Executive Summary

The Impact of Religious Intervention on Fertility Rates:
Evaluating Patriarch Ilia II's Influence in Georgia Using Synthetic Control

Alina Hordiienko

Background and Aims

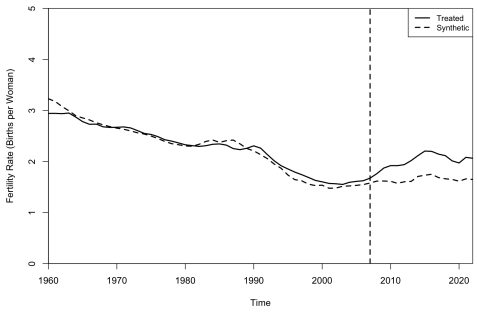
Declining fertility rates pose significant economic and social challenges worldwide. **Georgia**, characterized by strong cultural and religious traditions, faced **fertility rates below replacement levels (approximately 1.7 children per woman) by 2007** (World Bank Group, 2019).

That same year, **Patriarch Ilia II, head of the influential Georgian Orthodox Church, initiated a novel pronatalist intervention**: personally baptizing every third and subsequent child born to Orthodox Christian families (Esslemont, 2009). This culturally embedded, non-financial measure aimed to encourage higher birth rates. This study evaluates whether the Patriarch's intervention effectively increased fertility in Georgia.

Methods

Synthetic Control Method (SCM) was used to construct a "synthetic Georgia" by combining similar countries that did not experience the intervention. Pre-intervention data (prior to 2007) was used to ensure the synthetic control closely mirrored Georgia's demographic trajectory. Robustness checks included placebo tests (both temporal and spatial) and leave-one-out cross-validation to validate findings.

***Figure**: Georgia vs Synthetic Georgia*



Key Findings

The analysis reveals a substantial and sustained positive effect on Georgia's fertility rates from 2008 to 2022. **Approximately 159,759 additional births** occurred due to the intervention, representing a **1.24% increase** relative to the reproductive-age female population. The annual fertility rate increased, on average, by **0.37 births per woman**, remaining consistently elevated post-intervention. Rigorous placebo and robustness tests confirmed the reliability and significance (p-value = 0.045) of these findings.

Recommendations

Policymakers should recognize the potential of non-financial, culturally sensitive interventions in addressing demographic challenges. Future interventions might effectively leverage trusted institutions and cultural authorities to influence societal behaviors positively. It is essential to couple culturally embedded initiatives with supportive policies (e.g., childcare, healthcare, housing) to enhance long-term demographic stability. Additional research should explore similar interventions in varied cultural contexts to assess their broader applicability and sustained effectiveness.

The Impact of Religious Intervention on Fertility Rates: A Synthetic Control Analysis of Patriarch Ilia II's Influence in Georgia

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Abstract

This study evaluates the impact of Patriarch Ilia II's baptism initiative on fertility rates in Georgia using the Synthetic Control Method. The analysis reveals a substantial and sustained increase in fertility rates attributable to this culturally and religiously grounded intervention, estimating approximately 159,759 additional births from 2008 to 2022. Representing a 1.24% increase relative to the cumulative reproductive-age female population, these findings highlight the effectiveness of non-financial, culturally embedded pronatalist policies. The research underscores the importance of institutional trust and socio-cultural contexts in demographic interventions and provides valuable insights for policymakers aiming to mitigate demographic declines through culturally sensitive approaches.

1. Introduction

Modern economic systems are fundamentally intertwined with population dynamics, relying heavily on the assumption of continuous population growth. A growing population fuels consumer demand, expands the labor force, and contributes to economic development (Bloom & Canning, 2006). Nations depend on a steady influx of young workers to support aging populations, drive innovation, and maintain the sustainability of social welfare programs (United Nations, 2022). The vitality of both global and national economies is thus closely linked to demographic trends.

In recent decades, many countries have experienced significant declines in fertility rates. According to the United Nations (2022), global fertility rates have fallen from an average of about five births per woman in 1950 to approximately 2.5 in 2020. These same projections indicate that the world's population will likely peak at around 10 billion in the 2080s before entering a period of decline. This demographic shift presents several challenges.

Firstly, an aging population increases the dependency ratio, placing a heavier burden on the working-age population to support the elderly (Eurostat, 2011). This can strain public resources and social services, including healthcare and pension systems. Secondly, a shrinking labor force may lead to labor shortages, affecting productivity and international economic competitiveness (Bloom & Canning, 2006). Finally, reduced consumer demand can result in economic stagnation, as smaller populations consume fewer goods and services, potentially leading to lower economic growth rates and diminished living standards (United Nations, 2022).

These challenges underscore the importance of addressing declining fertility rates to ensure the sustainability of economic systems. Governments and policymakers have increasingly turned to pronatalist policies, such as financial incentives and family-friendly work arrangements, to mitigate the potential negative impacts of demographic decline (Gauthier, 2007; Thévenon, 2011). However, while financial incentives are frequently employed, non-financial interventions—often rooted in cultural or religious values—present alternative avenues for influencing fertility behavior, potentially without imposing significant financial burdens.

This study examines the impact of a unique non-financial intervention in Georgia, a country characterized by strong religious traditions and a history of declining fertility rates. Georgia's population peaked in the early 1990s and has since been steadily declining, compounded by significant emigration. By 2007, the total fertility rate was around 1.7 children per woman, falling below replacement levels (World Bank Group, 2019). Within this context, Patriarch Ilia II, the head of the Georgian Orthodox Church, announced in 2007 that he would personally baptize every third (and subsequent) child born to Orthodox Christian families (Esslemont, 2009). This unprecedented initiative leveraged Georgia's deeply rooted religious and cultural values, potentially influencing fertility decisions at a time when the country faced a looming demographic challenge.

Thus, the primary research question guiding this study is: *Does Patriarch Ilia II's baptism initiative have a causal effect on Georgia's fertility rates?* By employing the Synthetic Control Method, this research aims to isolate and quantify the impact of this non-financial, culturally embedded intervention. The study

contributes to broader debates on fertility determinants and policy responses, suggesting that interventions grounded in religious or cultural contexts may hold promise for countries seeking to stabilize or increase fertility rates without relying solely on financial incentives.

Recent scholarship has examined the effects of religious and culturally driven pronatalist interventions on fertility rates. Notably, (Chung et al., 2025) studied the specific case of Patriarch Ilia II's intervention in Georgia, demonstrating significant positive impacts on fertility through both macro-level and micro-level analyses. They found increases of approximately 17% in national fertility rates and substantial effects on higher-order births among Georgian Orthodox women. While Chung et al.'s research offers robust evidence of the effectiveness of religiously driven interventions, the current study expands upon their work by introducing additional methodological refinements and robustness checks, particularly through an alternative donor pool composition and enhanced placebo testing strategies.

2. Literature Review

2.1. Pronatalist Policies

2.1.1. Financial Incentives

Numerous studies have investigated the impact of financial incentives on fertility, with mixed results. Some research suggests that policies such as cash allowances, tax benefits, or housing subsidies can influence the timing of births, producing a short-term uptick in fertility (Laroque & Salanié, 2013). However, evidence for a sustained, long-term increase in overall fertility rates remains less clear (D'Addio & Marco, 2005; Gauthier, 2007). For instance, a study examining religiosity and fertility using macro-panel data from 25 Christian countries between 1925 and 2000 found a modest positive effect of religiosity at the individual level, which translated into a larger positive effect at the macro level due to peer influences (Herzer, 2019).

One reason financial incentives may fall short is that they often fail to address deeper structural, social, and economic determinants of fertility decline (Gauthier, 2007; Mcdonald, 2006). Factors such as rising childcare costs, increasing female education and labor force participation, shifting gender roles, and evolving family norms can limit the effectiveness of purely financial measures (Sobotka et al., 2019). Moreover, concerns about unintended consequences persist. Incentive programs risk disproportionately benefiting wealthier families who already have the means to raise children comfortably or incentivizing childbearing driven more by financial gain than by genuine parental intention (D'Addio & Marco, 2005; Laroque & Salanié, 2013).

The Romanian experience during the communist era highlights the potential pitfalls of aggressive pronatalist measures. In the 1960s, the government banned abortion and contraception to boost population growth, causing a temporary spike in birth rates. However, this approach led to severe social repercussions, including increased maternal mortality, child abandonment, and pressure on social services (Kligman, 1998).

