

An Empirical Study on the Relationship between Happiness and Fertility: A Country-level Analysis

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Received: 25 September 2023 / Accepted: 1 November 2023 /

Published online: 1 December 2023

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Abstract Numerous studies have extensively examined the correlation between parenthood and individual happiness. However, the reciprocal relationship, wherein happiness influences a country's fertility, has received little attention. This paper empirically tests whether countries with higher happiness levels exhibit correspondingly higher fertility rates in over 130 countries from 2005 to 2019 while controlling for the potential mediating factors such as income, education, etc. Through empirical analysis, this paper concludes that happiness is positively associated with fertility rates. Interestingly, when countries are stratified based on income levels, the relationship is not statistically significant for low-income and lower-middle-income countries but significant and positive for upper-income and high-income countries.

Keywords Fertility · Happiness · Income · Subjective well-being

JEL Classification J1 · I3

Introduction

In recent decades, a global trend of declining fertility rates has become a matter of concern for policymakers and demographers due to various factors such as enhanced accessibility to birth control, rising levels of education, increasing urbanization, and changing social norms. Despite

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continuous efforts by governments, the decline in fertility rates persists, and predictions suggest that low fertility rates will likely continue in the coming years. This demographic issue has far-reaching consequences for societies and economies, as it accelerates population decline and presents formidable challenges in reversing the trend. Although extensive research has explored the impact of fertility on happiness, the reciprocal relationship and the impact of happiness on fertility have received relatively limited attention.

This paper empirically studies how happiness accounts for the changes in fertility rates using a dataset with more than 130 countries from 2005 to 2019. Additionally, the paper also examines the potential mediating factors that could exert influence on this association. By conducting empirical research, this paper can provide a comprehensive analysis of the relationship between happiness and fertility rates. The implications of the findings hold significant relevance for policymakers, as they suggest that promoting happiness may constitute a pivotal approach to addressing the declining fertility rates prevalent in numerous countries. The underlying hypothesis posits a positive effect of the happiness index on the fertility rate.

Background

The Problem of Low Fertility Rates

The low birth rate poses a significant challenge as it creates an age structure that accelerates future population decline. As persistently low birth rates continue, finding effective solutions to counteract this trend becomes increasingly complex. The declining trend of birth rates can harm the economy by disrupting its growth cycle in various ways. Specifically, the resulting decrease in fertility rates can lead to a domino effect, leading to a reduction in the labor force, productivity, production, investment, and consumption. Diminished labor productivity contributes to a decreased pool of young individuals available for the workforce, resulting in a decline in labor productivity and a contraction of the domestic market. As the economic situation deteriorates, private enterprise investment declines and consumer spending decreases. This cyclic downturn can further exacerbate the already weakened economy, potentially leading to adverse economic and social outcomes, including labor shortages, aging populations, increased pressure on social welfare systems, and increased public debt.

Happiness and Fertility

There is relatively limited research that examines the relationship between happiness and fertility compared to other areas of research, such as the relationship between education or economic factors and fertility. On top of that, research that investigates how fertility affects happiness is widely conducted, while studies that specifically scrutinize how happiness influences fertility are notably scarce.

There are numerous ways to measure happiness, encompassing subjective and objective measurements. Diener and Suh (1997) emphasize the significance of considering both objective and subjective dimensions of well-being when evaluating the quality of life. It explores various

indicators of quality of life, including subjective measures such as life satisfaction. It discusses the importance of subjective well-being as a complement to economic and social indicators in assessing the overall quality of life. Accordingly, this paper incorporates subjective well-being as an independent variable while controlling for other objective measurements such as income, education level, and related factors.

Investigating how subjective well-being influences fertility is crucial for several compelling reasons. Firstly, according to Stulp and Barret (2016), fertility decisions are influenced by several social, economic, and psychological factors. Among these factors, happiness is a significant psychological component that can significantly shape individuals' decisions (Lerner, 2015). Secondly, Diener and Chan (2011) mention that individuals with higher levels of subjective well-being frequently exhibit enhanced physical health, potentially fostering positive implications for their reproductive capacity. Consequently, greater happiness contributes to improved reproductive health, decreased incidence of fertility-related challenges, and reduced stress levels, all of which foster a conducive environment for successful conception and childbearing.

