

FERTILITY AND UNEMPLOYMENT IN TIMES OF CRISIS IN ITALY

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Abstract. Previous studies found a pro-cyclical relationship between economic downturns and fertility in Western countries, while less is known about the Great Recession's consequences on Italy's fertility levels. Using macro-data from different ISTAT sources, from 2006 to 2018, this study investigates how changes in the economic context, specifically unemployment, have influenced fertility at the regional level. The study also explores whether and how this relationship has changed. Our findings reveal a pro-cyclical relationship between fertility levels and unemployment during the period under observation, more sensitive after 2013 and less homogeneous across macro-areas. A deeper understanding of these dynamics can inform policy interventions aimed at supporting fertility and addressing demographic behaviours in times of uncertainty.

1. Introduction

The Great Recession started in the autumn of 2007 in the USA and rapidly spread to most European Countries, causing worsening economic conditions and increasing unemployment in the period 2008-2013. The effects of the Great Recession were felt across various domains of the economy, including employment, financial markets, and consumer spending. During this period, several countries experienced a decline in economic growth, as well as a rise in unemployment rates and financial instability. This crisis profoundly impacted individuals and households, leading to job losses, reduced income levels, and financial hardships. Its effects were not limited to economic aspects but also had social and demographic consequences. The adverse economic conditions relating to downturns led to increased stress and a general perception of uncertainty about the future that induced individuals to postpone or reduce their plans for having children (Comolli, 2021). The strongest fertility declines were registered in Southern Europe, especially in countries such as Italy and Spain (Matysiak et al., 2020), given the existent and persistent precarious labor market conditions brought about the recent reform of labor market flexibilization (Cirillo et al. 2017).

The Italian Great Recession had the unique characteristic of occurring at a time when fertility rates were in the process of recovering from a period of significant decline (Goldstein et al., 2013; Comolli, 2017; De Rose and Strozza, 2015). Meanwhile, the mean age of women giving birth to their first child increased, further constraining reproductive choices. Moreover, despite the prevalence of strong family ties and traditional values, Italy has long shown very-low fertility levels.

The central aim of this article is to investigate the association procyclical or countercyclical between changes in economic conditions, specifically the deterioration of employment rates, and fertility rates before, during and after the Great Recession in Italy. A macro-panel dataset was constructed, encompassing annual data for all 20 Italian regions, spanning from 2006 to 2018, to explore the impact of Total Unemployment Rates on the Total Fertility Rates. Subsequently, we delve into variations in the fertility response to unemployment over time (before and after 2013) and between the macro areas in Italy (North, Center, South).

2. Theoretical background, literature and research hypotheses

The question of whether and how business cycles affect fertility has been widely debated over the years (Sobotka et al., 2011; Goldstein et al., 2013). While there is an abundance of studies on the effects of economic downturns on births in the United States and some European countries, less is known about Great Recession's consequences on Italy's fertility trends.

All things considered, fertility depends on a wide range of individual and institutional circumstances, including sex, age, and social status as well as welfare and family policies (Vignoli et al., 2012), but it also differs across countries and contexts (Alderotti et al., 2022).

Childbearing is the result of choices made by individuals and strictly depends on personal preferences, family situation, and income constraints evaluation, in the present and for the future. The general perception of uncertainty about economic conditions plays a crucial role in childbearing decision-making, especially during periods of economic decline (Ayllón, 2019). If the individual's future economic expectations are positive, the number of children may increase; conversely, in the case of economic downturns (job loss or job instability), uncertainty about the future may induce individuals to avoid long-term commitments and postpone childbearing decisions. Income constraints and employment insecurity, at the individual and family level, act as signals of possible future uncertainty, making the decision to have children less attractive, leading young adults to prolong their education in order to improve their labour market position (Kohler et al., 2002; Matysiak et al., 2021). This may be the result of an income effect, related to the greater difficulty of childbearing during an economic downturn (Bellido and Marcèn, 2019). On the contrary, some couples could take advantage of unemployment spells or instability

employment periods to decide to have children, exploiting this low wage window characterized by lower opportunity costs of parental leave and childcare, especially for mothers, who generally represent the main childcare providers. In this case, a substitution effect arises as childcare costs decrease when women are out of the labour market (Butz and Ward 1979; Friedman et al., 1994; Alderotti et al. 2019). Childbearing decision-making is generally made by the couple, therefore, the labour market status of both is potentially able to affect future fertility intentions (Alderotti et al., 2022; Comolli et al., 2019).

