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Labour market gender gaps and childcare policies in countries with different social investment strategies

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Abstract

We study the role of formal and informal childcare within the ECEC policies for gender employment and pay gaps, considering the life course stages distinctive for childcare tasks. The ECEC policies are framed within the types of social investment strategies identified in the EU countries to picture developments in social investments after 2005. The aggregated EU-SILC data from 2005 to 2019 for 27 European countries have been used in the panel regression models to uncover how the caring arrangements influence labour market gendered outcomes of women at different ages (15–24, 25–49, 50–65). We find that better provision and use of early education and childcare not only contribute to early investment in human capital but it also facilitates mothers' employment and thus contributes to lowering gender employment and pay gaps. However, better coverage of care for children older than 3 years old results in negative employment effects for grandmothers. These effects vary also across countries, depending on their overall institutional setting depicted by the types of social investment strategies distinguished. Consequently, the ECEC agenda should be extended by addressing the employment of women at the

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pre-retirement age. It is crucial not only for reducing gender gap in employment and pay but also in the light of challenges generated by demographic developments—the labour force shrinking and the population ageing processes.

KEYWORDS
childcare, gender equality, labour markets, social investments, social protection and security

1 | INTRODUCTION

Social investment policies (Bonoli, 2007; Esping-Andersen, 2002; Hemerijck, 2013; Morel et al., 2012) have been proposed to improve people's life chances by preparing and supporting individuals to face new risks 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. These policies refer to investment in skills and education and human capital in general (from early education to learning of the adults), active labour market programmes, supporting parents and carers in their care obligations as well as services that enable independent living with increasing fragility and disabilities. In this article, we aim to look at the linkages between social investment policies implemented in EU countries and gendered labour market outcomes. Gender matters for both life opportunities and risks: gender differences are visible in education at each of its levels, family formation, (child)care, labour market participation, retirement, health, and social relations, and altogether produce the gendered life courses (Hagestad & Dykstra, 2016). As social investment focuses on human capital and peoples' life capabilities, its policies support gender equality (Saraceno, 2023; Saraceno et al., 2015).

We study social investment policies across the EU, referring predominantly to the typology of European countries by Baiocco et al. (2021), which considers the multidimensionality of the welfare provision concept to depict different social investment strategies in Europe and their evolution over the years 2004–2018. The typology is based on the three pillars of social investment: family and children, education and social investment towards working age people. They are described by the set of indicators representing both expenditure and coverage of the analysed social investment measures. The typology proposed reflects recent developments of the welfare model in the EU. The three country clusters, identified on country-year specific data, show differences in the levels of social investment expenditure and their allocation over the life-course. The first cluster comprises countries with the all-in strategy for social investment (mainly Scandinavian and Continental countries), the second one includes countries with the stripped-down strategy, that focus on social investment at the later stages of the life course (Italy, Malta, Cyprus, Portugal, Ireland) while the third one countries with the sprouting-up strategy (Central and Eastern European Countries), that present a larger focus on social investment at early stages and with preferences for cash benefits rather than services.

Following the broad debate about social investment returns and their measurement (Hemerijck & Plavgo, 2021; Parolin & Van Lancker, 2021; Plavgo & Hemerijck, 2021), we refer to the macro level to investigate whether country differences in social investment policies are associated with different gender labour market outcomes. Gendered labour market outcomes are measured by the gender gaps in employment and pay. In line with the prevalent approaches in research on the upward trend of female labour force participation and gendered labour market outcomes, framed within relevant family policy developments and their support to the transition towards a dual-earner family model (Ferragina, 2019, 2020; Thevenon, 2011), formal early childcare and education (ECEC) has been selected as a social investment measure we study. This key family policy measure matters both for children's education outcomes and their employment prospects as well as parents' labour market outcomes (European Commission, 2022; OECD, 2018). Returns from early childcare investments concern people's life capabilities at the

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different life course stages. Here, our attention is on labour force participation of females being at subsequent stages of the life course, which are depicted by their age (15–24, 25–49 and 50–65 years), distinctive from the perspective of childcare provision and use.

Rich evidence about the impact of ECEC on women's labour market performance, presented in the broad survey of comparative and country-specific studies by Ferragina (2020), shows persistent cross-country differences despite the general trend in the formalization of childcare observed in European countries (also ESDE Quarterly Review, 2023; Ferragina & Magalini, 2023; ILO, 2022; OECD, 2018). These differences are rooted, among others, in the developments of formal services in terms of accessibility, costs and quality, which are related to different welfare regimes, in particular to their family policy packages and the way these policies support the transition from a male breadwinner towards a dual-earner—dual carer family model (Ferragina, 2019, 2020; Thevenon, 2011). For countries at the early stage of this transition (lower women's employment, weaker childcare provision), employment effects of ECEC are stronger (e.g., Germany, Italy) than in countries more advanced in the transition (the Nordic countries) (Ferragina, 2019). Moreover, these effects, particularly regarding mothers' employment, are moderated by the interplay between formal and informal care (substitution vs. complementation) (Havnes & Mogstad, 2011). In addition, the formalization of childcare, both in terms of coverage and time spent in institutions, differs as regards services provided for children under 3 years and for children aged 3–5 years (Daly & Ferragina, 2018; ESDE Quarterly Review, 2023; Ferragina & Magalini, 2023). These aspects of ECEC developments and their impact on gendered labour market outcomes are underlooked; this is the first one of the knowledge gaps we aim to fill.

