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The (low) productivity roots of lowest-low fertility: Evidence from Italy

Thea Jansen, Alessandra Faggian, Daniele Vignoli

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The (low) productivity roots of lowest-low fertility: Evidence from Italy

Thea Jansen [1], Alessandra Faggian [1], Daniele Vignoli [2]

[1] Gran Sasso Science Institute, Italy

[2] University of Florence, Italy

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Abstract

This paper investigates whether productivity growth in micro, small, and medium-sized enterprises (mSMEs) is associated with fertility in Italy, a context characterized by very low fertility and a productive structure dominated by mSMEs. While existing research links economic conditions to fertility, most studies rely on aggregate indicators or labor-market shocks and pay limited attention to the role of local productive structures, such as firm size. Exploiting highly granular municipal-level data from the Italian National Institute of Statistics, we leverage an instrumental variable strategy based on historical soil suitability for wheat cultivation, to rule out potential endogeneity concerns. Our results show a positive, sizable and statistically significant relationship between productivity and fertility, with a €1,000 increase in value added per worker being associated with a 2% increase in fertility the following year. Our findings suggest that productivity-enhancing policies may generate indirect demographic and social returns, in addition to their economic benefits.

JEL codes: J13, L25, R23

Keywords: Fertility, Productivity, Instrumental variable, Italy, Municipalities

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1. Introduction

Over the past three decades, advanced economies have faced a dual challenge: persistently weak productivity growth and sustained declines in fertility. While these trends are typically studied separately, their potential interdependence has received little attention. Yet the long-term sustainability of advanced welfare states increasingly depends on the interaction between economic performance and demographic dynamics. As populations age and working-age cohorts shrink, productivity growth becomes critical for sustaining living standards and financing pensions, healthcare, education, and other core welfare commitments (Draghi, 2024). At the same time, fertility decline threatens to further reduce the future labor force, reinforcing pressures on already strained social systems.

Despite the centrality of both trends, research has largely overlooked whether local economic productivity shapes demographic behavior. This study addresses this gap by examining whether productivity influences fertility. Specifically, we investigate whether increases in productivity among micro, small, and medium-sized enterprises (mSMEs) affect local fertility outcomes. We posit that productivity is not only a determinant of economic performance but also a key structural condition shaping young adults' capacity to form families.

Our analysis focuses on Italy, which provides a particularly informative empirical setting. Italy combines one of the weakest productivity performances among advanced economies with some of the lowest fertility rates in the world. Since the mid-1990s, labor productivity has stagnated, while fertility has declined to among the lowest levels in Europe, reaching 1.18 children per woman in 2024 (Alderotti et al., 2025; Vignoli et al., 2025) against a European Union (EU) rate of 1.34 children per women in the same year. Over the same period, population ageing has accelerated and the working-age population has begun to shrink. These trends are projected to place increasing pressure on already high pension and healthcare expenditures while the tax base continues to contract.

A key structural feature underlying Italy's productivity slowdown is its productive system, which is heavily dominated by micro, small, and medium-sized enterprises. In 2022 mSMEs accounted for 99.9% of firms, with microenterprises employing less than 10 people accounting for 94.9% and small and medium enterprises (SMEs) with 10 to 249 staff accounting for 5% of all firms. Jointly, they moreover account for 76.1% of employment (42.3% in micro and 33.8% in SMEs) and 65.5% of value added (27.2% in micro and 38.3% in SMEs) – among the highest shares in the OECD (OECD, 2014, ISTAT, 2025). Historically, this economic model – characterized by family ownership, specialization in traditional manufacturing sectors, and geographically concentrated industrial districts ("distretti industriali") – supported rapid industrialization and regional development (Becattini, 1991). Nonetheless, globalization and technological change since the 1990s have exposed structural limitations of this production system, including difficulties in exploiting economies of scale, limited innovative capacity, lower risk-taking, and constrained access to external finance. These factors

can translate into lower productivity growth, weaker competitiveness, and limited opportunities for reinvestment.

We argue that these structural economic conditions may also have demographic consequences. While public policy debates and the academic literature often portray economic efficiency and social objectives as competing or mutually exclusive (Margolis and Walsh, 2003), we follow the perspective advanced by Draghi (2024) that productivity growth is a prerequisite for collective well-being. From this perspective, productivity is not only a driver of economic performance but also a structural condition shaping young adults' life chances. By influencing employment quality, income stability, and future prospects, productivity may affect individuals' ability and willingness to form families. In local economies characterized by weak productivity growth, employment opportunities tend to be more precarious, wages grow more slowly, and career prospects are less predictable, undermining young adults' economic security and long-term expectations – key determinants of family formation. Economic uncertainty and limited opportunities for upward mobility are known to cloud young adults' future expectations (Autor, 2019; Calligaris et al., 2023), potentially delaying or reducing childbearing (Mills & Blossfeld, 2013) and encouraging young people to emigrate in search of better prospects (Alderotti et al., 2021), further weakening local demographic dynamics. Together, these processes may generate a self-reinforcing cycle linking economic stagnation and demographic decline.

Empirically, we test this relationship using highly granular municipal-level data from the Italian National Institute of Statistics (ISTAT). To address concerns about endogeneity, we implement an instrumental variable strategy that exploits historical variation in soil suitability for wheat cultivation as a source of exogenous variation in local productivity levels. This approach allows us to isolate the causal effect of productivity on fertility outcomes while accounting for confounding economic and demographic factors.

Our findings contribute to two strands of literature. First, they extend research on productivity and firm structure by highlighting previously overlooked demographic consequences of local economic performance. Second, they contribute to the growing literature on the economic determinants of fertility by identifying productivity as a structural factor shaping family formation behaviors. More broadly, the results suggest that productivity-enhancing policies may generate wider social benefits by supporting fertility and mitigating demographic decline. Hence, economic competitiveness and social sustainability should not be seen as competing objectives but as mutually reinforcing components of long-term development.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature. Section 3 describes the data and presents summary statistics. Section 4 outlines the empirical strategy. Section 5 presents the main results and robustness checks. Section 6 concludes with policy implications.

2. Literature

Productivity is widely regarded as a central determinant of a country's living standards (Krugman, 1997; Easterly and Levine, 2001). Higher productivity – defined as the ratio of outputs to inputs – raises profits and incomes, which are generally expected to translate into broader gains in material well-being (including salaries). Empirical evidence confirms that productivity growth tends to be positively associated with employment and wage growth (Calligaris et al., 2023). However, these gains are unevenly distributed across territories (Partridge et al., 2021), sectors, and skill groups (Hornbeck and Moretti, 2024), and their transmission to wages has become slower and increasingly decoupled from productivity growth over time (Stansbury and Summers, 2017).

Fertility dynamics are likewise central to long-term economic performance (Brander and Dowrick, 1994; Huang, 2024) and to the sustainability of welfare systems, as they shape the future size and age structure of the working population and hance the tax base financing pensions and healthcare. Cross-country evidence suggests that the relationship between productivity and fertility varies systematically with the stage of economic development. In lower-income countries, productivity gains reduce the relative cost of subsistence consumption and are associated with higher fertility, whereas in high-income economies higher productivity tends to coincide with low fertility levels (Lehr, 2009). However, more recent studies show that fertility rebounds once labor productivity and female employment reach sufficiently high levels (Myrskylä et al., 2009; Luci and Thévenon, 2010).

