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# Do Democracies Enhance the Effectiveness of Low-Fertility Policies? An Analysis Based on International Comparison

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# Do Democracies Enhance the Effectiveness of Low-Fertility Policies? An Analysis Based on International Comparison

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## Abstract

Even some countries, including Northern European countries, which are democracies with well-developed low-fertility policies and significant progress in gender equality, have experienced a decline in fertility rates since around 2010. These trends highlight the role of political systems in addressing low fertility. Understanding whether democracies effectively promote low-fertility policies is essential for informing policies. This study examined whether democracies enhance the effectiveness of low-fertility policies. Specifically, it investigated whether the relationship between public spending ratio on family benefits —a proxy variable for low fertility policies—and total fertility rates differs depending on the degree of democratization among groups and regions. Using panel data for OECD 38 countries from 2010 to 2021, they were categorized into two groups based on their democratization levels. The impact of the family benefits public spending ratio on fertility rates was evaluated across these groups. Additionally, each country was categorized into regional blocs. Based on the interaction term of these regions and the ratio, the differences in the effectiveness of the policies across the regions were examined. The analysis found that, in contexts where democratization was limited, the public spending ratio on family benefits did not increase fertility rates. In contrast, in more democratized contexts, significant effects were observed, suggesting that a higher degree of democratization enhances the efficacy of low-fertility policies. The background of these findings may lie in the fact that democracies foster a supportive environment for effective policies. This may be due to greater political trust, gender equality and universal spending, which enhances citizen satisfaction.

**Keywords**: Total Fertility Rate, Democratization, Low fertility policies, Gender Equality, Social Security spending

## 1. Introduction

Even some countries, including Northern European countries, which are democracies with well-developed low-fertility policies and significant progress in gender equality, have experienced a decline in fertility rates since around 2010. Although the total fertility rate in these countries is below replacement level, it is relatively high. However, the recent declining trend in these countries poses a threat to their institutional advantage. Since democracies tend to prioritize individual interests over social interests more than autocracy-oriented countries, debates may arise regarding how strongly low-fertility policies should be promoted. In other words, to what extent is it acceptable to sacrifice individual interests in addressing low fertility?

Since these arguments are often based on ideology and values, I do not discuss their pros and cons here. Instead, based on objective data, I examine whether democracy is a beneficial system for overcoming low fertility, or in other words, whether democracy plays an important role in effectively implementing low-fertility policies. Specifically, I use panel data for OECD 38 countries from 2010 to 2021, categorize them into two groups based on their degree of democratization, and compare the impact of family benefits public spending ratio—a proxy variable for low-fertility policies—on the fertility rate. I also categorize each country into regions, and from the interaction term between these

and the family benefits public spending ratio, examine whether differences exist in the effectiveness of low-fertility policies among regions with different degrees of democratization. These allow us to clarify the difference in effectiveness across groups and regions.

Regarding the impact of democracy on fertility behavior, some previous studies suggest that democratization suppresses fertility behavior[1,2]. Basso (2015) uses panel data on 69 developed and developing countries from 1870 to 2000, while Fall & Zidi (2022) use panel data on 30 developed and developing countries from 1972 to 2017, finding that democratization leads to a decline in fertility rates based on the influence of the Polity2 indicator from the Center for Systemic Peace. Using individual data (sample size 1,586) from a 2022 survey conducted in Hong Kong, Cheung & Lui (2024) find that people with stronger political support for democracy have lower fertility preferences. Bailey (2009), using macro data from 22 European countries and 4 diaspora countries, finds a relationship between the timing of democratic revolutions and the onset of declining fertility rates (that is, the earlier the democratic revolution, the earlier the start of the decline in fertility rates).

Conversely, using online survey data to examine the impact of political efficacy on fertility intentions in Hong Kong, Taiwan, and Singapore (sample sizes of 1,895, 1,971, and 1,985, respectively), Cheung et al. (2024) find a positive impact of democratization on fertility. Specifically, in Hong Kong and Taiwan, where there are active movements, the higher the political efficacy, the higher the fertility intentions of people who support democratic values, while in Singapore, where there is a lack of active movements, political efficacy has no significant effect on people's fertility intentions. Based on this, it is possible to infer that when political efficacy is high, expectations for society and the future are fostered under a democratic atmosphere, which in turn has a positive impact on fertility. Additionally, Wang & Sun (2016) used country-level macro panel data from 70 developed and developing countries from 1973 to 2011 to demonstrate that the deterioration of political freedom in upper-middle-income countries tends to reduce fertility rates.

Given the results of these previous studies, it can be said that democratization has both positive and negative effects on fertility behavior. However, no previous studies have theoretically, systematically and comprehensively presented both the positive and negative effects of democratization on fertility behavior. Therefore, based on a theoretical framework, I quantitatively compare the effectiveness of low-fertility policies according to the degree of democratization among groups and regions. I believe that low-fertility policies are likely to be successful once a country has achieved a certain level of democratization. This is because, as democratization progresses beyond a certain point, factors that help curb declining fertility come into play.

The next section provides a theoretical explanation of the relationship between democratization and fertility rates, incorporating some of the studies discussed earlier to illustrate the background and positioning of this study. Thereafter, the data and estimation model are explained, and a regression analysis is conducted.

## 2. Background

According to the Economist Intelligence Unit (EIU, 2023), democracy is made up of an electoral process and pluralism, the functioning of governments, political participation, political culture, and civil liberties. When the first four democratic elements are fulfilled, people's political interest and

[1] Conversely, some previous studies suggest that a decline in fertility rates leads to democratization (Sommer, 2018; Wilson & Dyson, 2017).

