Discussion Paper Series – CRC TR 224

Discussion Paper No. 726
Project A 03

Family Institutions and the Global Fertility Transition

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January 2026

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Support by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) through CRC TR 224 is gratefully acknowledged.

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January 17, 2026

Much of the observed cross-country variation in fertility is consistent with the predictions of classic theories of the fertility transition. That is, countries with higher levels of human capital, higher GDP per capita, or lower child and maternal mortality rates, tend to exhibit lower fertility. However, looking at fertility data within countries, larger declines in fertility over the last 60 years are, on average, not associated with greater improvements in human capital, real per capita GDP, or survival rates. Notably, most of sub-Saharan Africa experienced fertility declines smaller than predicted by economic and health progress, while parts of Asia and Latin America experienced declines larger than predicted, and some countries in East Asia even reached record low fertility levels.

To understand why economic and health progress alone fail to account for most of the observed change in fertility over the past half-century, we focus on the role of family institutions, particularly marriage and inheritance customs. We study whether the same institutions can help explain both the stalled fertility transitions in sub-Saharan Africa today as well as the variation in the timing of historical fertility declines across pre-modern European regions. We also explore whether the diffusion of cultural norms

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related to religion, educational aspirations, and gender roles can help explain heterogeneous trajectories in the speed and the magnitude of fertility transitions. Then, we benchmark the quantitative importance of institutional and cultural factors against the effect of economic and health factors documented in the literature.

Finally, we investigate how these factors interact to shape fertility transitions. In particular, we analyze whether family institutions, in addition to their direct effect on fertility, also mediate the effect of economic and health factors. Much of the existing literature examines each factor in isolation, yet no single factor can fully explain all observed fertility transitions, or the entire trajectory of a given transition from start to finish. Understanding how these forces interact remains the central challenge. We propose a stylized framework that integrates these factors. As in standard economic models, economic conditions influence fertility decisions. However, these choices operate under constraints determined by the broader environment–health, institutional, and cultural factors–which determine the set of feasible fertility outcomes. We use the theory as a lens to address open questions in the literature: *(i)* Why does fertility within a country not exhibit a consistent relationship with economic factors over time? *(ii)* Will fertility in sub-Saharan Africa eventually fall below replacement levels once economic forces become sufficiently strong, even without institutional or cultural change?, and *(iii)* Can policies prevent further fertility decline in East Asia, absent institutional or cultural reform?

What We Know: Economic and Health Factors Matter for Fertility Decline

Cross-Country Evidence

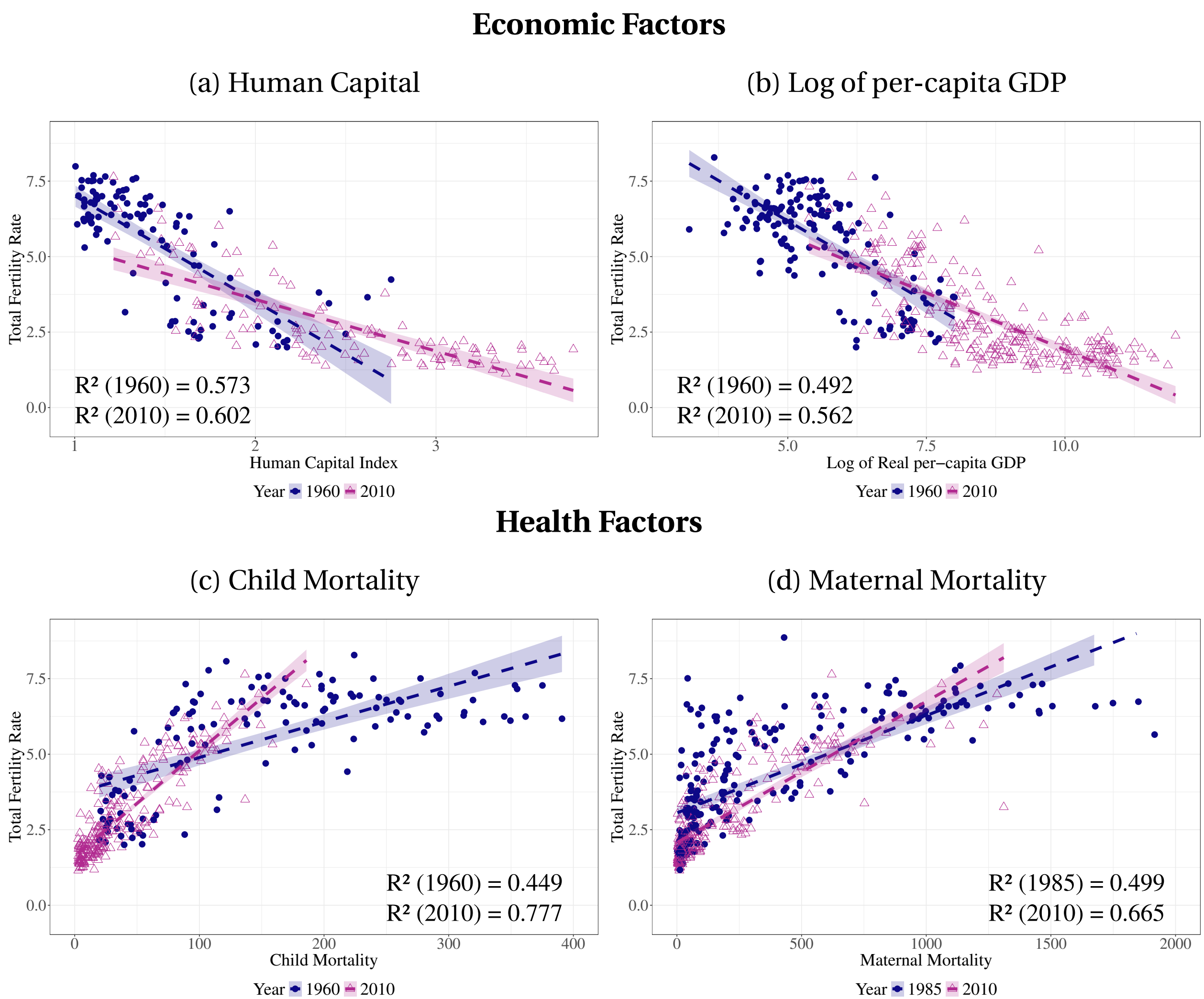
The two most prominent explanations of the fertility transition are economic progress in the economics literature and health progress in the demography literature.[1] Figure 1 shows that economic and health factors are indeed strongly associated with total fertility rates[2] across countries at different points in time.