Restricting attention to high-income, low-fertility societies, fertility rates exhibit substantial cross-national and subnational variation. A large body of demographic research attributes this heterogeneity to differences in employment conditions and economic stability during the prime reproductive years, particularly for women (Adserà, 2004; Billari, 2018). Unemployment, income insecurity, and precarious contracts have consistently been linked to delayed childbearing and lower completed fertility (Comolli, 2017; Matysiak et al., 2021; Vignoli et al., 2020). Two interrelated mechanisms underpin this relationship. First, employment instability entails income penalties and wage stagnation, raising the economic prerequisites of parenthood. Recent scholarship highlights how rising income thresholds – and parallel increases in housing requirements – have become central drivers of fertility decline in high-income contexts (van Wijk and Billari, 2024; van Wijk, 2024). In Italy, in particular, the transition to parenthood is closely tied to homeownership, often requiring substantial housing expenditures (Gallo and Vignoli, 2025). Second, in an era of mounting uncertainty, fertility decisions are shaped not only by current conditions and past trajectories but also by expectations about the future. Employment instability clouds future prospects and amplifies perceived risks, thereby discouraging childbearing; it is not only present hardship but anticipated insecurity that depresses fertility (Matysiak and Vignoli, 2024).

Nonetheless, this literature largely neglects productivity as a core structural driver of economic stagnation and its downstream effects on family formation. A substantial body of economic research identifies productivity growth as the fundamental engine of long-run economic performance. Persistent slowdowns in productivity are widely regarded as a central driver of economic stagnation in advanced economies (Summers, 2014). When productivity growth falters, aggregate income growth weakens, firms' profitability declines, and the capacity of the economy to generate stable, well-paid employment erodes. At the labor market level, sluggish productivity is associated with wage stagnation, limited career progression, and the expansion of low-quality or precarious employment (Autor, 2019). In contexts dominated by small and medium-sized enterprises, where scale economies and innovation capacity may be limited, low productivity can constrain firms' ability to offer stable contracts and upward mobility, thereby increasing employment volatility. While productivity-enhancing technological change can in some cases displace workers in the short run (Acemoglu & Restrepo, 2020), sustained productivity growth remains essential for long-term employment stability and real wage growth. Conversely, persistent productivity stagnation contributes to structural labor market fragility, reinforcing income insecurity and uncertain career trajectories – conditions that are well known to shape demographic behavior.

In population research, productivity is rarely treated as a structural driver of fertility dynamics. When considered, it is typically examined through exogenous technological shocks or proxied by aggregate macroeconomic indicators, thereby obscuring the localized mechanisms through which productive dynamics shape demographic outcomes. For example, Matysiak et al. (2023) show that declining labor market prospects among low- and middle-educated workers – those most exposed to automation – are associated with regional fertility declines, while more highly educated and economically dynamic regions may even experience fertility gains in response to technological change. Yet far fewer studies investigate how the underlying productive structure itself – particularly the distribution of firm size – conditions local economies' capacity to generate stable employment, adequate wages, and predictable career trajectories conducive to family formation. Existing research shows that more complex and diversified productive structures are associated with higher fertility levels (Innocenti et al., 2021), yet the role of productivity in mSME-dominated economies remains largely unexplored.

While mSMEs dominate employment across Italy – its Southern regions particularly – they also exhibit systematically lower productivity, weaker innovative capacity, and more limited access to finance compared to larger firms. Deficits in managerial skills, financial constraints, and difficulties in adopting and exploiting new technologies further undermine their competitiveness and their ability to provide high-quality, stable jobs (Pastore et al., 2020).

Finally, the demographic literature tends to rely on micro-level, national or cross-national comparisons, often overlooking sub-national heterogeneity (Voss, 2007; Vitali and Billari 2017; Salvati et al. 2020; Benassi and Carella 2023). This study addresses this gap by analyzing the relationship between mSME productivity and

fertility at the municipal level. This level of granularity allows us to accurately account for spatial variation in human capital and migration – both critical determinants of productivity and fertility. Higher educational attainment is associated with lower fertility but higher productivity (Black and Lynch, 1996; Schmidt et al., 2012; Sobotka et al., 2017), while migration is linked to more dynamic labor markets and higher fertility rates, as migrants tend to be younger and display higher fertility propensities (Kulu, 2005; Sato, 2007).

3. Data

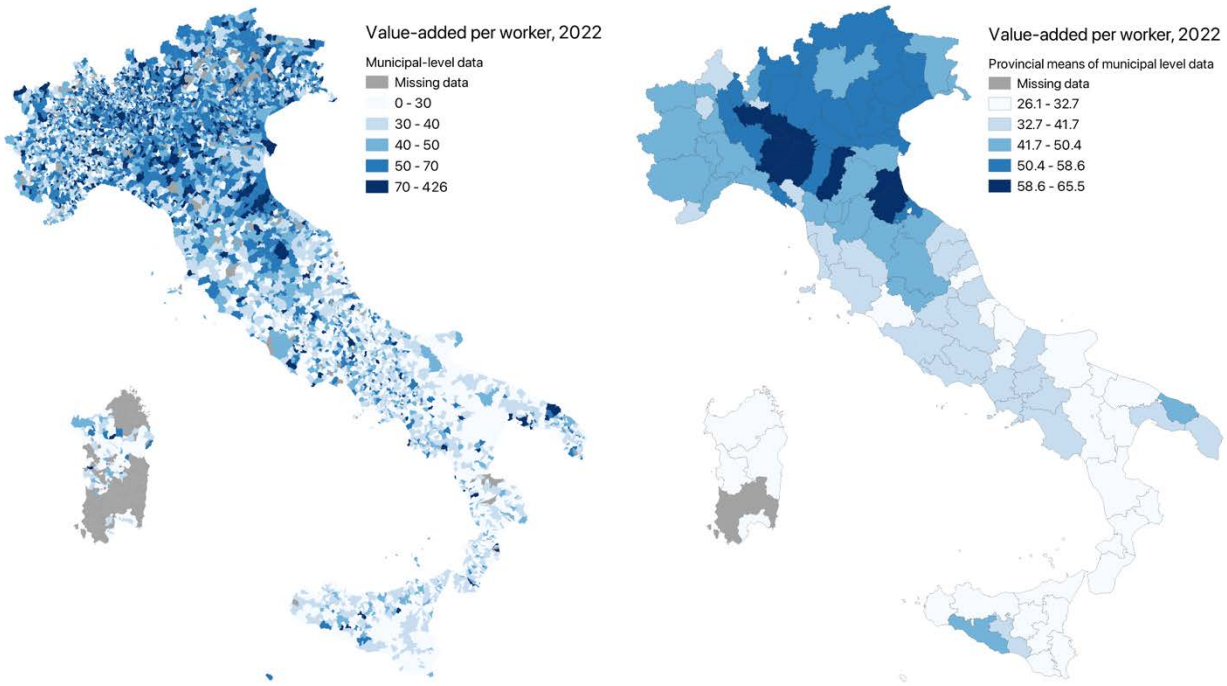
Our analysis relies on a unique dataset that draws primarily on data from ISTAT, which provides information on productivity (value-added per worker, thousands of euros) as well as the share of local workers employed in large firms, formal childcare availability, human capital, and net migration. ISTAT also offers data on total annual births and the female population of fertile age (15–49) that we use to construct our fertility indicator. Data on housing prices are obtained from the Italian Real Estate Market Observatory (Osservatorio del Mercato Immobiliare, OMI).

For our instrumental variable, we rely on the Food and Agriculture Organization's (FAO) Global Agro-Ecological Zones (GAEZ) terrain Suitability Index for the cultivation of wheat. Finally, historical controls such as land ownership concentration, urbanization, and literacy rates are provided by Mariella (2023), whom we gratefully acknowledge, and are based on his elaborations of ISTAT's 1881 population census.

All variables are measured at the municipal level, with the exception of the historical controls, which are available as provincial-level averages. The full dataset initially includes all 7,896 municipalities in the Italian territory. Missing values in key covariates lead to the exclusion of 1,068 municipalities. Municipalities are observed annually from 2015 to 2022. After excluding municipalities with missing values and accounting for all years in the panel, the final dataset comprises 51,447 observations.