The debate about ECEC and women's labour market participation is centred around mothers' employment. This group might be proxied predominantly by women aged 25–49 years, however, younger women aged 15–24 also account for. Including women aged 50–65 into the population of interest involves consideration about grand parenting (informal care) and its effects for labour market performance of mothers and grandmothers. There is some evidence, both from the country-specific and cross-country perspectives, that caring for grandchildren reduces the employment rate of women aged 55–64 (Backhaus & Barslund, 2021; Frimmel et al. 2017; Reinkowski, 2013), particularly in countries with a lower availability of formal childcare. However, childcare provided by working-age grandmothers affects positively the labour participation of their daughters (Aassve et al. 2012; Arpino et al. 2014; Dimova & Wolff 2011; Zamarro, 2020) and moderates the impact of extending formal childcare on mothers' employment (Karademir et al. 2023). It is however unclear how the interactions of formal and informal care impact women's employment and gender pay gaps over the life course under care arrangements provided by different social investment strategies. This is a second question we want to address.

The analytical approach proposed to answer both questions is based on the EU-SILC data from 2005 to 2019 for 27 European countries used for the descriptive analysis of coverage and use of formal and informal ECEC services and panel regression modelling. We have found that the provision and use of ECEC not only contribute to early investment in human capital but also facilitate mothers' employment, which contributes to reducing gender gaps in the labour market, consistent with the social investment life course multiplier effect perspective of Hemerijck et al. (2023). This evidence is stronger for the gender gap in employment than for the gender gap in pay. However, these relationships differ across women at different age groups, which depicts the life course stages distinctive for childcare tasks. Increasing coverage of informal care for children aged 3–5 years comes together with a higher gender employment gap among women aged 50–65. This is likely related to the fact, that grandparents often provide this care. Hence, some women in the pre-retirement age may be inclined to reduce their labour market attachment to care for their grandchildren, widening the gender employment gap. Thus, the life course perspective matters here, as the effects of informal care differ between younger and older women. Formal and informal childcare for children under 3 years and those aged 3–5 years impact differently gender gaps in country clusters specified by the type social investment strategy. Given these findings, we conclude that the ECEC agenda should be reframed as aimed not only at investing in children and supporting mothers' employment, but also at prolonging working lives of women. It is crucial not only for reducing gender gap in employment and pay but also in the light of challenges generated by the evolution of the population age structure—the labour force shrinking and the population ageing.

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The paper is structured as follows. In the next section we present a brief literature review on social investments, with a focus on childcare, and women's labour market outcomes. Then, we describe our methodology and data. In the subsequent section we discuss the results. The concluding remarks close the paper.

2 | LITERATURE REVIEW

The social investment approach with its focus on human capital investment and facilitating labour force participation to prepare and support people to face risks over their lives has strengthened the dual role of early childcare and education (ECEC): investing in children and supporting mothers' employment. ECEC, one of the the family policy measure of increasing relevance in the 1980s and after under so called 'the consolidation phase' of family policies developments (Daly & Ferragina, 2018), has been reframed into the key welfare state policy. Consequently, the role of family policies within the welfare state has changed. Their contribution to economic prospects started to be acknowledged due to their redefined focus on improving labour force participation of women and improving the quality of the future labour force (Saraceno, 2023).

ECEC is also a strong social investment life course multiplier (Hemerijck et al., 2023). On the micro level, it supports children's cognitive and social development, as well as parent's employment preservation or insertion, which contributes to the equality of opportunity. This multiplier can also affect the life course employment path of the grandparents' generation, as conducive to the extension of their working lives, as we aim to show in the article.

Framing ECEC contributions to changes in women's labour force participation, which is also expected to diminish gender gaps in employment and pay, the family policy layouts are under consideration. Main emphasis is on policy support given to gendered family responsibilities for breadwinning and childcare (Ferragina, 2019, 2020; Ferragina & Magalini, 2023; Thevenon, 2011), as it reflects policy responses crucial for the gradual transition from a male breadwinner towards a dual earner—dual carer family model. However, due to its focus on women's labour market participation and their reconciliation of work and care, and missing the men's role in combining care and earning responsibilities, the social investment welfare state primarly supports the transition to the dual-earner family model (Saraceno, 2023; Saraceno et al., 2015). Therefore, neglecting the caring role of men might slow down the process of diminishing gender gaps in employment and pay.