Literature Review

The relationship between fertility and happiness is complex and multifaceted. Fertility and happiness exhibit a bidirectional relationship, where each can influence the other. The presence of a child can impact an individual's happiness, while conversely, an individual's level of happiness can play a role in influencing their fertility choices. In essence, these two aspects are interconnected, and alterations or fluctuations in one can affect the other. Billari (2009) proposes that in affluent societies, happier individuals tend to have more children, implying that happiness may have a positive influence on fertility rates. On the other hand, the author also states that fertility is often perceived as a means to attain happiness, as individuals and couples anticipate having children to contribute to a more fulfilling life.

Cetre, Clark, and Senik (2016) propose a positive association between fertility and subjective well-being, emphasizing that this positive correlation applies only in developed countries, particularly among individuals over 30 with high incomes. The authors further assert that happier individuals are not only more likely to choose to have children but are also more likely to be selected for parenthood due to factors such as stable relationships or higher income levels. This relationship between parenthood and happiness could be attributed to self-selection, wherein individuals who eventually become parents exhibit higher happiness levels even years before having children, compared to those who will not have children.

Cetre et al. (2016) use individual-level data from World Gallup Poll, European Social Survey (ESS), and the British Household Panel Survey (BHPS) to examine the relationship between happiness and fertility. Notably, their study differs from ours as they focus on examining the relationship between happiness and fertility at the individual level. At the same time, our research explores this relationship at the country level. Furthermore, while their analysis encompasses how fertility affects happiness and vice versa, our study is dedicated to understanding how happiness affects fertility, representing a one-way relationship investigation.

Mencarini, Vignoli, Zeydanli, and Kim (2018) investigate the connection between life satisfaction and fertility in low-fertility countries, including Australia, Germany, Russia, South

Korea, Switzerland, the United Kingdom, and the United States. The authors claim that a positive relationship exists, indicating that higher life satisfaction is associated with an increased likelihood of having children across all the countries examined. Thus, their research provides evidence for the correlation between happiness and fertility in low-fertility societies. However, it is essential to note that their study is confined to developed low-fertility countries, while our paper extends its scope to encompass both developed and developing countries.

Econometric Framework

To investigate the causal relationship between happiness and total fertility rate at the country level, the following regression model is used:

$$\begin{aligned} fertility_{it} = & \beta_0 + \beta_1 happiness_{it} + \beta_2 lngdppc_{it} + \beta_3 lngdppc^2_{it} + \beta_4 flfp_{it} + \beta_5 education_{it} \\ & + \beta_6 urbanization_{it} + \alpha_i + \gamma_t + \varepsilon_{it} \end{aligned}$$

It examines the causal relationship between fertility rates and happiness. Where $fertility_{it}$ is the fertility rate, which is the number of births per woman of a country i in year t . Moreover, $happiness$ stands for happiness index; $lngdppc$ stands for log GDP per capita; $flfp$ stands for female labor force participation rate; $education$ stands for gross female secondary education enrollment rate; $urbanization$ stands for the percent of the urbanization. These coefficients capture the impact of each variable on the fertility rate, controlling for other factors included in the model. The empirical analysis aims to estimate these coefficients and assess their statistical significance to understand the relationship between happiness and fertility, among other factors. α_i indicates the country fixed effect. γ_t is a year-fixed effect. ε_{it} captures unexplained random shocks.

Numerous studies have proposed that various economic factors contribute to fluctuations in fertility rates. For instance, Sobotka, Skirbekk, and Philipov (2022) states the impact of economic recessions on fertility in developed countries, indicating that indicators such as declining GDP levels, decreasing consumer confidence, and rising unemployment play a role in shaping fertility patterns.

The correlation between fertility and income has been a subject of extensive discussion in the literature. Doepke, Hannusch, Kindermann, and Tertilt (2022) claim that the relationship between fertility and income has undergone a shift from negative to positive among high-income countries in the 21st century. With the introduction of Becker's economic model of decision-making on childbearing (Becker, 1960), past literature commonly asserts a negative association between fertility and income, citing the tradeoffs between quantity and quality in fertility decisions. However, the recent findings by Doepke et al (2022) challenge this conventional view, revealing that the negative relationship between income and fertility in high-income countries has flattened and even reversed in some instances since the 21st century.

