



Individual and regional determinants of women's participation in the European labour market: a Labour Force Survey empirical study

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Abstract

In line with the existing literature, the primary focus of the present paper is on understanding the multifaceted factors contributing to unequal employment opportunities for women and the potential implications for both individuals and society. Specifically, the objective is to identify meaningful risk factors that affect the probability of being employed for women in the 20–49 age group, exploring possible demographic, educational, social, and family factors, as well as territorial context factors. The analysis is conducted on the three most populous European countries (Italy, France, and Germany) as representatives of different welfare regimes. The analysis exploits the rich information available in the micro-data of the Labour Force Survey (2021) as well as Eurostat regional statistics considering individuals nested in regions (NUTS 2). A deep analysis of empirical findings sheds light on employment determinants and motivations for not working, which appear to be essentially related to family and demographic factors. These results reveal the country-specific profiles that indicate greater risk of non-employment and also provide a basis for suggesting different policy implications.

Keywords Labour Force Survey · Employment · Regional factors · NUTS · Multilevel modelling

JEL Classification F66 · J21 · J71

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1 Introduction

The issue of gender disparities in the labour market has garnered significant attention in recent decades. In contemporary Europe, women's participation in the labour market has witnessed noteworthy developments. According to recent statistics from the Organisation for Economic Co-operation and Development (OECD) and Eurostat, women's employment rates vary across the region. In Southern European nations such as Italy and Greece, women's employment rates tend to be comparatively lower, hovering around 50% (Eurostat 2023a).

According to the most recent data from the National Institute of Statistics (Istat 2023), in Italy, the female employment rate reaches its minimum value for the 20–24 age group (24.9%) and its maximum value (64.5%) for women aged between 35 and 49. Furthermore, there are large differences in female employment in the 20–65 age group between the regions of Northern Italy (69.0% for the regions of the North-West area and 71.0% for those of the North-East area) and Central Italy (64.7%) on the one hand and the regions of Southern Italy (with rates between 31.1 and 52.1%) on the other. Furthermore, the percentage of employed women aged 20–49 varies from 56.3% for women without children to less than 43.0% for women with three or more children, and among women with a child aged between 3 and 5 years, only 52.5% have a job.

By contrast, in Nordic countries such as Sweden and Norway and especially Germany (72.3%), women's workforce participation is notably high, with rates exceeding 70% (OECD 2022), whereas France show a lower rate (64%).

These divergent trends reflect the influences of cultural, social, and economic factors on women's integration into the labour force.

Despite recent progress in certain regions and countries, typically due to post-Covid rises in employment, persistent challenges such as occupational segregation and gender wage gaps underscore the need for ongoing efforts to enhance gender equality in European workplaces. Various studies (Smith et al. 2018; Jones 2020; Brown and Williams 2019; Bertrand 2020) have consistently reported a significant disparity in earnings, with women often earning less than their male counterparts for comparable work, while also examining risk factors such as occupational segregation, discrimination, and differences in negotiation strategies.

Numerous studies have attempted to shed light on the complex set of factors influencing the employment of women, exploring aspects such occupational segregation and the effects of implicit biases and stereotypes on career progression and wage differentials.

A prevailing issue is occupational segregation (Babcock et al. 2017) or inefficient allocation of female workers (Di Addario et al. 2023), whereby women are disproportionately concentrated in lower-paying firms or professions characterized by lower wages (Casarico and Lattanzio 2023), with limited career advancement opportunities (Bertrand 2020). This phenomenon reveals that women in Europe continue to face challenges in accessing high-skill and high-wage occupations, thereby increasing their vulnerability to unemployment (Martinez and Johnson 2017; Gupta et al. 2021).

However, discrimination and biases against women operate in many other ways in society and also act on the women's ability to enter the labour market (Goldin and Katz 2016). Family responsibilities have emerged as a significant risk factor impacting women's employment outcomes. An international report (International Labour Office 2023) has emphasized the intricate interplay between work and family responsibilities, with women often shouldering a disproportionate burden. The resultant challenges, such as career interruptions and the potential imposition of a "motherhood penalty", contribute to increased risks of unemployment for women in Europe. Additionally, discriminatory practices and gender biases in hiring and promotion processes persist. These biases perpetuate gender-based disparities in employment, placing women at a heightened risk of unemployment.

Research on individual risk factors influencing the employment status of women in Europe has identified several key variables. Age is a prominent factor, with studies (Smith et al. 2018; Gupta et al. 2021) indicating that older women may face increased challenges in labour market participation due to age-related biases and potential skill mismatches. Education levels also play a critical role, with higher levels of education generally associated with improved employment prospects for women (International Labour Office 2023; Khoudja et al. 2019). Conversely, lower educational attainment may pose a risk factor for unemployment, particularly in competitive job markets. In addition to the level of education, the sector in which the highest level of education was achieved may represent an important employment factor, typically linked to the opportunity for self-employment (Insee 2022; Istat 2022).

Immigration status is another salient determinant (Cortinovis et al. 2023), highlighting the vulnerabilities faced by immigrant women in accessing stable employment opportunities.

The number of children and family structure also contribute significantly to women's employment outcomes: women with more children may encounter greater difficulties balancing work and family responsibilities, potentially influencing their risk of unemployment (International Labour Office 2023).

Marital status is another influential factor with regard to women's employment in Europe. Research by Brown and Williams (2019) suggests that the dynamics of the labour market may differ for single, married, or cohabiting women. For example, societal expectations or biases may affect single women differently from their married counterparts. Additionally, marital status can intersect with other factors such as age and education to influence employment trajectories.

Other family characteristics further contribute to employment disparities, and housing arrangements, such as living with parents or alone, can also influence employment trajectories. Women with larger families, including the elderly, may face challenges in balancing work and family responsibilities, decreasing or increasing potential interruptions in their careers (Insee 2022).

Finally, geographical location also contributes to employment disparities. Living in urban or rural areas may affect job accessibility (Williams and Smith 2016).

Apart from individual characteristics, different welfare regimes, such as the existence of support networks and policies for family support and employment for young woman, may have an important role in explaining differences across European

countries (Vogel 2002; Carta et al. 2023). For example, the three most populous countries in Europe (Italy, France, and Germany) differ not only in their constitutional models (parliamentary republic, semi-presidential republic and federal republic) but also in their types of welfare systems. A variety of research has provided insight into specific risk factors for women's unemployment or inactivity in these countries.

In Italy, a recent report by the Bank of Italy (Carta et al. 2023) synthesized empirical research into the occupational status of Italian woman, emphasizing the impact of educational levels on women's employment. Lower educational attainment tends to be associated with a higher risk of unemployment, reflecting the importance of skills and qualifications in the Italian labour market.

Analysing school and university careers and considering the professional opportunities of different cohorts of Italian students, Bovini et al. (2023) revealed that girls, although they excel compared with boys in terms of scholastic results, tend to select degree courses and fields of study with potential returns that are worse in the labour market.

Additionally, family-related factors, such as the number of children, were explored by Ferrera and Barban (2017), who found that women with larger families may face challenges in reconciling work and family responsibilities, contributing to a potential increased risk of unemployment. In this sense, gender inequalities, already present upon entry into the labour market, persist and widen when women become mothers (Carta et al. 2023): the probability that employed women become unemployed in the two years following motherhood doubles compared with those without children (De Philippis and Lo Bello 2023). In the same vein, other studies have shown that Italian women who continue to work after motherhood earn 40% less than childless women, even up to 15 years after giving birth (Casarico and Lattanzio 2023) and that women tend to change jobs less often or to benefit less than males in terms of salary (Di Addario et al. 2023).

