

How does the number of children affect female participation in the labour market? A cross-national analysis of EU Countries

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Abstract: This paper assesses the effect of the number of children on female participation in the labor market, while controlling for female educational attainment and welfare policies. Even if relevant progresses have been made during the last decades, the analysis reveals that a remarkable and embedded gap in the traditional division of gender roles still exists. Through a cross-section and cross-national analysis of the European Union countries’ data, the paper explores the relation between the number of children and female employment rate both at aggregated and disaggregated levels. The results of both analyses confirm that while having children does negatively affect females’ employment, the negative effect is counterbalanced by the level of education.

Keywords: Childcare, Education, Gender Equality, Labour Market Outcomes, Welfare policies

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Avere figli nuoce al lavoro femminile? Un’analisi comparativa fra Paesi europei

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Sommario: Lo scopo del presente contributo è quello di indagare l’impatto che il numero dei figli detiene sulla partecipazione femminile nel mondo del lavoro, in considerazione sia del livello di istruzione di queste ultime sia delle politiche di welfare. Sebbene negli ultimi decenni siano stati compiuti progressi rilevanti in tal senso, l’analisi rileva come, ancora oggi, esista un notevole divario nella tradizionale divisione dei ruoli di genere. Attraverso un’analisi dei dati relativi ai Paesi dell’Unione Europea, il contributo esplora la relazione tra il numero di bambini e il tasso di occupazione femminile a livello sia aggregato sia disaggregato. I risultati di entrambe le analisi confermano che, sebbene avere figli influisca negativamente sull’occupazione femminile, l’effetto negativo è controbilanciato dal livello di istruzione.

Parole chiave: Infanzia, Istruzione, Parità di genere, Mercato del lavoro, Politiche di welfare

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1. Introduction

Educational attainment, labour market, employment and childcare are closely interrelated: as pointed out by OECD - Organisation for Economic Co-operation and Development (2017), the «female labour force participation is influenced by a number of factors, such as the rise in female educational attainment, changes in the nature of the labour market, family-friendly policies, and the tax system» (p. 102). The combination of all these factors allows the investigation of facilitating and hindering factors affecting gender equality, as well as the access to equal opportunities and resources in the broader context of the labour market. In this respect, during the last decades of the 20th century, the globalization, the economic crisis and the cultural changes, which are closely related to individual needs connected to the personal career and to the construction of an own identity (Giddens 1990; 2011), also changed women's attitudes and perspectives (Kerr and Sweetman 2003).

In this context, the aim of the present paper is to test in a cross-national perspective if and to what extent the number of children affects female participation in the job market within European Union (EU) countries, and if the effect for women changes at different levels of education. More in detail, the paper aims at answering the following research questions:

1. Does the number of children affect women participation in the job market?
2. Does the effect equally apply for different levels of education?

To answer these questions, through the employment of a linear multiple regression model, the paper analyses data coming from two different databases to assure the robustness of the results. Variables capturing female participation to labor market, the level of education, the number of children, the age of children and the national expense on family welfare policies, in fact, are retrieved from Eurostat to analyze the issue at country-level and from the European Social Survey to assess the robustness of country-level results with individual-level analysis.

the paper is structured as follows: next section presents an overview of the relation between education and female participation in the job market, critically discussing the relevant literature and presenting some preliminary data. Sections 3, 4 and 5 present the analytical strategy employed, describing the data used in the quantitative analysis and the estimation strategy applied. Finally, section 6 concludes the paper discussing the results obtained and their implications and section 7 briefly discusses the study's limitations.

2. Women's labour market participation

The relationship between number of children and female labour participation has been investigated in several sociological and economic works (Bowen and Finegan 1969; Baranowska-Rataj and Matysiak 2016; Klasen 2019): on one hand, sociological studies tend to highlight how cultural context-dependent constraints still put upon the mothers the responsibility to take care of children (Lehrer and Nerlove 1986; Cameron et al. 2013; Nayati and Puri 2021), reducing the time and the possibility that women may dedicate to labour; on the other hand, neo-classical economic theories developed similar models (Joesch 1994; Rønsen and Sundström 2002; Cortés and Pan 2020) in which the time devoted by parents to the labour market is determined also by the time supplied to child caring. In this sense, one approach is commonly labeled the male-breadwinner model of family policy (common in Continental Europe) while a second more innovative model (common in the Nordic countries) is based on the logic derived from the dual-earner model where family benefits and services are designed to provide resources and to create incentives for both parents to work and take

caring responsibilities. Also, child-related benefits have been historically paid directly to mothers irrespective of their labour status (Palme and Ruhs 2018).