[2] While numerous studies have examined the impact of low-fertility policies on fertility (Bergsvik et al., 2020; Sobotka et al., 2019), research examining the impact of democratization on fertility remains limited.

involvement tend to increase. For example, when these conditions are met, the voices of minorities and opponents can be respected, public opinion can be reflected in policymaking and execution, and the political interests and involvement of citizens can increase.

According to Mishler & Rose (2001) and Uslaner (2017), political trust increases as democratic elements strengthen. When political trust increases, trust in socio-economic systems, including low-fertility policies, may also increase. According to Ellingsæter & Pedersen (2016), trust in the family policy system lowers the barriers to childcare[3]. In this context, these policies can become more effective, and people can gain a greater sense of security and stability in society. Novelli et al. (2021) and Fiori et al. (2013) demonstrate that fertility intentions decrease when socioeconomic stability declines. According to Cheung et al. (2024), individuals who support democracy tend to have higher fertility intentions when they have high political efficacy. This effect may be particularly evident in contexts where trust in politics is high.

However, based on Cheung and Lui (2024), even if individuals support democratic values, they may become disillusioned when the reality contradicts those values, which in turn reduces their fertility preferences. Additionally, it is worth noting the results of previous studies which suggest that extreme polarization resulting from democratization can also have a negative impact on fertility. According to Iyengar & Westwood (2015), in democratic contexts, partisanship and political polarization tend to intensify. They indicate that in such settings, people's evaluations and behavioral responses to politics often tend to become extreme; however, this kind of emotional engagement with the political atmosphere significantly influences fertility preferences (Cheung et al., 2024). Cheung and Lui (2024) found that in Hong Kong, individuals with high levels of affective polarization and strong support for democracy had lower fertility preferences. Dahl et al. (2022) revealed that Trump's 2016 election victory in the United States led to a sharp and sustained increase in fertility among Republican-supporting counties compared to Democratic-supporting counties.

Additionally, democratization can influence fertility behavior through the expansion of universal social security spending, and the subsequent promotion of low-fertility policies. According to Tavares & Wacziarg (2001), democratization tends to increase public expenditure ratios. In highly democratic countries, electoral process and pluralism, government functioning, political participation, and political culture tend to be robust, which can enhance people's concern for their nation's overall well-being. In turn, this is likely to result in increased universal public expenditure, and greater spending on low-fertility policies. In addition, Inglehart (2009) and Paleologou (2022) posit that democratization leads to increased happiness. Increased spending on low-fertility policies and rising happiness levels can both positively affect fertility.

Furthermore, democratization can influence fertility behavior by promoting gender equality, and encouraging low-fertility policies. Mulligan et al. (2004) argue that democratization tends to enhance civil liberty, while Basso (2015) emphasizes its role in fostering individual freedom. Basso contends that gender equality tends to increase, raising the opportunity costs of childbirth and childcare for women, which may contribute to lower fertility rates, in such contexts. Esping-Andersen & Billari (2015) have established a U-shaped relationship between gender equality and fertility rates[4]. This implies that democratization has both positive and negative indirect effects on fertility through gender equality. Based on Esping-Andersen & Billari (2015), the U-shaped theoretical relationship between

[3] Yamamura and Antonio (2011) demonstrate that trust in others, though not political trust, has a positive effect on fertility rates.

[4] Previous empirical analyses of these relationships include the studies of Arpino et al. (2015), Baizan et al. (2016), and Kolk (2019).

gender equality and fertility rate is explained as follows.

Gender inequality is strong on the left side of the U-shaped curve, indicating that traditional values dominate, with men working and women caring for the household and children. Fertility rates tend to be high in such societies. Toward the bottom of the U-shaped curve, gender equality improves to some extent and women's participation in the workforce rises; however, the adaptation of the socioeconomic system remains incomplete. In other words, in societies like present-day Japan, traditional gender norms remain deeply rooted; therefore, policies to address declining fertility rates are often insufficient, resulting in higher opportunity costs of childbirth and childcare for women. As a result, the burden on women increases, leading to the suppression of marriage and childbirth behaviors.

In societies on the right side of the U-shaped curve, gender equality is more advanced, and there is negligible friction between the socioeconomic system and gender equality, leading to higher fertility rates. For example, as gender equality progresses, better compatibility between childbearing, childcare, and work is fostered by increased male parental leave-taking and reduced male working hours, thereby promoting low-fertility policies. Additionally, traditional gender role norms weaken, leading to increased male participation in housework and childcare, and a reduction of the burden on women.

As previously stated, the key components of democracy—electoral process and pluralism, functioning of government, political participation, political culture, and civil liberties—influence fertility through various pathways. These relationships are illustrated in Figure 1. The impact of democratization on fertility rates over time can be conceptualized as follows. In the process of democratization, gender equality advances, but in the early stages, the socioeconomic system does not function well; thus, the opportunity cost of childbirth and childcare for women increases. In this context, as trust in politics and universal social security spending function insufficiently, the negative effects of democratization outweigh its positive effects.

However, with time, changes in the socioeconomic system adapt to gender equality, policies to support work-childcare balance are enhanced, and the opportunity costs of childbirth and childcare decrease. Consequently, trust in politics and universal social security spending begins to function effectively. In this case, the positive effects of democratization outweigh its negative effects. In other words, a U-shaped relationship can be observed between democratization and fertility. Based on the data used in this analysis, a U-shaped relationship is observed between democratization and total fertility rates (Figure 2)[5].

