages is, indicating that social investment policies may have multi-generational consequences when looking at the labour market outcomes. To explain these findings more insights is needed in the labour market structures and economic activity patterns over the life course in the clusters considered. In particular, potential employment effects should be more precisely specified as responses to improved accessibility of childcare might differ among different groups of women. In addition, more detailed information about formal and informal childcare arrangements (private/public provision of formal care, different providers of informal care) need to be accounted for. And finally, informal care arrangements reflect social perception about obligations for childcare, especially for children under 3 years, hence the cultural context matters as well.

Nevertheless, the early childcare and education and investment in human capital in general as well as other measures aimed at balancing work and family, distinctive for social investment and reducing inequalities in the labour market, might be considered as pre-redistribution instruments as proposed by (Saraceno, 2019). The pre-redistribution concept imposes 'changing the state of play *ex ante*, not only *ex post*' (p. 39), instead of reforming a redistributive mechanism of welfare state to contrast rising inequalities.

Our results show that pre-redistribution in the work-family balance policies not only reduces constraints facing by individuals in the labour market, especially by women with caring responsibilities, but also contributes to strengthening human capital over life course and encouraging labour force participation, in particular of women. Therefore, access to the power resources related to childcare and active labour market policies can empower people to cope with new risks and reduce vulnerabilities. The availability of formal care for smaller children, as well as the intensity of care for children in pre-school age are key to reduce employment gaps between men and women, not only among younger women, but also in older ages. In particular, insufficient access to formal childcare leads to its substitution by informal care provided, among others, either by grandmothers or older women. This finding underlines that access to such individual power resources produces not only direct outcomes (supporting employment of mothers), but also indirect one (supporting longer working lives of older women/grandmothers).

Furthermore, the accessibility to affordable childcare seems to be beneficial for women with a lower socio-economic status as improves their work opportunities as well as human capital development of children, both constituting the important aspects of the efficient social investment strategy. Therefore, the design of the childcare services should particularly take into account their provision to children from families with a lower socio-economic background, in particular those living in regions and localities characterised by weaker economic and labour market developments.

Our approach to study social investment returns is consistent in many aspects with the conceptual framework presented by Hemerijck & Plavgo (2021), as explained before. However, we differ from (Plavgo & Hemerijck, 2020) in terms of specifying relevant indicators of social investments strategies: we do not distinguish between the stock, flow, and buffer policies to describe a strategy. Our specification of life outcomes to measure social investments returns is different. This way we demonstrate that the overall framework might have different applications to extend the knowledge how to identify the returns to social investments applied in the countries, using the generational economy approach and focusing on the gender gaps on the labour market.

We must emphasize that our results provide a description of the current and historical relationships between gender gaps on the labour market and different social investment strategies, but they do not offer causal explanations. They just reveal some regularities at the macro level which could be considered as the first step towards more in-depth research with more focus on micro-level interdependencies.