Figure 1 presents the distribution of our main explanatory variable, productivity, measured as value added per worker. We rely on official ISTAT estimates from the *Frame SBS Territoriale* dataset, which integrates administrative, fiscal, and statistical survey sources to produce robust productivity measures at a highly granular territorial level. In order to highlight spatial patterns, we both present distributions for municipal-level data and provincial-level means of the municipal data. Consistent with the existing literature (Aiello and Scoppa, 2000), the most productive municipalities are concentrated in North-Western and North-Eastern Italy, with productivity progressively declining toward the Centre-South and the Islands. High levels of heterogeneity within provinces moreover highlight the importance of a granular-level analysis.

Figure 1: Productivity, municipal data and provincial means of municipal-level data, 2022



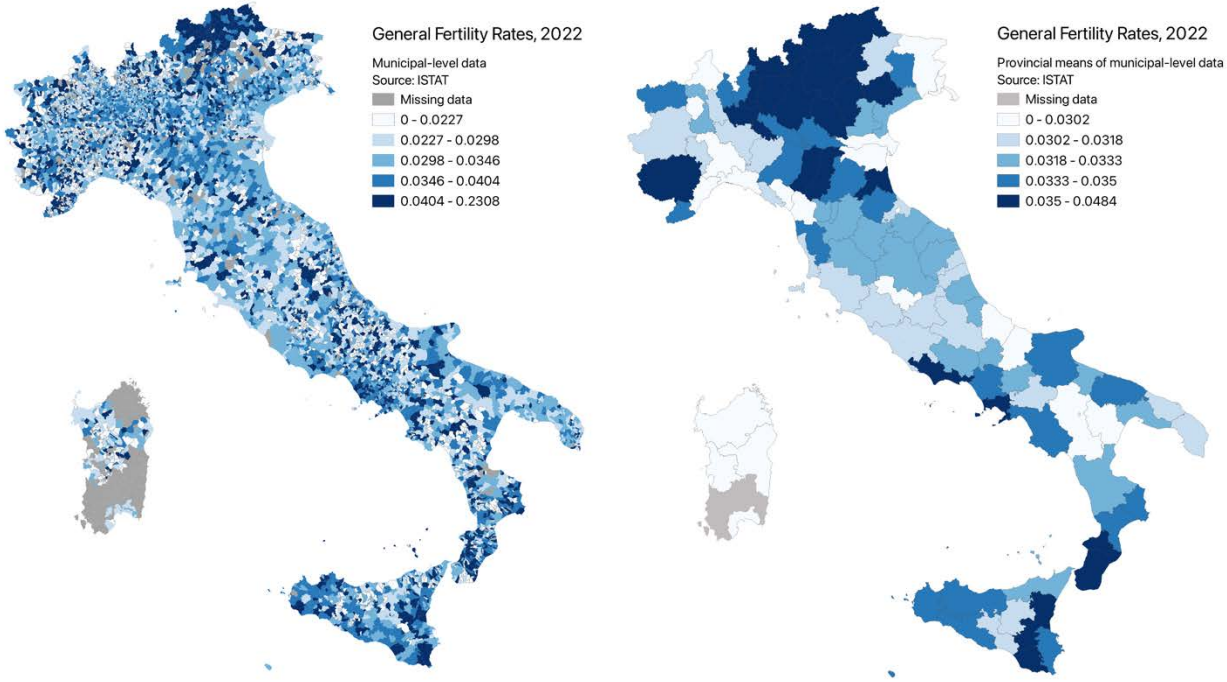
Sources: Authors' elaboration on ISTAT "Frame SBS Territoriale" municipal-level data.

Figure 2 illustrates the spatial distribution of our outcome variable, fertility. Due to the lack of official estimates of Total Fertility Rates (TFR) at the municipal level, we compute the General Fertility Rate (GFR) using municipal-level intercensal data on live births, divided by the resident female population aged 15-49 as of January 1 of each year. Unlike the TFR – which measures the average number of children a woman would have over her lifetime assuming age-specific fertility rates remain constant – the GFR captures fertility by aggregating women of reproductive age into a single group. While this approach is by construction affected by the age structure of the population compared to the TFR, it enables analysis at a much finer territorial scale, which remains under-explored in the demographic literature (Voss, 2007). Even more so than is the case for productivity, fertility shows a high level of heterogeneity between municipalities, which is lost looking at provincial-level means only.

Provincial averages of our GFR closely mirror the spatial patterns observed in official provincial-level TFR data, as shown in Figure A1 in the Appendix. Both measures display a U-shaped fertility pattern across Italy, with relatively higher fertility in the South and in the North. Southern Italy – characterized by more traditional gender norms and higher gender inequality – exhibits comparatively high fertility, while Northern Italy combines higher fertility with more modern social values, lower gender inequality, and higher levels of well-being. Central Italy, by contrast, shows particularly low fertility, despite moderate economic development, likely reflecting a less developed welfare system. This spatial pattern is consistent with a U-shaped relationship between fertility and development (Esping-Andersen and Billari's 2015; Goldscheider et al 2015): fertility initially declines with rising female labor force participation and increasing individualism, but recovers at

higher levels of development as gender egalitarianism strengthens, men assume a greater share of care responsibilities, and public services – such as childcare – facilitate the reconciliation of work and family life.

Figure 2: General Fertility Rates, municipal data and provincial means of municipal-level data, 2022



Sources: Authors' elaboration on ISTAT municipal-level data on total births per year and female population in fertile age (15-49).

Summary statistics for all variables used in the empirical analysis are reported in Tables A1 and A2 in the Appendix. Detailed variable definitions and data sources are provided in Table A3 in the Appendix.

4. Empirical strategy

This section presents the empirical framework and identification strategy to estimate the causal relationship of local economic productivity on fertility outcomes. First, we present ordinary least squares (OLS) results from analyzing the relationship at the municipal level between 2015 and 2022. Then, we introduce an instrumental variable approach based on the suitability of land to wheat cultivation to address potential endogeneity.

4.1 OLS estimates

We estimate a standard OLS model where fertility outcomes are a function of the productivity of firms:

$$\ln(Fertility_{it}) = \beta Productivity_{it-1} + LargeFirms_{it} + X_{it} + Geo_i + \mu_r + \lambda_t + \varepsilon_{it}; \quad (1)$$

where $\ln(Fertility_{it})$is the log of GFR in each municipality i in year t and $Productivity_{it-1}$ is the value-added per worker in each municipality i in year $t-1$, to account for the fact that changes in productivity influence fertility intentions, which result in realized fertility minimum 9 months, if not a year later. β is the coefficient of interest.

$LargeFirms_{it}$ controls for the share of employment in large firms in each municipality i in year t, which allows to control for labor market structure and isolate how mSMEs' productivity influences fertility outcomes net of the higher levels of productivity characterizing large firms. X_{it} is a vector of controls identified by the literature as key determinants of fertility outcomes, such as education levels, housing costs, formal childcare availability and net migration rates in each municipality i in year t. Human capital and net migration rates are important determinants of local productivity too. Geo_i is a vector of time-invariant geographical controls for each municipality i, such as being the provincial capital municipality, peripherality classification, belonging to an industrial district and productive specialization. These variables are strongly related to both productivity and fertility outcomes, so including them allows to compare municipalities *ceteris paribus*. μ_r are regional fixed effects, to account for time-invariant cultural differences, institutional and infrastructural differentials, while λ_t are year fixed effects, to account for national-level fertility and productivity trends. Finally, ε_{it} represents robust standard errors.