Panels 1a and 1b show that countries with higher levels of human capital and higher GDP per capita tend to exhibit lower fertility rates, both in 1960 and in 2010. In 2010, ap-

[1]See Doepke et al. (2023) for a discussion of economic theories of fertility and Guinnane (2011) and Galor (2012) for reviews on demographic transitions.

[2]The total fertility rate is the number of children that would be born to a woman if she had children in accordance with age-specific fertility rates observed in a country at a given point in time.

Figure 1: Evidence from Cross-Country Data in 1960 and 2010



Notes: Time period: 1960 and 2010. y-axis: Total Fertility Rate is taken from the World Development Indicator SP.DYN.TFRT.IN (World Bank, 2025). x-axis, Panel (a): Human Capital Index from Barro and Lee (2013). Panel (b): Real GDP per capita from the World Development Indicator NY.GDP.PCAP.CD. Panel (c): Child mortality is defined as the probability (per 1,000 live births) that a newborn will die before reaching age five, based on the World Development Indicator SH.DYN.MORT. Panel (d): Maternal mortality ratio is the estimated number of women who die from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births, taken from the World Development Indicator SH.STA.MMRT. Data on maternal mortality is not available prior to 1985.

proximately 60 percent of the cross-country variation in total fertility rates is explained by differences in either human capital or real GDP per capita. Similarly, child and maternal mortality rates are strong predictors of fertility rates, as shown in Panels 1c and 1d. For these health variables, the data compare 1985 to 2010, and they account for two-thirds to three-quarters of the variation in fertility in the most recent period. High fertility and high mortality tend to coincide in countries with weak reproductive health systems. The effect of economic and health factors on fertility has been documented extensively in the literature; in the following sections, we review important studies that explain the main mechanisms. Appendix Table A.1 summarizes the quantitative effects.

Economic Factors

The central channel between economic growth and fertility is the quantity–quality trade-off (Becker and Lewis, 1973; Galor and Weil, 2000). Parents face a trade-off between the number of children they have (quantity) and the resources, such as time and money, they can devote to each child (quality). As the returns to education increase with economic development and the demand for skilled labor rises, parents respond by raising educational investments in each child while having fewer children. To quantify the magnitude of the trade-off, Becker, Cinnirella and Woessmann (2010) and Bleakley and Lange (2009) exploit plausible exogenous variation in quality in two different contexts: an increase in school enrollment in Prussia in the mid-19th century and an increase in the returns to schooling in the US in 1910s, respectively. They come to the same conclusion: fertility drops by approximately 20% when schooling massively increases.

A second important channel is women's opportunity cost of time (Galor and Weil, 1996). As economies develop and incomes rise, the cost of staying at home to raise children and produce domestic goods, rather than participating in the formal labor market, also increases. Using a life cycle model, Caucutt, Guner and Knowles (2002) show that US fertility declined by 0.15 children in response to a 12 percent increase women's wage over a decade between 1980 and 1992.

Beyond the well-studied quantity-quality trade-off and opportunity cost of time channels, other economic mechanisms play an important role in explaining why fertility tends to decline with economic development. In traditional economies, children are a source of income and insurance within the family; in modern economies, however, the returns to "quantity" decline for two main reasons.

First, the demand for unskilled child labor falls sharply when economies transition out of agriculture. The need for family labor is a main driver of high fertility in subsistence-farming economies, where child labor is not regulated (Doepke and Zilibotti, 2005). For instance, in Burkina Faso, the sustained inflow of remittances from long-standing migration has reduced dependence on subsistence farming and, consequently, the need for child labor, leading to a decline in fertility of about 0.5 children in communities of origin (Dupas et al., 2023). Historically, in the United States in the 1890s, households that switched to manufacturing after an agricultural pest reduced fertility by around 0.25 children compared to those that stayed in agriculture (Ager, Herz and Brueckner, 2020).

