

Lost Generations? Fertility and Economic Growth in Europe

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The total fertility rate — the average number of births per woman — in Europe currently stands at 1.46, well below the replacement level of 2.1 required for population stability. Persistently low fertility, together with rapid population aging, has important social and economic consequences. This paper examines the causal effect of below-replacement fertility on income per capita growth using a panel of 42 European countries over 1960–2022. To address endogeneity arising from reverse causality, I implement an instrumental variable approach, exploiting exogenous variation in the comparative abortion index as an instrument for fertility. The results reveal a significant positive effect of fertility on real GDP per capita growth, implying that declining fertility acts as a substantial drag on income growth. These findings underscore the economic significance of demographic trends and provide insights for policy measures aimed at mitigating the long-term consequences of low fertility on economic performance.

Key Words: Fertility; Demographic trends; Economic growth; Europe.

JEL Classification Numbers: J10, J13, J22, O40, O47.

Data Availability Statement: The data that support the findings of this study are obtained from the World Bank, the United Nations, and the International Country Risk Guide database.

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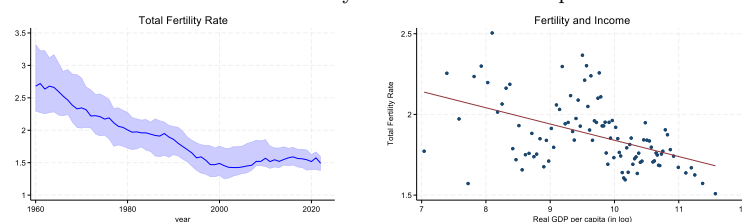
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1. INTRODUCTION

Europe is undergoing a major demographic transition characterized by ultra-low fertility rates, population aging, and shrinking working-age populations. Globally, the total fertility rate — the average number of births per woman — has fallen to 2.2 over the past 50 years, roughly half of its level in the 1960s. In Europe, however, fertility is already far below replacement, averaging 1.46 births per woman, well under the approximate replacement rate of 2.18 needed for a stable population (Figure 1). These trends are projected to continue, resulting in declining population size, rising old-age dependency ratios, and profound social and economic implications. While lower fertility is sometimes associated with higher female labor force participation, declining birth rates can reduce the future labor supply, depress income per capita growth, strain public finances, and undermine innovation and productivity (Becker, Murphy, and Tamura, 1990; Romer, 1990; Aghion and Howitt, 1992; Jones, 1995; Greenwood and Seshadri, 2002; Doepke, 2004; Bloom and Canning, 2008; Ashraf, Weil, and Wilde, 2013; Prettnner, Bloom, and Strulik, 2013; Cervellati and Sunde, 2015; Sasaki and Hoshida, 2017; Cooley and Henriksen, 2018; Aksoy et al., 2019; de Silva and Tenreyno, 2020; Peters and Walsh, 2021; Cevik, 2024; Huang, 2024; Karahan, Pugsley, and Şahin, 2024).

FIG. 1. Fertility and Income in Europe



Source: World Bank; author's calculations.

Fertility in Europe is already consistent with negative long-run population growth, but significant cross-country variation persists — from 1.79 in France to 1.08 in Malta — making it important to quantify the impact of ultra-low fertility on real GDP per capita growth and explore potential mitigating factors.¹ Estimating the impact of fertility on economic growth is challenging because fertility and income are jointly determined. Fertility can influence growth through multiple channels, including capital dilution and labor supply effects, while income and economic development affect fertility choices through opportunity costs, social norms, and policy environ-

¹A total fertility rate below 1.5 is considered to be “very low” and below 1.3 is classified as “ultra-low”.

ments. There is compelling evidence that women's labor force participation and higher levels of income alter the quantity-quality tradeoff in fertility choices and consequently reduce fertility (Barro and Becker, 1989; Simon, 1989; Becker, Murphy, and Tamura, 1990; Browning, 1992; Winegarden and Wheeler, 1992; Tamura, 1996; Eckstein, Mira, and Wolpin, 1999; Galor, 2005; Guinnane, 2011; Herzer, Strulik, and Vollmer, 2012; Lovenheim and Mumford, 2013; Chatterjee and Vogl, 2018; Gallego and Lafortune, 2021; Kokkinen, Obstbaum, and Mäki-Fränti, 2021), but this relationship is complex and the monotonic negative correlation disappears with higher income levels over time (Bar et al., 2018; Doepke et al., 2023; Strulik, 2024). In other words, fertility is not likely to be exogenous, and income tends to exhibit persistence over time. Ignoring this bidirectional relationship risks biased and inconsistent estimates.