Undoubtedly, the ever growing of female employment in recent decades has changed not only the female identity but also the more general labour scenario at the global level. Indeed, the increase in women's labour force participation in Europe, since the 1970s (Fahlen and Olah 2013), produced several beneficial effects for the economic and social systems, such as increased salaries among families, a more productive financing of social security systems and the dual-earnings family model (Letablier *et al.* 2009). In addition, the increase of women participation in the labour market has created new challenges for families (Rives and Yousefi 1997) as well as for the motherhood and, even if at snail's space, contemporary society has started shifting from the traditional paradigm of the male breadwinner to a more egalitarian distribution of the gender roles within families (Trask 2014; Berghammer 2014). Looking at data, the EU average employment rate, in 2017, was 67 percent for female and 78 percent for male. Across the EU-28, data from European Commission reported that the share of men in the working age (20-64) employed exceeded that of women by 11.5 percentage points; the employment rate of women (65.3 percent) was lower than for men (76.8 percent), with big variations across the EU (European Commission 2019b). According to the Gender employment gap indicator built by European Commission (2019b), countries showing a more egalitarian situation in employment rate, on average are Lithuania, Finland, Sweden and Latvia (whereas countries with an average employment rate lower than the EU average are Hungary, Greece, Italy and Romania). Although women's employment rate is increasing, the share of female employed is still lower than that of men and moreover women are usually employed in jobs with lower wages. Additionally, women work on average six additional hours per week on paid and unpaid labour such as childcare and housework (European Commission 2018b).

Therefore, gender identity and self-regulatory practices affect every aspect of life and constitute the leitmotif of life's choices, based on self-regulatory practices, self-identity construction and perceived self-efficacy (Di Tullio 2019).

Indeed, even if feminism and modern welfare states have significantly contributed in changing the cultural scenario, motherhood is still considered constrained by unconscious and conscious gender norms emphasized women's role as caregivers and reinforcing the primary woman role as a mother, contributing in the reproduction of the traditional gender roles and attitudes (Esping-Andersen 2009; McDonald 2000). These assumptions focus on the internalization of women's role as caregivers assuming that women are willing to perform their traditional role when required but, it also implies that the worth of a woman's identity as a worker is weakened when women hold the primary responsibility for newborns (Zhou 2017). Child caring, especially in the first three years of a newborn, increases the share of time at home, whilst it contributes to a reduction of time devoted to work: even though most of the main reasons on why a woman must spend more time in child caring are of biological nature (like the breastfeeding, for example), some other relevant reasons need to be considered and they are strictly related to the gender identity. Furthermore, since women are usually more concerned than men in childcare activities, they are also more impacted by the family size. In this respect, the relationship between the number of children and female participation to the job market results less investigated, with the literature mostly agreeing about the former negatively affecting the latter (Eurofound 2016).

Nevertheless, in order to highlight how motherhood influences women participation to the labour market, other relevant variables need to be further investigated. So, the number of children is not the only factor influencing female participation to the labour market, affecting

both female wage and lifetime earnings (Chapman et al. 2001; Joshi 2002; Paull 2006; Leung, Groes and Santaaulalia-Llopis 2016). Other differences in male and female participation to the labour market can depend on factors such as, among others, individual and firm's preferences (Campa, Casarico and Profeta 2010), the cultural component like the presence of traditional role relationships (Ruhm 1996; Rottmüller 2008; Mehta and Awasthi 2019) and/or the persistence of the male breadwinner model (Pfau-Effinger 2017), the living in metropolitan vis-à-vis rural areas (Moysier 2017) and, as we will discuss later, the level of education (Verick 2018).

3. Education and women in the EU Context

The massive increase of women into higher education has been analyzed across literature as one of the leading factors producing a cultural change in the traditional view of the relationship between the role of the women and the social values (Amano 1997; Martin 2011; Buck and Witt 2019). In the last few decades, the increase in women's education has enabled them participating in the labour force, earning an income, knowing and claiming their rights and attaining greater influence in the household and public life (United Nations 2010), demonstrating that education helps women to improve not only their scope of employment but also their quality of life. Nevertheless, there are still several differences between men and women, in career paths, choice of field of study and choice of work that reproduces the traditional gender role division. Furthermore, equal participation in the labour market increases diversity, which according to the literature is one of the most important drivers of innovation affecting the whole economic system (OECD 2015).

Going into detail to explore the scholarly grade of women, European Commission data shown that, recently, more and more women have accessed the tertiary education (i.e., who graduated from higher education institutions; ISCED 5-8). Even more, women achieve better results than men in all disciplines, even if the female participation in STEM disciplines is still dramatically low. However, between 2013 and 2017, in both science and engineering and professional and technical occupations, the number of women grew on average by 2.9 percentage points per year (European Commission 2019a).

The proportion of persons aged 30-34 that had attained tertiary education in 2017 ranged from 26.3 percent in Romania to 58 percent in Lithuania. Among EU Member States, in 2017, the largest gender gap in absolute values was registered Latvia, Slovenia and Lithuania. In the same year, the countries with the smallest gender gap in absolute values, were Romania, Malta and Germany (European Commission 2018a).