2.1.1. Non-Financial Interventions

There is a limited amount of research on the effectiveness of non-financial interventions as part of pronatalist policies. Some studies have investigated the impact of family-friendly policies, such as parental leave and childcare subsidies, on fertility rates. One study found that parental leave policies had a positive effect on fertility, sometimes being observed for second or higher-parity births. Another study concluded that family policies might help to raise below-replacement levels of fertility by reducing the number of women who are childless. However, the evidence on the effectiveness of family-friendly policies is mixed, with some studies finding that they can have negative consequences for women's labor force participation (Brini, 2020).

In addition to family-friendly policies, some researchers have suggested that policies aimed at reducing uncertainty in early adulthood due to high unemployment could be effective in increasing fertility rates. Other non-financial interventions that have been proposed include tempo policies, which aim to reduce the pace of fertility postponement (Kohler et al., 2006). These policies could involve reforms to the education system or measures to encourage earlier homeownership.

2.1.1. Fertility and Religiosity

The relationship between fertility and religiosity, defined as "strength of commitment to a religion or religious beliefs, together with the degree of participation in religious activities" (Bein et al., 2021), has been a subject of extensive research, particularly in contemporary European settings with low fertility rates. Religious individuals in these settings consistently exhibit larger family sizes compared to their nonreligious counterparts (Buber-Ennser & Berghammer, 2021). This positive correlation between religion and fertility has been documented across numerous countries and measured using various religious indicators, including religious affiliation and church attendance (Bein et al., 2020, 2021; Herzer, 2019). Studies have shown that this relationship holds true not only for actual fertility behavior but also for fertility intentions, with religious individuals expressing a desire to have a greater num-

ber of children (Bein et al., 2023; Buber-Ennser & Berghammer, 2021).

Several studies highlight the robust positive effect of religiosity, particularly church attendance, on fertility. Church attendance has emerged as a strong predictor of fertility, possibly due to the exposure to pronatalist teachings and the social support received from fellow congregants. While religious teachings and community support are often cited as potential mechanisms driving this relationship, there is also evidence suggesting that the impact of religiosity might be mediated by other factors, such as the perceived costs and benefits of parenthood (Bein et al., 2020, 2023; Buber-Ennser & Berghammer, 2021).

Despite the substantial body of research indicating a positive association between religiosity and fertility, this relationship is not without exceptions or variations. Some studies have found contradictory results, particularly in certain Central and Eastern European countries (Buber-Ennser & Berghammer, 2021). For example, in Poland, a majority-Catholic country, religiosity amplifies the perceived benefits of having children and simultaneously limits the perceived impact of the costs associated with childbearing (Bein et al., 2020).

2.2. Georgia's Context

Since the dissolution of the Soviet Union, Georgia has experienced a religious revival, particularly within the Georgian Orthodox Church. The Church is deeply intertwined with Georgian national identity and enjoys a high level of trust from the population (Ackert et al., 2020; Gurchiani, 2017). Despite low levels of religious practice such as attendance, prayer, and fasting, religious institutions are among the most trusted in Georgia (Charles, 2010). The Georgian Orthodox Church exerts significant influence on social and political discourse, shaping public opinion on various matters (Gurchiani, 2017).

The Georgian Orthodox Church also plays a significant role in shaping societal views on issues like IVF and abortion. The Church holds a stance against IVF, considering it an unnatural method of conception. This creates a moral dilemma for childless women who are both deeply religious and yearning for children, as they navigate the conflict between their faith and the medical possibilities of IVF. Despite the Church's opposition, the use of IVF is on the rise in Georgia (Gavashelishvili, 2018).

Abortion also presents a complex issue in Georgia. During the Soviet period, it was widely used as the primary form of birth control, leading to very high abortion rates. With the fall of the Soviet Union, access to family planning services improved, contributing to a significant decrease in abortion rates. However, abortion remains a prevalent practice in Georgia, especially among specific demographics. Research indicates that women aged 25-34, married women, those of Azeri ethnicity, those practicing Islam, and women with two or more children have higher abortion rates than other groups. The main motivations behind abortion in Georgia include the desire to limit family size, often after two or three children, and economic difficulties, highlighting the influence of financial pressures on reproductive decisions (Pestvenidze & Stray-Pedersen, 2018).

3. Methodology

3.1. Synthetic Control Method

The Synthetic Control Method (SCM) is a quantitative technique used to evaluate the impact of interventions or policies implemented in a particular unit (such as a country or region) over time. Developed by Abadie and Gardeazabal (2003) and further refined by Abadie et al. (2010), SCM constructs a weighted combination of control units to create a synthetic version of the treated unit. This synthetic control serves as a counterfactual, representing what would have happened in the absence of the intervention.

In this study, SCM is employed to estimate the effect of Patriarch Ilia II's baptism initiative on Georgia's fertility rates. By comparing the actual fertility rates of Georgia with those of a synthetic Georgia, created from a combination of similar countries that did not receive the intervention, we can infer the causal impact of the initiative.

The advantages of using SCM in this context include its ability to handle cases where traditional methods like difference-in-differences may be inadequate due to limited data or the uniqueness of the treatment. SCM provides a transparent and data-driven approach to causal inference, allowing for a detailed examination of the intervention's effect.

3.2. Data

All preprocessing and model construction steps were executed using R. The annotated code is publicly available in a GitHub repository (Hordiienko, 2025).

The primary data source for this analysis is the World Bank's World Development Indicators (WDI) database. Using a consistent data source ensures comparability across countries and time periods. However, it is important to acknowledge potential limitations in the data.

Data accuracy may be challenged due to historical factors such as the legacy of the USSR regime and its subsequent fall. The dissolution of the Soviet Union led

to significant economic and social upheaval, which may have affected data collection and reporting practices. Similar concerns apply to other countries in the donor pool, many of which are former Soviet or satellite states.

The 2008 war between Russia and Georgia is another factor that could influence the data. The conflict may have affected fertility rates independently of the Patriarch's intervention, potentially confounding the results. Additionally, since the war, approximately 20% of Georgian territory—including the regions of Abkhazia and South Ossetia—has been under occupation (UNHCR, 2010). This ongoing territorial dispute further undermines the accuracy of demographic data. Population displacement, changes in administrative control, and difficulties in data collection within these regions can affect the reliability of fertility statistics.

Similarly, the global financial crisis beginning in 2008 could have impacted all observations to some extent. Economic downturns often influence demographic behaviors, including decisions about marriage and childbearing, due to increased financial uncertainty.

Lastly, while the World Bank provides standardized data, other organizations may report different statistics due to variations in data collection methodologies. This potential bias in data collection must be considered when interpreting the results.

3.3. Donor Pool

The selection of appropriate countries for the donor pool is crucial for the validity of the Synthetic Control Method (SCM) analysis. The donor pool must consist of countries that closely resemble Georgia in terms of socio-economic conditions, cultural backgrounds, historical experiences, and fertility trends but did not receive the intervention being studied.

3.3.1. Criteria for Selection

One important factor is geographical proximity and regional similarity, as countries geographically close to Georgia or within the same region are more likely to share cultural and historical characteristics.

Another key criterion is cultural and religious background. Georgia is a patriarchal society with gender role attitudes, cultural and religious context closely aligned with that of other Eastern Orthodox countries such as Armenia, Bulgaria, and Russia. Research by Buber-Ennser and Berghammer (2021) highlights that countries like Georgia and Poland have high levels of religiosity and church attendance, which are influential factors in fertility behaviors.

Additionally, similar fertility levels and demographic trends are considered to enhance the accuracy of the synthetic control. Georgia's fertility rate is among the highest in Europe, while the average age at first birth in Georgia aligns with that of neighboring countries and Central Asian republics.

Lastly, the absence of similar interventions is an essential criterion to isolate the effect of the Patriarch's initiative. Countries that implemented significant pronatalist policies or experienced major disruptions affecting fertility during the study period are excluded.

3.3.2. Donor Pool Composition

Following the criteria outlined above, the donor pool was constructed through a systematic evaluation of European and Central Asian countries—regions that are historically, culturally, and demographically most comparable to Georgia. Table X summarizes this evaluation using a color-coded framework across four dimensions: geographic and political region, majority religious affiliation, post-intervention fertility levels, and the presence of fertility-related policy interventions.