Second, the introduction of formal social security systems reduces the need for children as a source of informal old-age insurance. The expansion of social pensions has been shown to substantially reduce fertility, by about 1 to 1.3 children, in contexts like an expansion of social pensions in Namibia in the 1990s (Rossi and Godard, 2022) and an equalization of urban and rural pensions in Brazil in 1991 (Danzer and Zyska, 2023). Historically, in much of the Western world, the decline in fertility coincided with the introduction of comprehensive social insurance schemes in the late 19th century (with the notable exceptions of France and the United States). In a more recent context, Boldrin, De Nardi and Jones (2015) develop a macroeconomic model with children as a parental investment in old age care to study the effect of US and European social security programs on fertility. They find that an increase in program size of 10 percent of GDP is associated with a reduction in fertility of between 0.7 and 1.6 children.

Health Factors

For demographers, the decline in fertility is often seen as a response to the rapid decline in child mortality in the late 19th century in Western countries, and after World War II in the rest of the world (Notestein, 1952; Preston, 1978). There are two channels: the replacement effect captures ex-post responses of couples to the loss of a child, whereas the anticipatory or hoarding effect reflects ex-ante strategies by couples to ensure surviving descendants. Strulik (2004, 2008) develops a theoretical framework in which high child mortality increases fertility, lowers resources per child, and slows human capital accumulation, trapping the economy in a high-fertility, low-education, low-growth equilibrium. Lower child mortality, by contrast, reduces incentives for additional births, raises educational investment per child, and fosters technological progress through human capital accumulation. Despite the prominence of this theory, the causal effect of child mortality remains theoretically and empirically contentious (Wolpin, 1997; Doepke, 2005; Bar and Leukhina, 2010; Baudin, 2012). Using a panel of countries from 1900 to

1999, Herzer, Strulik and Vollmer (2012) find that a 1 percent decline in child mortality reduces fertility by only 0.14 percent in the long run. This modest elasticity implies that the decline in child mortality alone cannot account for the magnitude of the fertility transition.

Maternal mortality is another often-mentioned health factor. In theory, improvements in maternal health should raise fertility by reducing the physical cost of childbearing, but they may in fact lower fertility in the long run if they increase the returns to female human capital accumulation. Evidence from the US suggests that the sharp reduction of maternal mortality between 1930 and 1950 led to a short-run increase in fertility, followed by a long-run decrease twice as large as the short-run response (Albanesi and Olivetti, 2014).

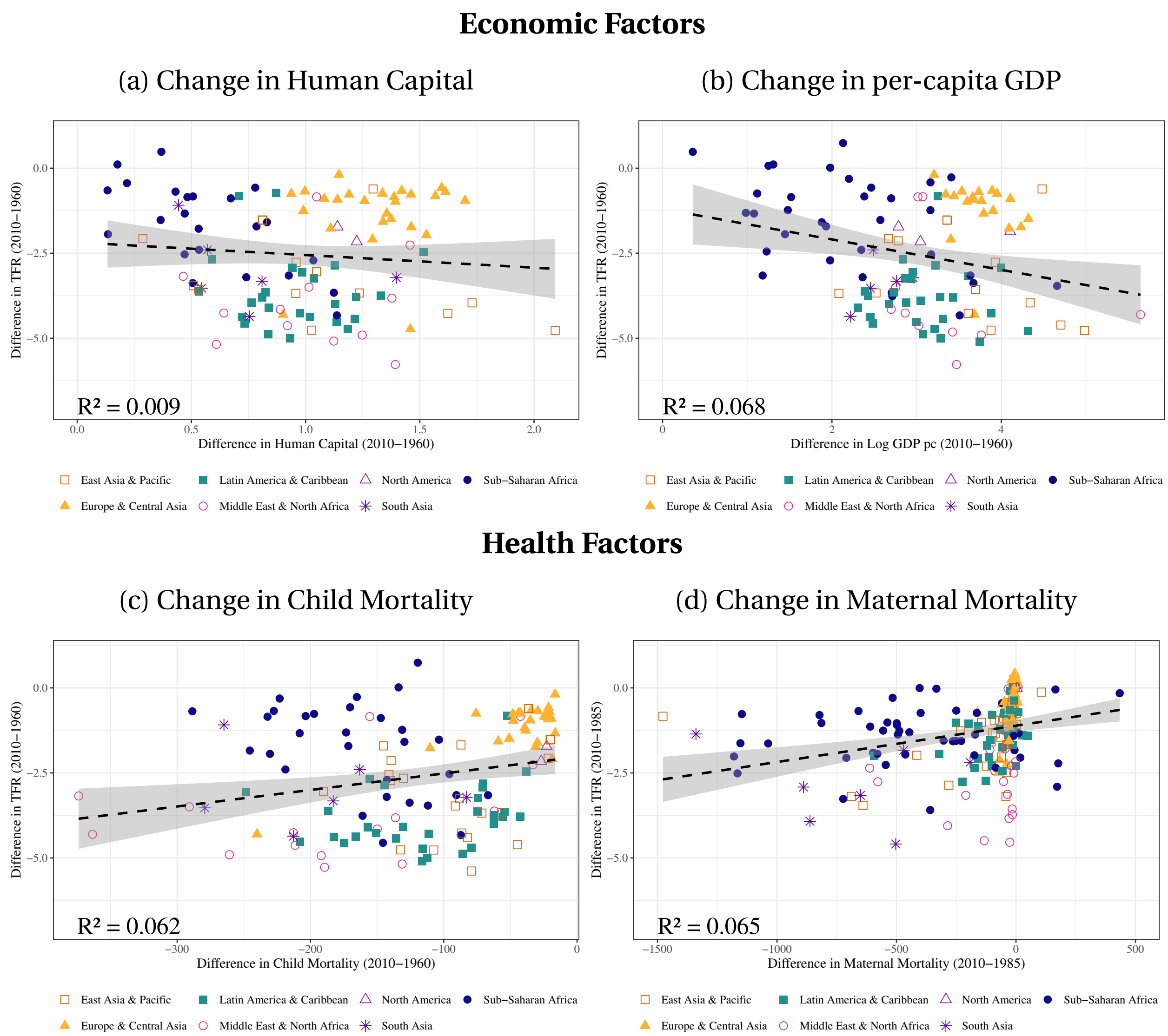
More generally, child and maternal mortality rates can be seen as proxies for the quality of reproductive health systems and the availability of modern contraceptive methods. The effect of modern birth control on fertility is debated given that traditional methods of contraception have long been available (see for instance Cinnirella, Klemp and Weisdorf, 2017), and that modern contraception historically followed, rather than preceded, fertility decline in the Western world (Pritchett and Summers, 1994; Hartmann, 1997). The contribution of family planning to contemporary fertility transitions in low- and middle-income countries varies across contexts. A review of the empirical evidence using the introduction of family planning programs as natural experiments reports reductions in fertility between 5% and 35% depending on the program (Miller and Babiarz, 2016). The most impactful programs combine access to contraception, improvements in child health and intensive communication campaigns.