Results are presented in Table 1. Columns outline estimates running the log fertility on 1-year lagged productivity (column 1) and the log of productivity (column 2). In the first case, we have the benefit of accounting for the fact that it takes about the year to realize fertility intentions, but at the cost of losing 2015 observations. In the second, the entire sample is maintained and the coefficient represents an elasticity, but we are now looking at contemporaneous associations between productivity and fertility levels.

Table 1: Fertility and productivity, OLS

	(1) Fertility (log) on productivity (1-year lag)	(2) Fertility (log) on productivity (log)
Productivity	0.0003***	0.015***
	(0.000)	(0.004)
Employment in large firms (share)	0.166***	0.159***
	(0.017)	(0.016)
Formal childcare availability	0.000	0.000
	(0.001)	(0.001)
Human capital (log)	-0.076***	-0.076***
	(0.007)	(0.006)
Housing prices (log)	0.123***	0.127***
	(0.006)	(0.006)

Net migration rate	0.001***	0.001***
	(0.000)	(0.000)
Provincial capital municipality	-0.032***	-0.032***
	(0.006)	(0.005)
Peripherality classification (baseline: Pole)		
Belt	-0.036***	-0.033***
	(0.005)	(0.005)
Intermediate	-0.083***	-0.082***
	(0.006)	(0.006)
Peripheral	-0.119***	-0.119***
	(0.007)	(0.007)
Ultraperipheral	-0.134***	-0.132***
	(0.013)	(0.012)
Productive specialization (baseline: Non-specialized)		
Industrial manufacturing districts	0.001	0.002
	(0.008)	(0.008)
Agriculture and agri-food districts	0.019**	0.020**
	(0.009)	(0.008)
Tourism systems	-0.046***	-0.049***
	(0.011)	(0.010)
Urban systems	0.002	0.001
	(0.008)	(0.007)
Region (baseline: Abruzzo)		
Basilicata	-0.006	-0.000
	(0.017)	(0.016)
Calabria	0.085***	0.082***
	(0.013)	(0.013)
Campania	0.028**	0.024**
	(0.012)	(0.011)
Emilia-Romagna	-0.004	-0.001
	(0.012)	(0.011)
Friuli-Venezia Giulia	-0.087***	-0.089***
	(0.014)	(0.013)
Lazio	-0.037***	-0.031***
	(0.013)	(0.012)
Liguria	-0.155***	-0.156***
	(0.016)	(0.015)
Lombardia	-0.005	-0.001
	(0.011)	(0.011)
Marche	-0.036***	-0.032**

	(0.014)	(0.013)
Molise	-0.015	-0.013
	(0.020)	(0.018)
Piemonte	-0.079***	-0.079***
	(0.012)	(0.011)
Puglia	0.017	0.019*
	(0.012)	(0.011)
Sardegna	-0.167***	-0.161***
	(0.016)	(0.015)
Sicilia	0.079***	0.076***
	(0.013)	(0.012)
Toscana	-0.070***	-0.069***
	(0.013)	(0.012)
Umbria	-0.034**	-0.035**
	(0.016)	(0.015)
Valle d'Aosta/Vallée d'Aoste	-0.037	-0.022
	(0.026)	(0.024)
Veneto	-0.019	-0.020*
	(0.012)	(0.011)
Trento	0.048**	0.056***
	(0.019)	(0.017)
Bolzano/Bozen	0.338***	0.338***
	(0.019)	(0.018)
Year (baseline: 2022)		
2015		0.085***
		(0.006)
2016	0.076***	0.077***
	(0.006)	(0.006)
2017	0.060***	0.061***
	(0.006)	(0.006)
2018	0.034***	0.035***
	(0.006)	(0.006)
2019	0.010	0.011*
	(0.006)	(0.006)
2020	-0.009	-0.007
	(0.006)	(0.006)
2021	0.002	0.001
	(0.006)	(0.006)

_cons	-4.038***	-4.107***
	(0.043)	(0.043)
N	45080	51447

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Despite being small, the coefficient of interest is positive and statistically significant in both regressions, with a one-unit increase in productivity being associated with a 0.03% increase in fertility the following year (column 1) and a 1% increase in productivity being associated with a 0.015% higher fertility the same year (column 2). Despite statistically significant associations, OLS estimates however still present several sources of endogeneity to be addressed, which bias the estimated coefficients preventing them from being interpreted as causal relations.

4.2 IV estimates: the role of wheat specialization in early productivity gains

Productivity is potentially endogenous to fertility for several reasons. First, reverse causality may arise if fertility dynamics affect local labor supply, workforce composition, or sectoral specialization, thereby influencing measured productivity. For instance, areas with lower fertility may experience a higher share of prime-age workers or greater female labor force participation, which can mechanically raise value added per worker. Second, productivity is likely correlated with unobserved factors – such as local cultural norms, long-run development trajectories, or institutional quality – that simultaneously shape fertility behavior. Even after controlling for observable characteristics and including regional fixed effects, time-varying unobservables related to economic structure or social change may bias OLS estimates. These concerns motivate the use of an instrumental variables approach to isolate exogenous variation in productivity. Specifically, we exploit a measure of land suitability to the cultivation of wheat as a source of exogenous variation in productivity. Before moving to the empirical analysis, we briefly describe the historical roots of the relationship between wheat cultivation and local productivity.

4.2.1 Historical rationale

The relevance of wheat suitability as an instrument for contemporary productivity is grounded in Italy's late nineteenth-century economic history and the persistence of early development advantages. During the second half of the nineteenth century, the integration of global grain markets – driven by the transportation revolution in the United States and Russia – led to a massive influx of cheap wheat into Europe, sharply reducing prices and threatening the viability of domestic producers (Marchildon, 2013). In response to this competitive shock, Italy abandoned free trade and adopted highly protectionist tariffs on selected agricultural goods, particularly wheat, beginning in 1887.

The effects of this protectionist turn were highly heterogeneous across territories and closely linked to local land suitability for wheat cultivation. Northern regions, especially the Po Valley, were naturally more suited to wheat production and thus benefited disproportionately from tariff protection. Higher and more stable margins allowed wheat-producing areas to reinvest in productivity-enhancing inputs and technologies – such as draft animals and mechanization – fostering early capital accumulation and modernization of agricultural practices (Bellucci et al., 2025). By contrast, much of Central and Southern Italy, characterized by lower wheat suitability and specialization in export-oriented crops (e.g. wine, olive oil, citrus), benefited far less from protectionism and, in some cases, experienced adverse effects due to foreign retaliation (e.g. the 1888 Italy-France trade war) and the reinforcement of extractive land-use regimes (Fiore Melacrinis and Felice, 2025). These divergent responses contributed to a widening North–South divide and set Italian regions on distinct long-run development trajectories. As a result, exogenous variation in terrain suitability to wheat cultivation provides a powerful and historically grounded source of variation in modern local productivity.