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## Appendix 1

**Table A1. The list of indicators used in analysis**

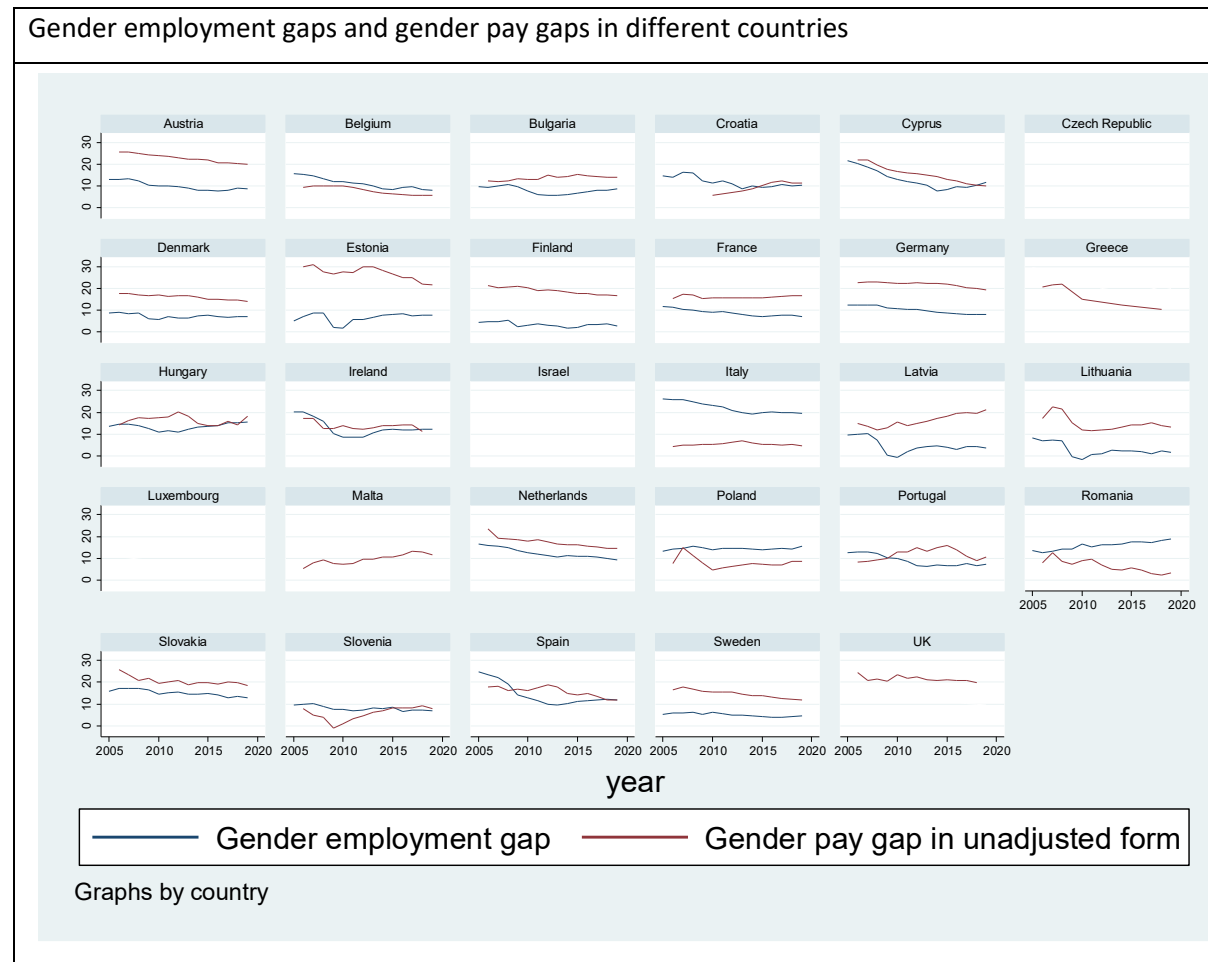
Indicator description	Data source
Employment rate (sex, age, educational attainment)	Eurostat: Labour Force Survey
Unemployment rate (sex, age, educational attainment)	Eurostat: Labour Force Survey
Activity rate (sex, age, educational attainment)	Eurostat: Labour Force Survey
Long-term unemployment rate (sex, age)	Eurostat: Labour Force Survey
Employment in current job by duration	Eurostat: Labour Force Survey
The real gross disposable income of households per capita (index = 2008)	Eurostat: EU-SILC
In-work at-risk-of-poverty rate (sex, age)	Eurostat: EU-SILC
Impact of social transfers (excluding pensions) on poverty reduction (sex, NUTS2 regions)	Eurostat: EU-SILC
Aggregate replacement ratio for pensions (excluding other social benefits) by sex	Eurostat: EU-SILC
Self-reported unmet need for medical care by sex	Eurostat: EU-SILC
Out-of-pocket expenditure on healthcare	Eurostat: EU-SILC
Healthy life years at age 65 by sex	Eurostat
Life expectancy at age 65 by sex	Eurostat
Individuals who have basic or above basic overall digital skills by sex	
National age profiles of labour income (YL)	AGENTA project database
National age profiles of consumption (C)	AGENTA project database
National age profiles of lifecycle deficit (LCD)	AGENTA project database
National age profiles of net public transfers (TG)	AGENTA project database
National age profiles of public transfers inflows (TGI)	AGENTA project database
National age profiles of public consumption on education (CGE)	AGENTA project database
National age profiles of public consumption on health (CGH)	AGENTA project database

Data: EUROSTAT AND AGENTA

## Appendix 2

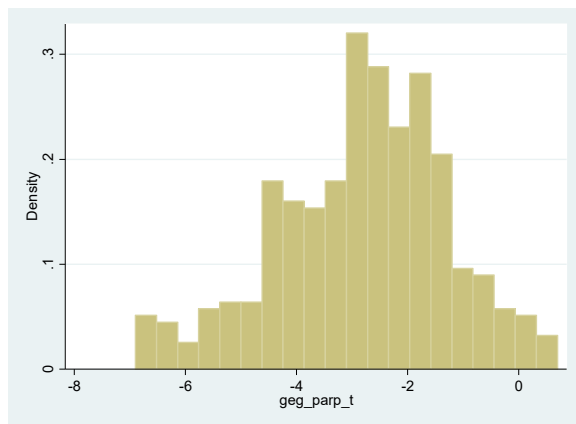
**Table A2. Descriptive statistics and distributions of variables used in regressions**