The Puzzle: Economic and Health Progress are not Enough to Account for all Fertility Transitions

Within-Country Evidence

The correlation between economic and health factors weakens when analyzing changes *within* countries over time. Figure 2 uses the same data as Figure 1 but now focuses on within-country changes. Colors and shapes denote each country's region. Panels 2a and 2b show that when looking at within-country data, larger declines in fertility between 1960 and 2010 are, on average, only weakly associated with greater improvements in human capital or real per capita GDP. Similarly, Panels 2c and 2d show no strong asso-

Figure 2: Evidence From Within-Country Changes Over Time



Notes: Time period: 1960 and 2010. y-axis: Total Fertility Rate is taken from the World Development Indicator SP.DYN.TFRT.IN (World Bank, 2025). x-axis, Panel (a): Human Capital Index from Barro and Lee (2013). Panel (b): Real GDP per capita from the World Development Indicator NY.GDP.PCAP.CD. Panel (c): Child mortality is defined as the probability (per 1,000 live births) that a newborn will die before reaching age five, based on the World Development Indicator SH.DYN.MORT. Panel (d): Maternal mortality ratio is the estimated number of women who die from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births, taken from the World Development Indicator SH.STA.MMRT. Data on maternal mortality is not available prior to 1985.

ciation between changes in child or maternal mortality and changes in fertility within countries over time. In fact, changes in economics and health variables alone explain at best 7% of the within-country variation in fertility over this period.

Many countries in East Asia and Pacific (□), South Asia (✳), Latin America and the Caribbean (■) and Middle East and North Africa (○) experienced substantial fertility declines without corresponding increases in income, human capital or health. Conversely, most countries in sub-Saharan Africa (●), experienced significant health progress and to some extent economic progress without a substantial decline in fertility. European (▲) and North American countries (△) experienced strong economic progress and only limited fertility declines. Taken together, these results suggest that countries followed distinct fertility transition paths over the past 60 years.

Heterogeneous Transition Paths

More generally, when examining fertility transition paths country by country, several puzzles emerge. The most debated case is that of France, the first country where fertility began to decline. The decline started in the mid-eighteenth century, one century before the rest of Europe and the UK, and well before the onset of modern economic growth and the decline in mortality. The French trajectory is therefore completely at odds with classic theories of the fertility transition. A similar puzzle arises in the US, another well-known forerunner, where the initial trigger of the decline remains a subject of debate.

Other exceptional cases are East Asian countries, notably Japan, South Korea and China, where fertility declined so rapidly in the second half of the twentieth century that they reached ultra-low levels of fertility. Fertility levels in East Asia not only converged toward Western levels but continued to fall even in countries, such as China, that had not yet caught up in terms of economic development. None of the classic theories of fertility transition can predict how low fertility will drop.

Finally, another frequently cited exception is sub-Saharan Africa, where the decline has been particularly late and slow, and future trajectories remain difficult to predict. For example, comparing the region's two largest countries, Nigeria and Ethiopia, the decline has been slower in Nigeria, despite its higher income level. This raises the question of whether sub-Saharan Africa is truly exceptional, and if so, what makes it so. To address this question, we turn to the role of family institutions and cultural norms.