To address the potential endogeneity between fertility and income and thereby obtain credible causal inference beyond simple correlations, I implement an instrumental variable (IV) approach, exploiting exogenous variation in the comparative abortion index as an instrument for fertility. This strategy follows a well-established empirical tradition (Rosenzweig and Wolpin, 1980; Angrist and Evans, 1998; Klerman, 1999; Chun and Oh, 2002; Bloom et al., 2009; de Silva and Tenreyno, 2020; Hailemariam, 2024; Huang, 2024). The instrument satisfies the requirement of being strongly correlated with fertility while remaining exogenous to economic performance.

Using a panel of 42 European countries over the period 1960–2022, ordinary least squares (OLS) fixed-effects estimates initially suggest a negative relationship between fertility and GDP per capita growth. However, this result may be misleading due to endogeneity arising from reverse causality, omitted variables, and measurement error. Estimating the model with the IV approach, using the comparative abortion index as an instrument, produces a statistically significant positive coefficient on the total fertility rate. The magnitude of this effect is nearly twice as large as the OLS estimates, highlighting the severity of endogeneity bias in conventional estimations. These results indicate that higher fertility contributes strongly and positively to economic growth, implying that Europe's ongoing fertility decline, coupled with rapid population aging, acts as a drag on income per capita growth.

To complement the cross-country analysis, and following Ashraf, Weil, and Wilde (2013) and Karra, Canning, and Wilde (2017), I develop a macrosimulation model for Lithuania — a transition economy that has experienced pronounced demographic and economic change. Between 1990 and 2023, Lithuania's fertility rate declined by 37.4 percent, from 2.03 to 1.27 births per woman, and is projected to reach 0.88 by 2050. The population is expected to shrink from 3.7 million in 1990 and 2.8 million

in 2023 to under 2.3 million by 2050, while the old-age dependency ratio will rise from 16.5 percent to 57.9 percent. The macrosimulation model incorporates changes in population age structure and female labor force participation and assumes fertility to be exogenous. Simulations show that lower fertility reduces both the size of the population and the share of working-age adults, with income per capita projected to fall by as much as 17.6 percent under a low-fertility scenario relative to the baseline over the next 75 years. These projections highlight how declining fertility and labor supply constraints can turn labor's contribution to growth negative, making productivity improvements the primary driver of long-term growth.

Although raising fertility could help mitigate the decline in the labor force and support growth, there are no quick fixes, as reproductive preferences and social norms change slowly. Nevertheless, demography is not destiny. Policymakers can pursue targeted "family-friendly" interventions to encourage higher fertility, which in turn could partially offset the negative economic effects of population decline. Evidence suggests that reducing the cost of education, expanding access to childcare, and improving work-family balance are among the most effective measures (Bauernschuster, Hener, and Rainer, 2016; Sobotka, Matysiak, and Brzozowska, 2019; UN, 2021; Zhang et al., 2023). Complementary labor market reforms, such as teleworking, flexible hours, and policies that better share childcare responsibilities, can increase female labor force participation. Finally, immigration can bolster the workforce, support fertility rates, and raise potential growth in aging societies, particularly when paired with effective integration policies (Bove and Elia, 2017; Mitaritonna, Orefice, and Peri, 2017; Dustmann and Preston, 2019; Tabellini, 2020).

In sum, this paper combines rigorous empirical identification with country-specific simulation to provide a comprehensive assessment of how fertility influences economic growth in Europe. By demonstrating the causal impact of fertility on income per capita growth and highlighting the long-term consequences of declining fertility for transition and advanced economies alike, the study informs both scholarly debates and policy interventions aimed at mitigating the economic challenges of population aging.

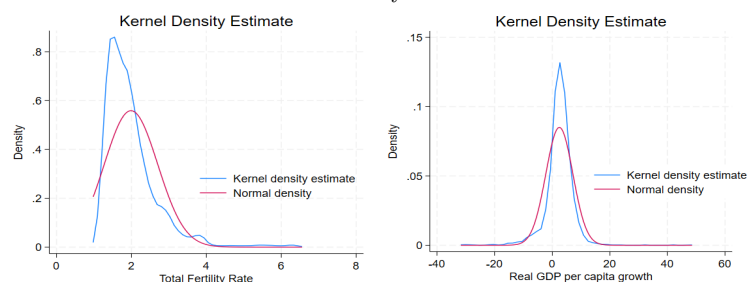
The remainder of this paper is structured as follows. Section 2 provides an overview of the data used in the empirical analysis. Section 3 describes the econometric methodology and presents the findings. Finally, Section 4 summarizes and provides concluding remarks.