The impact of female labor participation on fertility has been a significant topic of research. Doepke et al (2022) further mention that the effect of female labor force participation on fertility has also changed in the new era. Before 1980, there was a negative association between

female labor participation rate and fertility, driven by the perceived tradeoff between career and childbearing. Nevertheless, the relationship shifted to a positive from 1990 onwards, challenging previous findings such as Kogel (2004), which indicates a persistently negative link between fertility and female employment among OECD countries during the 1980s. Similarly, Rindfuss, Guzzo, and Morgan (2003) investigate the correlation between fertility and female labor participation in 22 low-fertility countries, finding that the association was strongly negative until the 1980s but turned positive during the 1980s and the positive relationship strengthened further since 1990. Moreover, Afzali and Rostovskaya (2022) analyze the impact of economic indicators, including female labor force participation and the unemployment rate, on the total fertility rate in Iran. They concluded that female labor force participation negatively correlates with fertility, while male labor force participation shows a positive correlation. These findings collectively emphasize the evolving and complex nature of the relationship between female labor participation and fertility.

This research hypothesizes that there is a positive relationship between the fertility rate and the happiness index. To empirically examine this relationship, this paper uses panel regression with fixed effects and 2SLS panel regression with fixed effects. The instrumental variables used for 2SLS panel regression with fixed effects are the degree of corruption and degree of freedom. The regression analyses are conducted separately for five income classifications: no income classification group, low-income group, lower-middle-income group, upper-middle-income group, and high-income group. Therefore, a total of ten regression analyses are conducted, each utilizing different methods while controlling for other relevant variables.

The reason for employing 2SLS in examining the relationship between fertility and happiness is to mitigate the endogenous effect. Endogeneity arises from the possible bidirectional relationship between fertility rate and happiness, where one can influence the other. To tackle this issue, corruption and freedom are introduced as instrumental variables for happiness, as they are theoretically related to happiness but not directly linked to the fertility rate. By doing so, we aim to address the endogeneity problem and obtain more reliable results in our analysis.

Corruption and freedom satisfy the criteria of relevance and exogeneity as instrumental variables. Firstly, these variables are theoretically relevant to happiness since they can significantly influence individuals' well-being and perception of life satisfaction. Secondly, these variables are considered exogenous in the context of the fertility rate and happiness relationship. This implies that while they do not directly affect the fertility rate, they may exert an indirect influence through their impact on happiness. By satisfying these criteria, corruption and freedom serve as appropriate instrumental variables to address endogeneity concerns and yield more robust estimates of the association between happiness and fertility rate.

According to the correlation matrix in Table 1, it is evident that the degree of corruption and degree of freedom exhibit a noticeable correlation with the happiness variable, whereas the correlation with the fertility variable is relatively weak. In this regard, the degree of corruption and degree of freedom variables prove to be suitable candidates for serving as instrumental variables for the happiness variable. Accounting for instrumental variables in the model becomes crucial to avoid biased results in assessing causal effects, particularly in scenarios where correlations exist between the independent variables. Neglecting the inclusion of instrumental variables could introduce bias due to the presence of omitted variables that might impact both happiness and fertility outcomes.

Table 1 Correlation Matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| (1) fertility | 1.00 | | | | | | | |
| (2) happiness | -0.59 | 1.00 | | | | | | |
| (3) lngdppc | -0.83 | 0.79 | 1.00 | | | | | |
| (4) feducation | -0.83 | 0.72 | 0.86 | 1.000 | | | | |
| (5) flfp | -0.11 | 0.27 | 0.21 | 0.23 | 1.000 | | | |
| (6) urbanization | -0.66 | 0.72 | 0.83 | 0.75 | 0.17 | 1.000 | | |
| (7) corruption | 0.12 | -0.42 | -0.32 | -0.28 | -0.27 | -0.31 | 1.000 | |
| (8) freedom | -0.28 | 0.55 | 0.38 | 0.41 | 0.32 | 0.31 | -0.54 | 1.000 |

Source: Elaborated by the authors.

