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Descriptive Finding

**Does the women's employment–fertility U-shape
emerge at the local level? Evidence from Italian
municipalities**

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Does the women's employment–fertility U-shape emerge at the local level? Evidence from Italian municipalities

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Abstract

BACKGROUND

The gender revolution and multiple equilibria perspectives suggest a U-shaped relationship between women's employment and fertility as societies move from a traditional male breadwinner equilibrium, through institutional and normative mismatch, towards gender egalitarianism. Whether this pattern can be detected locally in a persistently low-fertility setting remains unclear.

OBJECTIVE

We ask whether the employment–fertility U-shape is visible across Italian municipalities and whether this relationship displays distinct territorial configurations across the country's main macro-areas (North, Centre, and South and Islands).

METHODS

We construct a harmonized municipality-level dataset from Italian National Institute of Statistics sources for 2019–2024, projecting all observations onto the 2024 geography of 7,896 municipalities. We compute period averages of the general fertility rate and female employment at ages 25–64. We display descriptive associations for both the full sample and a restricted sample, excluding small municipalities, where fertility indicators are more exposed to statistical volatility.

RESULTS

In both samples, the association is U-shaped. Net of some minor overlaps, macro-area panels suggest that municipalities in the South and Islands are more often located on the traditional low-employment/high-fertility side, those in the Centre are around the low-

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fertility transitional segment, and those in the North are on the high-employment/high-fertility side.

CONCLUSIONS

We illustrate that a U-shaped relationship is detectable at the finest available administrative scale for Italy.

CONTRIBUTION

This study documents a U-shaped employment–fertility association across Italian municipalities. The findings are consistent with a structural interpretation of low fertility, highlighting the importance of institutional and socioeconomic conditions that enable women and men to combine employment and parenthood.

1. Background

Recent scholarship has questioned the idea that modernization and women's rising employment necessarily imply a long-run erosion of family formation and childbearing. This discussion has shifted attention from whether women's employment depresses fertility to the conditions under which employment and parenthood can become compatible. Within this perspective, the U-shaped relationship between female employment and fertility has emerged as a conceptual representation of the broader process of transformation of gender roles. The gender revolution framework (Goldscheider, Bernhardt, and Lappegård 2015) and the multiple equilibria framework (Esping-Andersen and Billari 2015) both describe a transition from a traditional equilibrium, characterized by the male breadwinner/female caregiver model and relatively high fertility, to an intermediate phase in which women's labour market participation increases while domestic responsibilities remain largely unchanged. This mismatch between expanding employment opportunities and persistent gender specialization raises the opportunity costs of childbearing and contributes to fertility decline. As societies develop further towards a gender equality equilibrium, however, women's employment becomes increasingly compatible with family formation because institutions, norms, and family arrangements adapt to the new economic role of women and to a new caregiving role of men. In this process, contextual factors (including the availability of formal childcare, intergenerational support networks, supportive work–family reconciliation policies, and more egalitarian gender norms) play a central role in reducing the incompatibility between employment and parenthood (Oláh, Vignoli, and Kotowska 2021). This transition hinges on men's active involvement in childcare and domestic work (Goldscheider, Bernhardt, and Lappegård 2015). Work–family

reconciliation policies are unlikely to sustain it if they remain directed at women alone rather than fostering co-responsibility in caregiving from the outset of parenthood.

This perspective is consistent with earlier work emphasizing the role of gender equality in explaining very low fertility and with evidence showing that the once negative association between female employment and fertility has weakened, and in some settings reversed, in high-income societies (McDonald 2000; Ahn and Mira 2002; Billari and Kohler 2004; Brewster and Rindfuss 2000; Doepke et al. 2023; Neyer, Lappegård, and Vignoli 2013). A meta-analysis by Matysiak and Vignoli (2026) confirms that the historical tension between employment and childbearing has weakened across high-income Western countries. Nonetheless, Han, Gowen, and Brinton (2024) suggest that fertility intentions remain depressed where cultural expectations regarding care work remain stagnant. Such findings suggest that any fertility recovery is far from automatic. Although Lei (2025) identifies a conditional U-shaped relationship at the macro level, evidence from the Nordic countries reveals that the association is contingent on micro-level configurations of gender beliefs (Begall and Hiekel 2025). Importantly, Gauthier and Gietel-Basten (2025) emphasize that these complexities necessitate a cautious approach to family policy, acknowledging that its impact is fundamentally heterogeneous and context-dependent.