Rich empirical research follows that conceptual approach to reveal how ECEC affects women's labour force participation. The cross-country policy differences used to be shown by referring to the typologies of family policies based on policy support given to evolved economic provision and childcare tasks by women. The positive impact of ECEC provision (access, costs, and quality) on women's labour force participation is shown in most comparative and country-specific studies as well as in reports by international organizations (ESDE Quarterly Review, 2023; European Commission, 2022; Ferragina, 2020; Ferragina & Magalini, 2023; ILO, 2022; OECD, 2018). Better access to public childcare services and their more intense use stimulates women's employment, particularly mothers' employment, and increases their working time, and reduces the gender pay gap by lowering the motherhood wage penalty. These effects have been evidenced both in the comparative (e.g., Adema et al., 2014; Budig et al., 2016; Del Boca, 2015; Del Boca & Mancini, 2013; Jaumotte, 2003; Sikirić, 2021) and in the country-specific papers (e.g., see Table 2 in Ferragina (2020)). Some findings illustrate that childcare has been the main driver of increasing women's labour force participation rates (e.g. De Henau et al., 2010; Thévenon, 2016).

The broad national evidence for countries, representing different welfare regimes and family policy evolutions, demonstrates various labour market effects related to progress in public childcare services and subsidies. However, some general conclusions might be formulated when looking across country studies. Improvements in the ECEC services are more vital for mothers' labour market outcomes in countries being less advanced in the childcare formalization process and countries with lower employment of mothers (Daly & Ferragina, 2018; Ferragina, 2020). There is a supposition that in countries with well-developed and highly subsidized childcare and high employment rates of mothers, further progress in public childcare would depict lower or even no impacts on labour force participation of

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mothers (e.g., Lundin et al., 2008). This seems to be confirmed by studies for Nordic countries, most advanced in women's engagement in the labour force and in the transition to the dual-earner—dual carer model, as in these countries positive effects of childcare were found to be lower. Denmark, Finland and Norway show positive impacts of childcare on women's employment (Hardoy & Schøne, 2015; Simonsen, 2010; Viitanen, 2011), while in Sweden the effects have been noticed in the early 1990s and have diminished over time, becoming statistically insignificant (Lundin et al., 2008). Havnes and Mogstad (2011) contest the causal effect of subsidized childcare on maternal employment in Norway despite the existing evident correlation between these variables. Their findings suggest that improved provision of public care crowds out informal childcare rather than encourages mothers' employment, resulting in a negative net effect for childcare. In reaction (Hardoy & Schøne, 2015) indicate that Havnes and Mogstad have limited their analyses to children aged 3–6. Therefore, a saturation effect of additional childcare provision reform might explain their findings, as all children at this age are in public childcare. The paper by Ferragina and Magalini (2023) on gendered labour market outcomes about changes in ECEC services in selected countries (Germany, France, Italy, Denmark, Sweden, and the United Kingdom) also provides supportive evidence about the limited effects of childcare. The saturation effect has started to be referred to when comparing cross-country results and looking at regional differences in childcare effects for women's employment between different country regions (e.g. Brilli et al., 2016). This study on Italy shows the more substantial impact of better childcare provision on women's employment in areas with limited childcare services.

Overall, the saturation effect and the links between formal and informal childcare are not well recognized. As informal childcare is often provided by grandparents, predominantly by grandmothers, the interdependencies between grand parenting and labour force participation of both mothers' (proxied by women aged 25–49) and grandmothers (women aged 50–65) need to be explored. The steadily growing evidence, created by the country-specific research (Arpino et al. 2014 for Italy; Frimmel et al. 2017 for Austria; Karademir et al. 2023 for Canada) as well as the comparative studies on the European countries (Aassve et al. 2012; Backhaus & Barslund, 2021; Dimova & Wolff, 2011; Hank & Buber 2009; Reinkowski, 2013; Zamarro, 2020), justifies that suggestion. Empirical findings show that caring for grandchildren is negatively associated with the employment rate of women aged 55–64, especially in countries with a lower availability of formal childcare. The negative effect of grand parenting on women labour market attachment is stronger in countries where enrollment into formal childcare is low, proving that childcare by grandparents substitutes formal services (Backhaus & Barslund, 2021). Moreover, childcare provided by working-age grandmothers affects positively the labour participation of their daughters (Aassve et al. 2012; Arpino et al. 2014; Compton & Polak 2014; Dimova & Wolff 2011; Zamarro, 2020) and moderates the impact of extending formal childcare on mothers' employment (Karademir et al. 2023). Furthermore, the patterns of formal-informal childcare provision and use differ between children under three years and those aged three to compulsory school. Our study accounts for this distinction.

Finally, the contextual variables play a crucial role in shaping social investment policies. Some key factors considered in the literature include economic conditions (GDP growth, unemployment rates), demography (as age, gender, ethnicity can influence social investment priorities), cultural norms (cultural attitudes towards family, work, and welfare with different emphasis on individual responsibility vs. expectations about the state support), health and education outcomes as the quality of healthcare and education systems can impact a society's overall well-being and can be key driver of social investment decisions (Esping-Andersen, 2002; Ferragina & Magalini, 2023).

3 | DATA AND METHODS

Analysing gender inequality in the labour market and changes in social investment outcomes requires indicators that measure gender inequality across countries and over time. We have selected two measures: 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 (15–64),

additional indicators are also provided to reflect gender gaps at different stages of the life course, which age groups depict: 15–24, 25–49 and 50–65 years. These GEG 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 only in unadjusted form, which does not account for different characteristics of women and men (the unexplained gender pay gaps are calculated for 2018 and 2021 only thus the time series is too short for us to use it). To partially adjust for the fact that measures used are raw, we account in our analysis for a tertiary education gap among men and women, as this gap also translates to gender pay inequality.