Missing Pieces: Family Institutions and Culture

How can we explain that economic and health factors alone fail to account for much of the observed change in fertility over the past half-century? We highlight one additional channel: the role of *family institutions*. We focus on two types of long-standing family institutions: marital structure, referring to the prevalence of monogamous versus polygamous marriage, and inheritance customs, namely partible versus impartible inheritance. Under impartible inheritance, property, assets, or wealth are passed on to a single heir, typically the eldest son. This system was common in historical England and in several regions of continental Europe before the adoption of harmonized national civil codes, and it still exists in parts of sub-Saharan Africa where family law falls under customary law. By contrast, partible inheritance divides property equally among multiple heirs.

Family Institutions: Marriage and Inheritance

The role of family institutions in shaping aggregate fertility has long been discussed by historians, demographers, and sociologists (Todd, 1984; Lesthaeghe, 1989). In particular, customary law related to marriage and inheritance may help explain both pre-transition differences in fertility within countries and variation in the timing of the transition's onset. Recent empirical studies have begun to shed light on the magnitude of these effects.

In Western Europe, both marriage and inheritance are shown to be quantitatively important in explaining why fertility was already low during Malthusian times, and why fertility began to decline before the transition to modern growth. The "European Marriage Pattern," characterized by late marriage and high rates of celibacy, implied for centuries that women typically married after age 23-24, and 10 to 15 percent never married at all. In contrast, female marriage was early and universal in most other parts of the world (Hajnal, 2017). Because later marriage reduced the number of women exposed to pregnancy risk, the European Marriage Pattern is estimated to have reduced birth rates by 20 to 40 percent between the 14th and 19th centuries (Voigtländer and Voth, 2013; Perrin, 2022).

Customary inheritance laws, and in particular the equal division of land between children, created incentives to restrict fertility to avoid land fragmentation across generations. Regional variation in such laws is correlated with fertility differences between French regions during the early 18th century. The general adoption of equal partition after the French Revolution contributed to France's early fertility decline, reducing completed fertility by around 0.5 children (Gay, Gobbi and Goñi, 2025).[3]

In the same vein, marriage and inheritance institutions can explain the high levels of fertility and the stalled demographic transition in modern sub-Saharan Africa. The region exhibits persistently high rates of polygamy, which sustains a high level of fertility

[3] Similarly, in the 17th and 18th centuries, the British nobility often used marriage settlements to entail land and thus prevent the (solo) heir from breaking up the family estate. These inheritance practices increased fertility through a reduction in childlessness (Gobbi and Goñi, 2021).

through several mechanisms. Polygamy is associated with *(i)* early and universal female marriage, which maximizes women's exposure to pregnancy; *(ii)* high bride-price, which incentivizes parents to have many daughters (Tertilt, 2005); and *(iii)* rivalry between co-wives, which motivates each wife to have more children than the others (Rossi, 2019). A quantitative model predicts that banning polygamy would reduce fertility by 40 percent (Tertilt, 2005). Cousin marriage (also called within-kin or endogamous marriage), also a prevalent institution in parts of Africa and the Middle East, may also raise fertility by reducing search frictions in the marriage market and limiting wealth fragmentation from exogamous (that is, outside-group) unions (Lesthaeghe, 1989).

The customary inheritance laws across countries of Africa tend to favor impartible inheritance, enabling the transfer of family land to a single heir and removing the incentives to limit the number of heirs. Today, belonging to an ethnic group with a tradition of impartible inheritance increases fertility by around 1 child compared to neighboring ethnic groups (Fontenay, Gobbi and Goñi, 2025). Moreover, customary laws excluding widows from inheritance rights increase women's reliance on their children for economic security. In these contexts, high fertility reflects women's strategies to mitigate risks related to divorce or widowhood. For example, Lambert and Rossi (2016) show that when women in Senegal are married to a man with children from previous wives, which reduces the probability of a substantial inheritance, they have more sons. As a consequence, granting widows a fair share of the husband's bequest should weaken these strategies. In Namibia, a 2008 reform improving widows' inheritance rights reduced the annual birth rate by 24 percent, equivalent to a reduction in completed fertility by 1 child (Sage, 2025).

Recognizing that some institutional contexts can generate incentives for women to desire larger families is important for understanding recent empirical patterns that may otherwise seem puzzling. For example, experimental interventions aimed at promoting female economic and reproductive empowerment involving business training and land titling caused an *increase* in fertility in Togo, Ethiopia, Benin, and Ghana (Donald et al., 2024) as well as in Tanzania (Berge et al., 2022). Similarly, experimental evidence involving husbands in family planning interventions has been shown to reduce contraceptive take-up among monogamous households but to *raise* contraceptive take-up in polygamous households in Burkina Faso (D'Exelle et al., 2023). These findings are consistent with the idea that women want many children, which makes sense when family law is designed to reward high fertility.