In France, Bonnet et al. (2021) shed light on the role of marital status and its interaction with age in shaping women's employment outcomes. Their research suggests that the relationship between marital status and employment may vary across age groups, highlighting the need for nuanced analyses when examining individual risk factors in the French context. Additionally, immigration status was explored by Khoudja et al. (2019), who revealed the complexities faced by immigrant women in accessing stable employment opportunities.

In Germany, research by Brenke and Zimmermann (2019) delved into the impact of age on women's employment, emphasizing the challenges that older women may face in the labour market. Moreover, the German context emphasizes the importance of educational qualifications, as demonstrated by studies such as that by Wrohlich and Zucco (2019), which highlight the positive correlation between higher education levels and employment prospects for women.

Although less well investigated than women's individual characteristics, regional disparities within countries have an important role in shaping the unemployed status of woman, and it is therefore important to consider local contexts and inequalities when addressing this issue. The impact of regional or environmental factors on women's employment in Italy, France, and Germany has been explored, with

insights being obtained into the regional dynamics within each nation. Among several EU Member States characterized by regional disparities in their labour markets, official data (Eurostat 2023a) shows that in 2021 the highest regional disparities were recorded in Italy (Eurostat 2023b), illustrating a north–south split between Italian regions, with the northern region of Provincia Autonoma di Bolzano/Bozen recording the highest female employment rate (63.7%), and the southern region of Campania and Sicilia having the lowest (29.1%). Cipollone and Patacchini (2017) investigated the role of regional disparities in employment outcomes, emphasizing that regional characteristics, such as economic development, poverty, and industrial structure, significantly influence women's employment opportunities.

In France, regional factors such as economic and social environment in different regions can contribute to variations in female labour force participation rates (Barlet and Guergoat-Larivière 2019). Although in general urban and industrialized regions often exhibit higher women's employment rates, owing to the presence of diverse economic opportunities, the available data demonstrate that the regions (NUTS 2 regions) with the highest values are Aquitaine (68.7%), Pays-de-la-Loire (68.5), and Bretagne (67.8%), excluding major metropolitan areas such as Paris and Lyon. Corse (56.6%) and Languedoc-Roussillon (57.7%) have the lowest values in France.

In Germany, statistical data and research insights also underscore the significance of regional disparities, which are generally focused on industrial composition and local economic conditions (Blien et al. 2016). Urban and economically prosperous regions such as Brandenburg (76.7%), Bavaria (75.9%), and Nordrhein-Westfalen often demonstrate higher women's employment rates (the last region, however, presents one of the lowest values of the State, 68.4%, together with the Region of Bremen, 66.9%). These areas benefit from a more extensive range of job opportunities, including positions in various industries and services. By contrast, major cities such as Berlin, Munich, and Hamburg, with their dynamic economies, contribute to the overall higher employment rates for women.

Regional factors that may explain regional variability of employment rates are essentially the same as individual characteristics (personal, familial, social, and educational). As an example, the educational status of an area can be quantified in terms of school dispersion (rate of early leavers from education or training) or the number of people not in employment, education, or training (the NEET rate). In this end, recent empirical data demonstrate that in Germany young mothers are particularly at risk to becoming NEET, thus requiring particular policy interventions (Brzinsky-Fay 2022).

Apart from individual characteristics aggregated at regional level and other environmental conditions, such as structure and participation in the labour market, immigration rates, poverty rates, and other factors associated with employment status, additional factors may include regional fertility rates, as well as the prevailing family structure (couples, singles, or singles with children) in the region of residence (Tzvetkova and Ortiz-Ospina 2017).

The major justification for the inclusion of such covariates (and particularly the share of household formed by single or married couples) is that, for most countries, empirical evidence shows that a large part of the long-run increase in the participation of women in labor markets during the last century has been due principally to

an increase in the participation of married women (Engemann and Owyang 2006), significantly reducing the gap with single, never-married woman (Ortiz-Ospina et al. 2018), who still present the highest employment rates.

Although there has been no a single comprehensive study covering all the mentioned risk factors for women's unemployment in these specific countries, the cited studies have provided a nuanced understanding of the multifaceted dynamics shaping women's employment in Italy, France, and Germany.

In this context, the aim of the present paper is to identify and assess possible factors that affect the probability of being employed for women (not involved in formal education) in the 20–49 age group, exploring possible demographic, educational, and social factors linked to the family to which the young belong, as well as territorial context factors, in line with the existing literature.

To obtain a complete overview of the problem under consideration, an analysis was conducted on three most populous European countries (Italy, France, and Germany) as representatives of different welfare regimes. The analysis, which exploits the rich information obtainable from the micro-data of the Labour Force Survey (Eurostat 2022a) of Eurostat updated to the latest available year (2021), is carried out using a multilevel generalized linear model, taking the statistical units (women aged 15–49) as the first level and the regions (NUTS 2 for Italy and France, and NUTS 1 for Germany) as the second level. To this end, LSF data were merged with those from Regional statistics (Eurostat 2022b) in order to adjust and consider contextual indicators in the estimation of individual probability.

The remainder of the present paper is structured as follows. Section 2 describes the sources used, the choice of variables, and the methods applied. Section 3 presents the results of the multilevel models for each country, together with a comparison of risk factors for unemployment across countries. Section 4 discusses the results and presents the main policy implications, and Sect. 5 concludes the paper.

2 Data and methodology

The Labour Force Survey (LFS) (Eurostat 2022a) is a large household sample survey providing quarterly results on labour participation of people aged 15 and over and on people outside the labour force in Europe. The survey covers persons resident in a given country, aged 15 years and over and who live in private households.

From LFS microdata referring to year 2021 (in the following discussion, we show in bold the original names of the LFS variables), we select, from respondents in each analysed country, woman aged 20–49 years (**AGE_GRP**) who have not been not participating in formal education and training (i.e. as students or apprentices) in the previous four weeks (**EDUCFED4**). As binary target variable, we use **EMP-STAT** (= 1 if employed and 0 if unemployed or outside the labour force). As individual covariates, we select the following:

- Age class: **AGE_GRP**;
- Education: **HATLEVEL** for highest title and **HATFIELD** for field of highest title;

- Family type: (crossing) **HHPARENT** (if living with parents), **HHPARTNR** (if living with partner), **EMPSTAT** (occupational status of partner);
- Numbers of children in age classes 0–2, 3–5, 6–8, 9–17 years: **HHNBCH0TO2**, **HHNBCH3TO5**, **HHNBCH6TO8**, **HHNBCH9TO17**;
- Presence of elderly over 65 years in the family: **HHNBOLD**;
- Citizenship: **CITIZENSHIP**;
- Area of birth: **COUNTRYB** (native or another continent);
- Time (year) of permanent residence in the country: **YEARESID**;
- Area of urbanization where woman resides: **DEGURBA**;
- Number of persons in the household outside the labour market, **HHNBAD-OUTLF**;
- If the woman is registered (and also if she received assistance or monetary benefit) or not with a public employment service: **REGISTER**.

In particular, this last variable, which refers to 2020, one year before the year of observation (see Eurostat manual), was specified not to capture any effectiveness of public employment service, but rather to measure the degree of motivation in looking for work (in general, those who are motivated or able to find work do not use such public services, being able to rely on their own strengths) and/or any characteristics of the woman that may disadvantage her (education, age, or complex family or housing situation) compared with other women, thus justifying the assistance or monetary benefits received from the welfare state.