As mentioned, the effects of the recent economic decline on fertility have been widely studied. Schneider and Hasting (2015) investigated how the worsening of economic conditions that occurred during the Great Recession impacted state-level fertility in the US. The authors found a negative relationship between the detrimental economic conditions and fertility decisions of low-educated women. Along this line, Seltzer (2019), combining statistical and survey US data, examines the long-term effect on fertility in post-recession periods. In particular, the author considers the structural changes in the industry composition (job displacement and deindustrialization) as playing a primary role in the decrease of TFR, with a particular focus on the Great Recession period. Finally, Comolli (2017) further develops the approach in Goldstein et al. (2013) and finds that fertility seems to negatively respond to the economic uncertainty during the Great Recession. In particular, the author points out the central role played by the deterioration of the labour market structure in determining a decline in fertility rates.

Goldstein et al. (2013), using European data from Eurostat and the OECD database, investigated how changes in labour market conditions, through an increase in the unemployment rates, affected fertility rates during the Great Recession. They found a strong negative correlation between the decline in fertility rates and the economic recession, especially for those European states hardest hit by the crisis, albeit in the presence of strong variation by region, age, and parity. Following the Goldstein et al. approach, Comolli (2017) confirms the negative association between a rise in unemployment, as a consequence of the Great Recession in European countries, and the decline in fertility rates, in particular among young women. An interesting work in this direction is Bellido and Marcén (2019). The authors investigated the business cycle impact on fertility for 30 European countries over three decades and found that, although the business cycle effect on fertility seems to be negative but moderate, different scenarios are identified, strictly related to socioeconomic and institutional factors at the country level, such as the generosity of welfare or high levels of gender equality. Similar results were found by Ayllón (2019).

More recent European studies confirmed a pro-cyclical relationship between employment instability and fertility (Matysiak et al., 2020). Specifically, relying on

different measures, such as the unemployment rates (total unemployment and youth unemployment) and the proportion of long-term unemployment (unemployment lasting 12 months or more), they found a strong relationship between increased unemployment rates and fertility decline in Italy. The findings indicated that deteriorating economic conditions during the recession were associated with a more pronounced decline in fertility compared to the pre-recession period. Furthermore, well-established literature confirms the presence of gender-specific responses: the effect of the economic crisis on fertility strongly depends on men's economic and labour conditions (Vitali and Billari, 2017).

The strength and the nature of the crisis effects tend to be different across countries (Alderotti et al., 2022). The high degree of heterogeneity of social and family welfare coverage, as well as regional labour market conditions, strongly moderate the overall effect of economic downturns on fertility decisions (Hiilamo, 2017). In Southern Europe, especially in countries such as Italy and Spain, structural weaknesses and labour market instability worsened the effects of the economic downturn on fertility decisions. Focusing on Italy, very few studies investigated the link between the Great Recession and fertility decisions from a macro perspective. An exception is Comolli and Vignoli (2021) who aimed to investigate the causal effect of the economic crisis on birth rates, because of decreasing levels of confidence about the future and increasing perceived uncertainty. They documented a procyclicality of the relationship between fertility and economic downturns in Italy.

We draw on the literature strand that shows that there is a negative relationship between unemployment and fertility (Sobotka et al., 2011; Goldstein et al., 2013; Cherlin et al., 2013; Seltzer, 2019). Considering changes over time, some studies found that the Great Recession has had a negative impact on fertility, particularly in terms of first births (Adserà and Menendez, 2011; Neels et al., 2013). Especially in Italy and Spain, the effects of the crisis on fertility levels were intensified by labor market instability, after having already experienced a substantial decline in the past. We, therefore, hypothesize a pro-cyclical relationship between fertility and unemployment (H1).