Other institutions play an important role at later stages of the fertility transition, in particular by shaping the career-family trade-off faced by mothers. This trade-off is absent when women's economic opportunities are limited by legal restrictions. As women's legal and economic rights expand, however, the trade-off becomes salient. When childcare institutions remain underdeveloped, fertility typically declines. For instance, comparisons of neighboring counties that have a state-level border running between them shows that the improvement in women's legal and economic rights in some states and not others during the late 19th century in the US reduced fertility by around 7 percent or 0.2 children (Hazan, Weiss and Zoabi, 2023). In contemporary settings, the rapid improvement in female career prospects alongside a high burden of domestic work has been proposed as an explanation for East Asia's exceptionally low fertility levels (Goldin, 2025). The emergence of childcare institutions, whether market- or state-based, eases the trade-off and women can combine having a family and a career, which implies both higher levels of fertility and higher levels of female labor force participation. This was shown by d'Albis, Gobbi and Greulich (2017) using cross-sectional data for 2011 across European countries with different levels of childcare, by Bar et al. (2018) looking at the effect of marketization of child care on high- and low-income US women from 1980 to 2010, and by Hazan, Weiss and Zoabi (2021) using changes in relative child care costs for US women with different levels of education from 1980 to 2020. In addition, labor market institutions can influence the career-family tradeoff. Guner, Kaya and Sánchez-Marcos (2024) develop a life cycle model to show that temporary contracts or split-shift jobs reduce fertility in Spain. Removing these features, in combination with childcare subsidies, could raise fertility in Spain by 0.22 children.

Cultural Factors

Cultural factors, or norms, will also affect how fast and how low fertility drops, operating through two main mechanisms: *(i)* directly, by shaping norms about the ideal family size; and *(ii)* indirectly, by influencing the acceptability of birth control and perceived costs of child rearing.

A central hypothesis in demography is that limiting births was a cultural innovation, first observed in France, that spread through social interactions across Europe and European offshoots (Coale, 1986; Bongaarts and Watkins, 1996). Fertility declines often diffused to culturally or geographically close communities (Delventhal, Fernández-Villaverde and Guner, 2024). In France, the decline radiated from low-fertility regions, in particular Paris, to the rest of the country via internal migration (Daudin, Franck and Rapoport, 2019). Across Europe, the decline propagated from French-speaking regions to culturally similar communities before reaching more distant ones, again with migration playing a central role (Spolaore and Wacziarg, 2022; Melki et al., 2024). In the English-speaking world, the sharp fertility decline in Britain in the late 19th century was mirrored among British migrants in Canada, the US and South Africa (Beach and Hanlon, 2023). Among second-generation American women, higher ancestral-country fertility predicts about 0.4 more children (Fernández and Fogli, 2009). Similarly, in China, fertility reductions imposed on the majority ethnic group, the Han Chinese, in the 1970s spilled over to culturally close minority groups, despite their exemption from birth quotas (Rossi and Xiao, 2024).

At the start of the fertility transition, cultural attitudes toward the "morality" of birth control were pivotal. In France, where secularization was already advancing in the 18th century, weakening religious influence helps explain why the transition began there first. Within France, regions with high secularization experienced transitions up to a century earlier and completed fertility about one child lower than fully religious areas (Murphy, 2015; Blanc, 2023), with similar patterns in Belgium (Lesthaeghe, 1977). In addition, Perrin (2022) argues higher gender equality and women's agency, in combination with secularization, contributed to the decline. In Britain, the break in the fertility trend around 1877 coincided with a high-profile trial, in which Charles Bradlaugh and Annie Besant published a book making a case for the right to choose family size and offering some basic information about contraception. Bradlaugh and Besant knew they were very likely to be arrested for doing so, and then used their trial to publicize the benefits of birth control (Beach and Hanlon, 2023). A modern parallel comes from Brazil, where the broadcast of soap operas (*novelas*) influenced fertility choices by promoting smaller family size norms (La Ferrara, Chong and Duryea, 2012). In the US, Kearney and Levine (2015) show that a reality show on teenage childbearing led to a 4.3 percent reduction in teen births.[4]

This bottom-up spread of birth control norms sharply contrasts with the post–World War II transition in other parts of the world, where population control policies, ranging from mildly paternalistic to strongly coercive, were often imposed from the top down. Such policies aimed at establishing a radically different family size norm over a short period of time (De Silva and Tenreyro, 2017) and explain why post-World War II fertility declines were much faster than the gradual historical transitions. One exception is sub-Saharan Africa, where such policies often clashed with deep-rooted religious and traditional customs that emphasize the role of ancestral lineage and where extended family members often influence a couple's fertility decision (Caldwell and Caldwell, 1987). Today, ethnic groups placing high value on the perpetuation of family lineage have fertility

[4]See Jaeger, Joyce and Kaestner (2018) for a critique of Kearney and Levine (2015)'s findings.

rates higher by 0.5 to 1 child compared to others (Álvarez-Aragón, 2025).