This U-shaped relationship can be applied to the effects of low-fertility policies on fertility. In other words, in a country where insufficient democratization prevails, low-fertility policies do not have adequate effects, owing to factors such as rising opportunity costs and flaws in the socioeconomic system. However, once democratization has progressed to a certain extent, these policies are thought to rise in effectiveness.

As previously stated, there are no previous studies that theoretically, systematically and comprehensively present both the positive and negative effects of democratization on fertility behavior. Based on a theoretical framework, I compare the effectiveness of low-fertility policies according to the degree of democratization among groups and regions. In this analysis, I categorize

[5] Theoretically, such trends over time can be considered, but when conducting empirical analysis, the relative strength of the positive and negative effects of democratization may differ depending on the country/region, year, and survey method being analyzed. For example, even if the degree of democratization is the same, its impact on fertility may differ depending on the country. This point should be noted.

**Fig. 1** Relationship between democratization and fertility

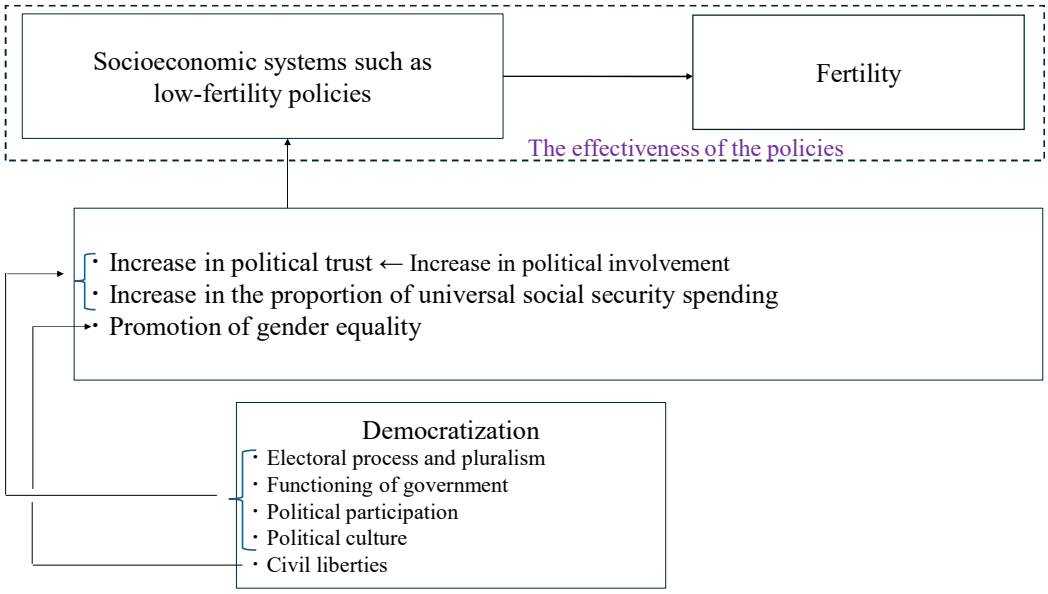
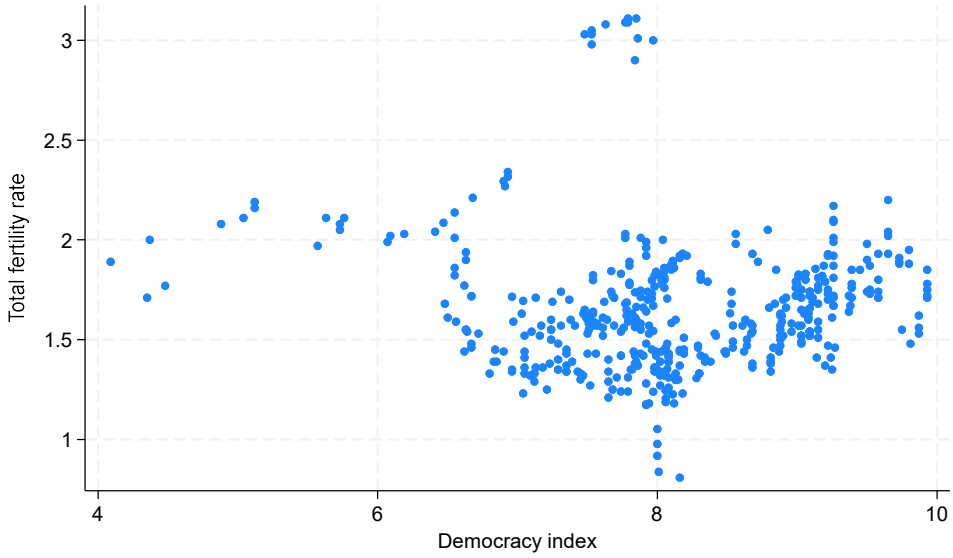



**Fig. 2** Correlation between democracy index and total fertility rate




the sample into groups with strong and weak democracies and use the levels of the family benefits public spending ratio as a proxy variable for low-fertility policies. In this context, the analysis focuses not on the impact of democratization on fertility rates but on how democratization influences the effectiveness of low-fertility policies. This constitutes the novelty of this study. This allows us to clarify the difference in effectiveness across groups and regions. Since differences in democratic systems do not lead to changes in fertility rates as a result of a single-unit change, but the impact on fertility rates varies depending on the large grouping of systems, the methodology of this analysis, which examines the impact on the effectiveness of low-fertility policies, can be considered appropriate.