The studies conducted by Goldstein et al. (2013) and Zambon et al. (2020) provide evidence of a decrease in fertility rates during periods (and especially in Southern European countries) characterized by pronounced labour market instability. We, therefore, expect to find a more sensitive fertility response to unemployment after 2013 (H2).

Finally, we test the previous hypotheses by grouping regions into macro-areas. A well-differentiated geographical fertility trend has been identified in Italy. The upturn in the TFR occurred mainly in Northern regions, where most of the increase has been attributed to the contribution to the fertility of foreign women (Caltabiano

et al., 2009). Along this line, Zambon et al. (2020) investigated the TFR at the regional level in Italy, between 1952 and 1998. They found that fertility levels in Italy are strongly associated with economic changes, also confirming different patterns across the Italian territory. Fertility rates in the economically advanced regions of Northern Italy appeared less sensitive to the worsening of economic conditions but more responsive to economic growth, if compared to more disadvantaged regions (Southern Italy). We, therefore, expect to find important differences in fertility responses to unemployment between Italian macro-areas (H3).

3. Data and Methods

We aim to examine the impact of Total Unemployment Rates on the Total Fertility Rates over a period that covers before, during, and after the occurrence of the Great Recession using macro data at the regional level for Italy. To do this, from 2006 to 2018 a macro-panel dataset was constructed, encompassing annual data for all 20 regions. Our dependent variables are TFRs, which were drawn from the Population Roster; while our main variables of interest are TURs, coming from the Labour Force Survey. The mean values of these indicators for the period under examination are displayed in Table 1.

We can observe variations in both TUR and TFR across different regions in Italy. The variations in both the Rates across different regions in Italy suggest an inverse relationship between unemployment and fertility rates. Regions with higher TUR values, such as Puglia, Calabria, and Sardegna tend to have lower TFR values, indicating a negative correlation between unemployment and fertility. This pattern implies that higher levels of unemployment may be associated with lower fertility rates in the Italian regions. Conversely, regions with lower TUR values, such as Trentino-Alto Adige, and Veneto, tend to have higher TFR values, suggesting a positive correlation between lower unemployment rates and higher fertility rates.

Additionally, we explore whether and how the relevance of unemployment to fertility has changed over the observed period. The period trend is represented as a categorical variable, divided into three categories: 2006-2008, 2009-2013, and 2014-2018. Furthermore, we also investigate possible variations in the observed relationship across macro-areas by grouping regions (Northern, Central, and Southern regions).

Following the mainstream literature (Goldstein et al., 2013; Hiilamo, 2017; Seltzer, 2019; Matysiak et al., 2020) a one-year lag has been incorporated into empirical analyses. All our model specifications also include the following control variables: the percentage of the population with a university education (men and women), mean age at marriage (men and women), marriage and divorce rates, the percentage of foreign women and childcare coverage (Bellido and Marcén, 2019; Comolli, 2017).

Table 1 – Mean values of Total Unemployment Rate (TUR) and Total Fertility Rate (TFR) for Italian regions, 2006-2018.

Region	TUR	TFR
Sicilia	16,52	1,39
Calabria	15,81	1,29
Campania	15,03	1,40
Sardegna	13,98	1,11
Puglia	13,94	1,29
Basilicata	11,03	1,18
Molise	10,19	1,17
Lazio	8,67	1,38
Abruzzo	7,92	1,29
Valle d'Aosta	6,18	1,50
Piemonte	5,97	1,39
Marche	5,87	1,35
Liguria	5,84	1,35
Umbria	5,41	1,34
Toscana	5,30	1,35
Lombardia	4,50	1,32
Friuli-Venezia Giulia	4,50	1,43
Emilia-Romagna	4,14	1,45
Veneto	4,04	1,61
Trentino-Alto Adige	2,95	1,47

Source: Own elaboration, ISTAT data.