2. DATA OVERVIEW

The empirical analysis presented in this paper is based on a panel dataset of annual observations covering 42 countries in Europe over the period 1960-2022, as shown in Appendix Figure A1. The dependent variable is economic

growth as measured by annual percent change in real GDP per capita. The key explanatory variable of interest in this analysis is the total fertility rate defined as the average number of births per woman through the end of her reproductive life span, which is instrumented by the comparative abortion index. The country-level abortion index — drawn from the Quality of Government database — is built by Forman-Rabinovici and Sommer (2018) to quantify the permissiveness of abortion policies based on worldwide data compiled by the UN Department of Social and Economic Affairs. Countries are assigned a score on a scale of 0 to 1, where 0 represents countries in which there are no conditions for legal abortion, and 1 represents a country that accepts all criteria for abortion, including on request. The Forman-Rabinovici and Sommer (2018) dataset covers 192 countries from 1992 to 2013. This broad coverage is essential for a study of this scope, allowing for a robust analysis of the impact of fertility on growth across a large, heterogeneous sample of countries. In this paper, to maximize the sample size for the empirical analysis, I use the comparative abortion index's 1992 value to represent the prior period and its 2013 value for the period afterwards. Although this approach assumes temporal stability in the comparative abortion index for these years, it is reasonable because abortion behavior tends to evolve slowly over time.²

FIG. 2. Distribution of Fertility Rates and Economic Growth



Source: World Bank; author's calculations.

To control for the influence of other factors, I introduce an array of economic, demographic, social and political variables, including the level of real GDP per capita, the share of industry in GDP, trade openness as measured by the share of exports and imports in GDP, population, educational attainments measured by average years of schooling, the infant mortality rate measured by the number of deaths under 1 year of age per thousand births, the female labor force participation rate in percent of female population ages 15 and above, and a composite index of government

²Estimation results remain broadly unchanged when I alternatively use the period 1992-2013.

stability, which are obtained from the World Bank and the International Country Risk Guide (ICRG).

Table 1 provides a detailed description of the variables that are used in the empirical analysis. There is a substantial degree of dispersion across countries and over time in terms of real GDP per capita growth. The sample average for economic growth is 2.5 percent, with a minimum of -31.2 percent to a maximum of 48 percent. The total fertility rate also exhibits considerable cross-country heterogeneity during the period 1960–2022. With a downward trend in the average number of births per woman, the mean value of fertility is 2, with a minimum of 1.1 and a maximum of 6.5. Similarly, the comparative abortion index — the instrument I use for fertility — varies between 0 and 1, with a sample mean of 0.9. Other explanatory variables show analogous patterns of considerable variation across countries, highlighting the potential importance of economic, demographic, social and political differences.

TABLE 1.

Descriptive Statistics

Variable	Observations	Mean	Std. dev.	Minimum	Maximum
Real GDP per capita growth	2,063	2.5	4.7	−31.2	48.0
Total fertility rate	2,644	2.0	0.7	1.1	6.5
Comparative abortion index	2,148	0.9	0.2	0.0	1.0
Real GDP per capita	2,105	23,398.6	19,943.3	698.2	112,417.9
Share of industry	1,842	30.5	7.8	11.4	58.3
Trade openness	1,882	92.7	53.3	5.7	394.2
Population	2,688	18,200,000.0	27,900,000.0	175,574.0	149,000,000.0
Educational attainments	1,358	10.7	1.9	4.5	14.3
Infant mortality	2,406	14.1	16.1	1.5	171.4
Female labor force participation	1,568	50.0	11.3	13.5	85.5
Government stability	1,413	7.6	1.7	2.0	11.5

Source: ICRG; Quality of Government; World Bank; author's calculations.