## 3. Data and Methods

In this analysis, I use macro data by country from 2010 to 2021 as panel data. The reason I target the period from 2010 onward is to cover the period after the fertility rate began to decline, including countries such as Northern European countries[6]. This study aims to verify whether democratization has a positive effect on the effectiveness of low-fertility policies, even in a situation where the fertility is declining in countries such as Northern European countries, which have been policy models of Japan, South Korea, and other countries. The target countries are OECD 38 countries excluding missing values[7]. I limit the scope to OECD member countries with similar characteristics to a certain extent[8].

The estimation model is as follows:

$$TFR_{i,t} = \alpha + \beta_1 POLICY_{i,t} + \beta_2 X_{i,t} + \mu_i + \theta_t + \gamma_{i,t} \ ,$$

where TFR is the dependent variable, total fertility rate[9]; POLICY is the ratio of public spending on family benefits; X is the control variable; μ is the individual effect; θ is the time effect; γ is the error term; i is country, and t is year. All explanatory variables are one period prior to TFR. This is because socioeconomic variables affect pregnancy, and childbirth occurs approximately nine months later[10].

The explanatory variable that I focus on is the ratio of public spending on family benefits, which is a proxy variable that denotes low-fertility policies. This was taken from the Organization for Economic Co-operation and Development (OECD) database and calculated by dividing public spending on family benefits by GDP[11]. According to the OECD, family benefits public spending refers to government spending on families and children and includes child-related cash benefits to families with children, public spending on services (benefits in kind) for families with children, and financial support provided to families through the tax system. It does not include spending on other social policy areas that support families, such as health and housing.

When making estimates, I categorize samples into two groups based on the degree of democracy. The ratio of public spending on family benefits is expected to have a positive impact on the fertility rate as low-fertility policies, but I examine whether this impact differs depending on the level of democratization. Moreover, I categorize each country into regions and, based on the interaction term between these and the ratio of public spending on family benefits, consider whether differences exist in the effectiveness of low-fertility policies among regions with different levels of democratization. For this part of the analysis, I use data from the entire sample.

GDP per capita and unemployment rate are used as control variables. GDP per capita is used to control a country's stage of development, and the expected sign is negative. This is because the wealthier a country, the more the demand for the quality of children exceeds the demand for the

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[6] Furthermore, when covering a long period of time, the possibility of structural changes may make the time period unsuitable for a systematic analysis. In any case, the democracy index discussed later is only available from 2006, and annual data is only obtainable from 2010 onward.

[7] The value of the public spending ratio on family benefits in Costa Rica for 2010 is missing, resulting in Costa Rica having a smaller sample size.

[8] Data on the family benefits public spending ratio is only available from OECD member countries in the first place.

[9] This data is taken from the World Bank's World Development Indicators, and it was updated on June 5, 2025.

[10] However, this case assumes that individuals make immediate decisions about childbearing in response to socioeconomic changes and can conceive immediately afterward. In reality, this is not always the case, and a lag longer than nine months may occur.

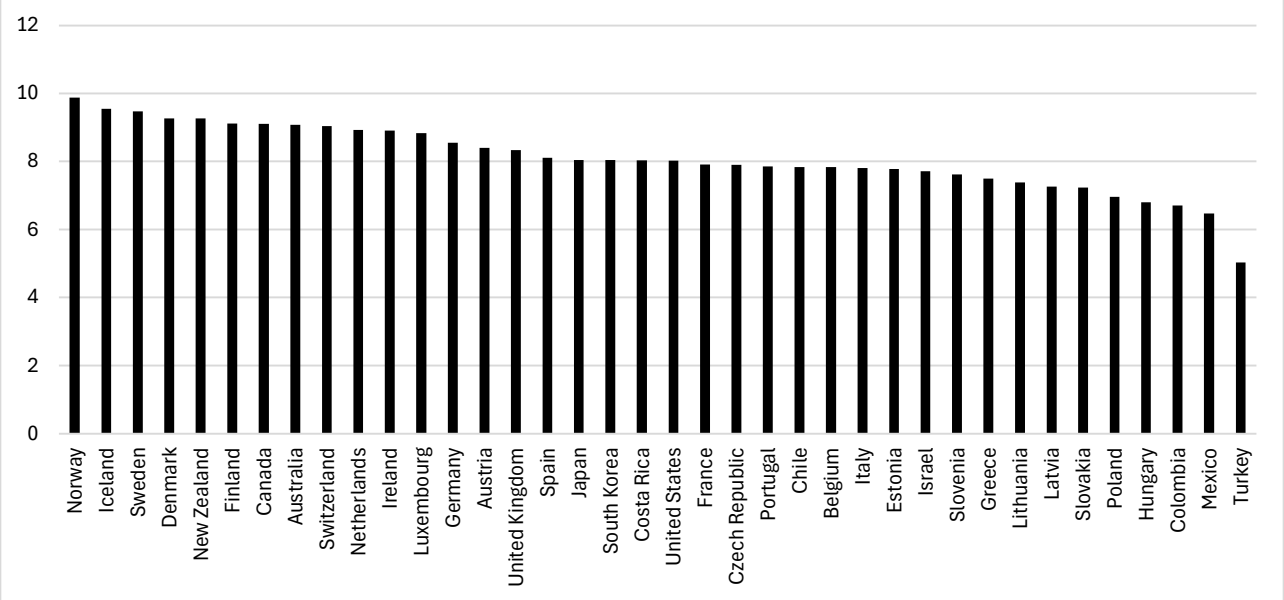
[11] It was updated on May 28, 2025.

quantity, which has a negative impact on the fertility rate. The data are taken from the World Bank's World Development Indicators and are real GDP per capita expressed in constant 2015 US dollars[12]. The unemployment rate is used to control the economy, and the expected sign is negative. This is based on the idea that a bad economy suppresses fertility. This data, like GDP per capita, is taken from the World Bank's World Development Indicators[13].