In this study, we put our main interest in one policy instrument expected to be a social investment, namely childcare support. Therefore, we look at indicators of access to care and education services and their relationship to employment and pay gaps among men and women. Importantly, we focus on both formal and informal services for small children, as the literature so far offered a limited discussion of informal care services from a social investment perspective. We collect data on the average number of weekly hours of formal services and other types of care (child-minders or grandparents) delivered to children. Eight indicators based on aggregate EU-SILC data are used. The variables are provided for two age groups separately: children aged under 3 years 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 per week are used as indicators of care intensity. 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.

Table 1 presents comparisons between mean values of the 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 use intensity for both groups of children.

Looking at means, we see that the differences in coverage and usage intensity between formal and informal care are statistically significant for all variables considered, with a leading role of formal care. Usage intensity of formal care is much higher among older children than those below 3 years. If formal care is used then its usage intensity is similar for children below 3 years and those older than 3 years. Informal care is much less popular among older children 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 are less expensive for parents.

TABLE 1 Descriptive statistics of formal and informal care variables.

	Formal care	Informal care	T-test (H0: Different means)
Average number of hours	Mean (std dev)	Mean (std dev)	*p*-value
Coverage: children below 3 years (total)	**8.48** (6.28)	**7.12** (5.82)	0.001
Use intensity: children below 3 years (with at least 1 h of care weekly)	**30.11** (7.06)	**22.47** (7.93)	0.000
Coverage: children from 3 years to minimum compulsory school age (total)	**25.26** (6.35)	**5.24** (4.14)	0.000
Usage intensity: children from 3 years to minimum compulsory school age (with at least 1 h of care)	**31.30** (5.61)	**17.03** (6.75)	0.000

Note: Table presents mean values, standard deviations and T-test *p*-values of childcare variables. Columns (1) and (2) show 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.

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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 h of informal care)
Formal care (total)	−**0.1129****	**0.2271*****
Formal care (with at least 1 h of formal care)	**0.0313*****	**0.4347*****
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 h of informal care)**
Formal care (total)	−**0.4221*****	−**0.1643*****
Formal care (with at least 1 h of formal care)	−**0.1737****	**0.2753*****

Note: 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).

The average number of hours of formal care among children with at least one hour of formal care is equal to around 30 h, which is only 75% of the full-time work week. The gap of 10 h can be a result of part-time work of parents (mainly mothers) and usage of 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 the minimum compulsory school age) children substitute each other, while for the intensity of usage both forms of care complement each other.

The analysis of interdependencies between the labour market gender inequality and access to and usage of childcare services has been performed by use of panel regression models with country fixed effects, where the dependent variables are gender employment gap and gender pay gap. The independent variables included—on the one hand—characterize the ECEC measure: the coverage and intensity of formal and informal care (and their interactions). On the other hand, the range of potential correlates of gender employment and gender pay gaps are specified: unemployment rates, the differences in percentage of tertiary educational attainment and poverty differences between males and females in different countries. The analysis was conducted both for the full panel of countries and for the clusters of countries. As outlined in the introduction, the regression has been applied for the three country clusters identified by Baiocco et al. (2021) according to their social investment strategies. Here it should be noticed that in this classification clusters to which countries belong to can change in time reflecting developments in social investment strategies. Following Baiocco et al. (2021) the assignment of countries to the selected clusters can differ in three subperiods: 2004–2008, 2009–2013, and 2014–2019. The clusters describing types of social investment are as follows: 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 (Finland, Sweden, Denmark, France, Belgium and Luxembourg and recently also France, Germany and Belgium), as well as those that do not provide universal access, but offer generous leave policies (Austria and the Netherlands) and overall spend a lot on family polices (over 3.25% of GDP). 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 (ALMP) are widely available to both employed and unemployed people, with average spending exceeding 0.25% of GDP.

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Cluster 2: *Stripped-down strategy*, comprising Portugal, Italy, Malta, Cyprus and Ireland. In the past this cluster also covered Spain and Greece but it has changed due to reforms introduced after global financial and economic crisis in 2009. These countries are characterized by medium spending in main areas of social investment, with social investment orientation towards later ages. They do not provide universal access to childcare, and the income replacement for the leave policies is relatively low, as is the overall family policy expenditure—1.75% of GDP on average. 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. ALMP are available, but are less generous (they spend on average 0.08% of GDP).

Cluster 3: *Sprouting-up cluster* comprising countries in Central and Eastern Europe (Poland, Hungary, Czech Republic, Estonia, Latvia, Lithuania) as well as some Southern Europe (Bulgaria, Romania, Croatia and recently also Slovenia, 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. Total spending on family policies varies a lot across the countries in these clusters: from top spenders like Poland or Hungary (both relatively new in the group) to low spending in Greece or Slovenia. 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 varying spending on ALMP: relatively high in Spain and Estonia (0.15%–0.16% of GDP), and low expenditure in the remaining countries (0.02%–0.07% of GDP).