The TFR column (2007–2022) reflects the focus on recent demographic trends rather than the full 60-year period. Many countries, including Georgia, experienced above-replacement fertility in earlier decades but now maintain sub-replacement levels. To construct a credible counterfactual, countries were only considered if their fertility trends during the post-treatment period resembled Georgia's. In this column, green denotes countries with a total fertility rate below the replacement level of 2.1, while red flags those with above-replacement fertility, which were excluded due to fundamental demographic differences.

In the Geographic and Political Region column, green indicates former Soviet republics, which share institutional legacies with Georgia for at least half of the study period. These countries are considered especially relevant given their similar experiences with centralized planning, family policy, and demographic transitions. Yellow represents other European countries—primarily from the former Eastern Bloc or EU—that, while not as closely aligned, still offer meaningful regional comparability.

The Religious Affiliation column captures a key aspect of cultural similarity. Countries with over 80% Christian affiliation are coded green, aligning with Georgia's Orthodox Christian tradition. Yellow marks countries with high levels of religious affiliation but different dominant religions (e.g., Muslim-majority states), and red indicates countries where the majority is religiously unaffiliated, which were excluded due to limited cultural comparability in the context of a religious intervention.

The Fertility Interventions column evaluates the presence and scale of state-led pronatalist measures during the post-2007 period. Green reflects no signifi-

cant fertility interventions, yellow indicates minor or targeted measures, and red denotes substantial policy changes, such as large-scale cash transfers or restrictive abortion laws, that could independently influence fertility rates. Countries with major interventions were excluded to avoid confounding effects.

The Assessment column provides the final inclusion decision, with short justifications where applicable. Countries were excluded primarily due to either non-comparable fertility trends, policy interference, or cultural dissimilarity. This process produced a donor pool composed of countries that are regionally proximate, culturally aligned, and demographically similar to Georgia in recent years, without overlapping fertility interventions—thereby supporting the validity of the synthetic control. The countries shortlisted for the donor pool are shown in Figure 1.

Figure 1: *Donor Pool Weights*

w.weights	unit.names	unit.numbers
0.000	Albania	2
0.013	Croatia	3
0.008	Cyprus	4
0.007	Malta	5
0.390	Moldova	6
0.128	North Macedonia	7
0.019	Slovak Republic	8
0.012	Slovenia	9
0.004	Turkiye	10
0.090	Azerbaijan	11
0.009	Belgium	12
0.029	Bulgaria	13
0.011	Denmark	14
0.010	France	15
0.009	Italy	16
0.218	Latvia	17
0.009	Netherlands	18
0.009	Portugal	19
0.016	Serbia	20
0.009	Switzerland	21
0.000	Ukraine	22

3.4. Covariates

3.4.1. Covariates Selection

The selection of appropriate covariates is a critical step in constructing a credible synthetic control for analysis. Covariates must be strong predictors of the outcome variable—in this case, the fertility rate—and should capture the key factors influencing fertility decisions.

One important covariate is GDP per capita growth, which measures the annual percentage increase in a country's economic output per person. Economic growth influences fertility rates by affecting household income and economic stability. Higher economic growth can enhance individuals' confidence in their financial future, potentially encouraging them to have more children. Economic prosperity may also reduce the perceived cost of raising children and increase the ability to provide for larger families.

Another key factor is the unemployment rate, which represents the percentage of the labor force that is unemployed and actively seeking employment. Unemployment affects economic security and influences family planning decisions. High unemployment rates may lead to financial uncertainty, discouraging individuals from starting or expanding a family. Conversely, low unemployment can boost confidence in job stability, potentially encouraging higher fertility rates.

The female labor force participation rate, which measures the proportion of women aged 15 and older who are actively engaged in the labor market, is also a crucial variable. Higher participation rates are often associated with delayed childbearing and lower fertility rates, as women may prioritize education and career development. The opportunity cost of time and challenges in balancing work and family life can influence decisions about the number and timing of children.

Finally, the age dependency ratio plays a significant role in fertility decisions. This ratio reflects the proportion of dependents—people younger than 15 or older than 64—relative to the working-age population. A higher dependency ratio indicates a greater economic burden on working individuals, potentially discouraging higher fertility rates. When families and societies face the financial strain of supporting a large number of dependents, individuals may be less inclined to have more children.

4. Results

4.1. Weights

The construction of the synthetic control relies on two sets of weights: covariate weights and donor country weights. These weights are calculated by optimizing the fit between Georgia and its synthetic counterpart during the pre-intervention period, ensuring that the control closely mirrors Georgia's fertility trends and demographic characteristics prior to 2007.

The donor country weights determine the extent to which each country in the donor pool contributes to synthetic Georgia. Countries that more closely align with Georgia in both fertility trajectories and covariates receive higher weights, while those with greater dissimilarity receive lower or zero weights (Figure 1). In this case, Moldova, Latvia, and North Macedonia were assigned the highest weights, indicating that their demographic and fertility profiles most closely resembled Georgia's in the years leading up to the intervention. In contrast, countries such as Albania and Ukraine received zero weight and did not contribute to the final synthetic control.

The covariate weights reflect the relative impor-

Figure 2: *Covariate Weights*

	v.weights
GDP_Per_Capita_Growth	0
Unemployment_Rate	0.011
Female_Labor_Force	0.645
Age_Dependency_Ratio	0.344

Figure 3: *Covariate Balance*

	Treated	Synthetic	Sample Mean
GDP_Per_Capita_Growth	1.957	0.749	2.543
Unemployment_Rate	11.258	11.020	9.508
Female_Labor_Force	47.620	47.612	43.314
Age_Dependency_Ratio	54.989	54.988	54.918

tance of each predictor variable in achieving a good pre-treatment fit. Among the selected covariates (Figure 2), female labor force participation and the age dependency ratio emerged as the most influential, suggesting that these factors played a key role in explaining fertility variation across the sample. Conversely, GDP per capita growth received no weight, indicating it had limited predictive value in this context.

The resulting synthetic control achieves strong covariate balance, with near-identical values to Georgia across all predictors, as the synthetic unit nearly replicates Georgia's pre-treatment values on each covariate (Figure 3). Such a high degree of similarity reinforces the credibility of the synthetic control as a counterfactual and supports the reliability of the causal estimates that follow.

4.2. Georgia vs Synthetic Georgia

To evaluate the impact of the Patriarch's 2007 intervention, we compare the actual fertility rates of Georgia to those of synthetic Georgia over the study period (Figure **??**). The fertility trends for Georgia and synthetic

Figure 4: *Treated vs. Synthetic Georgia*

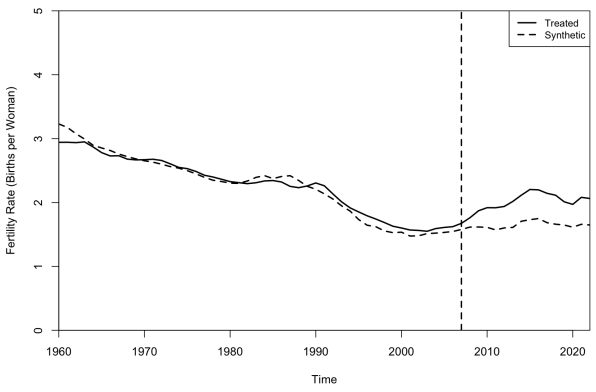
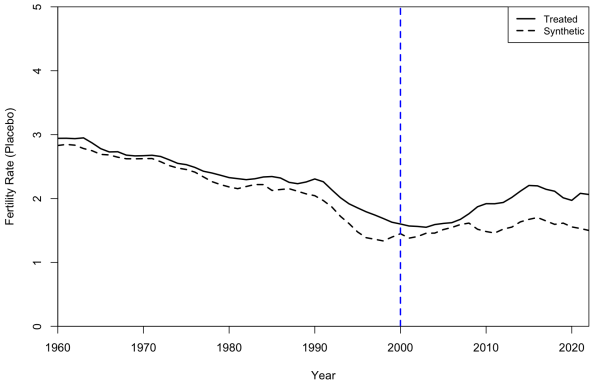


Figure 5: *Placebo In-time for Year 2000*



Georgia closely align during the pre-treatment period, indicating a strong model fit and reinforcing the validity of the synthetic control as an approximation for Georgia in the absence of the intervention.