To test our hypotheses, we run two groups of Ordinary Least Squares (OLS) regression models. To account for the influence of unobserved variables that change over time, calendar-year fixed effects are utilized. This approach helps to control for time-varying and region-varying factors that might affect the relationship between unemployment rates and fertility rates (Goldstein et al., 2013; Seltzer, 2019). To address potential bias resulting from correlation within and between regions, we applied robust standard errors clustered by regions (Kohler and Kreuter, 2005).

The first group of models (Table 1) is aimed at identifying the pro-cyclical or counter-cyclical nature of the relationship between TFRs and TURs and changes occurred over time during the period. The first three model specifications are aimed at testing our first research hypothesis (H1) while comparing results across a null model (M1), a model with fixed calendar year and region effects (M2) and a fixed effects model that considers the influence of control variables (M3). To test for our second research hypothesis (H2) models also include interaction terms between period trends and unemployment measures to search for differences in fertility responses over time (M4).

The second group of models (Table 2) follows the same structure of the former, but divided into macro-areas (North, Center and South), to approximate geographical differences in the effects of unemployment on fertility and test for our third and last research hypothesis (H3).

4. Results

To test for the presence of a negative relationship between fertility and unemployment (H1), we estimated OLS models without and with fixed effects (FE). Table 2 (M1-M3) reports a pro-cyclical relationship between fertility and unemployment levels during the examined period, which aligns with findings from both Italian and international literature. In M1, as the TUR increases by one-percentage-point, the respective TFR decreases by 0.0128. This negative association is also found when including region and calendar year fixed effects and robust standard errors clustered by regions (M2), but the strength of the relationship decreases. As stated before, this finding is consistent with most studies conducted in US, Europe, and Italy (Sobotka et al., 2011; Goldstein et al., 2013; Cherlin et al., 2013; Cazzola et al., 2016; Seltzer, 2019; Zambon et al., 2020). It is interesting to note that the negative effect of TURs on TFRs diminishes when adding control variables to model estimations (from M2 $b = -0.0118$ to M3: $b = -0.0077$).

Table 2 – Estimates of the OLS regression analysis of the Total Unemployment Rate (TUR) on the Total Fertility Rate (TFR), 2006-2018, without and with region and calendar fixed effects.

	M1	M2	M3	M4
TUR	-0.0128*** (0.00138)	-0.0118*** (0.00213)	-0.00768*** (0.00254)	-0.00394 (0.00282)
<i>Period trend*TUR</i>				
2009-2013*TUR				-5.15e-05 (0.00130)
2014-2018*TUR				-0.00181* (0.00140)
Constant	1.477*** (0.0152)	1.466*** (0.0210)	2.719*** (0.221)	2.535*** (0.218)
Observations	256	256	256	256
R-squared	0.253	0.316	0.655	0.664
Number of id		20	20	20

Notes: Robust Standard Errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Models 3 and 4 (M3 and M4) control for the percentage of the population with a university education (men and women), mean age at marriage (men and women), marriage and divorce rates, the percentage of foreign women, and childcare coverage

Table 3 – Estimates of the OLS regression analysis of the Total Unemployment Rate (TUR) on the Total Fertility Rate (TFR), for Italian macro areas, 2006-2018.