Toward the end of the fertility transition, cultural factors help explain the stark differences across modern economies. While many countries in East Asia have reached a "lowest-low" fertility level, several Western countries remain near replacement levels. In contexts with high labor market inequality or strong social norms around educational attainment, an "education fever" emerges, as parents compete in terms of resources spent per child (Mahler, Tertilt and Yum, 2025). This competition raises the cost of children and hence how many children can be afforded. Using a quantitative model calibrated to South Korea, Kim, Tertilt and Yum (2024) show that fertility would be 28 percent higher absent status externalities in education. Rising education also affects the marriage markets. In much of East Asia, women marry later or remain unmarried if suitable partners are scarce, and given that out-of-wedlock births are rare, this trend amplifies fertility decline. In China, the growth in the educated population is estimated to explain half of the drop in marriage rates, partly because educated women rarely marry less-educated men (Rossi and Xiao, 2025). Finally, Kearney and Levine (2025) attribute the fertility decline in high-income countries to rising childlessness among cohorts whose priorities shifted away from parenthood.

New Lessons and Puzzles

Table A.1 summarizes both micro- and macroeconomic evidence on the quantitative importance of economic, health, institutional and cultural factors. The table allows us to benchmark the effect of family institutions and culture against the effect of economic and health factors documented in the literature. Overall, the magnitudes are comparable, and in some cases even larger, which indicates that all types of factors play a substantial role in shaping fertility transitions.

But how do they interact? Existing evidence suggest that the effects of economic and health factors depend on the social context. For instance, the magnitude of the quantity-quality trade-off is estimated to be much smaller in sub-Saharan Africa than it was historically in Western countries. Vogl (2025) shows that fertility decline is only weakly associated with the educational progress of children within countries or regions, while Collins, Guarnieri and Rainer (2025) estimate that free primary education in recent decades reduced fertility by only 0.1 child, or 4%. The impact of family planning interventions appears similarly limited. Randomized controlled trials in three sub-Saharan African countries find that free access to contraception has a negligible effect on births (Desai and Tarozzi, 2011; Ashraf, Field and Leight, 2013; Dupas et al., 2025).

Similarly, health factors interact with economic conditions. For example, Cervellati and Sunde (2011) exploit cross-country variation in mortality reductions due to epidemiological changes and find that a 1 percent increase in life expectancy is associated with a 1.4 percent reduction in fertility, but only after the onset of the demographic transition, not at earlier stages of economic development.

This suggests that we are still far from a unified theory of the fertility transition that fully captures the interactions between all factors. In the next section, we propose a first step in that direction.

An Extended Model of Fertility Transitions

We develop a framework in which fertility choices respond to economic incentives. The influence of these economic incentives, however, can be mediated by prevailing family institutions, cultural norms, and health conditions. Institutions include marriage and inheritance. Culture relates directly to fertility through the ideal family size, and indirectly through religious beliefs, attitudes towards sex and contraception, educational expectations (e.g., competitive schooling environments), or gender roles in society. Finally, health-related factors encompass child and maternal mortality, access to contraception and the availability of infertility treatments. We illustrate the model with examples of settings where economic factors alone have had limited impact on fertility.[5]

Fertility Transition Paths

Figure 3 illustrates different fertility transition paths captured by the model. The vertical axis shows the equilibrium fertility level in a given economy. The horizontal axis reflects the broad economic costs of having a child, which includes the opportunity cost of child-rearing relative to being in the labor market, returns to human capital, the ability to accumulate assets, and the economic value of child labor (when children are young) and support from children (when the children have become adults) for parents in their old-age. One can think of the horizontal axis as net costs, also taking into account the economic benefits of having children.

The transition paths highlight that fertility decisions are made within a broader societal context, shaped by factors that are often not fully incorporated into standard economic models. Specifically, a combination of family institutions, culture and health technology impose bounds on fertility choices. Between these bounds, fertility responds

[5] For an algebraic presentation of the model, please refer to Online Appendix A.1.

to economic factors in the way predicted by standard economic theories of fertility. However, when fertility is constrained by prevailing family institutions, culture, or health factors, changes in economic incentives no longer influence fertility behavior.

This framework encompasses several classes of models that analyze fertility transitions. Demographers often focus on how upper and lower fertility bounds change over time when health factors, such as child mortality or the availability of contraception, vary. Social scientists typically stress the role of family institutions in shaping these fertility bounds. For example, institutions encouraging late female marriage tend to relax the lower bound and tighten the upper bound, because women are married during a shorter span of their reproductive years. Finally, diffusion models of the fertility transition focus on how changes in the bounds propagate through changes in cultural factors.

Interpretation and Examples

To illustrate the intuition behind the model, we compare transitions in historical Europe and sub-Saharan Africa, as well as modern Europe and East Asia.