In our regression analysis we hypothesize that a higher use of childcare services is associated with lower gender gaps in employment and pay (Ferragina, 2020; Ferragina & Magalini, 2023; Sikirić, 2021), however differently for women at different life course stages. Moreover, these effects are expected to be stronger in cluster 3 (with a lower childcare provision) and for children aged under 3 because of the ECEC crucial role in supporting women's labour market return. In addition, we suppose that the interplay between formal and informal care moderates differently ECEC effects in countries with different social investment strategies.

4 | RESULTS

First, we show results of the panel regression with fixed country and year effects for the entire sample of the working-age population with a focus on the gender employment gap. Next, we provide insights on how these interdependencies differ between country clusters that reflect types of social investment policies (Baiocco et al., 2021) and the women age groups defined: young (between 18 and 24), prime-aged (25–49), and in the pre-retirement age (50–65). Due to limited access to unadjusted pay gaps for age groups in EUROSTAT, the analysis of gender pay gaps has been performed only for the total population aged 18–65 in all countries and in the country clusters. The results for gender employment gap are presented in Table 3 while Table 4 refers to the results for gender gap in pay.

Apart from childcare arrangement variables, other social investment indicators and control variables are included in each regression. These variables offer a better understanding of the context for interactions between social investments and gender equality. To this end, we account for unemployment and long-term unemployment rates, gender gaps in poverty, gender gaps in tertiary educational attainment, and gender gaps in health at an older age (Table 5 and Tables A1, A2, A3 in the Appendix A).

We find that for small children (under 3 years old), better access (coverage) to formal care is associated with a lower gender employment gap, which confirms the previous results (Ferragina, 2019, 2020; Ferragina & Magalini, 2023; Sikirić, 2021). Interestingly, there is no such effect observed for the coverage of informal care. More intensive use of care services for small children, whether formal or informal, does not relate to the employment gap at all. For older children, from the age of 3 to the minimum compulsory school age, an increase in the intensity of use of formal care is associated with lower gender employment gap.

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TABLE 3 Childcare arrangements and gender employment gap by clusters and female groups.

ECEC indicators			Total sample	Cluster 1	Cluster 2	Cluster 3	Youth	Prime aged	Pre-retirement age
Formal care	Children under 3 years	Coverage	−**0.101*****	0.019	0.016	0.062	−**0.140*****	−0.037	−0.047
		Intensity	−0.113	−**0.274****	0.186	−0.065	0.073	0.008	−0.104
	Children 3–5 years	Coverage	**0.085****	−0.037	0.072	0.06	0.01	−**0.204*****	**0.147*****
		Intensity	−**0.356*****	−**0.534*****	−0.436	−0.186	−0.179	−0.02	−**0.260****
Informal care	Children under 3 years	Coverage	−0.068	−0.03	−0.031	−0.034	**0.131****	−0.124	−0.097
		Intensity	−0.155	−0.25	0.175	−0.063	−0.131	0.103	0.008
	Children 3–5 years	Coverage	**0.142****	0.029	−0.226	**0.283*****	−0.091	0.116	**0.134****
		Intensity	−0.18	−0.22	−0.538	−0.384	−0.004	**0.493***	−**0.392****
Children 3–5 years		Interaction: Formal care # Informal care—intensity	0.005	0.006	**0.023***	0.009	0.001	−**0.014***	**0.012****

Note: Table shows coefficients from linear panel regressions including country and year fixed effects. Variables included, but not reported in this table: unemployment rates, long-term unemployment rates, gender gaps in poverty indicators, gender gaps in the tertiary educational attainment, gender gaps in health at an older age.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

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TABLE 4 Childcare arrangements and the gender pay gap by clusters.

ECEC indicators			Total sample	Cluster 1	Cluster 2	Cluster 3
Formal care	Children under 3 yeas	Coverage	−**0.102***	0.061	−0.245	−0.133
		Intensity	**0.332*****	0.065	0.282	0.17
	Children 3–5 years	Coverage	0.109	−**0.257***	−0.401	−0.082
		Intensity	0.184	0.404	**1.278****	**0.677****
Informal care	Children under 3	Coverage	−0.008	0.115	−0.125	−0.108
		Intensity	0.261	−0.009	**0.756***	0.097
	Children 3–5 years	Coverage	−0.019	−0.131	−0.442	−**0.271****
		Intensity	**0.450***	**1.061****	0.52	**0.731***
Children 0–2 years		Interaction: Formal care # Informal care—intensity	−**0.012****	−0.003	−**0.022***	−0.004
Children 3–5 years		Interaction: Formal care # Informal care—intensity	−**0.013***	−**0.030****	−0.016	−**0.020***

Note: Table shows coefficients from linear panel regressions including country and year fixed effects. Variables included, but not reported in this table: unemployment rates, long-term unemployment rates, gender gaps in poverty indicators, gender gaps in the tertiary educational attainment, gender gaps in health at an older age.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

TABLE 5 Human capital and unemployment indicators versus GEG and GPG by clusters.