Nevertheless, even if the level of education is strictly connected with the participation in the labour market¹, European women continue to hold lower shares of labour participation compared to men despite the fact that women are increasingly well qualified and even outperforming men in educational attainment. Education, therefore, triggering changes in women self-perception and in their expectations, helps them escape to the traditional division of gender roles.

All these considerations urge to take education into account when assessing the effect of the number of children in women participation to the job market. The literature, in fact, seems to

¹ An extensive literature highlights how job segregation depends on gender, sexuality, education, nationality, resulting in an overrepresentation of women and minorities in lower occupational groups (Kossek and Friede 2006).

show how the negative effect of children on female participation to the job market is compensated by females' level of education. In their seminal work, Angrist and Evans (1998), through an innovative estimation strategy, analyzing United States' data, found that the number of children negatively affects female labour supply, but they also found that the effects disappear for women that are more educated. These studies, however, are almost exclusively performed on single countries, therefore, a cross-national analysis is needed in order to produce more robust results.

4. The role of the welfare state on female participation in the labor market

The term welfare state indicates a form of government where the state safeguards and promotes the socio-economic wellbeing of its citizens, by implementing policies that are based on the principles of equal opportunities and wealth distribution. According to Béland et al. (2021) the term welfare state *“at its narrowest, it may simply describe a given country’s arrangements for income maintenance. At its broadest, it is a descriptor for the full range of economic, social, political, and even cultural traits of a given polity”*

Since the early '90 a variety of literature has been devoted to understanding differences among female and male in the labour market across countries (Esping-Andersen 1990). EU countries have different welfare regimes in which work-life balance support varies, even if in the last decade there has been an increase all over the EU in the implementation of more extensive national work-life policies. Typically, family political programs are based on measures providing support to families with children in ways that facilitate a gendered division of market and care work between the spouses. As stressed by Engelhardt, Kogel and Prskwetz (2004), the positive correlation between fertility rate and employment rate it is the results of government policies sustaining the reconciliation between family and work. Traditionally, reconciliation policies were created to enable better working conditions and to create effective equal opportunities for women participating in at the labour market, highlighting a gendered concept behind the Work-life balance concept. Over the last few decades, the EU has developed several policies aimed at balancing work and caring responsibilities, including recently Directive (EU) 2019/1158 on Work-Life Balance for Parents and Carers. Concerning childcare and family responsibilities, market flexibility and smart working for instance could offer opportunities in combining parenthood and employment, however the role of the “flexibility” could be ambiguous since it could entail to the marginalization of the employees and it does not guarantee the economic independency. Reconciliation practices not always could be applied to all employee’s typology, in particular to the precarious ones or to minorities in lower-skilled sectors and non-standard employment, negatively affecting equal opportunities as well as the reinforcement of the traditional role division of labour market (Chiericato 2020).

Moreover, as shown by Miani and Hoorens (2013), mothers, more than fathers, reduce working hours (i.e., accessing to part-time or teleworking changes) to take care of children across countries and it might vary from the starting age of kindergarten, or the amount of time spent in school by children (late in the morning or late in afternoon). Facts and figures provided by the Labour Force Survey data show that about 3.3 million Europeans (15-34 years) have had to switch to part-time working considering the lack of care facilities for children and older relatives and this is particularly true in Germany, Netherlands, UK and Austria where the majority of mothers do work part-time. The other side of the coin shows that in some countries, such as Bulgaria, Poland, Portugal and Romania, there is no consistent difference between female workers with or without children in accessing part-time. The same data show

also that the tendency to work part-time is related to the number of children in the household, whereas mothers return to full-time working increases when their children are older (Eurofound 2016). These figures, almost certainly, could be the results of the different policies regimes and institutional factors such as welfare state and social policies providing childcare subsidies and flexible working time arrangements. An extensive literature, in fact, has shown how these policies have a positive impact on the participation of women with children in the labour market (Eurofound 2016; Dotti Sani and Scherer 2018).

For these reasons, any attempt to assess the effect of the number of children on women's participation to the labour market must necessarily take into account some measures of the extent to which countries provide welfare measures devoted to family and children.

5. Analytical strategy: variables, data, and sample

Most of the quantitative studies on female participation to the labour market carried out so far have been performed on single countries (on this subject, for example, see Garcia, Anker and Pinnelli 2003; or the most recent book focused on the female employment in the Mediterranean regions edited by Bugra and Ozkan in 2012), or a limited set of few countries (for instance: Fouarge et al. 2010), rather than in a cross-country perspective (Cipollone, Patacchini and Vallanti 2013; Verick 2014). Indeed, this is an issue since analyzing a single country does not allow considering country-specific effects such as social attitudes and culture. To close this gap, and to reach a better understanding of the phenomenon, this paper focuses on the analysis of cross-sectional and cross-country data.