In the estimation, I categorize countries into two groups based on the degree of democratization. The median democracy index of 8.03 is used as the criterion for this division. Democracy index[14] was created by the Economist Intelligence Unit (EIU) and comprises electoral process and pluralism, functioning of government, political participation, political culture, and civil liberties (EIU, 2023). The higher the value, the more democratization has progressed. Another indicator of democratization is Polity2, provided by the Center for Systemic Peace, which has been used in previous studies. It has the advantage of being able to use data over a long period of time; however, it has a more limited scope in capturing aspects of democratization related to citizen engagement[15]. In this study, I decided to use the democracy index instead of Polity2 to more fully consider democratization at the citizen level, such as gender equality and political trust.

Figure 3 shows the arithmetic mean of the democracy index by each OECD member state in descending order. Japan's level is slightly above the median. France and Belgium are exceptions among countries with well-developed low-fertility policies and significant progress in gender equality and have a lower democracy index than Japan.

**Fig. 3** Democracy index by country




As this analysis uses panel data from 2010 to 2021, the same country may exceed or fall below the median depending on the year and may be categorized into different groups depending on the year. Therefore, I also check whether each year is below the median. In Table 1, if the democracy index is

[12] It was updated on June 5, 2025.
[13] It was updated on June 5, 2025.
[14] Using data from the Democracy Index 2023.
[15] According to the Center for Systemic Peace, Polity2 comprises six elements that assess important characteristics such as executive recruitment, constraints on executive authority, and political competition.

**Table 1** Years when the democracy index by country is below the median

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belgium | | | | | X | X | X | X | X | X | X | X |
| Spain | | X | X | X | | | | | | | | X |
| South Korea | | | | | | X | X | X | X | X | X | |
| Sweden | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | |
| Norway | | | | | | | | | | | | |
| Chile | X | X | X | X | X | X | X | X | X | | | X |
| Ireland | | | | | | | | | | | | |
| United States | | | | | | | X | X | X | X | X | X |
| Estonia | X | X | X | X | X | X | X | X | X | X | X | X |
| Czech Republic | | | | | X | X | X | X | X | X | X | X |
| Hungary | X | X | X | X | X | X | X | X | X | X | X | X |
| Iceland | | | | | | | | | | | | |
| Luxembourg | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | |
| France | X | X | X | X | | X | X | X | X | | X | X |
| New Zealand | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | |
| Netherlands | | | | | | | | | | | | |
| Germany | | | | | | | | | | | | |
| Greece | X | X | X | X | X | X | X | X | X | X | X | X |
| Portugal | X | X | X | X | X | X | X | X | X | | X | X |
| Israel | X | X | X | X | X | X | X | X | X | X | X | X |
| Japan | | | | | | X | X | X | X | X | | |
| Canada | | | | | | | | | | | | |
| Switzerland | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | |
| Australia | | | | | | | | | | | | |
| Slovakia | X | X | X | X | X | X | X | X | X | X | X | X |
| Mexico | X | X | X | X | X | X | X | X | X | X | X | X |
| Turkey | X | X | X | X | X | X | X | X | X | X | X | X |
| Italy | X | X | X | X | X | X | X | X | X | X | X | X |
| Poland | X | X | X | X | X | X | X | X | X | X | X | X |
| Slovenia | X | X | X | X | X | X | X | X | X | X | X | X |
| Latvia | X | X | X | X | X | X | X | X | X | X | X | X |
| Lithuania | X | X | X | X | X | X | X | X | X | X | X | X |
| Colombia | X | X | X | X | X | X | X | X | X | X | X | X |
| Costa Rica | | | | | | X | X | X | | | | |

Note: X indicates years below the median.

below the median for each year, it is marked with an X. In Japan, the index is below the median from 2015 to 2019 but is equal to or above it in the years outside this period. In France, the index is below the median in all years except 2014 and 2019, and in Belgium, it is below the median from 2014 to 2021.

However, Figure 3 and Table 1 show that, overall, the democracy index is high and the period when it falls below the median tends to be short in countries with well-developed low-fertility policies and significant progress in gender equality. The arithmetic mean of the democracy index by region also reveals that the index is high in regions that include countries with well-developed low-fertility policies and significant progress in gender equality (Figure 4). The regional divisions are as shown in Table 2. The Baltic countries are defined as Northern European countries, but because their