After the intervention in 2007, a notable divergence appears between the actual fertility rate in Georgia and the synthetic control. The observed fertility rate in Georgia rises more sharply than in the synthetic Georgia, indicating a positive treatment effect. This divergence aligns with the expected impact of the intervention, as the religious and cultural significance of Patriarch Ilia II's promise to baptize third and subsequent children may have motivated increased fertility among Georgian Orthodox families.

4.3. Placebo Studies

The difference in fertility rates between Georgia and synthetic Georgia provides preliminary evidence supporting the hypothesis that the 2007 intervention positively impacted fertility in Georgia. To validate the causal interpretation of the results, this study conducts both spatial and temporal placebo tests. These help determine whether the observed divergence can be reasonably attributed to the Patriarch's intervention, rather than random fluctuations or pre-existing trends.

4.3.1 Placebos In-time

The temporal placebo test involves shifting the intervention date for Georgia to a period before the actual 2007 initiative and then re-running the SCM analysis. If a significant effect also appears at a time when no intervention took place, it would suggest that the observed divergence might be driven by pre-existing trends or unrelated factors, rather than the Patriarch's initiative.

The placebo-in-time results (Figure 5) illustrate Georgia's fertility trajectory when a hypothetical treat-

Figure 6: *Placebo In-space (No MSPE Limit)*

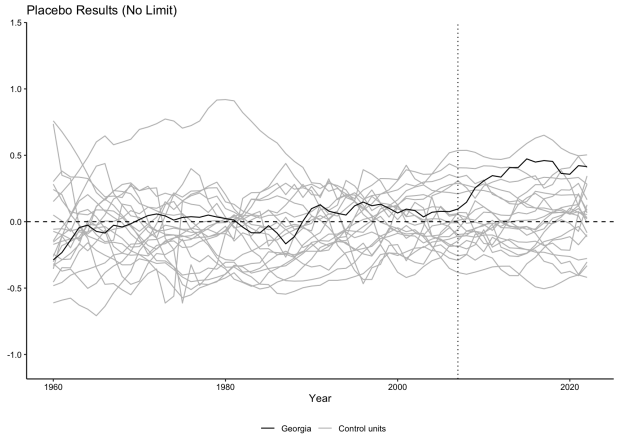
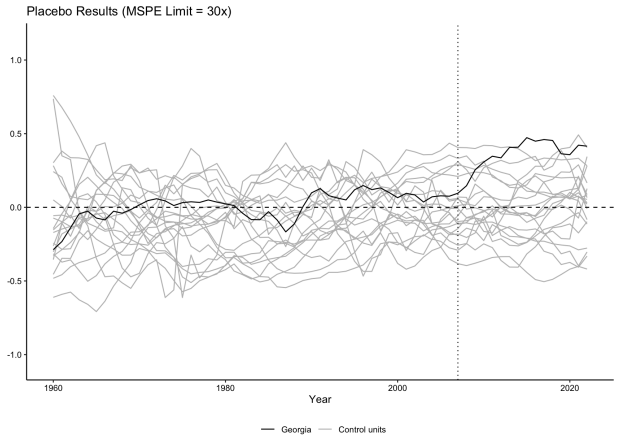


Figure 7: *Placebo In-space (30x MSPE Limit)*

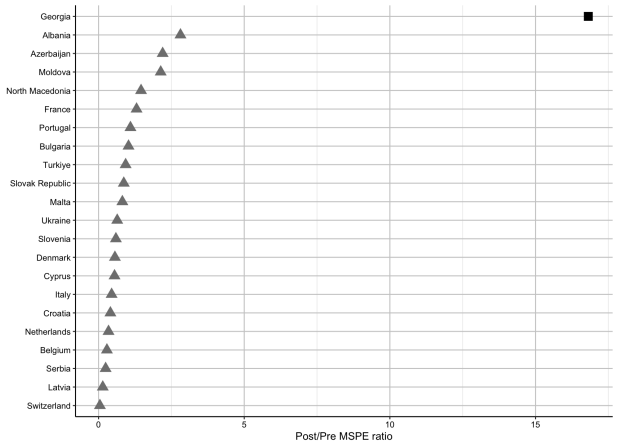


ment date is assigned prior to 2007, namely in year 2000. This scenario reveals a sustained and pronounced gap between Georgia's observed fertility and its synthetic control—comparable in magnitude to the gap following the actual intervention. While this similarity might suggest that the divergence is not unique to the 2007 intervention—potentially reflecting underlying structural shifts or unobserved confounders influencing fertility trends—it may also stem from the limited temporal window available for the placebo test. Specifically, we can only shift the intervention date back by 6 years—a relatively short span compared to the full 42-year observation period—due to the test's sensitivity to missing values.

4.3.2 Placebos In-space

A spatial placebo test assigns the "treatment" to other countries in the donor pool that did not actually receive the intervention. By replicating the analysis for these control units—pretending each, in turn, adopted a similar religious fertility initiative at the same time—one can assess whether comparable fertility upticks appear elsewhere by chance.

Figure 8: *MSPE Ratios*



In the placebo-in-space results (Figure 6), Georgia's pre-intervention trajectory does not align as closely with its synthetic counterpart as desired, as the placebo-treated countries exhibit more variation before 2007. Nonetheless, after the intervention, Georgia's fertility rate still stands out with a notable uptick relative to its synthetic control, whereas the placebo-treated countries do not show a similar upward shift. The black line for Georgia remains above the zero line (or baseline) in the post-treatment period, while the placebo trajectories generally hover near or below the baseline. The effect becomes more pronounced when we exclude countries, whose MSPE is 30 times more or higher than Georgia's (Figure 7).

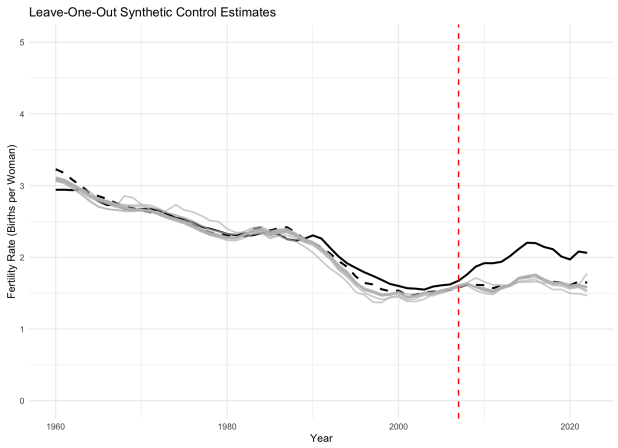
Further reinforcing this point, the Post/Pre Mean Squared Prediction Error (MSPE) ratio plot (Figure 8) shows Georgia with a substantially higher ratio than any of the placebo-treated donor countries. MSPE is a measure of how well the synthetic unit replicates the actual unit pre-intervention; the Post/Pre MSPE ratio gauges the magnitude of the divergence after the supposed "treatment." Georgia's ratio is distinctly larger, indicating that the observed effect is not replicated elsewhere. This uniqueness suggests that the result is not merely a statistical artifact.

Together, these spatial placebo tests strongly indicate that the fertility increase observed in Georgia post-2007 does not appear randomly in other countries when they are falsely assigned the same intervention. Thus, the effect seems to be tied to the actual event in Georgia.

4.4. Robustness Tests

Beyond placebos, a series of robustness checks further evaluates the reliability and stability of the findings. These include Leave-One-Out Cross-Validation

Figure 9: *Leave-One-Out Synthetic Control Estimates*



(LOOCV) tests, where each donor country is systematically removed from the donor pool to ensure that results are not driven by any single influential unit.

4.4.1. Leave-One-Out Cross-Validation

The leave-one-out cross-validation (LOOCV) results (Figure 9) show the fertility trajectories for Georgia and its synthetic counterpart after excluding each donor country in turn, with each gray line representing the synthetic fertility trajectory after excluding a different donor country. Despite some variation in the magnitude of divergence between Georgia's fertility rate and these synthetic trajectories, the overall pattern remains consistent: following 2007, Georgia's fertility rate consistently exceeds the synthetic unit. This consistency suggests that no single donor country is solely driving the observed effect. The robustness of these trajectories across different donor configurations reinforces the conclusion that the Patriarch's initiative had a genuine and enduring impact on fertility behaviors.