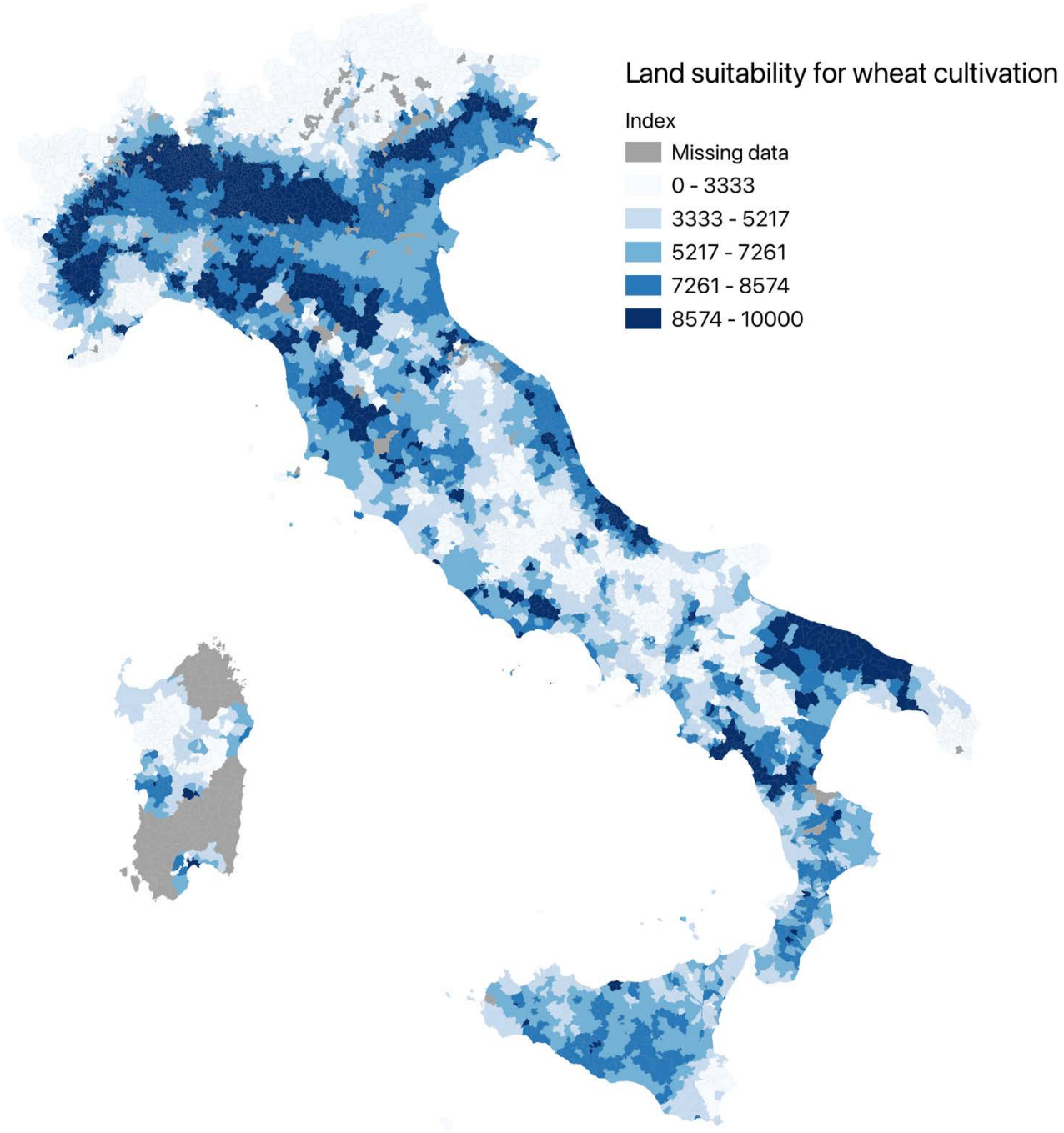
A key identifying assumption underlying our IV strategy is that historical wheat suitability affects contemporary fertility only through its impact on local productivity. While this exclusion restriction cannot be tested directly, we provide several arguments and include historical controls to support its plausibility. First, terrain suitability to wheat cultivation is a purely geographic and time-invariant characteristic, determined by soil and climatic conditions, and is therefore plausibly orthogonal to contemporary fertility preferences or family norms. Second, we acknowledge and control for the fact that early productivity gains associated with wheat specialization may have influenced local demographic behavior through intermediate channels. In particular, higher agricultural productivity reduced the demand for unskilled labor, increased the relative demand for skills, and encouraged investments in education, potentially affecting fertility choices. Similarly, labor-saving technological change and declining unskilled labor demand spurred large-scale emigration, with important compositional effects across regions (Spitzer and Zimran, 2018).

Our empirical strategy explicitly accounts for these channels. We control for historical literacy rates to capture long-run differences in human capital accumulation that may have affected fertility preferences. We also control for historical urbanization levels, as urban areas saw a better retention of skilled workers compared to rural ones (Abramitzky et al. (2012). In addition, we include a measure of land ownership concentration to account for the role of local agricultural regimes in shaping the effects of protectionism on development (Mariella, 2023; Fiore Melacrinis and Felice, 2025). Together with regional fixed effects, which absorb all time-invariant characteristics, these controls mitigate concerns that wheat suitability directly affected contemporary fertility through persistent differences in demographic composition rather than through productivity. Taken together, these considerations support the interpretation of wheat suitability as a source of exogenous variation in productivity that is plausibly unrelated to current fertility outcomes except through its effect on economic productivity.

4.2.2. Instrument Definition and First-Stage Specification

We instrument local productivity using the FAO Global Agro-Ecological Zones (GAEZ) terrain suitability index for wheat cultivation raster data to calculate municipal-level means. Wheat suitability is a purely geographic and time-invariant measure, determined by long-run soil and climatic conditions, and therefore predetermined with respect to modern economic and demographic dynamics. As outlined in Figure 3, suitability to wheat cultivation levels are highly heterogeneous, but tend to be concentrated in the country's North and in the Po valley.

Figure 3: Terrain suitability for wheat cultivation, index (0-10,000), municipal-level means



Source: FAO Global Agro-Ecological Zones (GAEZ) v4

The following equation expresses the first-stage regression:

$$Productivity_{it-1} = \pi WheatSuitability_i + LargeFirms_{it} + X_{it} + Geo_i + H_p + \mu_r + \lambda_t + u_{it}; \quad (2)$$

where $Productivity_{it-1}$ denotes value-added per worker in each municipality i in year $t-1$, $WheatSuitability_i$ is the terrain suitability index for wheat cultivation in municipality i, $LargeFirms_{it}$ controls for the share of employment in large firms in each municipality i in year t, X_{it} is a vector of time-varying controls and Geo_i is a vector of time-invariant geographical controls for each municipality i. H_p is a vector of 1881 historical controls, such as land inequality, urbanization and literacy rates, to account for persistent within-region differences in early development. μ_r are regional fixed effects, λ_t are time fixed effects, while u_{it} is an idiosyncratic error term.

The following equation expresses the second-stage regression:

$$\ln(Fertility_{it}) = \beta \widehat{Productivity}_{it-1} + LargeFirms_{it} + X_{it} + Geo_i + H_p + \mu_r + \lambda_t + \varepsilon_{it} \quad (3)$$

where $\ln(Fertility_{it})$ is the fertility outcome in municipality i in year t. The key explanatory variable, $\widehat{Productivity}_{it-1}$, is the fitted value of local productivity in year $t-1$ obtained from the first-stage regression using wheat suitability as an instrument. The coefficient β therefore captures the causal effect of productivity on fertility for municipalities whose productivity is affected by historical comparative advantage in wheat cultivation. The other covariates are unchanged compared to equation (2), and robust standard errors are denoted by the error term ε_{it}.

5. Results

First-stage results are reported in Tables A4 in the Appendix, showing the relationship between terrain suitability for wheat cultivation and local modern-day productivity. Mean wheat cultivation suitability levels are positively and significantly correlated with local productivity. Columns gradually add controls to evaluate the robustness of the association to different model specifications. Coefficient estimates remain stable, with residual baseline covariates and time-invariant geographic controls not altering the association between wheat cultivation and local modern-day productivity. The first-stage F-statistic remains high, despite slightly decreasing with the inclusion of additional controls, ranging from 34.72 to 57.60 and largely exceeding the threshold of ten as a rule of thumb. This confirms the instrument's validity and power.

Second-stage results are reported in Table 2. As in Table 1, columns outline estimates running the log fertility on 1-year lagged productivity (column 1) and the log of productivity (column 2). In the first case, we have the benefit of accounting for the fact that it takes about the year to realize fertility intentions, but at the cost of

losing 2015 observations. In the second, the entire sample is maintained and the coefficient represents an elasticity, but we are now looking at contemporaneous associations between productivity and fertility levels.