To consider possible regional differences within countries linked to factors such as regional economy and work opportunities, as well as education, economic, and social context, we used from publicly available data (Eurostat 2022b) various covariates that summarize the literature discussed above (Table 1). In Table 1, the last four covariates refer to household structure and situations that require support networks in regions, and the last one in particular tries to capture the prevalence of “non-traditional” families, such as situations where a household is composed of two or more nuclei (among the most frequent such cases is that of an elderly person living in their son’s or daughter’s family and that of a woman with or without children who returns to her parents’ household for different reasons).

Regions for Italy and France (where we excluded regions called *Départements d’Outre-Mer*) are NUTS 2, whereas for Germany they are NUTS 1 (Lands).

Regarding the methodology adopted, for data characterized by a hierarchical structure (e.g. individuals within regions), multilevel modelling is generally preferred as an improvement over classical regression models (Goldstein 1995). In this paper, we adopt a multilevel generalized regression model (MGM) that models a binary response as a function of individual data (level I) and aggregated data (level II), where the level II units are considered random effects.

The modelling adopted allows us on the one hand to consider the clustering effect of the micro-units in the macro-units (regions) and on the other hand to integrate regional indicators in their aggregate level to adjust and consider contextual indicators in the estimation of individual probabilities. More specifically, if we denote by Y_{ij} the

Table 1 Regional statistics used in the model (Eurostat 2022b)

GDP	Gross domestic product at 2021 market prices
MEAN_H_INCOME	Average gross household income
POVERTY_RATE	% of residents under the poverty threshold (< 60% of median income)
EMP_RATE_F	Employment rates for Female (age group 15–64 years)
EMP_RATE_M	Employment rates for Male (age group 15–64 years)
AGR_EMP_RATE	Employment rates in Agriculture, Fish and Forestry (age group 15–64 years)
FERT_RATE	Fertility rate
EDU_TER_TOT	% of population with Tertiary educational attainment (age group 25–64)
EDU_TER_F	% of women with tertiary achievement
EARLY_LEAVE	% of early leavers from education or training (age group 18–24 years)
NEET_RATE	NEET rates of young people not in education and training (age group 15–29 years)
WEB	% of households that have internet access at home
IMM	% of population with foreign and non-EU citizenship
UNIFAM	% of households composed by a single person
SPOFAM	% of households composed by a couple
MAMFAM	% of households composed by a single woman and at least one child under 25 years
MULTIFAM	% of households composed by two-or-more-family nucleus

occupational status (= 1 for employed and 0 otherwise) of woman i in region j , then the probability of the primary outcome ($Y_{ij} = 1$) can be modelled by a logistic model

$$P(Y_{ij} = 1) = \text{logit}^{-1} \left(\beta_{0j} + \sum_{k=1}^K \beta_k x_{ijk} \right) \quad (1)$$

as a function of K individual covariates x_{ijk} ($k = 1, \dots, K$). In Eq. (1), the coefficients β_k of the level 1 covariates remain fixed, while the intercept β_{0j} is specified as a random effect (region-specific) that possibly depends on level 2 predictors (regions):

$$\beta_{0j} = \beta_{00} + \sum_{k=1}^K \beta_{0k} z_{jk} + u_{0j}, u_{0j} \sim N(0, \sigma_j^2), \quad (2)$$

where β_{00} is the overall intercept, z_{jk} are level II covariates (see Table 1), and u_{0j} are the errors in the level II parameters, normally distributed with zero mean and variance σ_j^2 .

All models are estimated by weighting individuals by the LFS carryover universal coefficients, and analyses are performed separately for Italy, France, and Germany.

3 Results

3.1 Descriptive

The dataset under study covers 80,518 (Italy), 11,521 (France), and 30,956 (Germany) woman aged 20–49 years who had not participated in formal education during the four weeks preceding the interview. We initially removed 11.5% (Italy), 10.5% (France), and 12.9% (Germany) of woman aged 20–49 years participating in formal education and training.

Table 2, which describes of the analysed samples by country, reveals several notable differences across countries in the composition of the women analysed, especially in terms of the degree of urbanization of area of residence (more in rural areas in France, 32%, and less in Italy, 15%), the percentage of native women (less in Germany, 81%, and more in France, 91%), and education (27% of women with tertiary education in Italy, and 35% in France). In Italy, 40% of the women have a general non-specific specialization or have not achieved an upper secondary specialization (compared with 12% in France and 25% in Germany). Regarding living situation, in Italy, 30% of the women in age class 20–49 live with their parents (compared with 11% in the other two countries), only 16% are single (27% in the other two countries), and 11% are in households where there is an elderly person in charge (3% in the other two countries). Age and the remaining covariates present similar profiles. Interestingly, the percentages of women with permanent contracts (among working women) are highest for France and Germany, with Italian woman closing this gap only after the age of 35 years.

As expected, the characteristics of women not registered with public employment centres (not shown) reveal better characteristics: 32% have tertiary education, compared with just 16% for women registered in Italian centres. The same pattern is found in France (37% vs. 22%) and Germany (33% vs. 17%). Moreover, in Italy, 36% of women registered have not achieved an upper secondary level of education (18% in France and 43% in Germany). Hence, our hypothesis that this variable may provide a suitable proxy for motivational and general characteristics of the women seem to be confirmed.

Figure 1, which summarizes employment rates for the main characteristics of the women, demonstrates that unregistered women have the highest rates (not so different from those of most educated women) with respect to other possible features, in each country.

In Italy, registered women do not work at all, maybe indicating discouragement or other problematic situations that prevent active job search. Indeed, Fig. 1 illustrates similar patterns across the countries, demonstrating lower rates for the following profiles: women aged 20–24, women with children (although this is not so pronounced for France and Germany until there are two children), and non-native status (especially among African women, those with low education, and those living with parents). Note the large difference in employment rates between Italy and the other two countries for women in couples where the partner is working.

Table 2 Descriptive of sample by country (women 20–49 years), counts and percentages

	IT N = 80,518	FR N = 11,521	DE N = 30,956
Employment status			
Not-employed	36,072	2995	6841
Employed	44,446	8526	24,115
Urbanization area			
City urbanized	28,825	5507	13,621
City unurbanized	39,454	2293	11,732
Rural Area	12,239	3721	5603
Age group			
Y20–24	10,709	1740	4581
Y25–29	11,353	1717	4767
Y30–34	12,158	1936	5727
Y35–39	13,124	2028	5448
Y40–44	15,218	2016	5355
Y45–49	17,956	2085	5077
Permanent employment rate			
Y20–24	3733	782	2696
Y25–29	6380	1319	3746
Y30–34	9323	1665	5100
Y35–39	10,800	1795	4977
Y40–44	13,065	1831	4960
Y45–49	15,825	1889	4830
Citizenship			
Africa	1763	472	280
America	1031	90	188
Asia	1884	123	1330
Europe	5998	349	3929
National	69,839	10,483	25,204
Missing	3	4	25

Table 2 (continued)