Data and Sample

Source of Data

The data for this research are obtained from two primary sources: the World Development Indicators provided by the World Bank and the World Gallup Poll. The dataset comprises information on various indicators, including the total fertility rate, happiness index, GDP per capita, gross female secondary education rate, female labor force participation rate, and urban population for more than 130 countries from 2005 to 2019. Specifically, the World Development Indicators offer data on the total fertility rate, GDP per capita, gross female secondary education rate, female labor force participation rate, and urban population. At the same time, the World Gallup Poll provides data on the happiness index, degree of corruption, and degree of freedom.

To ensure data completeness, specific countries or years with missing data were excluded from the analysis, resulting in variations in the datasets used for each analysis. The datasets from the World Bank and World Gallup Poll were merged by aggregating the data by country and year. Thus, the unit of observation in our analysis is country by year. Table 2 presents the summary statistics of the data utilized in this study.

Table 2 Summary Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|--------------|------|-------|-----------|------|--------|
| fertility | 2370 | 2.85 | 1.49 | 0.92 | 7.61 |
| happiness | 1779 | 5.46 | 1.13 | 2.38 | 8.02 |
| lngdppc | 1765 | 9.35 | 1.17 | 6.64 | 11.65 |
| feducation | 1671 | 0.83 | 0.31 | 0.04 | 1.75 |
| flfp | 2370 | 0.57 | 0.17 | 0.06 | 0.89 |
| urbanization | 2370 | 58.52 | 22.58 | 9.38 | 100.00 |

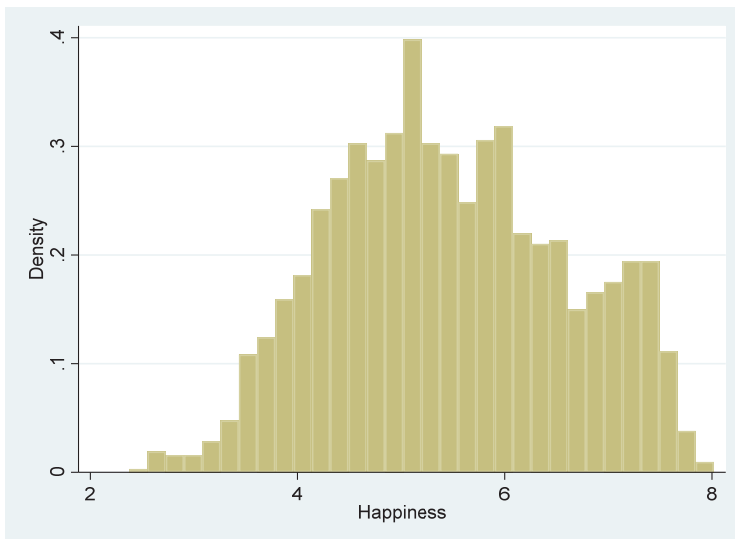
Note: feducation and flfp are denoted in decimals.

Dependent Variable

The total fertility rate is calculated as the number of births per woman. According to the World Bank, it represents the average number of children a woman would have during her reproductive years, assuming she follows the age-specific fertility rates of the given year until the end of her childbearing age. It is important to note that in countries without reliable vital registration systems, fertility rates are estimated using extrapolations based on the trends observed in previous censuses or surveys.

Key Experimental Variable

Happiness is measured using the Cantril Ladder scale, as referenced in the World Happiness Report. The World Gallup Poll provides this survey data. Respondents were requested to rate their present level of happiness by selecting a scale on a ladder that represents their perception of happiness ranging from 0 to 10, with 0 representing the worst possible life and 10 representing the best. In Figure 1, we observe a normally distributed histogram displaying the distribution of happiness data from 2005 to 2019 across all countries. The minimum happiness response in the data is 2.375, while the maximum happiness response is 8.019. It results in a range of 5.644, capturing the difference between the lowest and highest happiness levels reported.



Source: Elaborated by the authors.

Fig. 1 Histogram of Happiness from 2005 to 2019

Subjective well-being data collected over several years serves as a reliable source to measure happiness. According to the World Happiness Report, subjective well-being exhibits significant reliability at the group or national level. It is because individual-level random fluctuations and personality differences are smoothed out, while the overall changes in average life circumstances

from year to year are relatively small. Contrary to objective happiness indices, such as income level or GDP per capita, which suggest that wealthier countries are universally happier, subjective well-being measurements recognize that higher income does not necessarily equate to greater individual happiness than those with lower incomes. Thus, by utilizing subjective well-being as the measure of happiness instead of income, this paper avoids potential biases in its results.