5. Impact and Future Directions

5.1. Impact Estimation

The synthetic control analysis indicates a significant positive impact of Patriarch Ilia II's 2007 baptism initiative on Georgia's fertility rates. The analysis estimates that between 2008 and 2022, approximately 159,759 extra births occurred beyond what would have been expected in the absence of the intervention (Figure 10). These additional births represent about 1.24% of Georgia's cumulative reproductive-age female population during the same period.

Year-by-year, the intervention's impact varied, starting modestly at 0.51% extra births in 2008 and reaching a peak of 1.57% in 2015 (Figure 11). While there was some fluctuation, the effect consistently remained above 1% from 2011 onward. This sustained increase underscores the durable influence of the religious initiative on reproductive decisions.

Figure 10: *Extra births (extra people alive) by year*

Year	Extra_Births
2008	4420.188
2009	7636.063
2010	9173.042
2011	10256.226
2012	9824.959
2013	11800.559
2014	11760.958
2015	13543.882
2016	12760.925
2017	12983.229
2018	12712.127
2019	10091.570
2020	9871.017
2021	11562.360
2022	11361.974

Figure 11: *Extra births (as percentage of average reproductive-age female population) by year*

Year	Percentage
2008	0.51
2009	0.89
2010	1.07
2011	1.19
2012	1.14
2013	1.37
2014	1.37
2015	1.57
2016	1.48
2017	1.51
2018	1.48
2019	1.17
2020	1.15
2021	1.34
2022	1.32

Quantitatively, the average fertility gap between actual and synthetic fertility rates across the post-treatment period is 0.373, with a standard deviation of 0.088. This mean gap indicates that Georgia's observed fertility rate was, on average, about 0.37 births per woman higher than its synthetic control each year after the intervention. The low standard deviation demonstrates that the difference was highly consistent over time, with minimal fluctuations year-to-year. This consistency results in a very high Cohen's d value of 4.24, as standardizing the mean gap by such a small variability indicates a pronounced and reliable impact

on fertility rates relative to the synthetic control.

These metrics were computed by extracting observed and synthetic Total Fertility Rates (TFR) for the post-treatment period from the synthetic control model output. The gap was calculated as the difference between observed and synthetic fertility rates each year. Extra births were estimated using this TFR gap by converting it to an annual extra birth rate based on an assumed average reproductive span of 30 years, applied to the estimated reproductive-age female population in Georgia each year.

The large effect size and the consistency of the observed fertility increase strongly suggest that Patriarch Ilia II's religious intervention played a critical role in influencing family decision and boosting Georgia's birth rates during the examined period. Moreover, the result is statistically significant, with a p-value of 0.045, suggesting that the observed effect is unlikely to be due to chance.

5.2. Policy Implications

The findings of this study have practical implications for policymakers and stakeholders concerned with demographic sustainability. First and foremost, the results highlight the potential effectiveness of non-financial, culturally embedded interventions in shaping fertility behaviors. While many governments have traditionally relied on direct economic incentives—such as tax benefits, housing subsidies, or parental leave policies—these findings suggest that non-financial interventions rooted in religious, cultural, or community values can also be influential. This is particularly relevant in contexts where public budgets may be constrained or where purely financial measures have shown limited long-term success.

Moreover, the role of the Georgian Orthodox Church, as embodied by Patriarch Ilia II's intervention, underscores the importance of leveraging trusted institutions and deeply held social norms. Religious leaders and institutions, given their moral authority and ability to shape cultural narratives, can serve as powerful messengers in encouraging family growth. Policymakers may consider partnering with religious or community leaders to design and disseminate interventions that resonate with local values. Such collaborations can ensure that pronatalist messages are not perceived as top-down directives from the state but as organic appeals aligned with people's identity and sense of belonging.

However, religious and cultural interventions must be approached with sensitivity. Policymakers should be mindful of pluralistic societies where multiple religious and cultural traditions coexist. Tailoring interventions to diverse belief systems—without favoring one group at the expense of another—is essential to maintaining social cohesion and ensuring that interventions are inclusive rather than divisive. Additionally, interventions that rely on moral persuasion rather than incentives should be accompanied by supportive policies that help families meet the economic and social challenges of raising children. In other words, moral appeals may increase willingness to have children, but tangible support—such as access to quality healthcare, childcare services, and housing stability—remains crucial for long-term sustainability.

5.3. Areas for Future Research

While this study provides compelling evidence of a causal link between Patriarch Ilia II's 2007 baptism initiative and increased fertility in Georgia, it also raises several questions that merit further exploration.

First, more granular research could illuminate the mechanisms behind the observed effects. For instance, understanding how individual families interpret and respond to religious interventions could help distinguish whether the effect stems from increased moral motivation, enhanced social support networks, or shifts in perceived community expectations. Surveys, interviews, and ethnographic studies could complement quantitative analyses to uncover these nuanced pathways.

Second, future research could examine the longevity and stability of the intervention's impact. Assessing whether the fertility increase persists into subsequent decades—and whether it influences family size, birth spacing, or parity progression beyond the immediate post-intervention period—would provide insights into whether such initiatives produce fleeting spikes or more enduring demographic shifts.

Third, the Georgian context, defined by a powerful national church and a unique historical trajectory, may not be directly replicable elsewhere. Investigating similar religious interventions in other Orthodox countries or culturally distinct societies could help determine the generalizability of these findings. Cross-country comparisons would clarify whether religious pronatalist interventions are context-dependent or have broader relevance across different socio-religious landscapes.

Finally, future work could integrate non-financial interventions with other policy measures to assess their combined effects. Do religious initiatives work best in tandem with modest financial incentives, improved healthcare, or enhanced parental leave? Examining the interplay between cultural and economic policies can guide the development of multifaceted pronatalist strategies that leverage the strengths of each approach.

6. Conclusion

The synthetic control analysis conducted in this study robustly demonstrates that Patriarch Ilia II's baptism initiative had a substantial and sustained positive impact on fertility rates in Georgia. From 2008 to 2022, the initiative is estimated to have resulted in approximately 159,759 additional births beyond what would have otherwise occurred. This represents a 1.24% increase relative to the cumulative reproductive-age female population, underscoring a remarkable demographic effect driven by a non-financial, culturally rooted intervention.

These findings carry important implications for policymakers and stakeholders addressing demographic decline. They suggest that culturally embedded initiatives, leveraging trusted institutions and religious authority, can significantly influence fertility decisions without extensive financial outlays. Such non-financial strategies might be particularly valuable in contexts where traditional economic incentives show limited efficacy or face budgetary constraints.

However, the applicability of Georgia's experience should be approached cautiously. The unique sociocultural context, notably the influential role of the Georgian Orthodox Church, suggests potential limitations in the generalizability of these findings. Therefore, policymakers should carefully assess local cultural dynamics and institutional trust when considering similar interventions.

Future research should focus on the underlying mechanisms through which religious and cultural interventions influence fertility behaviors, evaluate the longevity of these effects, and assess the transferability of similar initiatives across different cultural contexts. Exploring the integration of religiously and culturally sensitive interventions with other policy measures may provide further insights into effectively addressing fertility declines in diverse socio-economic environments.