3. EMPIRICAL STRATEGY AND RESULTS

This paper is primarily empirical in nature, yet a concise conceptual framework helps clarify the channels through which fertility affects income growth and informs the interpretation of the results. Fertility influences per capita income growth mainly by shaping population size and the composition of the labor force. Persistently low fertility reduces the size of future working-age cohorts, lowering the worker-to-population ratio — a key determinant of per capita output. In the absence of compensating

factors, such as higher labor force participation or technological progress, these demographic shifts mechanically depress income growth.

Low fertility also accelerates population aging, raising dependency ratios — the proportion of non-working to working-age individuals. Elevated dependency ratios can constrain growth through multiple channels: reduced aggregate savings, slower capital accumulation, greater fiscal pressures on social welfare systems, and diminished labor market dynamism. While mitigating factors — including human capital accumulation, innovation, and immigration — can partially offset these effects, sustained below-replacement fertility may exert persistent negative effects on long-term growth trajectories.

Empirically, the fertility?income relationship is potentially endogenous. Higher income can influence fertility decisions through opportunity costs, cultural preferences, and policy frameworks, creating a risk of reverse causality. This endogeneity motivates the IV approach used in this paper, which exploits exogenous variation in fertility to identify its causal impact on per capita income growth.

The empirical objective of this study is to quantify the impact of fertility on income growth across 42 European countries over the period 1960?2022. Exploiting the panel structure of the data, the analysis begins with a baseline fixed-effects ordinary least squares (OLS) specification:

$$\Delta y_{it} = \beta_1 + \beta_2 \Delta tfr_{it-1} + \beta_3 X_{it} + \eta_i + \mu_t + \varepsilon_{it}$$

where Δy_{it} denotes economic growth as measured by the annual percent change in real GDP per capita in country i and time t ; tfr_{it-1} is the total fertility rate; X_{it} represents a vector of control variables including the lagged real GDP per capita, the share of industry in GDP, trade openness, population, educational attainments, infant mortality rate, female labor force participation rate, and government stability. The η_i and μ_t coefficients denote the time-invariant country-specific effects and the time effects controlling for common shocks that may affect real GDP per capita growth across all countries in a given year, respectively. ε_{it} is the idiosyncratic error term. To account for possible heteroskedasticity, robust standard errors are clustered at the country level.

However, as discussed above, estimating the impact of fertility on real GDP per capita growth is challenging due to potential endogeneity arising from reverse causality. Fertility can affect income growth through multiple channels, including capital dilution and changes in female labor force participation. At the same time, it is plausible that real GDP per capita growth influences fertility decisions during the demographic transition. This bidirectional relationship necessitates isolating the causal direction to obtain consistent and unbiased estimates.

An IV approach provides an effective strategy to address endogeneity and omitted variable bias. The key challenge is identifying a valid time-varying instrument — one that is strongly correlated with fertility but exogenous with respect to the regression error term. In this analysis, the comparative abortion index serves as the instrument. By construction, it influences fertility behavior while remaining unrelated to economic performance, satisfying the exclusion restriction. Appendix Table A1 presents the first-stage results, showing that the comparative abortion index is a statistically significant predictor of total fertility. As expected, higher values of the index are associated with lower fertility rates. The Kleibergen-Paap F-statistic exceeds conventional thresholds, confirming the instrument's strength and validity (Staiger and Stock, 1997). Using this instrument, I implement two-stage least squares (2SLS) to identify the causal effect of fertility on real GDP per capita growth across 42 European countries during the period 1960-2022.

Empirical studies generally find that higher fertility has a negative effect on real GDP per capita growth. Consistent with this, the OLS estimates reported in Table 2 show that an increase in the total fertility rate is associated with a reduction in income growth. The coefficient on fertility is negative and statistically significant at the 1 percent level, both before and after controlling for a broad set of economic, demographic, social, and political factors. While informative, these OLS results may be misleading due to potential endogeneity, arising from reverse causality, omitted variables, or measurement error. For example, fertility may affect economic growth through mechanisms such as dilution of capital per worker or changes in female labor force participation, while at the same time, higher or more persistent income may influence fertility decisions.

To address this endogeneity and obtain credible causal inference, I estimate the model using the 2SLS-IV approach with the comparative abortion index as an external instrument for the total fertility rate. Column 3 of Table 2 reports the second-stage results with fixed effects and control variables. The estimated coefficient on fertility (instrumented with the comparative abortion index) is positive and statistically significant. Moreover, the magnitude of this IV estimate is nearly twice as large as the OLS coefficient, indicating that endogeneity substantially biases conventional OLS estimates. Instrumentation also addresses potential measurement error, which can attenuate OLS estimates. Taken together, these results reveal that higher fertility makes a strong positive contribution to real GDP per capita growth — a finding that contrasts sharply with naïve OLS estimates and highlights the economic drag imposed by declining fertility in Europe.