Italy provides a demanding setting in which to examine the gender revolution and multiple equilibria perspectives, combining persistently low fertility with substantial local variation in institutional and cultural conditions. Italy also has one of the lowest female employment rates in the European Union (EU): 57.4% at ages 20–64 in 2024 versus about 71% EU-wide (Eurostat 2026). Therefore “high female employment” and “low female employment” are relative terms here, referring to the Italian municipal distribution. Unequal unpaid work, limited work–family support, unmet childcare needs, and unstable employment may all constrain fertility (García-Pereiro et al. 2025; Juni and Vitali 2025; Miaci et al. 2025; Alderotti et al. 2025). These mechanisms operate within pronounced territorial divides (Billari and Tomassini 2021; Alderotti 2022) in which the Centre and North generally combine higher female employment and broader services whereas the South and Islands display lower labour market participation, more traditional gender roles, and greater reliance on family support, alongside considerable within-area heterogeneity. Education adds a further dimension, since tertiary attainment is markedly lower in the South and Islands than in the Centre and North (ISTAT 2025). Education shapes fertility through employment opportunities and opportunity costs but also through the diffusion of gender-egalitarian norms (Esping-Andersen and Billari 2015). Educational gradients in fertility vary across subnational contexts (Nisén et al. 2021).

Evidence from Spain similarly documents substantial municipal fertility variation shaped by local spatial and contextual conditions (Burillo et al. 2020). In Italy, Salvati et al. (2020) identify marked regional and municipal variability in fertility dynamics while

Carboni and Caltabiano (2025) show persistent provincial disparities shaped by spatial dynamics, the North–South divide, and cultural factors. Moreover, female employment has been positively associated with fertility since 2010 in both northern and southern Italy, although with different magnitudes (Alderotti 2022). These findings motivate examining whether the U-shaped relationship remains visible at the municipal level.

This study addresses the women's employment–fertility relationship at an unusually fine territorial scale. Existing local-scale studies focus primarily on the spatial structure and temporal evolution of fertility itself rather than on whether the relationship predicted by the gender equilibrium framework remains visible at the municipal scale. The municipal scale provides a particularly stringent descriptive test: If the women's employment–fertility U-shape remains visible at this level, it is less likely to be merely an artefact of aggregation across larger territorial units and may instead point to a scale-invariant descriptive regularity. Our goal is therefore to establish whether one of the most prominent stylized expectations of the literature survives disaggregation to the municipal level, where aggregation bias is least likely to drive the result.

2. Data and harmonization

A central contribution of this study is the construction of a harmonized municipality-level dataset from Italian National Institute of Statistics (ISTAT) sources for 2019–2024. The starting year reflects the availability of the required information within the ISTAT Permanent Population and Housing Census system, which replaced the traditional decennial census with annually updated data integrating statistical registers, administrative sources, and sample surveys. The series ends in 2024, the latest year available at the time of extraction. Municipal female employment data are unavailable for 2020 because the regular series was interrupted during the COVID-19 emergency; employment averages therefore use observations for 2019 and 2021–2024.

Municipal analysis reduces the risk that regional or provincial averages conceal heterogeneous local patterns, but it also raises substantial comparability problems. The main challenge is territorial harmonization, since Italian municipalities may merge, split, be incorporated, or undergo changes in codes and boundaries. Between 2019 and 2024, 202 municipalities (approximately 2.5% of the 2024 total) were affected by administrative changes. Rather than excluding them, we traced each modification and retrospectively projected all annual data onto the 2024 geography of 7,896 municipalities. Predecessor municipalities were aggregated backwards in cases of mergers, while separations were handled through pro rata allocations.