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8. Appendices

8.1. Donor Pool Selection Criteria

#	Country	Geographic and Political Region	Majority Religious Affiliation (Pew Research Center, 2022)	2007 - 2022 TFR Range (World Bank, 2022)	Fertility Interventions	Assessment
0	**Georgia**	South Caucasus, former USSR	88.5% Christians 10.7% Muslims	1.67 - 2.2	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **2007**: *Religious intervention to boost fertility* – In December 2007, the Georgian Orthodox Church's Patriarch Ilia II announced that he would personally baptize any third-born or higher-parity child born to married Georgian Orthodox parents, making him the child's godfather (Esslemont, 2009).	**Treated Unit**
1	**Albania**	Southern Europe, former USSR Satellite state	80.3% Muslims 18.0% Christians	1.38 - 1.7	**1960s:** *Ban on contraception and abortion* – The communist regime outlawed birth control and abortion, promoting large families. (Population Reference Bureau, 2020)	**Yes**
2	**Armenia**	South Caucasus, former USSR	98.5% Christians	1.42 - 1.7	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **2009:** *Boosted childbirth cash benefit* – A reform of the universal birth grant sharply increased the one-time payment for third and higher-order births. This policy raised the probability of having an additional (third) child by about 58–64% of the pre-reform level in the subsequent five years, helping counter strong son-preference effects (Pinto et al., 2021). **2014:** *High-order birth grants ("birth order" benefits)* – A new benefit of AMD 1,000,000 was introduced for each third and fourth child (and AMD 1.5 million for a fifth or higher child) (Green, 2022).	**No** (Major fertility interventions)

					2020: *Increased support for first and second births* – The one-time "baby bonus" was raised six-fold for first births (to AMD 300,000) and doubled for second births (to AMD 300,000). Monthly childcare allowances were also raised (Green, 2022). **2022:** *Monthly subsidy for third child* – A new program began paying AMD 50,000 per month for every third or subsequent child born from 2022 until the child's 6th birthday, combined with housing support for young families (Green, 2022).	
3	**Austria**	Western Europe	80.4% Christians 13.5% Unaffiliated 5.4% Muslims	1.38 - 1.53	**1990:** *Two-year parental leave (Väterkarenzgesetz)* – Paid parental leave was extended from 1 year to 2 years and opened to fathers from July 1990 (Šťastná & Sobotka, 2009). **2002:** *"Kinderbetreuungsgeld" reform* – A major reform replaced the insurance-based parental benefit with a universal flat-rate childcare allowance up to 36 months, available to all parents (European Industrial Relations Review, 2025). **2019:** *"Family Bonus Plus" tax credit* – Austria introduced a new tax deduction of up to €1,500 per child per year (increased to €2,000 from 2022 (Austrian Ministry of Finance, 2025).	**No** (Major fertility interventions)
4	**Azerbaijan**	South Caucasus, former USSR	96.9% Muslims 3.0% Christians	1.52 - 2	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **2022:** *Increase in birth grants ("baby bonus")* – The government raised the lump-sum childbirth allowance from AZN 200 to AZN 300 per newborn (Mammadli, 2022).	**Maybe** (Moderate fertility interventions)
5	**Belarus**	Eastern Europe, former USSR	71.2% Christians 28.6% Unaffiliated	1.38 - 1.73	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **2015:** *"Family Capital" program* – A new pronatalist program was launched, granting families a one-time payment of US$10,000 (in a special account) upon the birth of a third or subsequent child (Republic of Belarus, 2019). **2020:** *Extended Family Capital and benefits* – The Family Capital scheme was renewed for 2020–2024, with expanded uses and indexation. In addition,	**No** (Major fertility interventions)

					monthly allowances for children in low-income families were increased (Republic of Belarus, 2019).	
6	**Belgium**	Western Europe	64.2% Christians 29.0% Unaffiliated 5.9% Muslims	1.53 - 1.86	**2002:** *Paternity leave extension* – Paid paternity leave was extended from 3 days to 10 working days for new fathers (July 2002). The uptake of the new 10-day leave exceeded 60% of eligible fathers by 2008 (Institute for the Equality of Women and Men, 2006). **2021:** *Further paternity and leave reforms* – Following EU directives, Belgium decided to extend paternity leave to 15 days (effective 2021) and then 20 days by 2023 (The Brussels Times Newsroom, 2025).	**Maybe** (Moderate fertility interventions)
7	**Bosnia and Herzegovina**	Southern Europe, former SFRY	52.3% Christians 45.2% Muslims 2.5% Unaffiliated	1.22 - 1.38	**2018:** *"Let Our Children Be Born" campaign (RS)* – The Republika Srpska government launched Djeca nam se rađala, a pronatalist public campaign in 2018–2019. Rallies and media messages (even a slogan unveiled at a football stadium) promoted having more children as a patriotic duty (Lero, 2023). **2019:** *National Program of Demographic Revival (RS)* – The RS entity adopted a comprehensive demographic strategy in 2019, including higher birth grants, monthly stipends for third and fourth children, expanded daycare, and housing support for young couples (Lero, 2023).	**No** (Major fertility interventions)
8	**Bulgaria**	Eastern Europe, former USSR Satellite state	82.1% Christians 13.7% Muslims 4.2% Unaffiliated	1.48 - 1.78	**1968:** *Abortion restriction policy* – Alarmed by fertility decline, Bulgaria in 1968 banned elective abortions except for limited cases (e.g. women with 3+ children or over age 45). Women with 1–2 children needed approval from a medical board to terminate a pregnancy (Fremer, 2022).	**Maybe** (Moderate fertility interventions)
9	**Croatia**	Southern Europe, former SFRY	93.4% Christians 5.1% Unaffiliated 1.4% Muslims	1.41 - 1.62	**2017:** *Pro-family financial incentives* – Amid continued population decline, Croatia slightly increased cash support, e.g. a one-time bonus of 10,000 kuna (~€1,300) for newborns was adopted in some cities (Opatija in 2017) and later considered nationally (News, 2017).	**Yes**
10	**Cyprus**	Southern Europe	73.2% Christians 25.3% Muslims 1.2% Unaffiliated	1.3 - 1.48	**None**	**Yes**
11	**Czechia**	Eastern Europe, former USSR Satellite state	76.4% Unaffiliated 23.3% Christians	1.43 - 1.83	**1995:** *Introduction of parental benefit* – In post-Communist Czechia, a universal parental allowance was formalized, providing a flat monthly payment to a stay-at-home parent until the child's 3rd year (later extendable to 4th) (Center for Economic Research and Graduate Education, 2021).	**No** (Majority religiously unaffiliated)

12	**Denmark**	Northern Europe	83.5% Christians 11.8% Unaffiliated 4.1% Muslims	1.55 - 1.89	**1984:** *Introduction of paternity leave* – Denmark was among the first in Europe to grant fathers a 2-week paternity leave to be taken during the first 14 weeks after birth (Rostgaard & Ejrnæs, 2020). **1998:** *Extended parental leave + father quota* – Denmark extended total parental leave to 10 months per family and introduced a "father's quota**"** of 2 weeks (later 4 weeks) reserved for fathers (Rostgaard & Ejrnæs, 2020).	**Maybe** (Moderate fertility interventions)
13	**Estonia**	Northern Europe, former USSR	59.6% Unaffiliated 39.9% Christians	1.41 - 1.72	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **1992:** *Family allowances in independence* – After regaining independence, Estonia introduced a universal child allowance per child and maintained a modest parental leave (Põldma, 2014). **2004:** *Generous parental salary scheme* – Estonia implemented a path-breaking Parental Benefit in January 2004, paying parents 100% of their pre-tax earnings for 435 days (about 15 months) after childbirth (Puur, 2023). **2008:** *Paternity leave benefit* – A 10-day fully paid paternity leave was introduced for fathers. With compensation at 100% wage, uptake was high (Põldma, 2014).	**No** (Major fertility interventions)
14	**Finland**	Northern Europe	80.1% Christians 19.1% Unaffiliated	1.32 - 1.87	**1985:** *Child Home Care Allowance (HCA)* – A national home-care allowance was introduced, allowing parents to opt for a cash benefit instead of public daycare if they stay home with a child under 3 (Korhonen, 2014). **2003:** *Parental and paternity leave expansion* – The parental leave was extended, and a new 2-week paternity leave (separate from parental leave) was added on top of the daddy month. By 2013, Finland combined these into a 54-day father-exclusive leave (Korhonen, 2014).	**No** (Major fertility interventions)
15	**France**	Western Europe	63.0% Christians 28.0% Unaffiliated 7.5% Muslims	1.79 - 2.03	**1984:** *Allocation Parentale d'Éducation (APE)* – APE was introduced in 1984, granting a parent who interrupts work to raise a third (or later second) child a flat monthly allowance until the child's 3rd birthday. By 1994, APE was extended to second children (Institut national de l'audiovisuel, 1986). **2002:** *11-day paternity leave* – France implemented a paid paternity leave of 11 days for fathers in 2002 (Embassy of France in Washington D.C., 2007).	**Maybe** (Moderate fertility interventions)