With regard to control variables, the 2SLS-IV approach produces consistent and intuitively interpretable results. The lagged real GDP per capita is negatively and significantly associated with economic growth, consistent

TABLE 2.
Fertility and Economic Growth

	OLS	OLS	2SLS-IV
Total fertility rate	-1.928*** [0.471]	-2.290*** [0.648]	4.023* [1.538]
Real GDP per capita	-4.831*** [1.042]	-7.460*** [0.981]	-1.720*** [0.360]
Share of industry		0.102* [0.038]	0.068*** [0.018]
Trade openness		0.026*** [0.006]	0.012** [0.003]
Population		-7.652*** [1.643]	0.004 [0.151]
Educational attainments		0.639* [0.246]	0.243* [0.076]
Infant mortality		-0.179*** [0.045]	-0.201* [0.074]
Female labor force participation		0.068* [0.026]	0.058*** [0.015]
Government stability		0.347*** [0.080]	0.267** [0.084]
Number of observations	2,061	1,140	1,107
Number of countries	42	42	42
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
R^2	0.36	0.48	0.42

Note: The dependent variable is economic growth as measured by real GDP per capita growth. In the 2SLS-IV estimation, the total fertility rate is instrumented with the comparative abortion index. Robust standard errors are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Source: Author's estimations.

with the convergence hypothesis across countries. Notably, the magnitude of this effect is considerably smaller in the 2SLS-IV estimates than in the OLS results, highlighting the severity of endogeneity bias in the latter. Both the share of industry and trade openness — proxies for economic development and international integration — exhibit positive and highly significant effects. Population size does not appear to meaningfully explain differences in economic growth, whereas educational attainment contributes positively and significantly to income per capita growth, as expected. Infant mortality, a proxy for overall health conditions, is negatively associated with economic growth, while higher female labor force

participation correlates with higher growth. Finally, the composite index capturing political stability and government effectiveness has the expected positive and statistically significant effect on real GDP per capita growth.

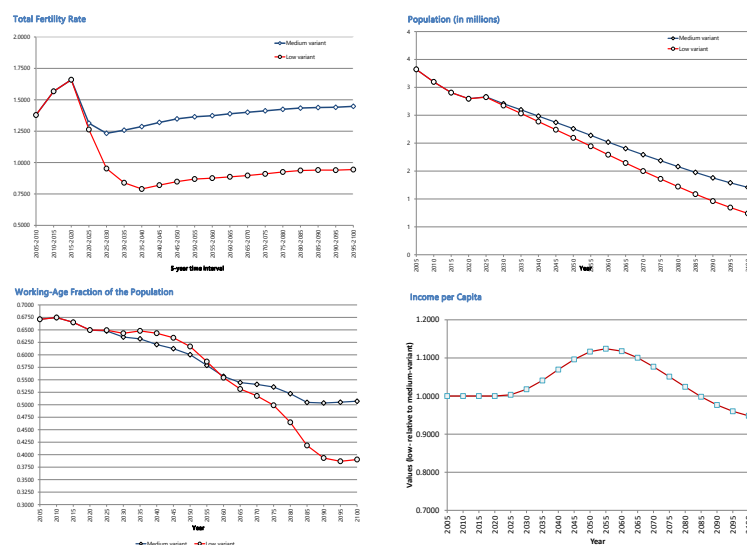
To further explore how the level of economic development influences the impact of fertility on income growth, I estimate the 2SLS-IV model separately for different income groups — advanced economies and developing countries in Europe.³ Despite smaller sample sizes in these subsamples, the disaggregated analysis reveals meaningful differences. The estimated coefficients on fertility exhibit a broadly similar positive effect on real GDP per capita growth across all groups, but the effect is statistically significant only in advanced economies. While the magnitude of the fertility coefficient (instrumented with the comparative abortion index) is larger in developing countries, it does not reach conventional levels of statistical significance. Building on the cross-country analysis and following Ashraf, Weil, and Wilde (2013) and Karra, Canning, and Wilde (2017), I also develop a macrosimulation model to examine the impact of fertility on income per capita growth in Lithuania — a transition economy that has experienced profound demographic and economic changes over the past three decades. Between 1990 and 2023, Lithuania's total fertility rate declined by 37.4 percent, from 2.03 to 1.27 births per woman. It is now among the lowest in Europe and is projected to fall further to 0.88 births per woman by 2050. Correspondingly, Lithuania's population is expected to shrink from 3.7 million in 1990 and 2.8 million in 2023 to under 2.3 million by 2050, while the old-age dependency ratio rises from 16.5 percent to 57.9 percent over the same period.