This procedure produced a series of datasets that were comparable over time, from which we calculated the two indicators examined in the study. The general fertility rate

(GFR) is defined as live births per 1,000 women aged 15–49, while the female employment rate measures employed women aged 25–64 as a share of the female population in the same age group. We use ages 25–64 because the indicator is intended to capture the broader local integration of women into the labour market rather than only employment among women currently exposed to childbearing. Including ages 15–24 would make the analysis more sensitive to territorial differences in educational enrolment and school-to-work transitions, which do not necessarily reflect the work–family compatibility mechanisms emphasized by the gender equilibrium framework. Nevertheless, we replicated the analysis using employment at ages 15–49 as a robustness check.

We use period averages rather than single-year values to reduce short-term volatility, which is particularly pronounced for municipal fertility indicators. The GFR is averaged over 2019–2024, whereas the employment rate is averaged over the available years. To assess whether the pandemic period influenced the findings, we also replicated the analysis using only 2022–2024.

For territorial comparisons, the five standard Eurostat/ISTAT macro-regional divisions are aggregated into three groups. North combines the North-West and North-East and includes Piedmont, Aosta Valley, Liguria, Lombardy, Trentino-South Tyrol, Veneto, Friuli-Venezia Giulia, and Emilia-Romagna. Centre includes Tuscany, Umbria, Marche, and Lazio. South and Islands includes Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sicily, and Sardinia. Municipalities correspond to local administrative units in the European territorial classification.

Our analysis relies on the GFR because the age-specific fertility schedules needed to calculate the total fertility rate (TFR) are unavailable at the municipal level (Benassi and Carella 2023). Municipal TFRs could be estimated indirectly by applying a provincial or regional fertility schedule to the municipal female age structure and rescaling the resulting estimate according to observed births. This standardization, however, assumes that the reference age pattern applies uniformly across heterogeneous municipalities while drawing on the same births and female population underlying the GFR; we therefore retain the directly observed GFR.

3. Descriptive findings

Figures 1 and 2 report the descriptive relationship between the female employment rate at ages 25–64 and the GFR across Italian municipalities over the 2019–2024 period. Figure 1 includes the full set of 7,896 municipalities, while Figure 2 restricts the analysis to municipalities with an average female population of reproductive age of at least 500 and at least one birth during the period. This restriction leaves 3,756 municipalities and

reduces the instability affecting very small municipalities, where even a few births, or the absence of births, can produce large fluctuations in fertility indicators. Sensitivity checks using different population thresholds produced the same substantive pattern, indicating that the finding is not driven by the specific cut-off adopted in Figure 2. Replacing the female employment rate at ages 25–64 with a measure for ages 15–49 slightly increases the concentration of municipalities on the left-hand side of the curve in the full sample, plausibly because employment among women aged 15–24 is lower and more strongly shaped by educational participation. Restricting the analysis to 2022–2024 yields a somewhat flatter U-shape in the full sample, consistent with greater volatility over a shorter period, especially in very small municipalities. In both checks, however, the fitted relationship is virtually unchanged in the restricted samples.