	Gender employment gap				Gender pay gap			
Variables	**Total**	**C1**	**C2**	**C3**	**Total**	**C1**	**C2**	**C3**
The difference in the share of the female and male population with tertiary education	−***	−***	−***	−***	−***	−***	−***	0
Current unemployment rate	−***	−/+***	0	−*	−*	0	+/−***	0
Long-term unemployment rate	+*	0	+*	+*	+/−*	+**	+***	+***

Note: Table shows signs of the coefficients from linear panel regressions including country and year fixed effects.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Increasing coverage of both formal and informal care for children older than 3 years old comes together with a higher gender employment gap, more visibly for informal care, which might seem to be counterintuitive. However, keeping in mind that informal care includes also care provided by grandparents, predominantly by grandmothers, the increase in the overall gender employment gap could be explained by lower employment of grandmothers providing care for children. This intuition is supported by the regression results for the gender employment gap displayed separately for three age groups—the positive correlation occurs only for those aged 50–65 years and for prime age the effect is even negative These findings are also amplified by the results for the interaction between the intensity of formal and informal care. It goes in line with findings of the comparative studies already referred to (Aassve et al. 2012; Backhaus & Barslund, 2021; Dimova & Wolff 2011; Hank & Buber 2009; Reinkowski, 2013; Zamarro, 2020). For instance, Backhaus and Barslund (2021) using the SHARE microdata revealed a large negative impact of grandparenthood on the employment rate of women aged 55–64, particularly pronounced in countries with a lower availability of formal childcare. Our results highlight the importance of the informal childcare channel.

There is a positive effect for the prime-aged women—here better coverage of formal care for children aged 3–5 is associated with a significantly lower gender employment gap. Hence it appears that the overall better coverage of care for children older than 3 years old does result in a positive employment effect for mothers, and a negative

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employment effect for grandmothers. This in turn suggests that the substantial increase in employment rates of women in pre-retirement age (50–64) over the past two decades (that we have observed both in absolute terms, but also relation to employment rates among prime-aged women) might have been even stronger if not childcare limitations. Therefore, the ECEC agenda needs to be considered as contributing not only to mothers' employment but also to grandmothers' labour force attachment.

Still, we need to remember that formal care constitutes the main type of service provided to older children. 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. This refers to the small effects of the extended public care services in Norway by Havnes and Mogstad (2011). Also empirical evidence for the province of Quebec demonstrates that childcare effects on mothers employment depend on existing care arrangements, in particular on care provided by grandparents (Karademir et al. 2023).

The extent of crowding out other care forms (usually informal ones) by formal/public services seems to depend on the types of services constitutive for both types of care, especially for informal care. Without insights into how informal care is structured that is, who provides care for children, are there mostly paid or unpaid carers, etc., it is difficult to provide a reasonable explanation for the 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 perceptions and prevailing gender norms about childcare obligations, in particular for children under 3 years. Therefore, one can conclude that the cultural context also matters.

The results of regression analyses across clusters show that the interdependencies studied greatly depend on the group of countries that we consider (Table 3). The effects of changes in formal and informal care on employment, statistically significant for all countries in the total sample, mostly lose their significance for the clusters. The only exception is the relationship between formal care intensity of children in both age groups considered and the gender employment gap in cluster 1, where the access to formal care is already the largest. Here, more time spent in childcare is linked to lower gender gap in employment. In cluster 3, the better coverage of informal care for children older than 3 years is associated with higher gender employment gap, showing that this type of care is more likely to be related to lower labour market participation of older females, rather than to higher paid work of young mothers. This finding confirms evidence provided by other comparative studies: Backhaus and Barslund (2021) show for ten European countries that under a relatively low formal ECEC provision grandparents' care substitutes formal services and reduces older female employment.

These results show that the link between women's employment and the extended access to formal care and its intensity of use need to be studied and discussed in the context of formal—informal childcare arrangements. Moreover, heterogeneous reactions by different groups of women may also contribute to the observed links between childcare and the overall women's employment. Life course perspective clearly matters, and it is important to consider the age of workers. For the youngest female workers, the larger coverage of formal care of children below 3 years of age is associated with a lower gender employment gap. As expected, care provision for children older than 3 years of age matters for the gender employment gap of the prime-aged group of female workers. The access to formal care (coverage and intensity) is associated with considerably lower gender employment gap while more intensive use of informal care is related to a larger gender employment gap. It must however be emphasized that our results must be discussed in relation to country specificities (country clusters). For example, informal childcare can be provided not only by grandparents but also by persons of pre-retirement age who work without a formal contract, but their work is measured and they are considered to be in employment.

The effects of better access to childcare services are weaker for the gender pay gap (Table 4), yet still, higher coverage of formal childcare for the youngest children is associated with lower average pay gap. There is no such a link for informal care. Also, interactions between formal and informal care services show that the greater use of both types of care is associated with even lower gender pay gaps. More puzzling results regarding childcare can be observed for the gender pay gap within the clusters. In cluster 1, better access to formal care for older children is

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correlated with lower pay differences between women and men. Likely, easily available formal services allowed mothers to return to the labour market earlier, contributing to their pay advancement. In clusters 2 and 3 more intensive formal care for children older than 3 years correlates with a larger gender pay gap. This might indicate that a need for double income seems to be higher in the the less developed EU members (that represent cluster 3), leading to higher employment of low-paid women and the demand for higher-intensity of childcare.