Table 2: Fertility and productivity, 2sls, second-stage regression results

	(1) Fertility (log) on productivity (1-year lag)	(2) Fertility (log) on productivity (log)
Productivity	0.020***	0.909***
	(0.006)	(0.244)
Employment in large firms (share)	-0.012	-0.010
	(0.060)	(0.054)
Formal childcare availability	0.000	0.000
	(0.001)	(0.001)
Human capital (log)	-0.070***	-0.071***
	(0.010)	(0.009)
Housing prices (log)	0.110***	0.101***
	(0.010)	(0.011)
Net migration rate	0.001***	0.001***
	(0.000)	(0.000)
Provincial capital municipality	-0.041**	-0.047***
	(0.017)	(0.017)
Peripherality classification (baseline: Pole)		
Belt	-0.036***	-0.033***
	(0.011)	(0.011)
Intermediate	-0.082***	-0.075***
	(0.012)	(0.012)
Peripheral	-0.115***	-0.112***
	(0.013)	(0.013)
Ultraperipheral	-0.118***	-0.120***
	(0.018)	(0.018)
Productive specialization (baseline: Non-specialized)		
Industrial manufacturing districts	0.006	0.006
	(0.011)	(0.011)
Agriculture and agri-food districts	0.040***	0.044***
	(0.013)	(0.013)
Tourism systems	-0.011	0.001
	(0.019)	(0.020)
Urban systems	0.025**	0.027**

	(0.012)	(0.012)
Region (baseline: Abruzzo)		
Basilicata	0.111***	0.130***
	(0.042)	(0.042)
Calabria	0.185***	0.196***
	(0.035)	(0.036)
Campania	0.141***	0.149***
	(0.038)	(0.037)
Emilia-Romagna	-0.159***	-0.271***
	(0.050)	(0.078)
Friuli-Venezia Giulia	-0.357***	-0.442***
	(0.088)	(0.104)
Lazio	0.063**	0.054**
	(0.031)	(0.026)
Liguria	-0.338***	-0.431***
	(0.059)	(0.080)
Lombardia	-0.282***	-0.357***
	(0.080)	(0.098)
Marche	0.028	0.010
	(0.025)	(0.021)
Molise	0.061*	0.060*
	(0.036)	(0.033)
Piemonte	-0.240***	-0.293***
	(0.050)	(0.061)
Puglia	0.168***	0.188***
	(0.049)	(0.050)
Sardegna	-0.242***	-0.250***
	(0.031)	(0.032)
Sicilia	0.021	0.009
	(0.025)	(0.027)
Toscana	-0.016	-0.048***
	(0.023)	(0.018)
Umbria	0.011	-0.057**
	(0.025)	(0.026)
Valle d'Aosta/Vallée d'Aoste	-0.175***	-0.209***
	(0.052)	(0.059)
Veneto	-0.275***	-0.380***
	(0.076)	(0.100)

Trento	-0.084**	-0.144***
	(0.042)	(0.056)
Bolzano/Bozen	0.000	0.000
	(.)	(.)
Year (baseline: 2022)		
2015		0.266***
		(0.050)
2016	0.179***	0.272***
	(0.031)	(0.054)
2017	0.163***	0.264***
	(0.032)	(0.056)
2018	0.142***	0.204***
	(0.033)	(0.047)
2019	0.093***	0.153***
	(0.026)	(0.040)
2020	0.050**	0.217***
	(0.020)	(0.062)
2021	0.122***	0.073***
	(0.036)	(0.022)
Land ownership concentration rate (1881)	0.051	-0.003
	(0.039)	(0.039)
Urbanization rate (1881)	-0.040	-0.038
	(0.029)	(0.025)
Literacy rate (1881)	-0.095***	-0.098***
	(0.036)	(0.032)
Constant	-4.690***	-7.084***
	(0.180)	(0.799)
Observations	44692	51057

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The coefficient of interest is positive and statistically significant in both regressions. Column (1) shows that a one-unit increase in productivity – equivalent to a €1,000 increase in value added per worker – is associated with a 2% increase in fertility in the following year. Column (2) presents results from a log-log specification, indicating that a 1% increase in productivity is associated with 0.91% higher fertility, considering the same year.

These estimates on the effect of productivity on fertility do take into account the share of employment in large firms – which is not significantly associated with higher levels of fertility – and are therefore representative of

the effect of productivity in mSMEs in particular. Interestingly, childcare availability is not significantly associated with fertility. These findings echo evidence on low-fertility countries suggesting that childcare availability does not increase fertility as much as hoped (Del Boca, 2002; Fukai, 2017). In line with the demographic literature linking more years in education to lower fertility rates (Schmidt et al., 2012; Sobotka et al., 2017), human capital and fertility are negatively associated. On the contrary, housing prices are positively associated to fertility, as buying a house is often a decision made in anticipation of family formation (Mulder, 2006; Gallo and Vignoli 2025), as are net migration rates, in line with the literature linking higher immigration and lower emigration with more dynamic labor markets and higher fertility rates (Kulu, 2005; Sato, 2007).

Provincial capitals are associated with lower fertility rates, but economic poles have higher fertility than more peripheral municipalities. Municipalities that are urban systems and part of agriculture and agri-food districts have relatively higher fertility rates than non-specialized municipalities. Regional fixed effects roughly follow the u-shaped pattern described in previous sections (Esping-Andersen and Billari, 2015; Goldscheider et al 2015) and fertility rates have been steadily declining, in line with the literature on the effects of the Great Recession on fertility outcomes (Comolli, 2017; Matysiak et al., 2021).

Finally, aside from regional fixed effects, provincial-level historical controls are included to better control for historical path dependence at the local level. Historical land ownership concentration and urbanization rates are not significantly associated to nowadays fertility rates, while historical literacy rates show a negative and significant association to nowadays fertility rates. Robust standard errors are reported in parenthesis.

Robustness checks

Table 3 outlines the results of an additional specification we ran as a robustness check. Instead of robust standard errors, we clustered errors at the local labor system level to account for commuting and the fact that people are often employed in a municipality different from the one of their residence. To avoid incurring in an over-specification with our regional fixed effects, we instead included macro area fixed effects. With the inclusion of all covariates first-stage F-statistics are 21.63 for column (1) and 23.35 for column (2), which is lower that the range of our baseline specification, but still largely exceeds the threshold of ten as a rule of thumb, confirming the instrument's validity and power.

Although levels of significance and magnitudes slightly vary, the substantial interpretation of the results remains unchanged. Column (1) shows that a one-unit increase in productivity is associated with a 1.5% increase in fertility in the following year (while results in Table 2 estimated a 2% increase). Column (2) estimate that a 1% increase in productivity is associated with 0.58% higher fertility, looking at the same year (while Table 2 estimated 0.91% higher fertility).

With the exclusion of regional fixed effects, provincial-level historical controls have now become significant, with higher historical inequality and urbanization rates being positively and significantly associated to current-day fertility and literacy rates losing their significant association. Industrial and touristic productive systems now show negative associations with fertility rates. For the remaining covariates, the interpretation remains similar to Table 2.