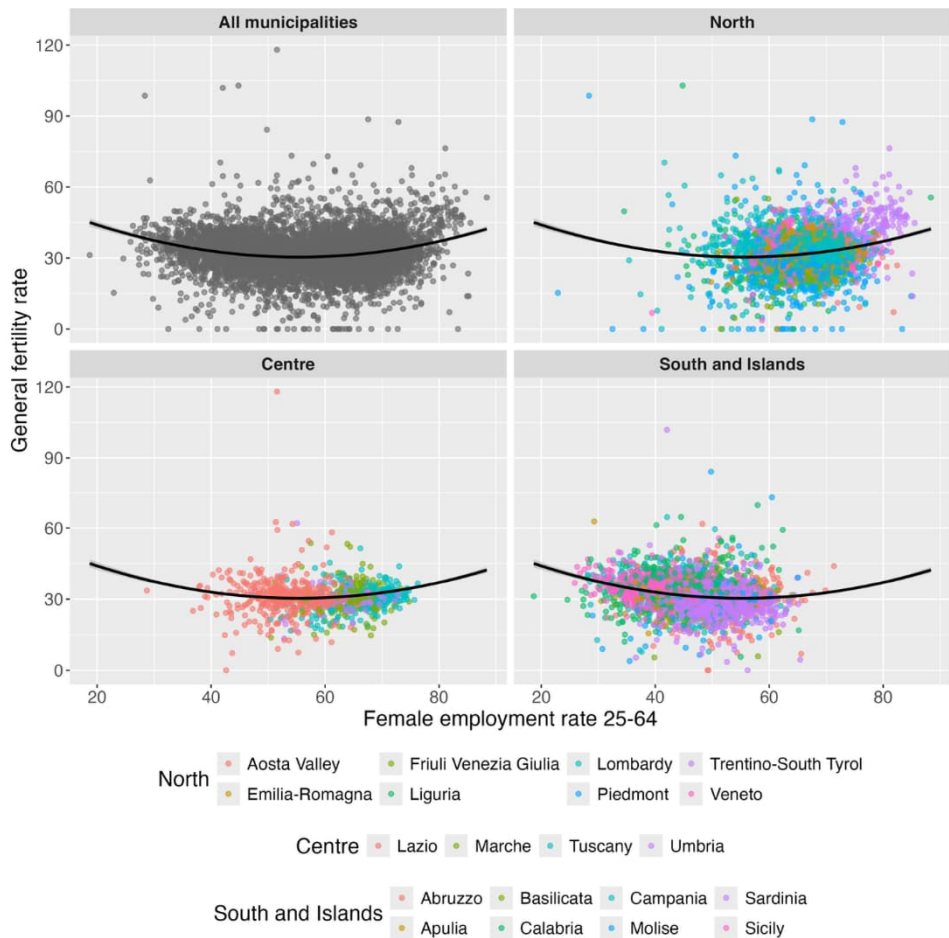
In both figures, the fitted curve for all municipalities follows a U-shaped profile: Fertility is comparatively higher where female employment is low, declines at intermediate levels of female employment, and rises again where female employment is high. This pattern is already visible in the full municipal dataset, despite the substantial dispersion generated by the presence of several small municipalities. Once the sample is restricted to municipalities with a sufficiently large female population at reproductive ages and non-zero observed fertility, the same relationship becomes more clearly defined. The filtered figure suggests that the U-shaped association is not simply the result of random noise generated by very small places; it remains visible after reduction of the most unstable observations.

The four-panel structure of the figures (one panel for all municipalities and three macro-area panels with regional legends) shows that the national U-shape is associated with distinct but overlapping territorial configurations. Municipalities that depart from the prevailing profile of their macro-area are substantively informative, suggesting that broad territorial divisions do not fully capture local combinations of employment and fertility and may also reflect heterogeneous care and family support contexts (Andreella et al. 2024). Municipalities in the South and Islands are more frequently located on the left-hand side of the curve, where relatively low female employment coexists with comparatively higher fertility. This pattern is especially visible in Sicily, Campania, and Calabria and is consistent with the persistence of a more traditional male breadwinner configuration combined with a comparatively weaker formal care provision in much of southern Italy. These contextual mechanisms cannot be identified directly through our descriptive analysis, however, and should therefore be regarded as plausible interpretations rather than demonstrated explanations. Sardinia, Abruzzo, and Apulia are more frequently located near the lower part of the curve, illustrating the substantial heterogeneity within the South and Islands and a comparatively more intermediate configuration between the traditional and gender-egalitarian equilibria. Many municipalities in Central Italy are likewise concentrated around the lower portion of the

curve, where intermediate levels of female employment coexist with comparatively low fertility. This position is consistent with the transitional phase described by the gender revolution and multiple equilibria perspectives, in which women's labour market participation has expanded while institutional and family arrangements have not yet fully adapted. Northern municipalities are more frequently located on the right-hand side of the curve, where higher female employment is associated with higher fertility. The municipalities of Trentino-South Tyrol are particularly illustrative: Their position in the upper-right portion of the distribution is consistent with a local institutional context characterized by extensive work–family reconciliation measures and relatively favourable conditions for combining employment and parenthood (Vitali and Billari 2017; Gorodetskaya, Marzani, and Podestà 2026).