Other Independent Variables

GDP per capita, according to the World Development Indicators, is calculated as the gross domestic product divided by midyear population, and it is presented in constant 2015 U.S. dollars. Moreover, the natural logarithm of the squared GDP per capita is also included as a variable to capture the nonlinear relationship between GDP per capita and fertility. As countries with higher income levels tend to invest in policies to increase fertility rates, a nonlinear tendency arises where higher GDP can lead to a subsequent recovery in fertility rates.

Female secondary school enrollment (% gross) has been used as a control variable for female education. The female labor force participation rate represents the economically active female population between the ages of 15 and 64 who provide their labor to produce goods and services within a specified period. Additionally, the percentage of the urban population, as identified by the National Statistical Office, is considered to account for urbanization effects.

Instrumental Variables

The degree of corruption and degree of freedom is used as instrumental variables in the 2SLS regression. The data on the degree of corruption and the degree of freedom is downloaded from the World Gallup Poll. To gauge the degree of corruption in each country, respondents are asked two questions: 1. Whether corruption is widespread within the business in the respondents' country; 2. Whether corruption is widespread throughout the government in the respondents' country. As for the degree of freedom, the survey assesses whether the individuals are satisfied or dissatisfied with the freedom to make choices in their own country.

Empirical Result

Analysis Including All Countries

Table 3 presents the regression results with no income classification. The analysis provides robust support for the hypothesis of a positive relationship between happiness and fertility. Two regression models were conducted, and the results indicate statistical significance for happiness in both cases: column (1) at a 0.1% level and column (2) at a 1% level.

To ensure that country and year are controlled, every regression is run with country-fixed effects and year-fixed effects. Each regression includes a different number of countries: 145 countries for column (1) and 139 countries for column (2).

Table 3 Analysis Results Including All Countries

| Country Classification VARIABLES | No Income classification | |
|-------------------------------------|--------------------------|-----------------------|
| | (1) Panel fertility | (2) 2SLS fertility |
| happiness | 0.056*** (0.012) | 0.130** (0.045) |
| lngdppc | -5.042*** (0.378) | -5.374*** (0.422) |
| lngdppc ² | 0.282*** (0.021) | 0.288*** (0.024) |
| feducation | -0.111 (0.068) | -0.156* (0.070) |
| flfp | 0.054 (0.211) | -0.033 (0.220) |
| urbanization | -0.023*** (0.004) | -0.015*** (0.004) |
| Constant | 25.823*** (1.758) | 27.574*** (1.943) |
| Country fixed effects | Yes | Yes |
| Year fixed effects | Yes | Yes |
| Observations | 1,288 | 1,233 |
| Number of countries | 145 | 139 |
| R-squared | 0.462 | |

Note: The dependent variable is the total fertility rate. The unit of observation is country by year. The degree of corruption and degree of freedom is used as instrumental variable of happiness in 2SLS regression analysis. Robust standard errors are in parentheses. * Significant at 5%, ** Significant at 1%, *** Significant at 0.1%.

Source: Elaborated by the authors.

In Table 3, specifically in column (1), we present the outcomes of the panel regression, highlighting the primary estimates concerning the impact of happiness on fertility. Based on our hypothesis, happiness exhibits a positive and statistically significant effect on fertility. For the panel regression in column (1), the estimated coefficient of the variable happiness is 0.056, which is statistically significant at a 0.1% level. It indicates that a one-unit increase in happiness corresponds to a 0.056 percentage points rise in fertility. In other words, when the respondents rate their happiness one level higher on the Cantril Ladder Scale, their fertility increases by 0.056 points.

Similarly, in column (2) of Table 3, we observe a positive and significant estimate of the effect of happiness on fertility. Column (2) presents the result of the 2SLS regression. The estimated coefficient of the variable happiness is 0.130, which is statistically significant at a 1% level. As mentioned earlier, the difference between the lowest happiness and the highest happiness levels is 5.644. This implies that the difference in fertility, based on happiness, between the happiest country and the unhappiest country is 0.733. This resulted from the coefficient of the happiness variable (0.13) multiplied by the difference between the highest and lowest happiness levels (5.644). In conclusion, we find a robust positive relationship

between happiness and fertility, as evidenced by the statistically significant results in both columns (1) and (2) of Table 3 at the 0.1% and 1% levels.