Before presenting the estimation, strategy used to analyze the investigated relations, it is worthy to present and discuss the data employed in the analysis. For the purpose of our analysis, we will employ two different sets of data, the first for the main analysis and the second for testing the robustness of the main results. The first set of data is retrieved from Eurostat and covers a sample of 28 countries for the years from 2009 to 2018; the second set of data is retrieved from the European Social Survey (ESS) and covers a sample of 19 countries for the year 2018. The choice to employ two different set of data is to check whether considering them at country-level (Eurostat) or at individual-level (ESS) influences the results of the analysis, so confirming the robustness of the results themselves.

Employment

As a measure of participation in the labour market, for the main analysis we will employ data on employment rate from Eurostat. Data range from 0 to 100 per cent. For the robustness check, instead, we will employ data from the European Social Survey (ESS), in particular, respondent's answers to the question: "are you in paid employment or apprenticeship at least 3 months 20 hours weekly". The answers are coded as a dummy variable taking value of 1 if the respondent is in a paid job or apprenticeship, and value of 0 if he is not. In the following sections we will refer to this variable as 'employment performances'.

Education

To measure the education level, we will firstly employ data from Eurostat. Data reflect the level of education according to the ISCED classification and they are aggregated into three groups: less than primary, primary and lower secondary education (levels 0-2); upper secondary and post-secondary non-tertiary education (levels 3 and 4) and tertiary education

(levels 5-8). For the robustness check we will employ ESS data on the ISCED level of education. In this case data are provided at disaggregated level for each respondent but for the sake of comparability we recode the variable according to the Eurostat's classification.

Gender

Data on gender, of both Eurostat and ESS are coded as a dummy variable taking the value of zero if the observation is referred to males and value of 1 if it is referred to females.

Child's number

Eurostat data on child's number are coded as a scale taking the value of 1 for 1 child, the value of 2 for two children and the value of 3 for 3 or more children. ESS data on the contrary are provided as integers according to the actual number of children of the respondents. For comparability reasons, we recode ESS variable into the three categories as provided by Eurostat.

Child's age

Eurostat data on child's age are coded as a scale taking the value of 1 for child's age less than 6 years, the value of 2 for child's age from 6 to 11 years and the value of 3 for child's age equal to 12 years or over. ESS on the contrary do not directly provide the age of respondent's children, however, it provides the year in which respondent's first children are born. We therefore calculated the age of respondent's first children by subtracting the year in which they are born from 2018, the year in which the survey has been carried out. Further, to make them comparable with Eurostat data, we recode the variable according to the scale provided by Eurostat.

Welfare policies

As a proxy for welfare policies directed to families and childcare, we will employ the governments' expenditure on social protection benefits intended to address the risks and needs associated with family and children. However, since the effect of such policies on the participation to the job market is not immediate but needs some time to develop, within the regressions we will employ a two-year lagged value.

Table 1 reports the relevant summary statistics of all the variables employed in our analysis.

Table 1 – Summary statistics of the variable employed in the empirical analysis

Eurostat Data					
<i>Variable</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Employment rate	14,982	74.80	19.43	5.600	100
Education level	14,982	34.02	15.10	8.400	75.90
Gender	14,982	0.495	0.500	0	1
Children's number	14,982	1.943	0.804	1	3
Child age	14,982	1.967	0.813	1	3
Expenditure on family/children	12,682	546.3	441.8	39.58	2,337
Country_id	14,982	17.21	9.374	1	32
European Social Survey Data					
<i>Variable</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Employment performances	15,980	0.928	0.258	0	1
Education level	15,980	2.245	0.719	1	3
Gender	15,981	0.564	0.496	0	1
Children's number	15,981	1.924	0.720	1	3
Child age	15,981	20.694	11.820	-1	53
Country_id	15,981	9.680	5.420	1	19

6. Estimation's strategy

To assess the effect of the level of education and the number of children on female employment within the European Union, we will proceed through several steps. This section will discuss the strategy employed to accomplish this task.

Firstly, we will present some descriptive statistics in order to preliminarily and visually describe the main relations occurring between our principal variables. Secondly, we will estimate a baseline equation using Ordinary Least Squares estimator (Equation 1).

Equation 1: Baseline linear regression's equation

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_k X_k + \mu$$

Changing the terms of the baseline equation with the variables employed in the analysis, the equation then become:

Equation 2: Estimated linear regression's equation

$$\text{Employment} = \beta_0 + \beta_1 \text{Gender}_1 + \beta_2 \text{Education level}_2 + \beta_3 \text{Number of children}_3 + \beta_4 \text{Childs' age}_4 + \beta_5 \text{Expenditure on family/children}_5 + \mu$$

Equation 2 represents a linear multiple regression aimed at testing the effect of education and the number of children on female employment.