Taken together, Figures 1 and 2 provide descriptive evidence consistent with the gender revolution and multiple equilibria perspectives.

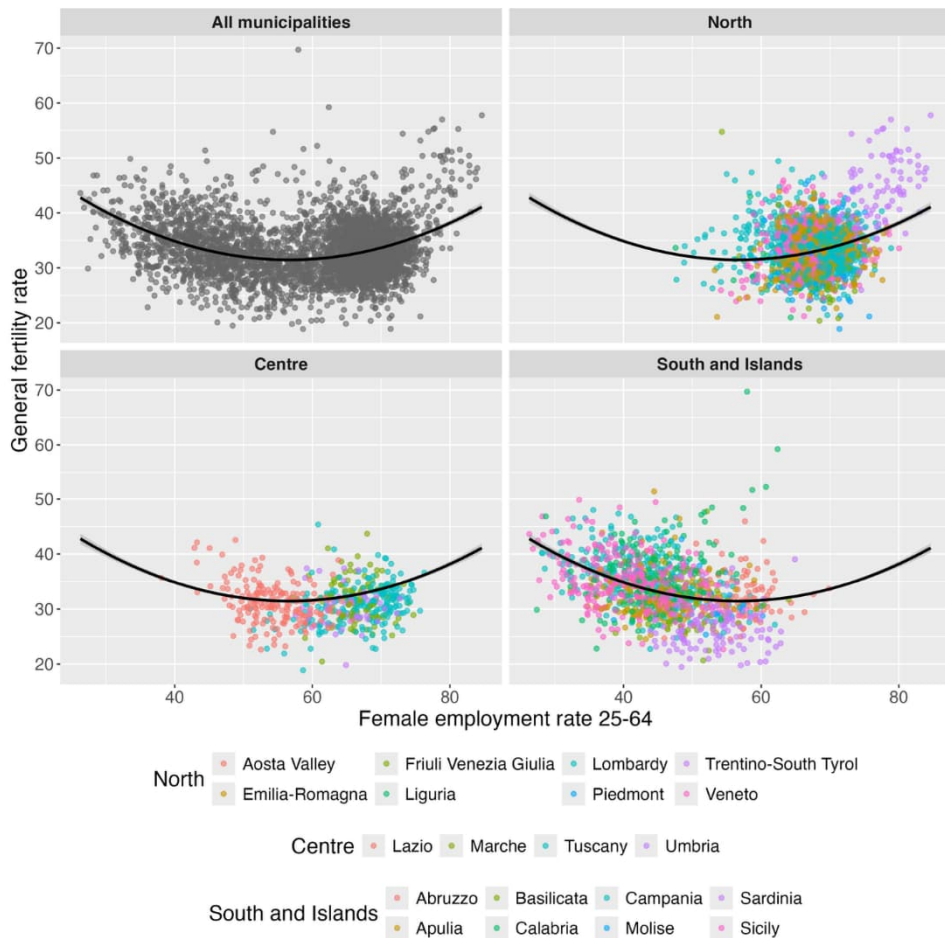
Figure 1: Female employment rate and general fertility rate across Italian municipalities, 2019–2024, full sample (7,896 municipalities)



Notes: Each point represents one municipality. The female employment rate refers to women aged 25–64, while the GFR is defined as live births per 1,000 women of reproductive age. Both indicators are computed as period averages over 2019–2024 (employment: 2019 and 2021–2024). Colours identify regions within each macro-area. The black curve reports fitted values from a second-degree polynomial regression estimated on all municipalities and then displayed in each panel as a common national reference. The shaded area reports the corresponding 95% confidence interval.