	IT N = 80,518	FR N = 11,521	DE N = 30,956
Country birth			
Africa	2190	897	384
America	1812	156	298
Asia	2126	209	2292
Europe	8309	431	4526
Native	66,081	9828	23,452
0–4 years	1605	252	2194
5–9 years	2327	332	1298
10+ years	10,513	1226	4141
Native	65,807	9715	23,272
Missing	265	65	46
No formal education	336	157	0
Primary or Lower II	19,359	1141	4827
Upper II (general/ vocational)	36,950	4375	11,169
Post II+ short cycle tertiary	1686	1847	5476
Tertiary (Bach, Master, PhD)	22,127	3972	9468
Missing	58	29	16
Registered and assisted	4015	936	1658
Registered not assisted	3991	1354	387
Not registered	72,127	9221	28,886
Missing	386	11	26
Year stay (Years of stay in Country)			
Africa	2.7%	7.8%	1.2%
America	2.3%	1.3%	1.0%
Asia	2.7%	1.8%	7.4%
Europe	10.3%	3.7%	14.6%
Native	82.1%	85.3%	75.8%
0–4 years	2.0%	2.2%	7.1%
5–9 years	2.9%	2.9%	4.2%
10+ years	13.1%	10.7%	13.4%
Native	82.0%	84.8%	75.3%
Missing			
No formal education	0.4%	1.4%	0.0%
Primary or Lower II	24.1%	9.9%	15.6%
Upper II (general/ vocational)	45.9%	38.1%	36.1%
Post II+ short cycle tertiary	2.1%	16.1%	17.7%
Tertiary (Bach, Master, PhD)	27.5%	34.6%	30.6%
Missing			
Registered and assisted	5.0%	8.1%	5.4%
Registered not assisted	5.0%	11.8%	1.3%
Not registered	90.0%	80.1%	93.4%
Missing			
Register (Public Employment Service)			
Registered and assisted	5.0%	8.1%	5.4%
Registered not assisted	5.0%	11.8%	1.3%
Not registered	90.0%	80.1%	93.4%
Missing			

Table 2 (continued)

	IT N = 80,518	FR N = 11,521	DE N = 30,956
Education field (Highest degree)			
General field	12,199	53	3198
Humanities	11,767	2146	4574
Law-Economy	15,285	3682	8484
Math-Science	3040	791	845
Engineering-Architect	4475	514	1482
Agriculture	1049	169	280
Health	4745	1894	4906
Transports-personal services- security	4907	932	2129
Upper II not achieved	19,691	1327	4857
Missing	3359	13	201
Where_Live			
Live with Parents	16,377	902	2225
Live with Father	1159	64	158
Live with Mother	5153	451	842
Live outside parents 'home	57,828	10,103	27,731
Live with partner/ husband	45,734	7005	19,224
Live without the partner	34,784	4516	11,732
Live with parents	22,885	1166	10,770
Single	11,971	2697	27,990
Couple, Partner not work	7526	810	640
Couple, Partner work	34,173	5568	55,070
Elderly_charge			
No	68,067	9976	29,782

Table 2 (continued)

		IT N = 80,518	FR N = 11,521	DE N = 30,956
(Presence of aged > 65 in Household)	Yes	8488	265	858
		11.1%	2.6%	2.8%
Out_Labour_Market	0 persons	35,265	7116	22,406
(No persons in Household outside the Labour Market)	1 person	24,375	2375	6474
	2 persons	11,892	601	1374
	> 2 persons	5023	149	386
		6.6%	1.4%	1.2%
Child_Age 0-2	No	68,106	8774	26,320
	Yes	8449	1467	4320
		11.0%	14.3%	14.1%
Child_Age 3-5	No	66,455	8659	26,243
	Yes	10,100	1582	4397
		13.2%	15.5%	14.4%
Child_Age 6-8	No	65,826	8521	26,513
	Yes	10,729	1720	4127
		14.0%	16.8%	13.5%
Child_Age 9-17	No	51,037	6485	22,249
	Yes	25,518	3756	8391
		33.3%	36.7%	27.4%

Percentages of "Permanent employment rates" are calculated as the number of women with permanent jobs divided by the total number of women in each age class. Bold indicate the most frequent category

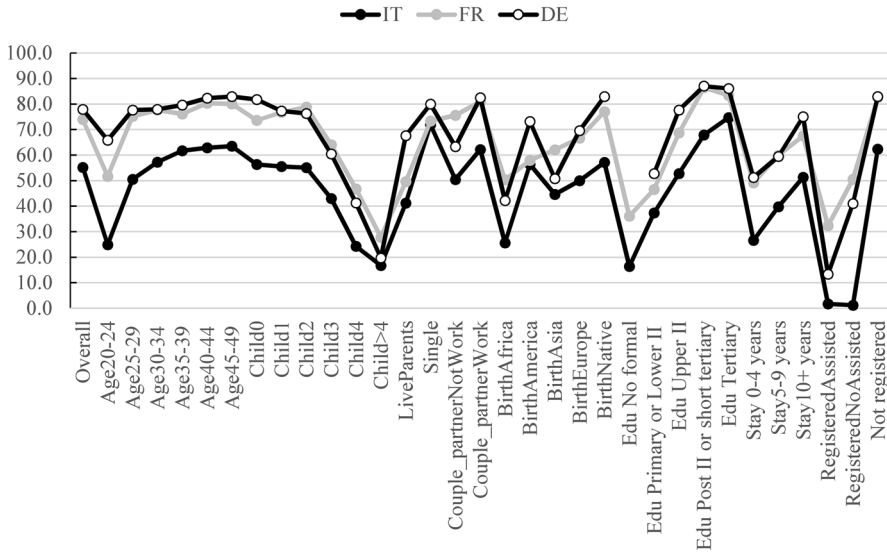


Fig. 1 Employment rate by relevant characteristics of the women, by country

Possible explanations for such differences may lie in differences in characteristics between territories within the individual states.

Table 3 synthesizes regional statistics and possible differences in indicators across the three states (the last column of this table shows the significance of each covariate, which provides an assessment of whether it changes among countries, obtained by multinomial logistic regression taking the country as dependent variable and one variable at time as unique covariate).

In examining the socio-economic regional statistics for Italy, France, and Germany (apart from immigration rates and Internet use), several noteworthy differences emerge, in terms of education (early leaver and NEET rates), employment, wealth, and especially fertility, poverty, and population with tertiary education.

Italy exhibits higher NEET and early leaver rates compared with France and Germany. In terms of poverty rates, Italy reports the highest (19.3), indicating a relatively larger percentage of the population living in poverty compared with France (13.3) and Germany (14.6). Economically, Germany stands out, with the highest mean GDP and employment rate, surpassing both Italy and France, suggesting potential disparities in labour market dynamics. On the other hand, fertility rates, tertiary education rates for females, and the total population are significantly higher in France compared with Italy and Germany. Interestingly, France exhibits higher mean rates of households comprising single females with children (5.53, MAMFAM) and lower rates of households comprising couples (41.8 SPOFAM), compared with Germany (49.5), suggesting a greater diversity of household structures. In accordance with the above considerations that the historical increase in the participation of women in labor markets is essentially due to participation by married women, these different household structures represent a

Table 3 Regional covariates (NUTS 2 for Italy and France, NUTS 1 for Germany)