Even if the analysis is performed on a timespan ranging from 2009 to 2018, the aggregated nature of data and the presence of multiple observations per country/year due to the subdivision of males and females, number of children and education levels, does not allow us to perform a panel analysis. Therefore, we choose to apply a cross section estimation, however, in order to control for country-specific factors potentially affecting employment, we will add country-dummies to the regressions.

Moreover, since both variables accounting for the level of education and the number of children are categorical variables, we choose to add them as dummies rather than as scales, each indicating a certain level of education and a certain number of children. This choice is guided by theoretical as well as econometric considerations, in fact, regressing them as single variables would imply to claim that the effect of moving from a low to a medium level of education is equal to the effect of moving from a medium to a high level of education. At the same time, concerning the number of children, using it as a scale would imply to claim that the effect of moving from one child to two children is equal to the effect of moving from two children to three or more children.

Since we are interested in understanding how each level of education and each number of children simultaneously affect employment, we add also a series of interactions between the two variables. Adding the interaction terms allow us to estimate the marginal effects of each number of children at each level of education.

To better gauge and to understand the differences in the effects for males and females, we perform three different regressions: the first jointly estimating the effects for males and females; the second estimating only the effect for males; and the third estimating only the effect

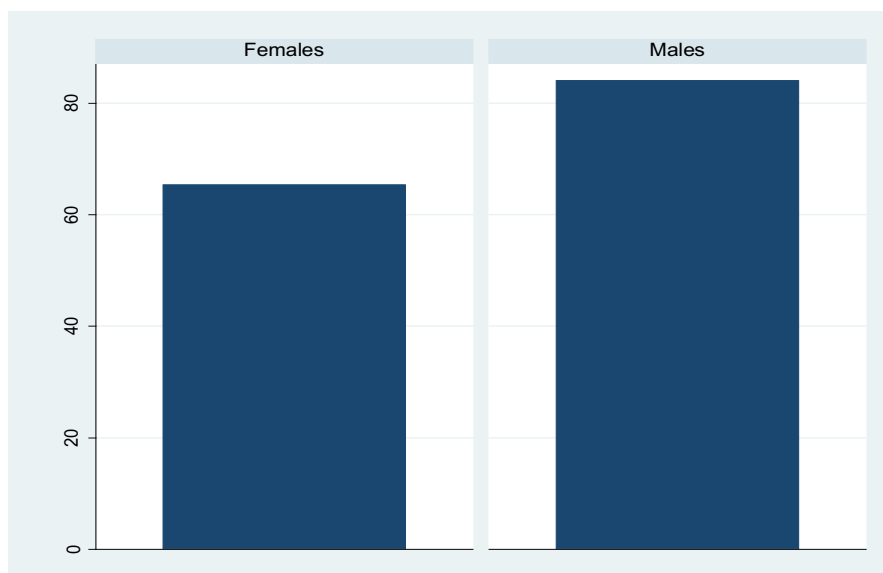
for females. Furthermore, to assess the presence of geographical differences between northern, southern and eastern EU countries, we perform a fourth regression adding regional dummy variables.

Lastly, to assess the robustness of our results and to account for the micro-nature of the relation investigated, we repeat the estimations by employing European Social survey micro-data. As previously discussed, instead of the employment rate, in this case, as dependent variable we employ the answer to the question: “are you in paid employment or apprenticeship at least 3 months 20 hours weekly”. Since the answer to that question results in a dummy variable taking value of 1 if the respondent is in a paid job or apprenticeship, and value of 0 if he is not, to estimate these regressions, we employ a logistic rather than a linear model.

7. Results

A preliminary descriptive analysis of Eurostat data across EU-28 shows that, on average, the employment rate is lower among females (Figure 1).

Figure 1 – Average employment rate by sex all countries, EU-28 (2009-2018)



To preliminarily and graphically describe the main relations occurring between our principal variables, we plot the data on employment rate and, respectively, the data on the number of children, children’s age and the level of education, by sex.

Figure 2 – Employment rate number of children relation by sex, EU-28 (2018)