Macro-areas	M1	M2	M3	M4
North				
TUR	-0.0174*** (0.00447)	-0.0123** (0.00478)	-0.0186*** (0.00378)	-0.0239** (0.00864)
<i>Period_trend*TUR</i>				
2009-2013*TUR				0.00790 (0.00594)
2014-2018*TUR				0.00728 (0.00708)
Constant	1.543*** (0.0294)	1.511*** (0.0297)	2.811*** (0.447)	2.758*** (0.396)
Observations	100	100	100	100
R-squared	0.134	0.176	0.784	0.792
Number of id		8	8	8
Center				
TUR	-0.0152*** (0.00320)	-0.0207*** (0.00204)	-0.0132 (0.00662)	-0.00428 (0.00516)
<i>Period_trend*TUR</i>				
2009-2013*TUR				0.00570 (0.00297)
2014-2018*TUR				-0.00108 (0.00510)
Constant	1.480*** (0.0273)	1.525*** (0.0166)	3.808** (0.711)	2.862** (0.527)
Observations	52	52	52	52
R-squared	0.311	0.501	0.825	0.871
Number of id		4	4	4
South and Island				
TUR	0.00245 (0.00249)	-0.00920*** (0.00237)	-0.00450* (0.00199)	-0.00444* (0.00217)
<i>Period_trend*TUR</i>				
2009-2013*TUR				0.000408 (0.00109)
2014-2018*TUR				0.000287 (0.00121)
Constant	1.231*** (0.0369)	1.397*** (0.0336)	2.784*** (0.323)	2.745*** (0.306)
Observations	104	104	104	104
R-squared	0.009	0.472	0.723	0.723
Number of id		8	8	8

Notes: Robust Standard Errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Models 3 and 4 (M3 and M4) control for percentage of the population with a university education (men and women), mean age at marriage (men and women), marriage and divorce rates, the percentage of foreign women and childcare coverage.

As for our second hypothesis (H2), we suggested that TFR at the regional level will experience a more sensitive response after 2013, due to the increase in unemployment rates. As shown in Table 2, M4 tests for changes on the unemployment-fertility relationship during different phases of the Great Recession after controlling for possible confounders. The interaction term between the last period and unemployment is negative and highly significant, suggesting that between 2014-2018 the negative unemployment-fertility association was stronger than it was during the 2006-2008 pre-recession period (M4: 2014-2018*TUR $b = -0.0018$).

Table 3 presents the results of OLS regressions for Italian macro areas. In the Northern area, there is a pro-cyclical relationship between unemployment and fertility, although no clear period effects are observed.

5. Conclusions

In this study we examined the association between changes in economic conditions, specifically the deterioration of total employment rates, and its impact on fertility rates in Italy before, during, and after the Great Recession. The study aligned with previous literature that suggests a negative relationship between unemployment and fertility confirming a pro-cyclical relationship between fertility and unemployment (H1).

Additionally, building on the literature that indicates a decrease in fertility rates during periods of labor market instability due to economic downturns (Goldstein, 2013; Zambon et al., 2020), the results supported our second hypothesis (H2), showing a more sensitive response in fertility rates after 2013. Finally, the study recognised differentiated geographical fertility trends among Italian regions because of varying sensitivity to the economic crisis impact, as found in previous literature, therefore confirming important differences in fertility responses to unemployment between Italian macro-areas (H3).

Understanding the relationship between economic conditions and fertility behaviours in Italy can inform policy discussions and interventions to address low fertility rates and promote more women employment's friendly measures. The political debates on population ageing/shrinking and gender equality, both high in the (inter)national agenda, could benefit from these insights. Specifically, initiatives such as flexible working arrangements, affordable and accessible childcare facilities, and parental (not only maternal, so as to share family duties in the couple) leave provisions can help maintain a work-family life balance, encouraging women to start and boost their careers while considering family planning. Regional policies would benefit at a deeper level: regions showing greater sensitivity to economic crisis should receive specific support, such as job creation programs, skill development,

and incentives for family planning helping the reduce the inherent territorial cultural gaps.

Acknowledgments

We acknowledge co-funding from Next Generation EU, in the context of the National Recovery and Resilience Plan, Investment PE8 – Project Age-It: “Ageing Well in an Ageing Society”. This resource was co-financed by the Next Generation EU [DM 1557 11.10.2022]. The views and opinions expressed are only those of the authors and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them. Additional co-funding was secured by PON Ricerca e Innovazione 2014-2020 DM 1062 by the project “La promozione della gender parity tra dinamiche sociodemografiche e politiche occupazionali innovative” CUP H95F21001450006.

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