Covariates	IT (N=21)	FR (N=22)	DE (N=16)	P value
GDP				
Mean (SD)	84.8 (92.9)	112.1 (156)	225.1 (230)	0.031
Median [Min, Max]	42.6 [4.70, 403]	63.5 [10.1, 765]	131 [34.4, 740]	
EMP_RATE_M				
Mean (SD)	67.8 (7.46)	70.0 (2.27)	78.6 (2.58)	<0.001
Median [Min, Max]	70.9 [53.2, 77.6]	70.6 [65.2, 72.7]	78.8 [72.0, 82.9]	
EMP_RATE_F				
Mean (SD)	50.6 (12.1)	64.0 (3.80)	72.3 (2.96)	<0.001
Median [Min, Max]	56.7 [29.1, 63.7]	65.4 [56.6, 68.7]	72.3 [66.9, 76.7]	
NEET_rate				
Mean (SD)	21.8 (6.88)	12.8 (2.49)	10.0 (2.00)	<0.001
Median [Min, Max]	19.2 [13.3, 36.3]	11.8 [9.60, 17.0]	10.1 [7.30, 13.7]	
WEB				
Mean (SD)	90.2 (3.06)	92.3 (2.41)	89.3 (7.27)	0.098
Median [Min, Max]	91.2 [84.4, 94.1]	92.9 [86.5, 96.1]	91.8 [66.6, 95.2]	
AGR				
Mean (SD)	4.60 (3.06)	3.15 (1.89)	1.14 (0.836)	<0.001
Median [Min, Max]	3.30 [0, 13.0]	3.00 [0, 6.70]	1.30 [0, 2.50]	
EARLY_LEAVE				
Mean (SD)	11.6 (3.50)	8.07 (1.79)	13.2 (2.38)	<0.001
Median [Min, Max]	11.1 [7.60, 21.2]	7.35 [5.90, 11.4]	13.4 [9.00, 17.4]	
IMM				
Mean (SD)	10.8 (5.52)	7.48 (4.20)	10.3 (6.55)	0.104
Median [Min, Max]	12.8 [3.00, 18.9]	6.40 [3.00, 21.5]	9.80 [2.30, 19.9]	
EDU_TER_TOT				
Mean (SD)	19.8 (2.82)	36.7 (5.96)	31.7 (5.51)	<0.001
Median [Min, Max]	20.0 [14.8, 26.1]	35.9 [27.8, 54.4]	30.3 [25.1, 46.7]	
EDU_TER_F				
Mean (SD)	23.2 (3.36)	39.6 (6.16)	30.8 (6.43)	<0.001
Median [Min, Max]	23.2 [16.7, 28.8]	39.5 [28.9, 56.1]	29.9 [23.5, 48.6]	
FERT_RATE				
Mean (SD)	1.24 (0.142)	1.75 (0.124)	1.56 (0.06)	<0.001
Median [Min, Max]	1.21 [0.990, 1.72]	1.77 [1.37, 1.93]	1.58 [1.39, 1.66]	
UNIFAM				
Mean (SD)	64.1 (3.83)	63.4 (2.04)	58.0 (5.15)	<0.001
Median [Min, Max]	64.0 [55.2, 71.4]	63.4 [60.1, 68.1]	59.9 [45.8, 62.8]	
MULTIFAM				
Mean (SD)	1.38 (0.569)	0.44 (0.213)	1.26 (0.315)	<0.001
Median [Min, Max]	1.22 [0.59, 2.42]	0.38 [0.160, 1.14]	1.31 [0.670, 1.68]	
POVERTY_RATE				
Mean (SD)	19.3 (10.7)	13.3 (2.14)	15.4 (2.68)	0.016

Table 3 (continued)

Covariates	IT (N=21)	FR (N=22)	DE (N=16)	<i>P</i> value
Median [Min, Max]	13.3 [5.60, 37.1]	13.2 [10.0, 18.1]	15.6 [11.7, 19.6]	
SPOSFAM				
Mean (SD)	49.5 (5.15)	41.8 (1.98)	42.7 (5.64)	<0.001
Median [Min, Max]	49.6 [39.9, 58.8]	42.2 [37.2, 45.3]	44.5 [29.0, 48.5]	
MAMFAM				
Mean (SD)	4.41 (0.706)	5.53 (0.868)	4.93 (0.542)	<0.001
Median [Min, Max]	4.20 [3.25, 6.08]	5.47 [4.33, 7.02]	4.81 [4.24, 6.37]	
MEAN_H_INCOME				
Mean (SD)	53.2 (57.6)	67.8 (80.3)	149.0 (154)	0.013
Median [Min, Max]	27.5 [2.46, 249]	43.8 [6.96, 392]	86.0 [17.5, 502]	

useful picture, with possible differences in the impact on employment from country to country.

3.2 Multilevel models

Before we fit the multilevel models, we pre-process the data, analysing possible forms of separation of quasi-separation among the target and each covariate. Moreover, we control for collinearity, a problem particularly affecting the use of regional statistics. For Italy, large collinearity ($|\rho| > 0.90$) emerges for the following pairs: GDP–MEAN_H_INCOME, EMP_RATE_M–EMP_RATE_F, EDU_TER_TOT–EDU_TER_F, SPOSFAM–UNIFAM, NEET_RATE–EMP_RATE_M and NEET_RATE–EMP_RATE_F. France shows the same pattern, also including MEAN_H_INCOME–EDU_TER_TOT ($\rho = 0.85$), whereas for Germany the previous high correlations are confirmed, apart from smaller correlations for the couples EMP_RATE_M–EMP_RATE_F (0.69), NEET_RATE–EMP_RATE_M (–0.66), NEET_RATE–EMP_RATE_F (–0.68), and SPOSFAM–UNIFAM (0.75) and a larger correlation for UNIFAM–POVERTY_RATE (0.75).

The same controls were performed with individual variables and demonstrate, in each country, strong association between citizenship and country of birth (which we remove from the model), as well as between variables describing the family situation: if the woman lives with a partner and if the partner works or not. Finally, we gather these variables in a single variable (Family).

Indeed, registration to PES (used as raw variable of motivation and skill characteristics) may induce possible collinearity with other specified covariates (e.g. education) or other contextual factors (e.g. having a child or family characteristics). Association analyses demonstrate no serious collinearity among PES and other variables.

First, we fit an empty multilevel model to assess intraclass correlation (ICC), i.e. the degree of clustering of individuals within regions. The results shown that only for Italy, as expected, is there a significant non-zero variance across regions

($\sigma^2 = 0.321$, Std. error = 0.108) and thus a non-negligible quota of total variation of the outcome across regions (ICC = 9.1%), unlike the case for the other countries (ICC = 1.1%).

Table 4 shows the main results of the multilevel models in term of importance (F -value of likelihood ratio test statistics) and significance, including all (non-collinear) individual and regional variables (full model) and the selected models, by country. Specifically, in Table 4, the F -test refers to a likelihood ratio test statistic that shows the overall significance of the j th covariate, comparing the full model (collecting all covariates) with the model without the j th covariate.

Note that the individual variables play a major role, in contrast to regional statistics, apart from some exceptions.