The macrosimulation model, parameterized using country-specific data and estimations, treats fertility behavior as exogenous and incorporates the dynamic evolution of population age structure and female labor force participation. The simulation results, presented in Figure 3, indicate that lower fertility reduces both the total population and the share of working-age adults over the next 75 years. The demographic shifts are especially pronounced in the low-variant scenario, which assumes fertility remains 0.5 children below the medium-variant projection throughout the period. As a result, the ratio of real GDP per capita under the low-variant scenario to that under the medium-variant scenario declines from a peak of 1.1242 in 2055 to 0.9481 by 2100. In other words, income per capita is projected to fall by 17.6 percent relative to the baseline scenario. These findings highlight that a shrinking labor force due to low fertility and population aging will render the labor contribution to growth negative, making productivity improvements the central driver of long-term economic growth.

³I also estimate the model for the period excluding the COVID-19 pandemic, which may have influence fertility choices. These results, available upon request, remain consistent with the baseline 2SLS-IV estimations.

Rapid population aging also raises important considerations regarding long-term caregiving.⁴ The old-age dependency ratio — defined as the population aged 65 and over relative to the population aged 20-64 — is already 37.3 percent in Europe and is projected to rise to 55.2 percent by 2050 and 59.1 percent by 2070. Much of this increased demand for care is provided by unpaid family members, placing additional pressure — particularly on women — to reduce labor market participation or exit the workforce entirely, further constraining potential income growth.

FIG. 3. Simulating Demographics and Income in Lithuania



Source: Author's calculations based on UN data and the Ashraf, Weil, and Wilde (2013) methodology.

4. CONCLUSION

Europe is undergoing a profound demographic transition characterized by persistently ultra-low fertility rates, which present both opportunities for socioeconomic advancement and significant challenges by reshaping population dynamics and age structures. While conventional empirical

⁴There is a nascent literature on this issue, including Carmichael and Charles (2003), Bolin, Lindgren, and Lundborg (2008), Carmichael, Charles, and Hulme (2010), Schmitz and Westphal (2017), Mozhaeva (2021), Labbas and Stanfors (2022), Pena-Longobardo and Olivia-Moreno (2022), and Maestas, Messel, and Truskinovsky (2023).

studies often report that higher fertility negatively affects real GDP per capita growth, these results can be misleading due to endogeneity arising from reverse causality between fertility and economic growth. In this paper, I address this critical methodological challenge by employing the comparative abortion index as an instrument for the total fertility rate, allowing for credible causal inference beyond simple correlations. The 2SLS-IV estimates, which control for a broad set of economic, demographic, social, and political factors, reveal that fertility exerts a positive and statistically significant effect on real GDP per capita growth across a panel of 42 European countries over the period 1960–2022. These findings imply that Europe’s ongoing downward fertility transition, coupled with rapid population aging, is a substantive drag on income per capita growth.

Building on this cross-country evidence, I develop a macrosimulation model to examine the long-term impact of fertility on income per capita growth in Lithuania — a transition economy that has experienced major demographic and economic shifts over the past three decades. Lithuania’s total fertility rate declined by 37.4 percent, from 2.03 to 1.27 births per woman, between 1990 and 2023. It now ranks among the lowest in Europe and is projected to decline further to 0.88 births per woman by 2050. Consequently, the population is expected to shrink from 3.7 million in 1990 and 2.8 million in 2023 to under 2.3 million by 2050, while the old-age dependency ratio is projected to rise from 16.5 percent to 57.9 percent. Parameterized using country-specific data and empirical estimates, the model assumes fertility behavior to be exogenous and accounts for the evolving population age structure and female labor force participation. Simulation results indicate that lower fertility reduces both the total population and the share of working-age adults, with income per capita projected to fall by as much as 17.6 percent under a low-fertility scenario relative to the baseline over the next 75 years. These results highlight that, in shrinking and aging populations, the labor contribution to growth becomes negative, making productivity gains the primary driver of long-term economic performance. While boosting fertility could help mitigate the decline in labor supply and support growth potential, there are no immediate solutions to ultra-low fertility in Europe or beyond, as reproductive preferences and social norms evolve slowly. International experience suggests that demographic reversal in the short term is unlikely, yet policy interventions can influence fertility trends over the medium and long term. Although beyond the scope of this paper, evidence from other studies indicates that family-friendly policies — such as reducing the cost of education, expanding childcare availability, and supporting work-family balance — can increase fertility and alleviate its negative impact on economic growth. Labor market reforms that promote flexibility, including teleworking and alternative working hour arrangements, can enhance women’s labor force participation