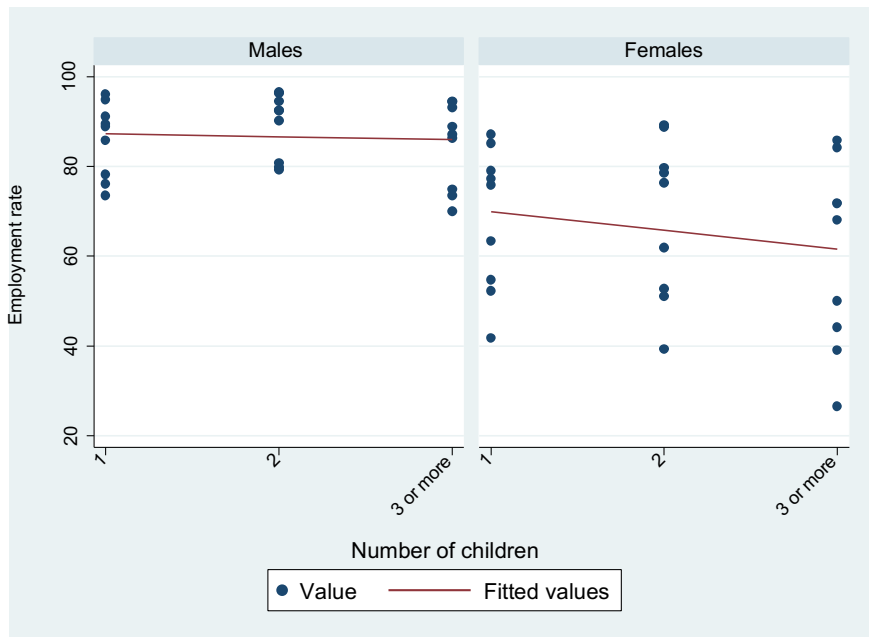


Figure 2 shows how higher number of children, on average, is associated with lower employment rates for females, while it shows almost no effect for males.

Figure 3 – Employment rate and children's age relation by sex, EU-28 (2018)

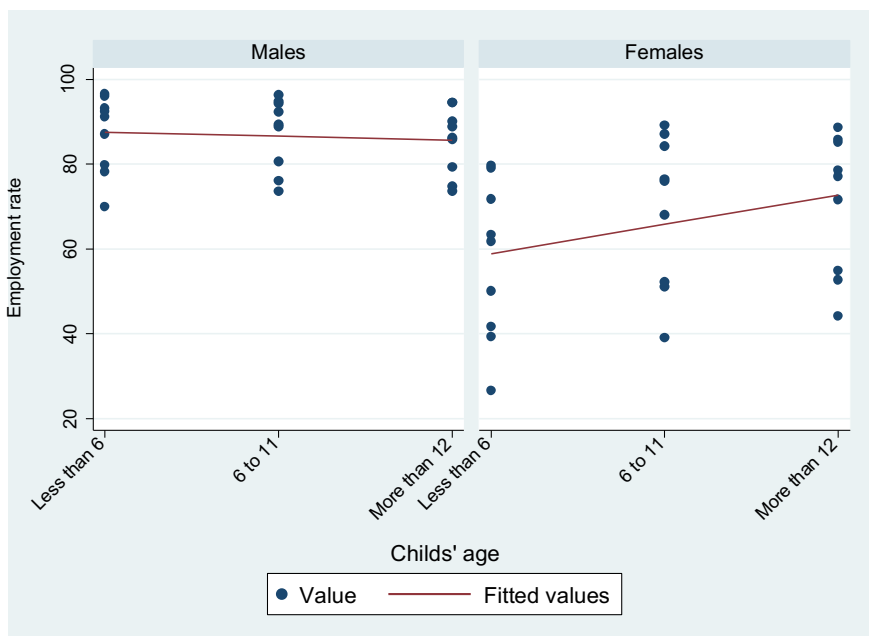
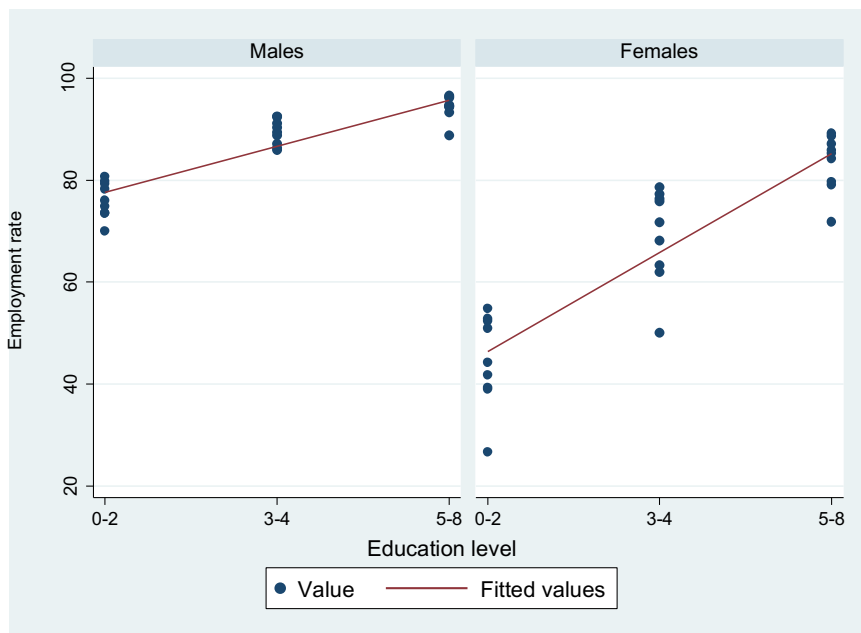


Figure 3, instead, shows how increasing the age of children the employment rate, on average, increases for females while, again, it shows almost no effect for males.