Table 4 Likelihood ratio test statistics (F -value) of the full and selected multilevel models, by country

Effect	Full model			Selected model		
	IT	FR	DE	IT	FR	DE
Urbanization Area	1.15	19.88	9.85		20.3	12.2
Age_Group	50.46	45.46	17.96	58.4	46.3	17.7
Citizenship	0.93	3.54	13.40	6.7	3.6	29.0
Year_Stay	17.02	25.97	16.28	24.2	26.4	18.7
Education	21.20	56.33	7.25	21.4	56.6	7.6
Register	179.04	638.37	477.10	178.5	641.9	476.5
Edu_Field	10.85	16.01	26.910	10.8	15.9	27.1
Child_Age0-2	20.2	138.19	395.25	20.7	139.0	397.9
Child_Age3-5	21.72	70.40	98.28	21.8	69.9	98.7
Child_Age6-8	13.34	34.50	24.52	13.4	34.6	24.1
Child_Age9-17	27.9	20.65	35.26	28.3	20.2	35.6
Family	51.79	54.89	33.09	58.6	65.3	38.9
Elderly_charge	0.09	1.39	1.18			
EMP_RATE_F	9.98	3.12	1.86	19.3	18.0	
POVERTY_RATE	1.58	0.12	0.76	3.2		5.2
FERT_RATE	0.30	3.23	0.29		4.5	
EDU_TER_F	4.58	0.35	0.79	3.9		
MULTIFAM	1.79	0.06	1.99			9.3
WEB	3.60	0.20	0.22			
AGR	6.63	0.43	1.06			
EARLY_LEAVE	2.37	0.11	0.01			
IMM	0.38	2.67	0.08			
UNIFAM	1.28	1.52	0.18			
MEAN_H_INCOME	0.32	1.09	0.54			
MAMFAM	0.38	0.51	0.92			

Bold numbers indicate significance levels < 0.01 and red numbers significance levels < 0.05

Variables in capital letters refer to regional statistics

To better assess the effects of single covariates (e.g. contrasts among levels and the reference level for each categorical predictor), Fig. 2 shows the estimated odds ratio (OR) for being employed for the selected models, by country. Detailed results with estimated coefficients, standard errors, significance and confidence intervals are provided in Table A1 of the supplementary material). The odds ratios for being employed in Italy, France, and Germany present notable patterns across various categories. The most significant variables differ between countries.

Apart from the largest effect, which is due to registration with an employment service (see the discussion below), the three most significant variables for France and Germany, in decreasing order, are having a child aged 0–2, having a child aged 3–5, both of which are negatively associated with employment, and living in a couple with a working partner, which *increases* the odds of being employed for women. The fourth and fifth most important variables are education and age group in France, and having a child aged 9–17 and citizenship in Germany).

Italy, by contrast, presents a completely different pattern: the most important covariates are family situation (being single increases the odds of being employed for women, whereas living in a couple with a working partner decreases the odds), age group, having a child aged 9–17, and duration of stay in Italy.

This last variable, namely duration of stay in the respective country, together with citizenship, education, field of study, having a child of whatever age, and degree of urbanization (apart for Italy) is significant in all countries. It is associated with lower odds of employment for women living in industrialized areas (confirming the Eurostat regional statistics for France and Germany).

From the significant odds ratios in Fig. 2, it can be seen that women aged 20–24 face significantly higher odds of being unemployed compared with other age groups across all countries, although this is particularly pronounced in Italy

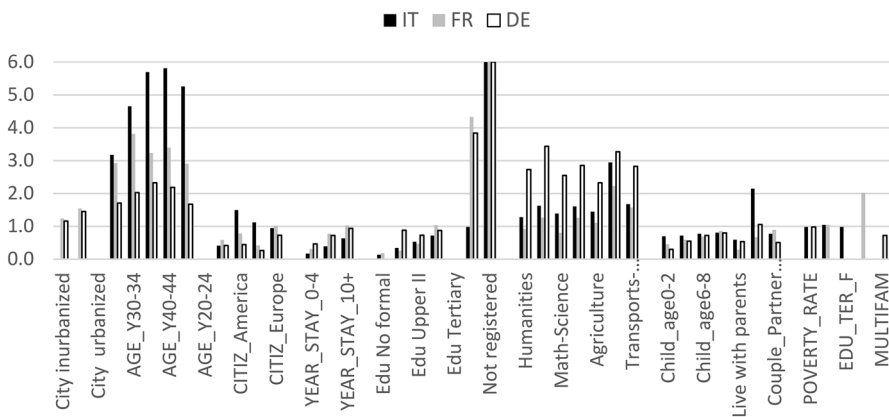


Fig. 2 Significant odds ratios (ORs) for being employed of the selected multilevel models, by country. *Note.* Empty bars are reference categories for ORs. In the plot, the ORs for persons not registered in public employment centres (vs persons registered and assisted) for Italy (139.4), France (16.8), and Germany (31.5) were truncated at a value of 6.0 for better interpretation of the other ORs

in comparison with France and especially Germany, where these age differences are more attenuated.

Woman with children consistently exhibit a higher risk of unemployment in all three countries, with this risk peaking in Germany for woman with children aged 0–2 (OR=0.301, $p < 0.0001$). However, although the employment opportunities increase as children grow older, having child in whatever age class remains a significant barrier to unemployment in all the countries.

Regarding citizenship, Italy presents another counter-intuitive situation: whereas in the other two countries, non-natives are significantly penalized compared with native woman (particularly American and Asian woman in Germany, and Asian and African women in France), in Italy, occupational opportunities do not significantly differ among Asian, American, and nationals (only African women have significant lower rates). However, after 10 years of residence in the respective countries, these occupational gaps disappear in France (OR=0.97, $p = 0.274$) and Germany (OR=0.94, $p = 0.393$), although not in Italy (OR=0.632, $p < 0.001$).

Educational levels play a crucial role, with nuanced differences among countries: although higher education levels increase employment, this effect is particularly strong in Italy, where all lower educational grades are associated with significantly lower odds of being employed compared with tertiary education. In other countries, women possessing post-secondary education face a non-significant lower risk of being unemployed compared with those possessing a tertiary education. The same holds in Germany also for women with primary or lower secondary education, probably confirming the degree of polarization of the labour market and demonstrating that employment rates for elementary jobs that require few skills may not be lower than those for highly skilled occupations.

In this regard, having a specialization in a specific field of study confers noticeable occupational advantages over women with only a general specialization. These differences, which are particularly strong in Germany, are associated with specialization in health (with odds ratios ranging from 2.22 in France to 3.27 in Germany), law–economics (from 1.27 in France to 3.44 in Germany), transports and personal services (from 1.57 in France to 2.82 in Germany) and engineering–architecture (from 1.26 in France to 2.86 in Germany).

Regarding the effect of registration of woman with employment service, in each country, we estimate very large positive effect for woman without such registration in Italy (OR = 139.4), France (16.8), and Germany (31.5), reflecting, as expected, that motivated women or those in more favourable conditions (age, education, etc.) generally do not use this type of service to find work. However, Italy presents another peculiarity: whereas in France and Germany, women who are registered but do not receive benefits or assistance present higher employment rates than registered women registered who do receive benefits or assistance (OR = 1.46 and 1.34, respectively, both with $p < 0.001$), indicating that the first group is less disadvantaged than the second and effectively has better opportunities for work, in Italy this difference is not significant, demonstrating that benefits and assistance do not have any significant effect on working opportunities, and, indeed, may even discourage the search for work.

Regional covariates have little effect, with some exceptions.

Significant environmental contexts that favour a high probability of employment are living in regions with high employment rate (Italy and Germany) or in regions with higher fertility rates (France). Conversely, significant risk factors for being outside the labour market are living in regions with high poverty rate (Italy and Germany), low percentage of women with tertiary educational attainment (Italy), and percentage of households including two or more-family nuclei (Germany).

In this regard, other covariates referring to other household structures at a regional level were found not to be significant. It could be that their effect is masked by important family-finding at an individual level: the “best family profiles” in terms of employment probability are women living with a partner who works in both Germany and France and single women in Italy.

Italian women living in couples where the partner is working have very small employment rates compared with German and French women in this profile. Moreover, unlike women in Germany and Italy, French women living in couples where the partner does not work were not penalized in terms of employment (OR=0.889; p value=0.276) with respect to such best profiles.

Hence, it can be seen that the effects of family situation on employment are quite variable across countries.