**Fig. 4** Democracy index by region

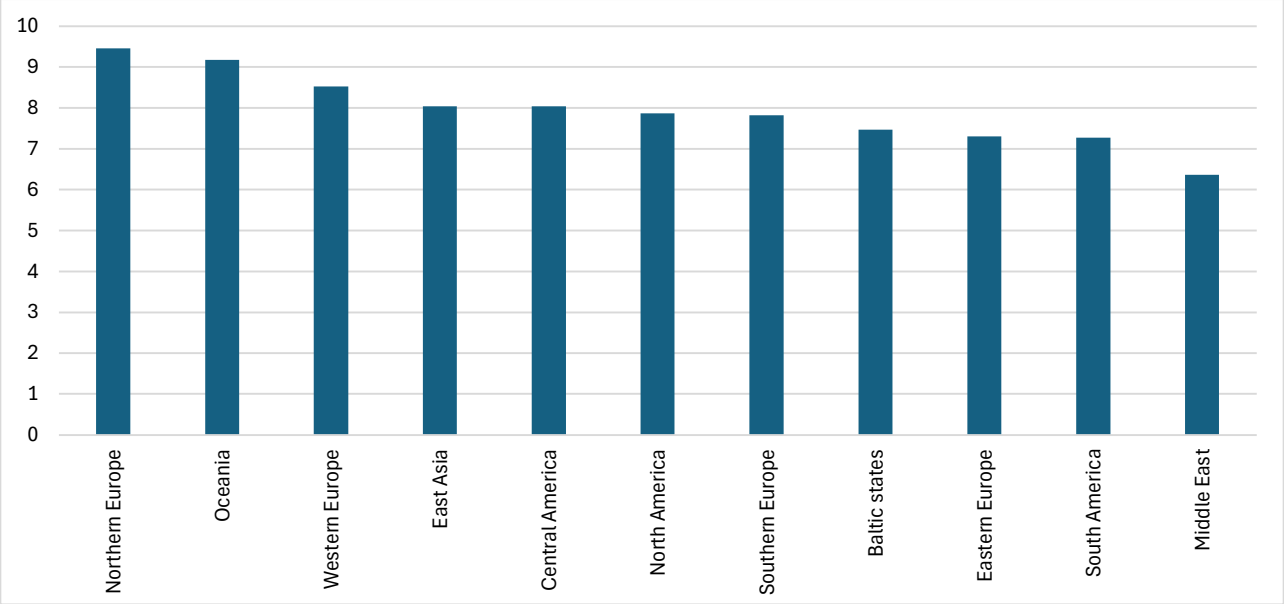



**Table 2** Region and country correspondence table

| | |
|---|---|
| Central America | Costa Rica |
| East Asia | South Korea |
| | Japan |
| Eastern Europe | Czech Republic |
| | Hungary |
| | Slovakia |
| | Poland |
| | Slovenia |
| Middle East | Israel |
| | Turkey |
| North America | United States of America |
| | Canada |
| | Mexico |
| Northern Europe | Sweden |
| | Denmark |
| | Norway |
| | Iceland |
| | Finland |

| | |
|---|---|
| Baltic States | Estonia |
| | Latvia |
| | Lithuania |
| Oceania | New Zealand |
| | Australia |
| South America | Chile |
| | Colombia |
| Southern Europe | Spain |
| | Greece |
| | Portugal |
| | Italy |
| Western Europe | Belgium |
| | Ireland |
| | Luxembourg |
| | Austria |
| | France |
| | United Kingdom |
| | Netherlands |
| | Germany |
| | Switzerland |

democracy index is noticeably low compared to that of other countries and is distinctive, they are not included in the Northern European countries but in the Baltic countries. North America includes Mexico; therefore, its democracy index is lower than that of East Asia and Central America. However, if Mexico's index is excluded, the index is 8.566, which is higher than that of East Asia and Central America.

Because the estimation was based on panel data, I tested whether there are individual effects. Consequently, the existence of individual effects has been demonstrated in all models. In addition, considering the possibility of the individual effects being correlated with the explanatory variables, the estimation was based on a fixed-effects model. In all models, year dummies were added as explanatory variables.

Descriptive statistics for each variable are shown in Table 3. We can confirm that the median value of the democracy index is 8.03.

**Table 3** Descriptive statistics

| Variable name | Mean | Standard deviation | Minimum | Median | Maximum |
|---|---|---|---|---|---|
| Total fertility rate | 1.66 | 0.33 | 0.81 | 1.61 | 3.11 |
| Family benefits public spending ratio (%) | 2.12 | 0.93 | 0.32 | 2.00 | 8.19 |
| Unemployment rate (%) | 7.76 | 4.29 | 2.02 | 6.80 | 27.69 |
| GDP per capita ($) | 35,816 | 22,604 | 5,214 | 35,365 | 110,426 |
| Democracy index | 8.09 | 0.99 | 4.09 | 8.03 | 9.93 |

## 4. Estimation results

Table 4 shows the estimation results for three groups: full sample (cases not including interaction terms), sample with a democracy index below the median, and sample with a democracy index equal to or above the median. First, the results for the full sample show that the family benefits public spending ratio is statistically insignificant, and GDP per capita and the unemployment rate are both statistically significant and negative.

For the below-median group, the ratio of public spending on family benefits and GDP per capita is not statistically significant, and only the unemployment rate is statistically significant and negative. By contrast, for the group with a democracy index equal to or above the median, the ratio of public spending on family benefits is statistically significant and positive, while the other variables are not statistically significant.

These results suggest that low-fertility policies are working effectively to increase the fertility rate in groups with a democracy index equal to or above the median, where democratization has progressed to a certain extent. Conversely, low-fertility policies are not working sufficiently to increase the fertility rate in groups below the median, where democratization has not substantially progressed.

Table 5 shows the estimation results when categorizing each country into regions and adding the interaction terms between these and the family benefits public spending ratio to the full sample estimation model in Table 4. Regional divisions are the same as those in Table 2. This makes it possible to consider whether differences exist in the effects of low-fertility policies among regions with different levels of democratization. As observed, the interaction term is statistically significant and negative in East Asia, Eastern Europe, South America, and the Baltic countries.