Figure 4 – Employment rate level of education relation by sex, EU-28 (2018)



Lastly, Figure 4 shows how, on average, higher levels of education are associated with higher employment rates for both females and males. However, looking at the lines’ slope, one can see how the effect of education seems to be higher for females. In other words, the figure suggests that at lower levels of education, males experience higher employment rates than females or, phrasing it differently, to grasp males’ employment rates, females need to gain higher educational levels.

Moving to the econometric analysis, Table 2 reports the results of the Ordinary Least Squares estimates. The first two regressions presented report the estimates of the effects of the independent variables on employment rate for males and females together (first column), and for females only (third column) separately. The third regression repeats the estimates for females adding regional dummies to assess the differences between northern, southern and eastern EU countries.

Concerning the first regression, all the variables show a high level of significance. In particular, being a female shows a negative effect on the employment rate, the level of education shows a positive effect for all the levels of education considered, having two children show a positive effect while having 3 or more children a negative effect, the children’s age shows a positive effect and the expenditure on social benefits directed to family/children also shows a positive effect. The interaction terms, however, reveal a further interesting result: having three or more children does not negatively affect employment rate if associated with the highest level of education. In other words, for better educated women, after the third child having an additional child does not influence labor market participation. This seems to indicate an effect that resemble what economists call “scale economies”. This could be explained by the fact that having a better education leads to a well-paid job that allow to buy child-care services which cost probably does not increase linearly when a women have more than three children.

Table 2 – Linear regression with employment rate as dependent

VARIABLES	(1) All	(2) Female	(3) Female
Gender	-18.01*** (0.192)		
2.Education	18.46*** (0.388)	21.88*** (0.528)	21.91*** (0.609)
3. Education	27.68*** (0.413)	34.20*** (0.567)	34.23*** (0.615)
2.Child_n	2.708*** (0.452)	0.910 (0.576)	0.901 (0.679)
3.Child_n	-3.461*** (0.540)	-6.816*** (0.683)	-7.417*** (0.793)
Child_age	3.045*** (0.123)	7.462*** (0.165)	7.320*** (0.190)
2.Education#2.child_n	-0.0702 (0.553)	0.875 (0.734)	0.884 (0.879)
2.Education#3.child_n	0.888 (0.656)	0.668 (0.865)	0.836 (1.026)
3.Education#2.child_n	0.225 (0.580)	1.929** (0.774)	1.938** (0.867)
3.Education#3.child_n	4.094*** (0.670)	5.981*** (0.900)	6.352*** (1.009)
L2.Family/children expenditure	0.00386* (0.00211)	0.00498* (0.00279)	0.00182*** (0.000452)
EU_north			-0.193 (0.386)
EU_south			-6.459*** (0.460)
EU_east			-4.590*** (0.450)
Constant	63.37*** (2.151)	35.10*** (2.853)	35.46*** (0.736)
Country dummies	YES	YES	NO
Observations	10,737	5,303	5,303
R-squared	0.719	0.774	0.697

Regressions two confirms the previous results, also showing how the positive effect of education and the negative effect of having three children or is higher when considering only females. Regression three, while confirming all previous results also shows how, for women, living in southern and eastern European Union countries is associated with lower levels of employment.

In order to assess the robustness of the previous results, and to account for the micro-nature of the relation investigated, we repeat the estimates employing micro-data extracted from the European Social Survey. Table 3 reports the results.

Table. 3 – Logistic regression ESS data

	(1)	(3)	(4)
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VARIABLES	All	Female	Female
Gender	-0.731*** (0.0875)		
2.Education	0.952*** (0.189)	1.252*** (0.237)	1.321*** (0.234)
3. Education	1.023*** (0.199)	1.423*** (0.246)	1.457*** (0.241)
2.Child_n	-0.225 (0.179)	-0.293 (0.216)	-0.353 (0.215)
3.Child_n	-0.643*** (0.184)	-0.741*** (0.220)	-0.834*** (0.217)
Child_age	0.0281*** (0.00403)	0.0380*** (0.00489)	0.0406*** (0.00466)
2.Education#2.child_n	-0.255 (0.230)	-0.400 (0.283)	-0.330 (0.280)
2.Education#3.child_n	-0.352 (0.250)	-0.446 (0.306)	-0.403 (0.302)
3.Education#2.child_n	0.335 (0.249)	0.454 (0.309)	0.532* (0.305)
3.Education#3.child_n	0.565** (0.276)	0.692** (0.345)	0.541 (0.340)
L2. Family/children expenditure	0.000705 (0.000429)	0.00131*** (0.000506)	0.000444 (0.000283)
EU_north			-0.184 (0.178)
EU_south			-1.359*** (0.201)
EU_east			-0.0330 (0.208)
Constant	2.940*** (0.409)	0.704 (0.463)	0.992*** (0.335)
Country dummies	YES	YES	NO
Observations	11,772	6,730	6,730