4 Discussion

To increase women’s employment in the labour market, institutions adopt various policy interventions, such as implementation of equitable family leave policies, such as providing maternity leave, promoting workplace flexibility, and addressing biases in hiring and promotion processes. The main policies that have been adopted over the last 30 years in France and Germany (Fondazione Magna Carta 2023) have addressed principally the problem of low fertility among the population, the need to raise the educational level of the workforce, the need to increase the participation of young people and woman in the labour market, and the need to make the working environment more friendly for women.

Regarding the first issue, France is now characterized by a fertility rate (1.83) that is decidedly higher than those of Italy (1.24) and Germany (1.53). One of the reasons for this seems to lie in a series of political policies (part-time working up to the child’s age of three, family quotient, free schooling, and family-friendly housing solutions) adopted in recent decades to support parenting: these not only facilitate births, but also support the choice to have children in the long term with aid that increases as the number of children making up the family unit increases. Furthermore, since the 1980s and 1990s, France has been very active in developing a child-care system. In 2019, around 60% of children under three years old had access to a care service, compared with an average of 36% across the OECD and 28% of Italian children.

In this context, our data demonstrate that French regions with higher fertility also have higher occupational rates.

This confirms evidence that in many advanced economies, the correlation between fertility rate and female employment has become positive, reflecting a better

balance between work and private life (Barbiellini Amidei et al. 2023), although in those European countries where the male breadwinning model is dominant (such as Italy, Spain, and Germany), unemployed women have higher birth rates than employed women. As an example, Swedish policies such as subsidized childcare or paid parental leave have encouraged both mothers *and* fathers to participate in childcare, as well as supporting full employment (Ortiz-Ospina et al. 2018).

By contrast, those countries where female employment is widespread (such as in Northern Europe) are characterized by a positive relationship between employment and fertility (Chabè-Ferret and Gobbi 2018). The literature suggest that a positive relationship could also reflect policy measures or institutional changes that favour conciliation between the roles of mothers and workers, by increasing childcare support or maternity leave provisions (Rindfuss et al. 2003). Findings for France seem to reflect these winning policies.

Over the last 20 years Germany has also invested substantially in family policies, resulting in an increase in the fertility rate from the 1.33 recorded in mid-2000. Among other things, these include mandatory three-month maternity leave at 100% of salary, 12-month parental leave with a salary of 67% of the income usable by both parents (and up to 100% for less well-off families), a legal right for children to have access to services starting from their first year of age, and an adequate number of nurseries for each Land.

Other policies have significantly contributed to women's entry into the labour market (an allowance per child in every family regardless of income, tax deductions of up to two-thirds of the costs incurred linked to expenses for children up to 14 years of age in households where both parents work, and gender equality policies in the distribution of tasks within the family unit).

Our results for Germany demonstrate that, as well as poverty, a particularly significant regional factor is living in a household including two or more family nuclei, and women in such multi-nuclear households (essentially situations where women, generally with children, have returned to their parents' homes) encounter problems not only with regard to school dispersion (Brzinsky-Fay 2022), but also in their later labour market participation.

Similar policies have also been proposed in Italy in the face of low female employment and demographic challenges, including low fertility rates and an aging population. The main policy measures proposed have been concerned with parental leave and allowances to support families with children and facilitate a work-life balance. Welfare policies related to unemployment have included unemployment benefits and social safety nets for individuals and families facing financial hardship due to unemployment (Welfare Italia 2022). However, these Italian policies have not achieved the same success as those adopted in France and Germany. Some recent data still demonstrate large gender gaps and failed occupational policies.

Regarding education, according to the latest (December 2023) OECD-Pisa report, which surveyed the skills of 15-year-olds, Italy is the only country, among 81 school systems, showing a gender gap in mathematics of 21 points, the equivalent of a year of school.

As far as the labour market is concerned, apart from the discouraging female employment rate (50.6), one of the lowest in Europe (compared with 64.0 in

France and 72.3 in Germany), the prospects for improvement do not seem comforting. From a recent report (5 December 2023) of the National Labour Inspectorate (Ispettorato Nazionale del Lavoro 2023), it emerges that in Italy over 44,000 mothers in 2022 left their jobs, representing an increase of 17.1% compared with 2021. The largest share of resignations (32%) is linked to micro-enterprises (less than 10 employees), then large (26.2%), small (22.3%), and finally medium-sized (15.5%) enterprises. Regarding motivation, for 63% of new mothers, difficulty in combining employment and childcare was cited as the cause of resignation, and for 32.2%, resignation was related to the absence of supportive relatives, the high costs of nurseries or babysitters, or failure to be accepted into a nursery.

The greatest number of resignations (58%) concerned with mothers with only one child (or expecting their first child), 32.5% of cases concerned mothers with two children, and only 7.5% concerned those with more than two children.

In Italy, there is a limited availability of childcare facilities for children aged between 0 and 2 years, as shown by the official enrolment rates (26 vs. 35% in Europe; OECD 2022). In the same vein, the limited uptake of leave by fathers following childbirth (20 vs. 30% in Europe) certainly do not encourage the employment of women (Carta et al. 2023).

Delving deeper into our empirical results, we note that LFS microdata provide several indications regarding the reasons for the lack of participation in the labour market or, for female workers, if they desire to work a greater number of hours or to move to a permanent contract from an (involuntary) part-time job.

An analysis of these variables (the original LFS variables are given in bold) for unemployed women shows that in Italy only 17.3% were looking for work (**SEEK-WORK**) during the four weeks preceding the reference week (compared with 29.5% in France), while 80.8% were not looking (67.5% in France).

Among the main reasons for not working among women not employed and not looking for work (**SEEKREAS**), the need to care for children or the elderly appears to be a minor reason in Italy (18.3%) compared with the other two countries (26.1% in France and 33.5% in Germany, where it represents the main reason), while “other family reasons” prevail (39.6%, compared with 22% in Germany and 10.1% in France, where the main reason, 32.3%, is the lack of a suitable job). Furthermore, possible obstacles to work such as lack or inaccessibility of assistance services receive less emphasis in Italy (15%) than in France (18%) and Germany (17%), despite the known lack of such services in Italy.

It is therefore interesting to analyse the reasons according to which women (not employed and not looking for work) believe that childcare would limit their participation in the labour market (**NEEDCARE**). The main reason, for all countries, is not the difficult time–family–work conciliation, but the desire to provide assistance, and, curiously, this answer is higher in Italy (84.2%) than in France (70.2%) or Germany (64.2%). This appears to demonstrate, in theory at least, that Italians are inspired by a strong idealistic desire to care for their offspring, which, however, is not confirmed in practice as the reason for unemployment and inactivity. It could also demonstrate different visions of the role of the woman–mother by the women themselves in the three countries. In Italy, a woman must personally take care of her

children, giving up or pausing her working career for long periods, whereas in the other two countries, a different idea of the woman is dominant.

Subsequent analysis of the responses of women employed in a part-time job reveals that in Italy the main motivation for working part-time (**FTPTREAS**) is a lack of availability of the current full-time job (58.3% of those interviewed), a value far higher than those in France (30.5%) and Germany (5.50%), where care for children and the elderly prevails as a motivation (36.6% and 46.9%, respectively, compared with 18.1% in Italy).

The considerations put forward seem to indicate a certain idea of the relationship between (out of labour market) women and work in Italy. The problem of low female employment does not seem to be dictated by the presence of children to look after (which instead is the primary reason for resignation by woman already in work), although this is nevertheless considered an important consideration-, or by a difficult family–work reconciliation.