Regarding the relationship between GDP per capita and fertility, we observe a U-shaped pattern, with the minimum point occurring at around 20,000 dollars. This outcome aligns with the argument of Becker (1960) that income and fertility are connected, wherein higher income is typically associated with lower fertility due to trade-offs individuals face when deciding on the number and quality of children. However, as the income level reaches 20,000 dollars, the fertility rate increases, leading to a U-shaped correlation between income and fertility. Countries with higher income levels have invested in boosting fertility rates, resulting in a non-linear relationship where higher GDP can subsequently facilitate a rebound in fertility rates.

Furthermore, 2SLS panel regression with fixed effects in column (2) of Table 3 reveals a negative effect of female secondary education on fertility. This observation aligns with the findings of Afzali et al. (2022) that female labor force participation is negatively correlated with fertility. Also, we find a negative relationship between urbanization and fertility, indicating that as a country becomes urbanized, fertility tends to decrease.

Analysis by Income Group

After conducting regression analysis and concluding that fertility accounts for the change in fertility rates, an intriguing question arises regarding the potential persistence of a strong positive association even after categorizing countries based on income levels. Thus, this paper further tests whether the robust positive correlation remains valid as the regression is run separately for countries with different income classifications as provided by the World Bank.

Table 4 demonstrates a summary of statistics of fertility rates categorized by country income level. Low-income countries exhibit the highest fertility rates among the four income classifications. There is a tendency that as the country has lower income, the fertility rates are high. Consequently, the fertility rates rank from highest to lowest in the following order: low-income countries, lower-middle-income countries, upper-middle-income countries, and high-income countries. Specifically, the average fertility rate for low-income countries is 5.339; for lower-middle-income countries, it is 3.344; for upper-middle-income countries, it is 2.210; for high-income countries, it is 1.710.

Table 4 Summary statistics of fertility rates by country income level

| Country Income Level | Obs | Mean | Std. dev. | Min | Max |
|-----------------------------|-----|-------|-----------|-------|-------|
| Low-income country | 360 | 5.339 | 0.958 | 2.771 | 7.612 |
| Lower-middle-income country | 645 | 3.344 | 1.183 | 1.213 | 6.461 |
| Upper-middle-income country | 645 | 2.210 | 0.715 | 1.219 | 4.534 |
| High-income country | 705 | 1.710 | 0.424 | 0.918 | 3.417 |

Source: Elaborated by the authors.

While governments of developed countries implement policies that target increasing fertility rates that can encourage fertility rates, governments of developing countries aim to lower fertility rates. Approximately half of the developing countries have implemented policies to reduce fertility rates, as reported by the United Nations (2021). The World Population Conference held

in Bucharest in 1974 led to the adoption of the World Population Plan of Action, prompting around 160 countries to initiate family planning policies to control population growth by 2013 (United Nations, 2021).

If happiness has a positive effect on fertility across all country groups, an increase in happiness implies that it would benefit population policies in advanced countries. However, it could have the opposite effect in developing countries. This suggests that the relationship between happiness and fertility may vary depending on the country's level of development.

Low-income & Lower-middle-income Countries

Table 5 demonstrates the result of panel regression and 2SLS regression explicitly conducted for low-income and lower-middle-income countries. None of the regression results in Table 5 exhibit a significant correlation between happiness and fertility. This result demonstrates that happiness does not have an impact on fertility rates in low-income countries and lower-middle-income countries.

Table 5 Analysis Results of Low-income and Lower-middle-income Countries

| Country Classification VARIABLES | Low-income countries | | Lower-middle-income countries | |
|-------------------------------------|------------------------|-----------------------|-------------------------------|-----------------------|
| | (1) Panel fertility | (2) 2SLS fertility | (3) Panel fertility | (4) 2SLS fertility |
| happiness | 0.012 (0.023) | 0.301 (0.162) | -0.007 (0.022) | -0.057 (0.145) |
| lngdppc | -5.507** (1.646) | -1.111 (3.765) | -4.017** (1.471) | -4.003** (1.533) |
| lngdppc ² | 0.361** (0.107) | 0.063 (0.253) | 0.221* (0.086) | 0.220* (0.089) |
| feducation | -0.114 (0.251) | -0.077 (0.425) | -0.173 (0.198) | -0.249 (0.280) |
| flfp | -6.236*** (0.656) | -4.415** (1.451) | -1.099** (0.403) | -1.074* (0.434) |
| urbanization | 0.014 (0.010) | -0.022 (0.025) | -0.040*** (0.008) | -0.039*** (0.009) |
| Constant | 30.252*** (6.500) | 12.869 (14.721) | 23.617*** (6.289) | 23.843*** (6.586) |
| Country fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 144 | 141 | 303 | 293 |
| Number of countries | 21 | 21 | 40 | 40 |
| R-squared | 0.938 | | 0.602 | |