Table 3: Fertility and productivity, 2sls, robustness check

	(1) Fertility (log) on productivity (1-year lag)	(2) Fertility (log) on productivity (log)
Productivity	0.015***	0.583***
	(0.005)	(0.192)
Employment in large firms (share)	0.033	0.051
	(0.063)	(0.054)
Formal childcare availability	0.000	0.000
	(0.001)	(0.001)
Human capital (log)	-0.050***	-0.051***
	(0.014)	(0.012)
Housing prices (log)	0.118***	0.113***
	(0.014)	(0.016)
Net migration rate	0.001***	0.001***
	(0.000)	(0.000)
Provincial capital municipality	-0.043**	-0.045***
	(0.017)	(0.016)
Peripherality classification (baseline: Pole)		
Belt	-0.028**	-0.025*
	(0.013)	(0.013)
Intermediate	-0.070***	-0.065***
	(0.015)	(0.015)
Peripheral	-0.106***	-0.104***
	(0.017)	(0.016)
Ultraperipheral	-0.132***	-0.134***
	(0.026)	(0.026)
Productive specialization (baseline: Non-specialized)		
Industrial manufacturing districts	-0.041**	-0.041**
	(0.020)	(0.020)
Agriculture and agri-food districts	-0.012	-0.014
	(0.020)	(0.020)
Tourism systems	-0.048*	-0.047

	(0.029)	(0.031)
Urban systems	-0.023	-0.024
	(0.020)	(0.020)
Macro area (baseline: Center)		
North-West	-0.226***	-0.223***
	(0.072)	(0.072)
North-East	-0.184**	-0.203***
	(0.072)	(0.079)
South	0.064***	0.078***
	(0.018)	(0.020)
Islands	-0.082*	-0.063
	(0.045)	(0.039)
Year (baseline: 2022)		
2015		0.199***
		(0.041)
2016	0.152***	0.200***
	(0.028)	(0.043)
2017	0.136***	0.189***
	(0.028)	(0.045)
2018	0.114***	0.141***
	(0.029)	(0.037)
2019	0.072***	0.100***
	(0.023)	(0.032)
2020	0.035**	0.134***
	(0.018)	(0.049)
2021	0.091***	0.046***
	(0.031)	(0.018)
Land ownership concentration rate (1881)	0.218***	0.178***
	(0.061)	(0.055)
Urbanization rate (1881)	0.076**	0.083**
	(0.037)	(0.037)
Literacy rate (1881)	0.073*	0.055
	(0.044)	(0.042)
Constant	-4.765***	-6.234***
	(0.175)	(0.624)
Observations	44692	51057

Errors clustered at the local labor system level in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6. Conclusions

Motivated by the joint challenges of prolonged productivity stagnation and demographic decline, this study investigates whether the productive capacity of local economies shapes family formation decisions. The paper contributes to the literature in several ways. First, while a large body of research has examined the relationship between economic conditions and fertility, most studies focus on macroeconomic indicators, labor market shocks, or individual employment status. By contrast, this study explicitly centers on the productivity of mSME-dominated local productive systems – a dimension that has received comparatively little attention. Second, the analysis adopts a highly granular municipal-level perspective, a scale that is rarely employed in demographic research but is particularly well suited to capturing local economic dynamics. Methodologically, the study combines detailed municipal-level data from ISTAT with an instrumental variable strategy designed to address endogeneity concerns. Local productivity is instrumented using historical soil suitability for wheat cultivation, which plausibly shaped long-run productive structures while remaining orthogonal to contemporary fertility decisions.

The results consistently reveal a positive and statistically significant association between productivity and fertility. Across specifications, municipalities characterized by higher productivity exhibit higher fertility rates, with economically meaningful magnitudes. Importantly, these effects persist after accounting for the employment share of large firms, indicating that the relationship reflects productivity dynamics within mSME-dominated local economies rather than broader firm-size composition. These findings align with established demographic patterns: fertility is lower in provincial capitals, negatively associated with higher levels of human capital, and positively related to net migration and housing prices, consistent with anticipatory household behavior around family formation. Childcare availability, by contrast, does not display a statistically significant association with fertility.

Although the empirical analysis does not directly test the underlying channels, the results are consistent with mechanisms operating through improved employment quality in more productive local economies. Higher productivity may enable firms to offer better wages, greater income stability, and clearer career prospects. These conditions are increasingly important in a context where the economic prerequisites for parenthood have risen, partly due to growing housing expenditure burdens (van Wijk and Billari, 2024; van Wijk, 2024), and where the transition to parenthood is closely linked to homeownership, which requires substantial financial resources and employment stability (Gallo and Vignoli, 2025).

Several limitations should be acknowledged. First, due to data constraints at the municipal level, the analysis relies on the General Fertility Rate (GFR) rather than the Total Fertility Rate (TFR). Because the GFR is sensitive to the age structure of women of reproductive age, it may partly reflect compositional differences across municipalities. Second, although the instrumental variable strategy is historically grounded and supported by strong first-stage statistics, the exclusion restriction cannot be directly tested. To mitigate the risk

that soil suitability for wheat cultivation affects contemporary fertility through channels other than productivity, the analysis controls for a rich set of demographic, economic, geographic, and historical covariates. Third, the estimated effects should be interpreted as local average treatment effects, capturing the impact of productivity on fertility in municipalities whose productivity is influenced by soil suitability for wheat cultivation. As a result, the findings may not generalize to all local contexts, particularly to areas whose productive structures emerged through different historical trajectories. Finally, the study does not directly disentangle the micro-level mechanisms linking productivity and fertility – such as the relative roles of wages, contract stability, career trajectories, or expectations about future income – an important direction for future research.

Despite these limitations, the findings provide robust evidence that economic productivity is not only a driver of economic growth but also a structural factor shaping demographic behavior. By documenting a systematic relationship between mSME productivity and fertility at the municipal level, this study highlights how the economic structure and performance of local economies influence young adults' life chances and, in turn, their capacity and willingness to form families. Policies aimed at enhancing productivity and competitiveness in mSME-dominated economies may therefore generate broader social returns by improving the conditions under which family formation occurs. More broadly, the results underscore the importance of integrating economic and demographic perspectives when designing strategies to support fertility and address demographic decline in advanced economies.

Policy implications

The findings of this study speak simultaneously to innovation and demographic policy debates. A growing body of evidence indicates that industry 4.0, digital technologies and artificial intelligence (AI) generate substantial labor-productivity gains across sectors, with particularly strong effects for mSMEs and implications for their ability to offer competitive employment conditions (Cirillo et al., 2023; OECD, 2025). However, given the low propensity toward innovation among Italian mSMEs, the availability of technology alone is insufficient: targeted investment is needed to support adoption through skills development, managerial capacity, and organizational change. Raising productivity also requires broadening the focus beyond manufacturing. While Italian mSMEs remain heavily concentrated on production activities, the highest value-added phases of the value chain – research, design, marketing, and distribution – remain comparatively underdeveloped. Strengthening these segments is essential to unlock productivity gains and improve employment quality. Finally, from a demographic perspective, the results imply that enhancing mSME competitiveness and productivity emerges as not only an economic objective, but also, indirectly, a demographic and social one.