Apart from childcare related indicators, we also analyse dependencies between gender gaps and contextual variables: unemployment rates among young, prime-aged, and older workers, long-term unemployment, poverty (gender gaps in poverty indicators), and human capital (gaps in the tertiary educational attainment of women and men, gender gaps in health at an older age). As it was already presented, 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 analysed the alternative model specification with an interaction between formal care and informal care use. The results are presented in Table 5. We observe that the control variables we use are statistically significantly associated with gender gaps in employment and pay. A larger share of tertiary-educated women than men is linked to lower gender gaps both 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, gender inequality in employment is lower because 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.) and are thus less vulnerable to the business cycle. As aresult, during the economic downturn, relatively more men become unemployed and their flexible wage components are also reduced, lowering their wages and gender pay gaps. The explanation is different when we consider long-term unemployment. It is positively correlated with the labour market gender inequality as it is women who are more likely to 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 positively correlated with long-term unemployment in the pre-retirement age, highlighting how important the work involvement of that subpopulation is for gender inequality in the labour market. In cluster 1, which groups mainly Scandinavian countries and after 2013 also Germany and France, the actual unemployment rate in the prime age group displays the strongest negative correlation with the gender employment gap. This relationship is also observed in 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 clusters 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.

The results also indicate both differences and similarities between groups of countries concerning variables that contribute to explaining the gender pay gap. For example, current unemployment seems to be a powerful explanatory variable only in cluster 2, but higher long-term unemployment is correlated with a wider gender pay gap in all clusters.

Regarding the control variables, it should be noticed that the correlations in all *age groups*, all clusters and all specifications are robust concerning the current unemployment rate and tertiary education attainment of women in comparison to men, which narrows the male–female employment gap.

5 | CONCLUDING REMARKS

Our study focuses on one of the key social investment policy, namely on formal and informal childcare and education and its links to the gender gaps in employment and pay among men and women of different age. First, we confirm that provision and use of ECEC not only contribute to early investment in human capital but also facilitate mothers' employment, which helps to reduce gender gaps in employment and pay. This evidence is stronger for the gender

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gap in employment than for the gender gap in pay. Second, we have also found different effects of formal and informal childcare for children under 3 years and those aged 3–5 years for gender gaps considered across the country clusters. Third, these relationships differ across women at age groups specified, which mirrors the life course stages distinctive for childcare tasks. Increasing coverage of informal care for children aged 3–5 years comes together with a higher gender employment gap among women aged 50–64. This is likely related to the fact, that the informal care is often offered by grandmothers, and some women in the pre-retirement age decide to reduce their labour market attachment, widening the gender employment gap. Thus, the life course perspective matters here, as the employment effects of informal care are different for younger and older women. Moreover, it is strictly related to grandparents' contribution to childcare and its impact on labour force participation of individuals, especially women aged 50–65, that is, the topics which are receiving more research attention (Backhaus & Barslund, 2021; Karademir et al., 2023; Zamarro, 2020) Given these findings, we postulate to reframe the ECEC agenda: beside investing in children and supporting parents' (mothers') employment it should also be considered as aimed at prolonging working lives of women. This recommendation is crucial for reducing gender employment and pay gaps, important also due to demographic challenges posed by labour force shrinking and advanced ageing of European populations.

Informal care, substituting formal services, does not show any significant link to gender employment when provided to small children and is associated with a lower gap when provided to older children. More intensive use of informal care for children below 3 years is associated with a lower gender pay gap.

Furthermore, we find that more intensive childcare in the stripped-down cluster 2 or the sprouting-up cluster 3 is associated with a larger gender pay gap. This can be explained by the higher labour market participation of low-skilled women in these countries. At the same time, we observe that in cluster 3 the larger coverage of the informal care for children aged 3–5 years, the higher the employment gender gap in the total population and at older ages, indicating that social investment policies may have multi-generational consequences for the gendered labour market outcomes. Also contrary to our expectations, neither better coverage in formal care nor higher formal care intensity for children under 3 years matter for gender gap in employment. To explain these findings more insights are needed into the labour market structures and economic activity patterns over the life course of the country clusters considered. In particular, potential employment effects should be more precisely specified as responses to improved accessibility of childcare (coverage and intensity), as these might differ among different groups of women (education, labour market status, household income, the family situation—single parent vs. couple family, the number of children). In addition, more detailed information about formal and informal childcare arrangements (private/public provision of formal care, different providers of informal care) needs to be accounted for as our results illustrate also that the interdependency between formal childcare and women's employment, in particular mothers' employment, is moderated by the interplay of formal and informal care coverage (substitution vs. complementation). Moreover, this interplay differs for small (under 3 years of age) and older (3–5 years) children.

Finally, the on-going formalization process of ECEC results in crowding out other care forms (usually informal ones) by formal/public services. However, these developments depend not only on the types of services constitutive for both types of care, especially as regards the interplay between public and private formal services and providers of informal care. Substitution of formal care with informal care arrangements may also reflect social perception and gender norms regarding responsibilities for childcare, especially for children under 3 years, hence the cultural context matters as well.