while balancing childcare responsibilities. Finally, immigration emerges as an important mechanism to supplement labor supply, raise fertility rates, and bolster potential growth in aging societies, particularly when integrated with supportive social and economic policies.

Taken together, these findings underscore that fertility is a key determinant of long-run income per capita growth, with important implications for policy. While demography alone does not dictate economic outcomes, proactive interventions to support family formation, labor market participation, and immigration can help counteract the economic drag of declining fertility and aging populations, providing a path toward more sustainable and inclusive growth in Europe and beyond.

APPENDIX A

Table A1. First-Stage 2SLS-IV Regression Summary Statistics

	R^2	Adjusted R^2	F-test statistic
Comparative abortion index	0.3969	0.3737	53.1437

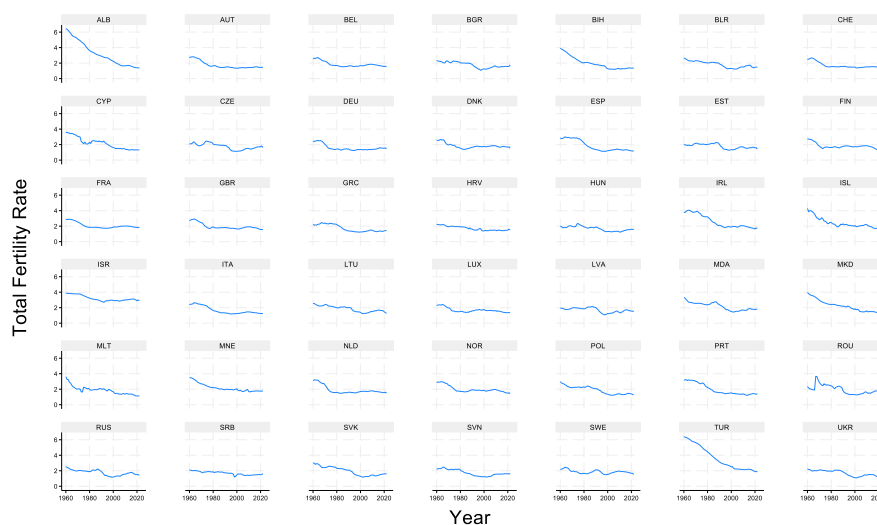
Source: Author's estimations.

Table A2. Fertility and Economic Growth — 2SLS-IV: AE vs EM

	All	AE	EM
Total fertility rate	4.023* [1.538]	2.301* [0.846]	16.487 [10.538]
Real GDP per capita	−1.720*** [0.360]	−1.269*** [0.282]	−1.129*** [0.247]
Share of industry	0.068*** [0.018]	0.093*** [0.016]	0.208*** [0.022]
Trade openness	0.012** [0.003]	0.012*** [0.003]	0.012 [0.018]
Population	0.004 [0.151]	0.001 [0.108]	−0.361 [0.372]
Educational attainments	0.243* [0.076]	0.052 [0.081]	2.266* [0.855]
Infant mortality	−0.201* [0.074]	−0.334*** [0.095]	−0.221* [0.084]
Female labor force participation	0.058*** [0.015]	0.004 [0.016]	0.075*** [0.014]
Government stability	0.267** [0.084]	0.148 [0.082]	0.084** [0.014]
Number of observations	1,107	808	299
Number of countries	42	27	15
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
R^2	0.42	0.57	0.26

Note: The dependent variable is economic growth as measured by real GDP per capita growth. In the 2SLS-IV estimation, the total fertility rate is instrumented with the comparative abortion index. Robust standard errors are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Source: Author's estimations.

Figure A1. Total Fertility Rate by Country

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