Source: Authors' elaboration on ISTAT data.

Figure 2: Female employment rate and general fertility rate across Italian municipalities, 2019–2024, restricted sample (3,756 municipalities)



Notes: Each point represents one municipality. The sample is restricted to municipalities with an average female population of reproductive age of at least 500 and a positive average GFR over the 2019–2024 period. The female employment rate refers to women aged 25–64, while the GFR is defined as live births per 1,000 women of reproductive age. Both indicators are computed as period averages over 2019–2024 (employment: 2019 and 2021–2024). Colours identify regions within each macro-area. The black curve reports fitted values from a second-degree polynomial regression estimated on all municipalities and then displayed in each panel as a common national reference. The shaded area reports the corresponding 95% confidence interval.

Source: Authors' elaboration on ISTAT data.

4. Concluding remarks

According to our descriptive finding, a U-shaped association between female employment and fertility emerges at the municipal scale, where local heterogeneity is maximized and aggregation bias is minimized. The pattern is illustrated through the general fertility rate, a necessarily less refined measure than the total fertility rate, whose use is dictated by the limitations of municipality-level data.

The relevance of this finding is twofold. First, it suggests that the relationship envisaged by the gender revolution and multiple equilibria perspectives is not confined to national or regional averages. Instead, the predicted nonlinear relationship can be detected across local communities, where demographic, labour market, and institutional configurations are much more heterogeneous. Second, the municipal scale allows us to identify how different parts of Italy are positioned along the stylized transition. This territorial differentiation reinforces the message that Italy's low-fertility regime should not be interpreted as a homogeneous national condition but as the aggregate outcome of distinct local configurations.

The observed U-shaped relationship should not be interpreted as evidence that increasing female employment will automatically lead to a recovery in fertility (Matysiak and Vignoli 2008, 2026). Rather it demonstrates local contexts in which high female employment and comparatively higher fertility coexist, indicating that employment and childbearing are compatible under favourable institutional and socioeconomic conditions. In this sense, our findings support a structural interpretation of persistently low fertility. They suggest that the key challenge is not to encourage childbearing through narrowly targeted financial incentives alone, which recent evidence has shown to have limited effectiveness (Gauthier and Gietel-Basten 2025), but to create the conditions under which individuals can successfully combine work and family life. This calls for policies that expand access to affordable childcare, strengthen work–family reconciliation for women and men alike, promote fathers' active involvement and co-responsibility in caregiving, and support stable employment (Vignoli and Guetto 2025). Our results indicate that where these conditions are present, female employment is not a barrier to childbearing but rather a feature of contexts in which fertility can be more successfully realized.

The case of Trentino-South Tyrol municipalities is particularly illustrative. They systematically occupy the upper-right portion of the distribution, where high female employment and relatively high fertility coexist. This descriptive position is consistent with a local institutional environment long characterized by work–family reconciliation measures (Vitali and Billari 2017; Gorodetskaya, Marzani, and Podestà 2026).

These results also suggest several directions for future research. Future work could refine the analysis by introducing explicitly spatial approaches, including neighbourhood

matrices and measures of spatial dependence, and by moving beyond macro-area comparisons to classify municipalities according to settlement type, accessibility level, urban–rural typology, or altitudinal profile while also examining whether local differences in formal childcare provision, proximity to grandparents, and the strength of intergenerational support networks help explain departures from the dominant configuration of each macro-area. Such extensions would help clarify whether the observed U-shaped pattern reflects not only broad territorial divisions, which themselves partly capture long-standing socioeconomic and institutional macro-clusters, but also finer local spatial structures. Future analyses should also consider the immigrant population, whose size and composition vary substantially across Italy and may contribute to local differences in both fertility and female employment (Benassi and Carella 2023).

The present study should be regarded as a first descriptive step. It provides evidence of a U-shaped relationship between women’s employment and fertility at the municipal level, documents a local pattern consistent with the gender revolution and multiple equilibria perspectives, and opens the way for more detailed analyses of the local conditions under which women’s employment and fertility can become mutually compatible.

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