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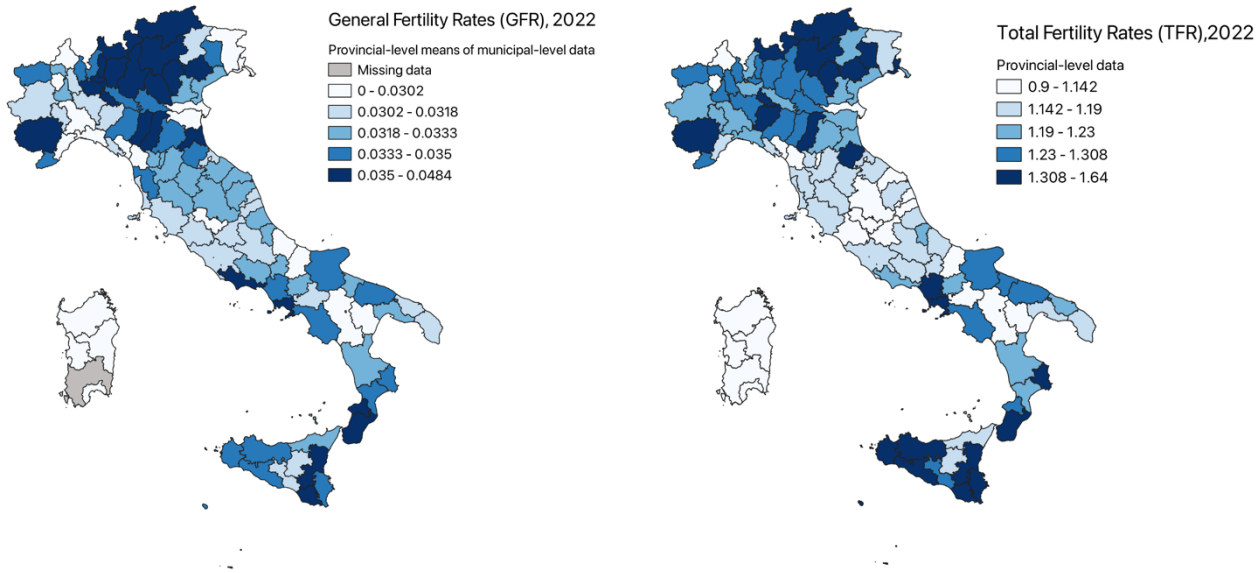
Appendix

Figure A1: Comparison between provincial means of municipal-level GFR and provincial-level TFR



Sources: GFR: Authors' elaboration on ISTAT municipal-level data on total births per year and female population in fertile age (15-49). TFR: ISTAT data.

Table A1: Summary statistics of the continuous explanatory variables

Variable name	*Mean*	*Median*	*Std. dev.*	*Min*	*Max*
Fertility (General Fertility Rate)	0.03	0.03	0.01	0.01	0.18
Productivity (value added per worker, thousands of euros)	38.13	34.30	20.33	0.33	921.49
Employment in large firms (share)	0.03	0.00	0.08	0.00	0.87
Formal childcare availability (places per 1,000 inhabitants)	4.58	3.01	6.68	0.00	171.80
Human capital (workers with tertiary education per 1,000 workers)	13.82	13.19	4.56	1.77	45.00
Housing prices (municipal mean of sales price per sqm)	767.79	683.89	390,16	202.75	7,164.063
Net migration rate (per 1,000 inhabitants)	2.60	2.43	10.74	-83.11	89.63
Wheat cultivation land suitability (index)	6,254.87	6,721.47	2,646.44	-1	10,000
Land ownership concentration rate (1881, provincial mean)	0.68	0.70	0.09	0.32	0.86

Urbanization rate (1881, provincial mean)	0.29	0.27	0.14	0	0.71
Literacy rate (1881, provincial mean)	0.34	0.32	0.12	0.14	0.63

Data sources: See Table A3

Table A2: Summary statistics of the categorical controls

Variable name	*Variable description*	*Obs.*	*%*
Region	Abruzzo	1,962	3.81
	Basilicata	995	1.85
	Calabria	2,731	5.31
	Campania	3,915	7.61
	Emilia-Romagna	2,455	4.77
	Friuli-Venezia Giulia	1,470	2.86
	Lazio	2,514	4.89
	Liguria	1,413	2.75
	Lombardia	10,606	20.62
	Marche	1,595	3.10
	Molise	921	1.79
	Piemonte	6,938	13.49
	Puglia	1,686	3.28
	Sardegna	1,257	2.44
	Sicilia	2,536	4.93
	Tocana	1,986	3.86
	Umbria	615	1.20
	Valle d'Aosta/Vallée d'Aoste	417	0.81
	Veneto	4,139	8.05
	Trento	968	1.88
	Bolzano/Bozen	366	0.71
Provincial capital	= 1 if provincial capital municipality	873	1.70
	= 0 if other	50,572	98.30

Peripherality classification	Pole	1,823	3.54
	Belt	26,812	52.12
	Intermediate	12,069	23.46
	Peripheral	8,759	17.03
	Ultraperipheral	1,982	3.85
Productive specialization	Industrial manufacturing districts	24,551	47.72
	Agriculture and agri-food districts	6,036	11.73
	Tourism systems	3,743	7.28
	Urban systems	12,486	24.27
	Non-specialized	4,629	9.00
Year	2015	6,366	12.37
	2016	6,420	12.48
	2017	6,523	12.68
	2018	6,442	12.52
	2019	6,398	12.44
	2020	6,398	12.44
	2021	6,462	12.56
	2022	6,436	12.51

Data source: ISTAT

Table A3: Description of the variables

Variables	*Description*	*Source*
Fertility	General Fertility Rate (GFR): total alive births per year by number of women aged 15-49 on January 1st of each year	Authors' elaboration on ISTAT data and intercensal estimates
Productivity	Value-added per worker, thousands of euros	ISTAT "Frame SBS Territoriale"
Employment in large firms	Share of persons employed in large firms by total employed persons	Authors' elaboration on ISTAT municipal-level data
Formal childcare	Total authorized Early Childhood	Authors' elaboration on ISTAT

availability	Education and Care (ECEC) places per 1000 inhabitants	municipal-level data
Human capital	Employed persons with tertiary education per 100 employed (aged 25-64), 2015-2021 average	Authors' elaboration on ISTAT municipal-level data
Housing prices	Municipal mean of sales price per sqm	Italian Real Estate Market Observatory (OMI)
Net migration rate	Total net migration per 1,000 inhabitants (Total population reference 2021)	Authors' elaboration on ISTAT municipal-level data
Wheat cultivation land suitability	Mean municipal-level land suitability to wheat cultivation index value, considering all land in each grid cell for the time period 1961-1990, assuming rainfed conditions, low input level, no CO2 fertilization, using historical climate data	Food and Agriculture Organization's (FAO) Global Agro-Ecological Zones (GAEZ)
Land ownership concentration rate (1881)	Proxy: share of landless peasants (*braccianti* and *salariati*) over the total labor force in agriculture	Mariella (2023)'s elaboration on 1881 ISTAT Population Census
Urbanization rate (1881)	Fraction of population settled in cities larger that 10,000 inhabitants, provincial-level mean	Mariella (2023)'s elaboration on 1881 ISTAT Population Census
Literacy rate (1881)	Share of people older than 6 able to read and write, provincial-level mean	Mariella (2023)'s elaboration on 1881 ISTAT Population Census

Table A4: Productivity and wheat cultivation terrain suitability, 2sls, first-stage regression results

	(1) Productivity in t-1	(2) Productivity in t-1	(3) Productivity in t-1	(4) Productivity in t-1	(5) Productivity in t-1	(6) Productivity in t-1	(7) Productivity in t-1
Wheat suitability	0.0003***	0.0003***	0.0002***	0.0003***	0.0003***	0.0002***	0.0002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Formal childcare availability		0.011	0.002	0.000	0.000	-0.001	-0.001
		(0.013)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Human capital (log)			-0.328	-0.447	-0.443	-0.407	-0.222

			(0.317)	(0.331)	(0.332)	(0.337)	(0.349)
Housing prices (log)				0.488*	0.488*	0.815***	0.676**
				(0.289)	(0.289)	(0.303)	(0.306)
Net migration rate					-0.002	-0.001	-0.000
					(0.008)	(0.008)	(0.008)
Historical controls	No	No	No	No	No	No	Yes
Productive specialization	No	No	No	No	No	Yes	Yes
Employment in large firms (share)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Provincial capital municipality	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Peripherality classification	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	51,004	50,945	46,646	46,196	46,196	46,196	45,468
First-stage F-stat	57.60	56.14	42.62	44.87	45.02	33.05	34.72

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$