Even in this case, the coefficients of the main variables show a high level of significance. Moreover, micro-data confirms that being a female is associated with lower employment performances, higher levels of education are associated with higher employment performances, increasing the number of children is associated with lower employment performances and increasing children's age is associated with higher employment performances. It is interesting to note that considering micro-data, increasing the number of children have a higher negative and significant effect when only females are considered.

8. Discussion and Conclusion

The present paper aimed at assessing the effect of the number of children on female participation to the job market, and the effect that such a variable has on different levels of female education.

The outcome of the quantitative analysis revealed some interesting results. Firstly, they show a remarkable and embedded gender gap in the traditional division of gender roles. All the analyses carried out highlight that having children does affect females' employment rate. However, the analysis also shows that the negative effect is far stronger when women only are considered; in particular, having children under the age of six has the strongest negative impact on the employment (Del Boca, Pasqua and Pronzato 2009), whereas the effects reverses as

children grow (Cipollone, Patanchini and Vallanti 2013). From a cultural point of view, this means that childcare responsibilities are still most of the time a “women issue” all over the EU. This also confirms the presence and the persistence of an embedded unconscious bias that considers women closer to the family-care responsibilities (Cancian et al. 2002; Castilla and Benard 2010).

Secondly, the results show how the level of education positively influences employment, not only by its direct effect but also indirectly by reducing (and at the higher level of education overturning) the negative effect that having children has on female employment. In fact, while having children do show a negative effect for poorly educated women, it shows a positive effect for highly educated ones. In this regard, it is interesting to note how both the direct and the indirect positive effects of education are far larger when woman only are considered. This confirms a positive effect of the education in the construction of the female identity role since highly educated women «are relatively more likely to work and to use their income to purchase external childcare and, given their higher expected amount of life-cycle wealth, they could eventually ‘afford’ a higher fertility as well» (Gustafsson and Kalwij 2006, p. 131).

Thirdly, beyond the research questions’ answers, the results show that: i) gender, even in EU countries, still matters in labour participation. Being a woman, in fact, is associated with way lower levels of labour participation at both aggregated and disaggregated levels; ii) the relation between the number of children and labour participation also depends on the children’s age. Increasing children’s age is associated with higher levels of female participation to the job market; iii) strong geographical differences persist between northern, southern and eastern European Union countries with respect to female participation to the labour market. At aggregated level, in fact, living in eastern and southern EU countries shows a negative effect on employment. Surprisingly, however, this effect confirmed by disaggregated data only in the case of southern countries. Indeed, this may depend on the fact that at disaggregated level cultural aspects are more important than at aggregated level, or by a sample selection bias of the disaggregated data. Indeed, this aspect need to be further investigated to reach a clearer understanding of the geographical differences occurring within the EU.

The results of our analysis also suggest some policy considerations as well as further research lines to be pursued. First of all, the persistent gender gap in labour participation needs to be faced by EU member states’ governments. In order to allow EU countries to benefit from the female participation to the labour market, at both economic and cultural level, the fact that having children negatively affects women employment needs to be seriously considered by governments. This should be done on the one side by incrementing their efforts in promoting initiative and implementing programs aimed at encouraging those cultural changes necessary to disrupt the traditional division of gender roles, and on the other side by implementing policies capable to reduce those factors that hinder female labour participation.

Then, the strong effect of education on female participation to the labour market, and its ability to avoid the negative effect of having children, suggests the need of increasing governments’ investment on education, with a particular attention to the promotion of female engagement in those sectors where the gender gap is more pronounced, such as scientific subjects.

Finally, concerning gender research, our results highlight the need to further investigate, theoretically and empirically, the determinants of labour gender gaps and the geographical differences through which they unfold. This last point is particularly important since it could be extremely useful, from a policy perspective, to identify which governments’ actions are better suited to reach the gender equality’s goals.

9. Limitation

The present study suffers from a number of limitations: *i*) it lacks to consider women's age at the birth of the first child. this aspect could be further explored in order to investigate the “delay syndrome” affecting women in fertility rate and in postponing the first birth-child (Schizopods and Lucchini 2004); *ii*) due to the availability of data, it employs different indicators to proxy female participation to the labour market at aggregated and at disaggregated levels, as well as different samples in terms of countries and years. Indeed, this reduces the comparability of the two results; *iii*) even if it would have been more precise, the nature of data did not allow us to perform a panel instead of a cross-section analysis.

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