**Table 4** Effects of low-fertility policies on fertility rate according to the level of democratization

| Dependent variable: Total fertility rate | Full samples | | Groups with a democracy index below the median | | Groups with a democracy index equal to or above the median | |
|---|---|---|---|---|---|---|
| | coefficient | t-value | coefficient | t-value | coefficient | t-value |
| Family benefits public spending ratio | 0.024 | 0.640 | -0.029 | -0.610 | 0.091 * | 1.720 |
| GDP per capita | -0.000011 *** | -3.070 | -0.000008 | -0.550 | -0.000002 | -0.570 |
| Unemployment rate | -0.028 *** | -4.540 | -0.026 *** | -4.100 | -0.015 | -1.610 |
| Constant | 2.289 *** | 10.440 | 2.165 *** | 7.640 | 1.722 *** | 5.420 |
| FE: country | X | | X | | X | |
| FE: year | X | | X | | X | |
| Observations | 417 | | 211 | | 206 | |

Note: Estimation was performed using a fixed-effects model with robust standard errors.
***, ** and * mean significance at the 1%, 5%, and 10% levels respectively.

**Table 5** Effects of low-fertility policies on fertility rate by region

| Dependent variable: Total fertility rate | coefficient | t-value |
|---|---|---|
| Family benefits public spending ratio | 0.146 *** | 3.420 |
| GDP per capita | -0.0000048 | -1.210 |
| Unemployment rate | -0.024 *** | -4.020 |
| Interaction term with family benefits public spending ratio<br>*The reference category is Western Europe." | | |
| Central America | -0.149 | -0.880 |
| East Asia | -0.274 ** | -2.350 |
| Eastern Europe | -0.160 ** | -2.050 |
| Middle East | -0.313 | -1.550 |
| North America | -0.098 | -0.810 |
| Northern Europe | -0.070 | -0.450 |
| Oceania | 0.125 * | 1.810 |
| South America | -0.301 *** | -4.010 |
| Southern Europe | -0.038 | -0.350 |
| Baltic States | -0.127 * | -1.820 |
| Constant | 1.929 *** | 9.670 |
| FE: country | X | |
| FE: year | X | |
| Observations | 417 | |

Note: Same as Table 4.

Table 6 presents the marginal effects of the interaction terms for each region. In Central America, East Asia, Eastern Europe, Midde East and South America, the fertility rate falls when the family benefits public spending ratio increases by one unit. From Figure 4, these regions are relatively behind in terms of the progress of democracy. Therefore, even when looking at the regions individually, low-fertility policies have no increasing effect on fertility rate but rather have the opposite effect in regions where democracy is lagging behind. In contrast, the marginal effect is positive in countries such as advanced Western and Northern European countries, and the low-fertility policies are functioning normally. However, the marginal effect is positive in Southern Europe, which has a particularly low fertility among countries with a fertility rate below replacement level. The marginal effect for North America is positive but small; this is presumably due to the inclusion of Mexico, which has a low democracy index.

However, as a whole, the results indicate that a necessary condition for low-fertility policies to be effective is the thorough establishment of democracy.

**Table 6** Marginal effects of low-fertility policies on fertility rate by region

| Regions | Marginal effects |
|---|---|
| Central America | -0.002 |
| East Asia | -0.127 |
| Eastern Europe | -0.013 |
| Middle East | -0.167 |
| North America | 0.048 |
| Northern Europe | 0.076 |
| Oceania | 0.271 |
| South America | -0.154 |
| Southern Europe | 0.109 |
| Baltic States | 0.019 |
| Western Europe | 0.146 |