Empirical results suggest, instead, two different reasons.

First, there are contextual conditions that do not particularly motivate entry into the market, such as an economy that does not favour women in top roles in companies, a society that does not value female self-entrepreneurship, or the exit from the traditional role of a woman–mother. As previously discussed (Bertrand 2020), preferences to not work are not innate or completely endogenous, but are heavily influenced by the cultural and social environment to which women are exposed. In this context, it should be noted that unfavourable labour market conditions have also been remarked upon by employed women (involuntary part-time workers).

Second, being out of the labour market depends on a conscious choice not to work, often due to lack of economic need, generally owing to the presence of a partner in the family who works (female employment rates in Italy for this subgroup are twenty percentage points lower than in France and Germany, and even lower than women in these two countries who still live with parents or women in the 20–24 age group). In this end, empirical data confirm that in Italy first-birth rates are higher for non-working women than for women with a job, confirming the importance of men's economic position for the decision to have a first child (Barbiellini Amidei et al. 2023).

A conscious choice not to work can also possibly be attributed to the existence of a welfare system and to fiscal policies that provide transfers and tax credits for dependent spouses, generously subsidizing unemployment rather than monetarily and fiscally rewarding the opposite, as is the case, for example, in France with the “family quotient”. It is no coincidence that in Italy the only subgroup with a high rate of female participation, comparable to France and Germany, is made up of single women. More specifically, in the Italian tax system, women who contribute a second income to a couple receive lower monetary incentives than single women or their husbands (first income).

Furthermore, the monetary incentive decreases if the additional income results in the family losing some benefits/transfers—a typically generous deduction for a dependent spouse, or loss of exemptions linked to the ISEE (the Italian acronym for the “Equivalent Financial Situation Indicator”). Finally, since the deduction for earned income does not depend on the number of earners, with the same income, a

family with one or two earners receives the same deduction, without any incentive for the second income (Colonna and Marcassa 2015).

The work described in this paper is subject to two main limitations. First, the analysed outcome and the cross-sectional setting do not allow assessment of how long the employment condition persists over time. Second, in the analysis of employment status, the issue of endogeneity is an important concern when examining the relationship between being employment and available variables. In particular, fertility and registration with the Public Employment Service (PES) are prone to this issue.

Regarding the first limitation, even if the effect may be attenuated since it is measured at a regional level, this variable presents an interesting point of discussion. In general, we expect higher women's employment rates to reduce fertility rates. In the recent literature, however, a positive relation has been found in many advanced economies where social contexts favor women's education and do not penalize the role of mothers in the labour market. Hence, fertility levels measured at a certain point in time can be used as proxy of effectiveness of past policy measures in countries or regions, aimed at favouring conciliation between the roles of mothers and workers, childcare support, or maternity leave provisions. In fact, it is no surprise that there is a significant relationship with a positive coefficient between fertility and working status only in France, whereas Italy and Germany do not show any relationship.

Regarding registration to PES, this variable surely risks being endogenous. However, registered women are a minority of the sample, and the strong PES effect is homogenous across countries. The main justification, however, is that PES registration refers to 2020, one year before the observation year, and thus at least the temporal pattern should exclude endogeneity. Besides these considerations, we should remark that this variable was chosen as a suitable proxy that condensed "unmeasured ability" (motivation, general characteristics, and skills that determine the decision to register, or other issues such as disability), the omission of which seriously plagues statistical models. In fact, the omission of a covariate that affects both the outcome and the included covariates resulted in an omitted effect that was absorbed by the error term, leading to the classical problem of omitted ability bias (Heckman 1979), meaning that the model attributes the effect of the missing variables to those that were included. Hence, we specify PES for this reason. In the same manner, PES endogeneity would apply whether or not our model missed other important covariates that affect both employment and PES.

Given that LFS data do not measure deeply personal characteristics (personal skills, mental health, disability, etc.) our hope is that all such features were captured by PES. In this regard, a number of studies have demonstrated many other possible causes that may explain the working status and opportunities of women in the labour market, but they have often not been reported or analyzed in empirical studies, since they are rarely measured: gender stereotypes, the role of the women in society, social acceptability of women's work, to name but a few.

In particular, the choice to participate in the labour market and the actual job opportunities for women are influenced by factors that are not easily measurable (Castellano and Rocca 2020). The unexplained portion can be attributed, in part, to socio-cultural factors related to entrenched gender stereotypes, which influence

the decisions made by economic market actors and the value attributed to female labour. In many cases, to explain this phenomenon, there is talk of a “discriminatory component”, although not all directly unobservable factors are triggered by discriminatory attitudes towards the female population. Recently, in many countries, the explainable portion of female occupational status has decreased, mainly because of women's increasing access to higher education (and thus increased female human capital that can be spent in the labour market). At the same time, however, the unexplainable portion has increased in these countries. Among the directly unobservable causes are choices made within the family regarding the division of care responsibilities, followed by choices made by partners to balance work and family needs. Part-time work and the value attributed to female employment play a significant and non-uniform role: part-time employment can represent a way to balance work and family, but at the same time, it is often synonymous with low wages, fewer benefits, excessively flexible working conditions, low-profile positions, lack of training, and limited promotion prospects. Some studies conducted in the UK have shown how, owing to stereotyped views, female work is often underestimated compared with male work, even with equivalent skill requirements. More specifically, in Italy, there are high levels of discouragement among workers regarding employment conditions, which must be considered when analysing the employment rate. In Germany, there is a significant gender bias in the choice of field of study by female students. The vicious circle that begins with choosing to sacrifice a proportion of working time for caregiving activities triggers the following consequences: less time dedicated to professional training, choosing less remunerative sectors, and opting for less satisfying careers. In Europe, France was the country where women deviated the most from choices dictated by gender constraints.

5 Conclusion

Addressing gender disparities in the Italian labour market requires a broad and coordinated set of policies. First of all, the system of transfers to families should distance itself from current paternalistic models by trying to increase the supply of female labour, favouring rewards or benefit if mothers work, instead of bonuses for mothers who stop working.

In the same direction, an increase in childcare facilities for younger children no longer seems to be an option, as clearly emerges from the recent EU directives on the so-called Next Generation (NextGen) European programme, implemented in Italy by the National Recovery and Resilience Plan, which provides around 2.7 billion Euros for the strengthening of public nursery schools (document presented by the Government to the Italian Parliament on 12 January 2021).

Implementing inclusion and awareness policies to combat gender or other discrimination disparities, and providing opportunities and resources necessary to overcome socioeconomic barriers, will not only promote individual well-being, but also contribute to more inclusive and sustainable economic and social growth for the whole of Italian society. To this end, a report of the Bank of Italy suggests that, other things being equal, a 10% increase in the Italian workforce, and

especially in the female workforce, from current to EU levels, would increase GDP by approximately the same percentage in the long term (Carta et al. 2023).

To conclude, given the considerations presented here regarding the two reasons for low employment levels among woman who do not work, the hope is that the first of these reasons, namely unfavourable market conditions and contextual conditions, will not become an endemic mechanism underlying long-term non-employment, discouraging in the future even those women now active in the job market who for age and economic reasons have not yet formed a family or had children, and forcing them over time to a irreconcilable choice whether to continue working or to start a family. Unfortunately, the above data provided by the National Labour Inspectorate seem to confirm such a likelihood.

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Declarations

Conflict of interest The authors have no conflict of interests related to this publication.

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