By demonstrating a variety of results about the interdependencies between the ECEC availability and gendered outcomes in employment and pay under different social investment strategies, studied for women at different ages reflecting life course stages, the paper highlights how relevant are pre-existing formal-informal care arrangements and the social investment strategy for expected effects in reducing labour market inequalities by gender. Progressing in ECEC may affect the labour market attachment of both mothers and grandmothers as it is evidenced that insufficient access to formal childcare leads to its substitution by informal care provided, among others, by grandmothers/women in pre-retirement age. The paper extends the debate about facilitating women employment prospects within the social investment approach. Consequently, the ECEC agenda should be extended by addressing also employment

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of women at pre-retirement age. It is worth to reflect also about the proposed measure of the childcare coverage, different from the incidence indicator usually applied. Despite this approach our results respond accordingly to empirical evidence of numerous studies in the field. Moreover, they provide arguments for more detailed insights into the childcare arrangements to reveal and understand their effects for labour market outcomes of women at different stages of their life trajectories.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A

TABLE A1 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)	−**0.063***	−**0.063***	0.043	0.040
	(0.036)	(0.036)	(0.064)	(0.064)
Unemployment rate among prime age people (25–49)	−**0.410*****	−**0.421*****	−**0.384***	−**0.370***
	(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	**0.124*****	**0.131*****
	(0.023)	(0.023)	(0.035)	(0.035)
Long term unemployment rate among prime age people (25–49)	−0.011	−0.006	−0.061	−**0.075***
	(0.029)	(0.029)	(0.040)	(0.040)
Long term unemployment rate among older (50–64)	**0.044****	**0.040***	0.029	0.041
	(0.022)	(0.022)	(0.031)	(0.031)
Gap in probability of being at risk of poverty or social exclusion (male—female)	−**0.161***	−**0.157***	−**0.301****	−**0.300****
	(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)	−**0.281***	−**0.294***	−0.062	−0.042
	(0.161)	(0.161)	(0.263)	(0.261)
Formal care—coverage—children below 3 years	−**0.103*****	−**0.101*****	−**0.107***	−**0.102***
	(0.036)	(0.036)	(0.062)	(0.062)
Formal care—intensity—children below 3 years	−0.032	−0.113	0.085	**0.332*****
	(0.032)	(0.075)	(0.053)	(0.124)
Formal care—coverage—children between 3 years old and minimum compulsory school age	**0.083***	**0.085****	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	−**0.261*****	−**0.356*****	−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)
Informal care—intensity—children below 3 years	−0.014	−0.155	−**0.157*****	0.261
	(0.027)	(0.115)	(0.045)	(0.186)
Informal care—coverage—children between 3 years old and minimum compulsory school age	**0.154*****	**0.142****	−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	**0.450***
	(0.025)	(0.160)	(0.042)	(0.263)
Formal care # Informal care—intensity—children below 3 years		0.004		−**0.012****
		(0.003)		(0.005)

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TABLE A1 (Continued)

	(1)	(2)	(3)	(4)
	Gender employment gap		Gender pay gap	
Variables	Without interactions	With interactions	Without interactions	With interactions
Formal care # Informal care—intensity—children between 3 years and minimum compulsory school age		0.005		**−0.013***
		(0.005)		(0.008)
Difference in the share of female and male population with tertiary education	**−0.526*****	**−0.515*****	**−0.357*****	**−0.437*****
	(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

Note: Results of panel regressions with country-year fixed effects.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

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TABLE A2 Panel regression analysis within clusters: GEG and social investment indicators.

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender employment gap					
	Cluster 1[a]		Cluster 2[a]		Cluster 3[a]	
Variables	Without interactions	With interactions	Without interactions	With interactions	Without interactions	With interactions
Unemployment rate among young (15–24)	0.038	0.048	**−0.202*** **	**−0.173*** **	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 exclusion (female—male)	−0.152	−0.157	−0.379**	−0.300*	−0.051	−0.052
	(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	**−0.129** **	**−0.274** **	−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 and minimum compulsory school age	**−0.424*** **	**−0.534*** **	0.029	−0.436	−0.037	−0.186
	(0.133)	(0.191)	(0.168)	(0.294)	(0.084)	(0.143)

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TABLE A2 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender employment gap					
	Cluster 1[a]		Cluster 2[a]		Cluster 3[a]	
Variables	Without interactions	With interactions	Without interactions	With interactions	Without interactions	With interactions
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	**0.064****	−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	**0.309*****	**0.283*****
	(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
		(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

[a]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).

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

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TABLE A3 Panel regression analysis: the unadjusted gender pay gap and social investment indicators.

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender pay gap					
	Cluster 1		Cluster 2		Cluster 3	
Variables	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 exclusion (male—female)	−0.333*	−0.311*	−0.718***	−0.679***	−0.888***	−0.882***
	(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**
	(0.177)	(0.281)	(0.315)	(0.576)	(0.164)	(0.257)

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TABLE A3 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender pay gap					
	Cluster 1		Cluster 2		Cluster 3	
Variables	Without interactions	With interactions	Without interactions	With interactions	Without interactions	With interactions
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 compulsory school age		−0.030**		−0.016		−0.020*
		(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

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

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