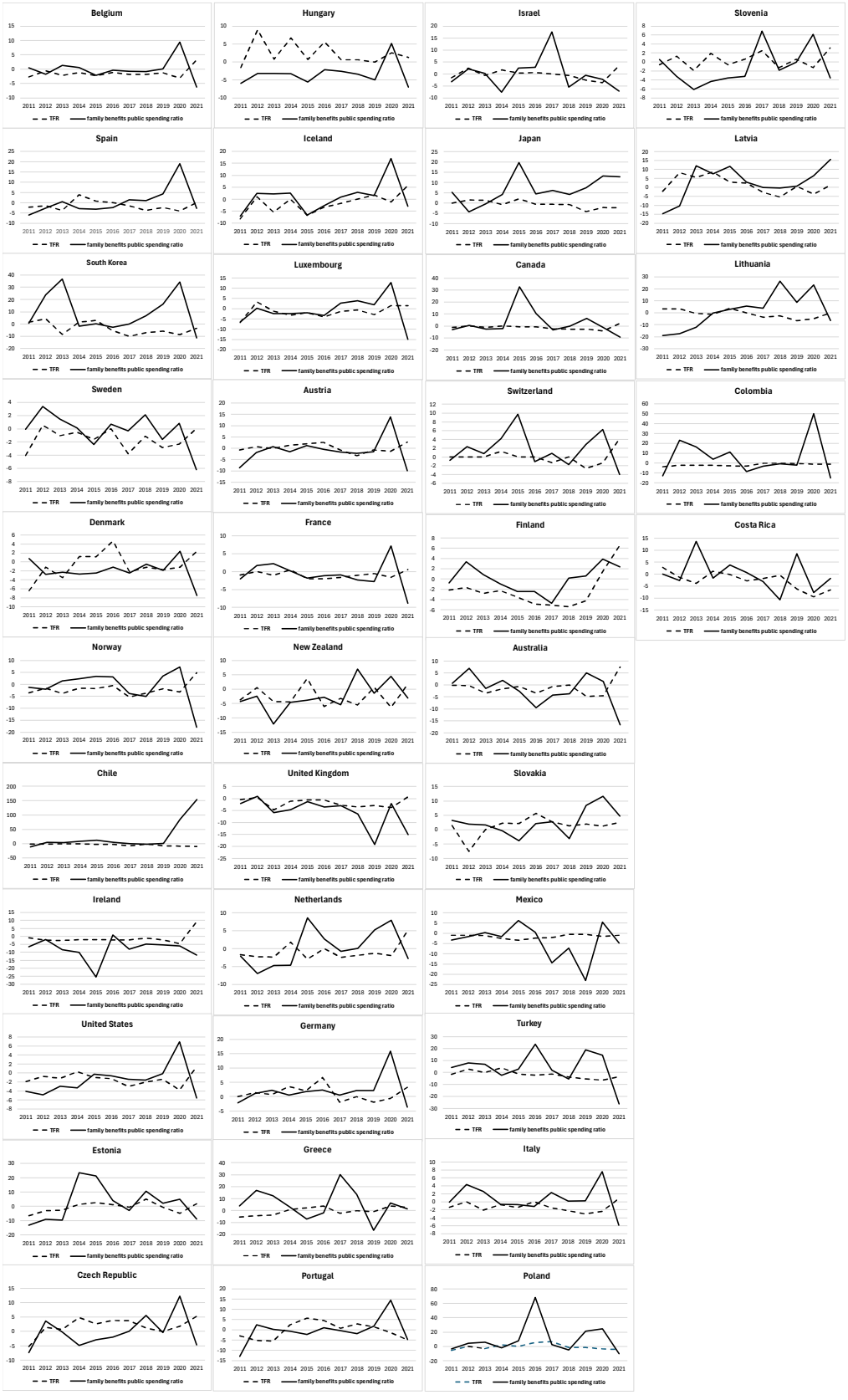
## 5. Discussion

Based on the above results, low-fertility policies are generally effective in contexts with advanced democratization, but not so with less advanced democratization. It is important to note that 8.03 was the democracy index threshold value used to categorize the sample into two groups. As shown in Table 3, within the distribution, this is quite high. Therefore, the impact of the family benefits public spending ratio in groups with a democracy index equal to or above the median (Table 4) can only be interpreted as emerging when democracy has advanced significantly.

Additionally, a key policy implication is that once democratization progresses beyond a certain level, universal social security expenditures become more substantial and happiness levels increase further. At this stage, gender equality has a positive effect on fertility, allowing the positive effects of democratization to outweigh the negative effects. Moreover, when democratization progresses, political trust among people increases, leading to greater effectiveness of low-fertility policies. Furthermore, as Cheung et al. (2024) suggested, political efficacy is likely to be an important factor.

I now discuss the endogeneity issue of the main variable, the public spending ratio on family benefits in the estimation models. Because all estimates are made using a fixed-effects model, the

**Fig. 5** Trends in the growth rate (%) of total fertility rate (TFR) and family benefits public spending ratio



problem of correlation between individual effects and the public spending ratio on family benefits has been eliminated. The problem of endogeneity may arise here due to the reverse causality that the fertility rate has on the family benefits public spending ratio. The government may view the decrease in fertility rate as a problem and thus increase family benefits public spending. In other words, the decline in the fertility rate serves as a motivation to increase these expenditures. Therefore, I examine the extent to which this relationship occurs in each country. Figure 5 shows the trends in the growth rate (%) of the total fertility rate and family benefits public spending ratio for each country. If the public spending ratio on family benefits increases significantly relative to its previous level after a significant relative decrease in the fertility rate, this may indicate that the government increased these expenditures in response to a decline in the fertility rate. This might be a case of reverse causality.

As shown in Figure 5, such a relationship is observed in certain periods for a limited number of countries. For instance, in Sweden, following the declines in the fertility rate from 2014 to 2015, 2016 to 2017 and 2018 to 2019, the family benefits public spending ratio showed an increasing trend. Therefore, the likelihood of such reverse causality is not considered high. Naturally, the endogeneity problem cannot be fully ignored. However, I believe that this study is still significant as it examines the effectiveness of low-fertility policies according to the degree of democratization.

## 6. Conclusion

This study examines the differences in the effectiveness of low-fertility policies on fertility rate across groups and regions. Overall, the results showed that in contexts where democratization had not progressed sufficiently, low-fertility policies, as expressed by the family benefits public spending ratio, had no effect on increasing the fertility rate. However, in contexts where democratization had progressed to a certain degree or more, the effects of the policies were notable. Overall, these results suggest that an enhancement of democracy may be a necessary condition for low-fertility policies to be effective.

Theoretically, the underlying factor behind the relationship between democratization and the effectiveness of low-fertility policies is that the more democratic a country is, the greater gender equality it has, and the more universally it spends to ensure that all citizens feel comfortable and prosperous. Political involvement and trust in the nation are also important factors. Thus, compared to citizens in autocracy-oriented countries, those in democratic countries are likely to have higher overall satisfaction, which in turn fosters more positive attitudes toward reproductive behavior.

The above results can be derived even when using data from 2010 onward, a period during which fertility rates began to decline, even in countries with well-developed low-fertility policies and significant progress in gender equality; the status of these countries can still serve as appropriate models for nations such as Japan and South Korea.

The following points can be cited as study limitations. That is, it will need to be verified using not only macro but also micro data. For example, by grouping individuals according to the level of democratization in the countries in which they reside, it is necessary to examine whether low-fertility policies have a positive impact on individual fertility behavior in countries with high levels of democracy.

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