Dependent variables

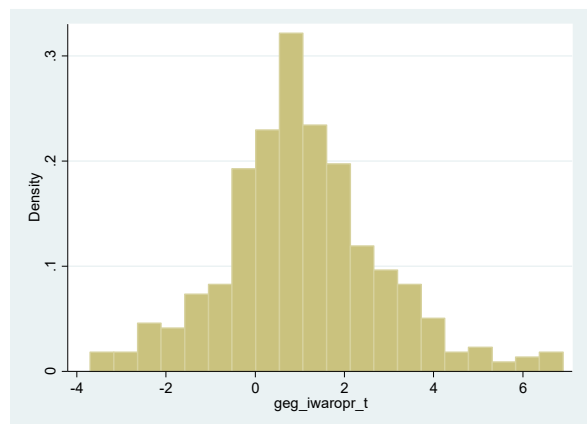


Explanatory variables in the regressions

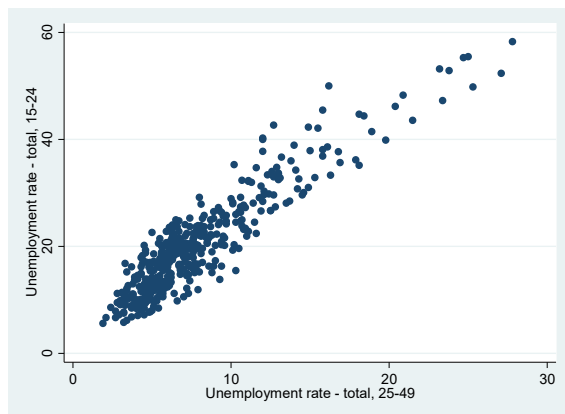
The gap in % of people at risk of poverty or social exclusion



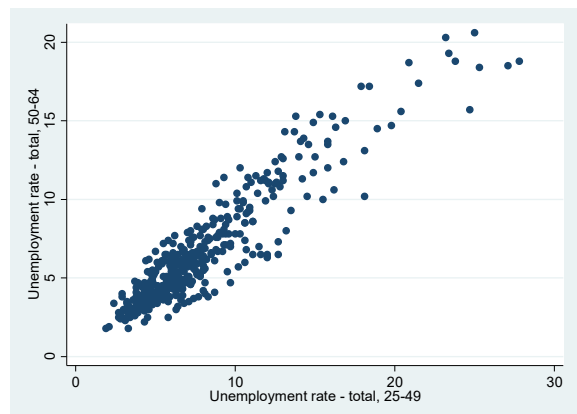
The gap in In-work at-risk-of-poverty rate:



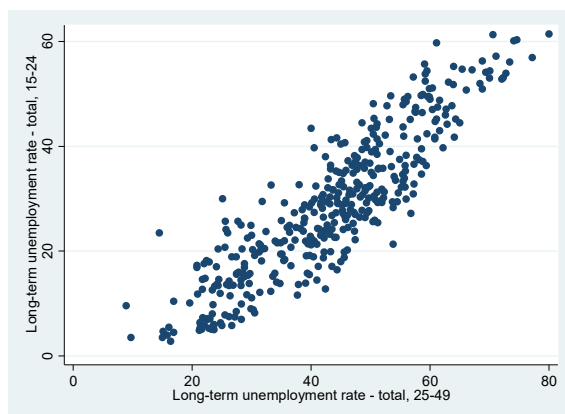
Unemployment rate (actual data) – prime age vs young people



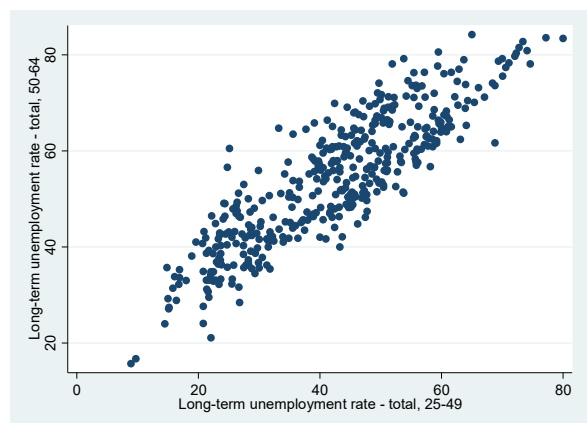
Unemployment rate (actual data) – prime age vs pre-retirement age people



Long-long term unemployment rate– prime age vs young persons



Long-long term unemployment rate– prime age vs pre-retirement age persons



## Histograms of formal and informal care variables

Columns: Left – formal care, right – informal care

Rows: 1) Children below 3 years – average number of hours including zeros (coverage)

- 1) Children below 3 years – average number of hours without zeros (usage)
- 2) Children older than 3 years – average number of hours including zeros (coverage)
- 3) Children older than 3 years – average number of hours without zeros (usage)

### Formal care vs. informal care