Note: The dependent variable is the total fertility rate. The degree of corruption and degree of freedom is used as instrumental variable of happiness in 2SLS regression analysis. Robust standard errors are in parentheses. * Significant at 5%, ** Significant at 1%, *** Significant at 0.1%.

Source: Elaborated by the authors.

Cetre et al. (2016) highlight that in developed countries, the connection between parenthood and happiness is influenced by the choice to have children. In contrast, low-income countries already experience high fertility rates, resulting in larger average household sizes. Consequently, parents' decisions about childbearing in these developing countries may be less dependent on their happiness, as households already tend to have more children than developed countries. Moreover, the relationship between happiness and fertility in developing countries may not be significant due to the prevalence of higher-than-desired household sizes, which could be attributed to limited access to birth control options. The lack of accessible birth control options in developing countries could result in a higher number of children than desired due to the unmet need for contraception.

Furthermore, governments in developing countries actively implement policies to reduce the birth rates, which may lead to less social acceptance or encouragement of larger families. Therefore, the positive correlation between happiness and increased fertility observed in developed countries may not be explanatory in the context of developing nations.

Upper-middle-income & High-income Countries

Unlike statistically insignificant results observed in low-income and lower-income countries, upper-middle-income countries show a positive effect of happiness on fertility. For the upper-middle-income countries in Table 6 column (1) and column (2), 37 and 34 upper-middle-income countries have been analyzed, respectively; for the high-income countries in Table 6 column (3) and column (4), 46 and 43 high-income countries have been analyzed respectively.

Except for the 2SLS regression for the upper-middle-income countries, all other results demonstrate a positive and statistically significant impact of happiness on fertility rates. The results are statistically significant at 1% and 0.1%. Unlike analysis results with all countries and analysis results of low and upper-middle-income countries, the relationship between income and fertility is positive in upper-middle-income countries and high-income countries. This aligns with the findings of Doepke et al. (2022), who reported a leveling off and, in some cases, a reversal of the previously negative association between income and fertility in high-income countries during the 21st century. Thus, the outcomes presented in Table 6 empirically prove the argument of the existing literature through country-level analysis.

Most importantly, happiness, a subjective measure, positively and significantly influences fertility, an objective measure. The data asks about the happiness level, and surprisingly, these subjective data are significant and correlated with the country's fertility.

In developed countries, individuals with higher happiness are more likely to exhibit an increased birth rate, as they hold a greater optimism regarding the conducive environment for child-rearing than individuals in developing countries. The desire for a better environment and happier surroundings to raise a child plays a significant role in this phenomenon. The presence of superior infrastructures, well-functioning health systems, and improved economic status in developed nations serves as a catalyst, leading to a higher prevalence of childbearing among their populations. As a result, people in developed countries feel more secure and optimistic about raising a family, resulting in a positive correlation between happiness and higher birth rates, in contrast to less developed countries. The availability of advanced healthcare, educational opportunities, and stable economic conditions creates an atmosphere of reassurance and opportunity,

encouraging individuals or couples to consider expanding their families.

To understand why the relationship between fertility and happiness is positive and significant, it is crucial to comprehend desired parenthood. Individuals with high happiness levels may have a greater desire for parenthood and experience a stronger emotional motivation to have children. They may perceive parenthood as a source of joy, fulfillment, and meaning in their lives, leading to a higher likelihood of choosing to have children. When people feel happy and optimistic about life, they often develop a strong desire to pass on that happiness to the next generation and create a loving and caring family. This makes them more likely to actively decide to become parents because they see parenthood as a way to find profound happiness and leave a remarkable legacy of love and joy in their own lives and the lives of their children.