16	**Germany**	Western Europe, East Germany as former USSR Satellite state	68.7% Christians 24.7% Unaffiliated 5.8% Muslims	1.36 - 1.6	**1976:** *GDR "Birth Premium" policy* – In East Germany (GDR), the government introduced in 1976 a package to boost births: women having a second child received a 1-year paid parental leave (at ~65% of wage), a one-time birth grant, and improved housing priority (Dolling, 1991). **1986:** *FRG Child-Rearing Benefit (Erziehungsgeld)* – West Germany enacted a child-rearing allowance in 1986 for parents (usually mothers) who stayed home in a child's first 6–24 months. It provided a flat monthly payment and job-protected leave (Ondrich et al., 1996). **2007:** *Elterngeld (Earnings-related parental benefit)* – A landmark reform in 2007 replaced flat Erziehungsgeld with Elterngeld, a 12-month parental leave benefit at ~67% of prior earnings, plus 2 bonus months if the second parent uses them (Geisler, 2012).	**No** (Major fertility interventions)
17	**Greece**	Southern Europe	88.1% Christians 6.1% Unaffiliated 5.3% Muslims	1.29 - 1.5	**None**	**Yes**
18	**Hungary**	Eastern Europe, former USSR Satellite state	81.0% Christians 18.6% Unaffiliated	1.23 - 1.61	**1984:** *GYED paid parental leave* – Hungary launched GYED in 1984, a paid child-rearing allowance for parents until a child's 2nd birthday (at ~70% of previous wage (Hajdú, 2020). **2015:** *"Family Housing Allowance" (CSOK)* – The government launched CSOK, a scheme of grants and subsidized loans for housing, conditional on having children. For example, families committing to have 3 children could receive around 10 million HUF (~€30k) toward a home (European Commission, 2016). **2019:** *Lifetime income-tax exemption and loan for mothers* – In 2019 Hungary announced that women who bear 4 or more children will be exempt from income tax for life. It also offered a "Baby Expecting Loan" – a 10 million HUF interest-free loan to young married couples, forgiven in part for each child born (BBC, 2019).	**No** (Major fertility interventions)
19	**Iceland**	Western Europe	95.0% Christians 3.5% Unaffiliated	1.59 - 2.23	**2000:** *9-month parental leave (3+3+3 model)* – In 2000, Iceland implemented a radical parental leave reform: 3 months for mother, 3 for father, 3 flexible (9 months total at ~80% pay) (Eydal & Arnalds, 2024).	**No** (Major fertility interventions)
20	**Ireland**	Northern Europe	92.0% Christians 6.2% Unaffiliated 1.1% Muslims	1.63 - 2.06	**2000:** *Improved maternity leave* – Statutory paid maternity leave was extended from 14 to 18 weeks in 2001, and further to 22 weeks by 2006, with job protection for 1 year (The Irish Times, 2006).	**Maybe** (Moderate fertility interventions)

					2019: *Paid paternity and parental leave* – Ireland introduced 2 weeks of paid paternity leave in 2016 and in 2019 began a new paid parental leave scheme (Parents' Benefit) offering each parent 5 weeks to use before the child turns 2 (Citizens Information, 2022).	
21	**Italy**	Southern Europe	83.3% Christians 12.4% Unaffiliated 3.7% Muslims	1.24 - 1.46	**1999:** *"Baby Bonus" trial* – Italy experimented with a one-off baby bonus in 1999, giving 1 million lire (~€500) for each second child born that year (Boccuzzo et al., 2008). **2015:** *"Bonus Bebè" and family-friendly reforms* – Italy introduced a means-tested annual baby bonus (approximately €960 per year for lower-income families, per child under age 3) in 2015. It also extended paid parental leave flexibility (European Website on Integration, 2016).	**Maybe** (Moderate fertility interventions)
22	**Kazakhstan**	Central Asia, former USSR	70.4% Muslims 24.7% Christians 4.2% Unaffiliated	2.47 - 3.32	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018).	**No** (TFR above replacement)
23	**Kosovo**	Southern Europe, former SFRY	93.8% Muslims 6.1% Christians	1.51 - 2.44	**None**	**Yes**
24	**Kyrgyzstan**	Central Asia, former USSR	88.0% Muslims 11.4% Christians	2.7 - 3.3	**None**	**No** (TFR above replacement)
25	**Latvia**	Northern Europe, former USSR	55.8% Christians 43.8% Unaffiliated	1.33 - 1.74	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **2002:** *Introduction of earnings-related parental benefit* – Latvia introduced a paid parental leave benefit in 2002 for one parent until the child's 1st birthday, at 50% of previous earnings (later raised to 70%) (Pīlipa, 2018).	**Maybe** (Moderate fertility interventions)
26	**Lithuania**	Northern Europe, former USSR	89.8% Christians 10.0% Unaffiliated	1.27 - 1.7	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018).	**No** (Major fertility interventions)

					1994: *Child Benefit program* – Facing a fertility decline post-independence, Lithuania in 1994 introduced a universal child benefit for children under 3 and a smaller one for 3–16 years (Maslauskaitė & Stankūnienė, 2015). **2004:** *Generous parental leave reform* – Lithuania enacted a new system allowing parents to take paid parental leave until a child's 1st birthday at ~70% salary, and thereafter unpaid up to age 3 with job security (Maslauskaitė & Stankūnienė, 2015). **2008:** *One-off birth grants and housing support* – The government increased the lump-sum birth grant (to about €400 per child) and provided special housing loans for young families with children (Maslauskaitė & Stankūnienė, 2015). **2017:** *Revised parental benefit options* – Lithuania introduced flexible parental benefit choices: either 100% wage for 12 months or 70% for 24 months (Maslauskaitė & Stankūnienė, 2015).	
27	**Luxembourg**	Western Europe	70.4% Christians 26.8% Unaffiliated 2.3% Muslims	1.31 - 1.63	**1999:** *Parental leave introduction* – Luxembourg introduced a 6-month paid parental leave (flat-rate) per parent in 1999 (Feyereisen, 1999). **2017:** *Parental leave reform* – The parental leave system was made more flexible and generous in 2017: parents could take 4 or 6 months full-time (or 8–12 months part-time) with benefits proportional to prior earnings (capped) (Turlan, 2017).	**No** (Major fertility interventions)
28	**Malta**	Southern Europe	97.0% Christians 2.5% Unaffiliated	1.13 - 1.45	**2020:** *Free childcare and benefits increase* – Building on a 2014 scheme that provides free childcare for children under 3 if both parents work, Malta in 2020 raised the children's allowance thresholds to include more middle-class families. - https://www.childcaremalta.mt/wp-content/uploads/2024/04/fcsbrochurewebuse2023.pdf	**Yes**
29	**Moldova**	Eastern Europe, former USSR	97.4% Christians 1.4% Unaffiliated	1.57 - 1.89	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **2018:** *Increased birth allowance* – The government raised the one-time birth grant to 5,645 lei (~€280) in 2018 (Government of the Republic of Moldova, 2018).	**Yes**

30	**Montenegro**	Southern Europe, former SFRY	78.1% Christians 18.7% Muslims 3.2% Unaffiliated	1.65 - 1.98	**None**	**Yes**
31	**Netherlands**	Western Europe	50.6% Christians 42.1% Unaffiliated 6.0% Muslims	1.49 - 1.79	**2005:** *Childcare subsidy expansion* – A new law in 2005 massively expanded childcare subsidies and established that the government, employers, and parents co-fund daycare (Noailly & Visser, 2009).	**Maybe** (Moderate fertility interventions)
32	**North Macedonia**	Southern Europe, former SFRY	59.3% Christians 39.3% Muslims 1.4% Unaffiliated	1.31 - 1.6	**None**	**Yes**
33	**Norway**	Northern Europe	84.7% Christians 10.1% Unaffiliated 3.7% Muslims	1.41 - 1.98	**1998:** *"Kontantstøtte" (Home Care Allowance)* – Norway introduced a cash benefit for parents of 1–2 year-olds who do not use state-subsidized daycare. It was about NOK 3,000/month (Ellinsæter, 2012). **2009:** *Extended parental leave to 46 weeks* – Norway gradually lengthened paid parental leave, reaching 46 weeks at full pay (56 weeks at 80% pay) by 2009, with a 10-week father quota (Nergaard, 2009).	**No** (Major fertility interventions)
34	**Poland**	Eastern Europe, former USSR Satellite state	94.3% Christians 5.6% Unaffiliated	1.26 - 1.48	**1993:** *Tightening of abortion law* – Post-communist Poland enacted one of Europe's strictest abortion laws in 1993, allowing it only for medical reasons or rape (Nowicka, 1996). **2016:** *"Family 500+" program* – In 2016 Poland launched Family 500+, a universal child benefit of PLN 500 (~€120) per month for each second and subsequent child under 18 (later extended to every child (Ministry of Family, Labour and Social Policy, 2017).	**No** (Major fertility interventions)
35	**Portugal**	Southern Europe	91.9% Christians 7.5% Unaffiliated	1.21 - 1.43	**1999:** *Parental leave and benefits* – In late 1990s, Portugal expanded maternity leave to 120 days at 100% pay and created a short (5-day) paternity leave (compulsory) plus optional 15 days. A modest parental leave benefit was also introduced (Cristovam, 1999).	**Maybe** (Moderate fertility interventions)
36	**Romania**	Eastern Europe, former USSR Satellite state	99.0% Christians	1.45 - 1.81	**1965:** *"Celibacy tax"* – To further force higher birth rates, Romania imposed a tax on childless adults under 45 (10% of income) (Nelson et al., 2013). **1966:** *Decree 770 – strict anti-abortion policy* – In a dramatic pronatalist turn, Communist Romania outlawed nearly all abortions in October 1966 and severely restricted access to contraception (Berelson, 1979).	**No** (Major fertility interventions)