On top of that, higher happiness levels often correlate with stronger relationships and greater satisfaction with one's partner. Couples who are happier in their relationships may be more inclined to start a family and share the experience of raising children. Additionally, high happiness levels can indicate emotional well-being and a sense of stability in life. When individuals feel emotionally and financially secure, they may be more willing to take on the responsibilities and financial demands of raising children.

Table 6 Analysis Results of Upper-middle-income and High-income Countries

| Country Classification | Upper-middle-income countries | | High-income countries | |
|------------------------|-------------------------------|-----------------------|------------------------|-----------------------|
| | (1) Panel fertility | (2) 2SLS fertility | (3) Panel fertility | (4) 2SLS fertility |
| happiness | 0.054** (0.020) | 0.092 (0.088) | 0.073*** (0.018) | 0.186** (0.063) |
| lngdppc | -5.790*** (1.554) | -10.352*** (2.035) | 4.208** (1.517) | 1.220 (1.927) |
| lngdppc ² | 0.335*** (0.080) | 0.545*** (0.099) | -0.185* (0.072) | -0.058 (0.088) |
| feducation | 0.226* (0.095) | -0.199 (0.106) | -0.282*** (0.066) | -0.209*** (0.061) |
| flfp | -0.132 (0.305) | -0.846** (0.316) | -0.127 (0.323) | 0.362 (0.361) |
| urbanization | -0.024*** (0.005) | -0.003 (0.009) | 0.002 (0.007) | -0.005 (0.007) |
| Constant | 28.118*** (7.540) | 51.622*** (9.866) | -22.388** (8.057) | -5.688 (10.516) |
| Country fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 344 | 327 | 485 | 460 |
| Number of countries | 37 | 34 | 46 | 43 |
| R-squared | 0.436 | | 0.300 | |

Note: Identical with the note of the previous table.

Source: Elaborated by the authors.

Conclusion

In conclusion, this paper has examined the relationship between happiness and fertility rates in over 130 countries from 2005 to 2019, aiming to provide a comprehensive analysis of an understudied area of research. The results of this study contribute to the existing literature on the topic by shedding light on the relationship between happiness and fertility rates. While previous research has predominantly focused on how fertility affects happiness, this paper highlights the importance of investigating the opposite direction: how happiness influences fertility decisions. The findings of this research support the hypothesis that happiness indeed exerts a positive influence on fertility rates.

The empirical evidence presented in this paper demonstrates that countries with higher happiness levels are more likely to have a higher fertility rate, even after controlling for various individual and contextual factors such as income, education, and labor force participation rate. These findings suggest that promoting happiness and well-being could be a key strategy for policymakers to address the challenges posed by declining fertility rates by controlling corruption or enhancing freedom.

The relationship between happiness and fertility is strongly positive for upper-middle-income and high-income countries. For comparatively high-income countries, increased happiness may be a factor for parents to have more children. Since childbearing is more of a matter of choice in developed countries, happiness positively affects fertility rates. In developed countries, individuals with higher happiness levels tend to have a higher birth rate due to their optimistic outlook on the conducive environment for child-rearing. The desire for a better environment and happier surroundings plays a significant role in this relationship, with superior infrastructures, functional health systems, and improved economic status as catalysts for increased childbearing. As a result, due to desired parenthood, relationship satisfaction, and emotional and financial stability, people in developed nations feel more secure and optimistic about raising a family, leading to happiness and increasing birth rates.

On the contrary, the effect of happiness on fertility is statistically insignificant in developing countries. In many developing countries, the desire for parenthood, relationship satisfaction, or emotional stability may not be the primary driving factors behind further increases in fertility. Factors like having larger family sizes and less favorable societal perceptions towards having children may account for the limited significance of happiness in explaining fertility patterns.

In conclusion, this empirical study provides compelling evidence supporting a positive correlation between happiness and fertility rates in upper-middle-income and high-income countries. The findings hold significant implications for policymakers, highlighting the potential of happiness as a factor in addressing declining fertility rates. Promoting happiness and well-being among individuals can be an effective strategy for tackling the issue of declining fertility. Encouraging further research in this domain is warranted to gain deeper insights into the intricate interplay between happiness and fertility, ultimately informing evidence-based policy interventions.

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