37	**Russia**	Eastern Europe, Central Asia, former USSR	73.3% Christians 16.2% Unaffiliated 10.0% Muslims	1.42 - 1.78	**1981:** *Brezhnev's pronatalist program* – The USSR (led by RSFSR/Russia) implemented a major family policy on Jan 1, 1981: maternity leave was extended (77 days pre + 70 post birth) and one-year partially paid childcare leave was introduced, alongside increased child allowances and priority housing for families (Malkova, 2018). **2007:** *"Maternity Capital" program* – In January 2007, Russia introduced Maternal Capital, a hefty certificate (initially ~250,000 rubles, later ~≈ €7,600) awarded to women upon the birth of a second (or higher) child, usable for housing, education, or pension (Slonimczyk & Yurko, 2014). **2018:** *Expansion of maternity capital & housing loans* – In 2018 Russia extended maternity capital to also cover first children (making first-time mothers eligible for a smaller amount) and launched subsidized mortgage programs for families with children (Social Fund of Russia, 2018).	**No** (Major fertility interventions)
38	**Serbia**	Southern Europe, former SFRY	92.6% Christians 4.1% Muslims 3.3% Unaffiliated	1.38 - 1.63	**2018:** *Comprehensive Population Strategy* – Serbia adopted a national strategy and boosted financial aid: a one-time payment of 100,000 RSD (~€850) for first births, 10,000 RSD monthly for second child (up to 2 years), 12,000 RSD for third (up to 10 years), and 18,000 RSD for fourth (10 years). - https://ec.europa.eu/social/BlobServlet?docId=19978&langId=en	**Maybe** (Moderate fertility interventions)
39	**Slovakia**	Eastern Europe, former USSR Satellite state	85.3% Christians 14.3% Unaffiliated	1.27 - 1.63	**None**	**Yes**
40	**Slovenia**	Southern Europe, former SFRY	78.4% Christians 18.0% Unaffiliated 3.6% Muslims	1.38 - 1.64	**None**	**Yes**
41	**Spain**	Southern Europe	78.6% Christians 19.0% Unaffiliated 2.1% Muslims	1.16 - 1.45	**2007:** *National "Baby Cheque"* – The central government, under Zapatero, implemented a universal €2,500 birth grant in 2007 (Warrington, 2010). **2013:** *Comprehensive family plan* – Spain shifted to indirect support: increasing preschool slots for under-3s, extending paternity leave (from 2 days in 2007 gradually to 5 weeks by 2018), and protecting large-family subsidies. By 2018, paternity leave equaled maternity (16 weeks) (Miret-Gamundi et al., 2014).	**No** (Major fertility interventions)
42	**Sweden**	Northern Europe	67.2% Christians 27.0% Unaffiliated 4.6% Muslims	1.52 - 1.98	**1974:** *Universal parental leave (first in world)* – Sweden replaced maternity leave with a 6-month gender-neutral parental leave in 1974, available to either	**No** (Major fertility interventions)

					parent at ~90% of earnings. In 1980, parental leave was extended to 9 months (270 days) in 1980. Flexibility was introduced: leave could be taken part-time over a longer period (Ann-Zofie Duvander & Sofie Cedstrand, 2022; Swedish Institute, 2023). **1995:** *"Daddy month" added* – Sweden introduced a 1-month father's quota in 1995 – one month of leave reserved exclusively for the father (loss if not used) (Duvander et al., 2005). **2008:** *"Maxtaxa" (max childcare fee)* – Sweden capped childcare fees in 2002, making daycare very affordable, and by 2008 guaranteed a daycare spot from age 1 (van den Berg & Siflinger, 2022). **2019:** *Flexible parental leave and continued high support* – By 2019, Swedish parents had 480 days (~16 months) of leave per child (with 3 months reserved for each parent). The benefit level is about 80% of earnings for most of that period (Lidbeck & Boström, 2020).	
43	**Switzerland**	Western Europe	72.7% Christians 20.9% Unaffiliated 4.9% Muslims	1.39 - 1.54	**2005:** *Introduction of paid maternity leave* – After multiple failed referendums, Switzerland finally passed 14 weeks of paid maternity leave (at 80% wage) in 2005 (Girsberger et al., 2023). **2009:** *Family Allowance Act* – A federal law in 2009 set minimum child allowance levels nationwide (~CHF 200 per child/month), ironing out cantonal disparities (Widmer & Zufferey, 2014). **2021:** *Introduction of paternity leave* – In a 2020 referendum, Swiss voters approved 2 weeks of paid paternity leave (effective Jan 2021) (Federal Social Insurance Office, 2022).	**Maybe** (Moderate fertility interventions)
44	**Tajikistan**	Central Asia, former USSR	96.7% Muslims 1.6% Christians 1.5% Unaffiliated	3.14 - 3.46	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018).	**No** (TFR above replacement)
45	**Turkiye**	Southern Europe	98.0% Muslims	1.88 - 2.2	**None**	**Yes**
46	**Turkmenistan**	Central Asia, former USSR	93.0% Muslims 6.4% Christians	3.14 - 3.46	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018).	**No** (TFR above replacement)

					2007: *Baby bonuses and marriage grants* – Under President Berdimuhammedov, Turkmenistan introduced a one-time payment for each newborn (around 250 manat) and provided young couples with wedding allowances (Press, 2008).	
47	**Ukraine**	Eastern Europe, former USSR	83.8% Christians 14.7% Unaffiliated 1.2% Muslims	1.16 - 1.53	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018). **2005:** *Birth grants* – In 2005, Ukraine launched a bold incentive: a one-time "birth payment" that was large relative to income (initially UAH 8,500 for the first child, ~ $1,700, and higher for subsequent children) (Institute for Economics Research and Policy Consulting, 2005).	**Maybe** (Moderate fertility interventions)
48	**United Kingdom**	Northern Europe	64.3% Christians 27.8% Unaffiliated 4.8% Muslims	1.56 - 1.92	**1977:** *Introduction of Child Benefit* – In 1977 the UK launched Child Benefit, a tax-free cash allowance for all children (replacing earlier Family Allowances). Crucially, it included the first-born child for the first time and was paid to the mother (RevenueBenefits, 2009). **1999:** *Working Families Tax Credit (WFTC)* – The Blair government introduced WFTC in 1999 (later reformed into Child Tax Credit), which gave in-work supplements to low-income parents (Inland Revenue, 2011). **2003:** *Paid paternity leave and extended maternity* – Statutory 2-week paternity leave was introduced in 2003 (paid at a flat rate), alongside extending statutory maternity leave to 26 weeks (and then 39 weeks in 2007) (UK Parliament, 2018). **2015:** *Shared Parental Leave (SPL)* – The UK implemented SPL in 2015, allowing parents to share up to 50 weeks of leave (37 weeks paid at low flat rate) after the mother's recovery period (Gangmasters & Labour Abuse Authority, 2015).	**No** (Major fertility interventions)
49	**Uzbekistan**	Central Asia, former USSR	96.7% Muslims 2.3% Christians	2.19 - 3.31	**1981:** *Extended maternity leave under USSR* – As part of Soviet pronatalist policy, working mothers gained up to one year of partially paid leave to care for infants (Malkova, 2018).	**No** (TFR above replacement)

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