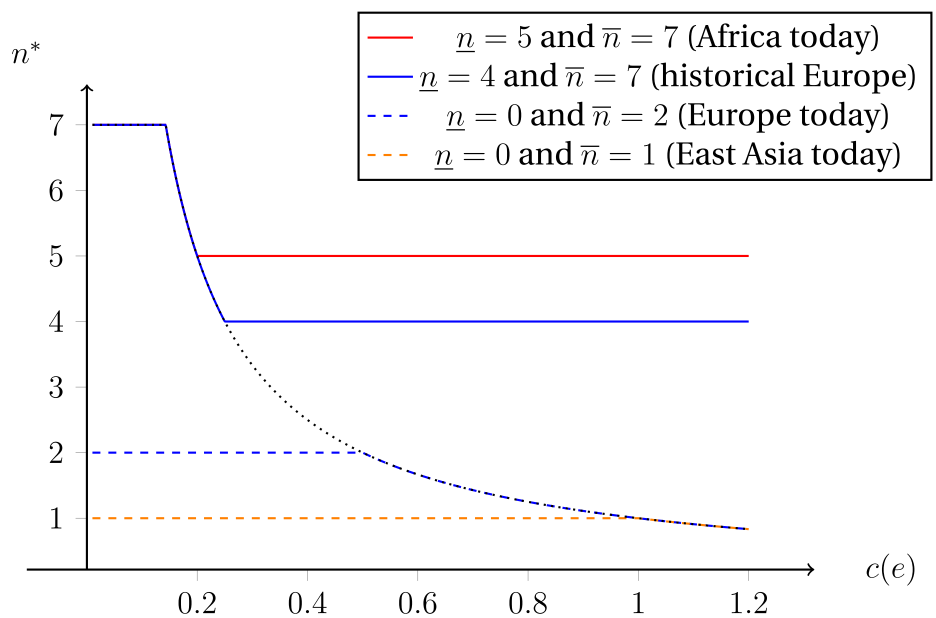


Figure 3: Fertility transitions paths given different fertility bounds $\{\underline{n}, \bar{n}\}$.

We begin with a comparison of historical Europe and contemporary sub-Saharan Africa, which both represent early stages of fertility decline. We assume that both settings share the same upper bound on fertility, interpreted as the biological maximum number of children that a substantial population of women can have, set at $\overline{n} = 7$. The two settings differ, however, in their health environment, institutions, and norms that lead to different lower bounds: the minimum achievable number of children. For illustration, the lower bound is set to $\underline{n} = 4$ in historical Europe (blue solid line) and to $\underline{n} = 5$ in sub-Saharan Africa (red solid line). The higher $\underline{n}$ in sub-Saharan Africa may stem from family institutions such as polygamy or impartible inheritance, strong pronatalist norms, or higher mortality rates.

This comparison delivers several important insights. First, institutions can determine how low fertility falls, even in Malthusian, pre-industrialized contexts. For example, the European Marriage Pattern and equal inheritance in early Europe facilitated lower fertility compared to regions at the same stage of economic development where these institutions were absent. Conversely, polygamy and impartible inheritance sustain higher fertility in some sub-Saharan African regions today, despite facing similar economic conditions.

Second, in pre-industrial times, when the costs of raising children are relatively low, fertility oscillated between $\underline{n}$ and $\overline{n}$, as shown in Figure 3, in response to short-run fluctuations in economic conditions. If the environment shifts, due to changes in institutions, health conditions, or social norms, a lower $\underline{n}$ can be achieved, for instance, through the adoption of partible inheritance or monogamous marriage. Such a shift gives economic factors greater scope in shaping fertility decisions.

Third, the timing of changes in the four factors affects fertility transition paths. Economic development leads to a sustained fertility decline only once institutional, health, or cultural constraints are not binding. A similar argument is put forward in Spolaore and Wacziarg (2022), who argue that economic forces reduce fertility only when the social stigma has declined enough to no longer anchor fertility. In France, although the transition to lower fertility spanned over two centuries (from the mid-18th to early 20th century), fertility was already low by the mid-19th century, following deep cultural change through secularization and institutional shifts, such as the harmonization of legal institutions. In other words, the initial decline in fertility reflected a downward shift in $\underline{n}$. Once this constraint eased, economic factors related to industrialization drove the second stage of the transition, allowing n^* to move along the black dotted line as $c(e)$ increased. By contrast, in sub-Saharan Africa, rising $c(e)$ from investments in education and urbanization have yet to lower fertility. Here, cultural norms and institutional structures, such as legal pluralism and customary family law, form a tightly intertwined set of slow-changing constraints. Differences in the sequence of how the four factors change thus help explain timing differences in the onset of fertility decline.

We now turn to the interaction of these factors in the later stages of fertility decline by comparing fertility patterns in Europe and East Asia today. At the end of the fertility transition, the lower bound is no longer binding, $\underline{n} = 0$, because women can socially choose to remain childless. However, these regions differ in their upper bounds, interpreted as the maximum number of children achievable given, for example, the availability of suitable partners or access to infertility treatments. We assume $\overline{n} = 2$ in Europe (blue dashed line) and $\overline{n} = 1$ in East Asia (yellow dashed line). When the cost of children is moderately high (say $c(e) < 0.5$), each economy is capped at a different upper bound: 2 in Europe and 1 in East Asia. As the cost of children rises further, both economies converge toward zero fertility.

During the European fertility transition, social change was gradual and spontaneous, with norms around ideal family size evolving slowly, allowing labor and marriage markets time to adapt. As a result, women now combine careers with motherhood without excessive postponement, and when delays occur, they have access to subsidized assisted reproductive technology. Two children thus remains the ideal family size reported by most individuals in many, though not all, European countries.[6] These patterns can be interpreted as a downward shift in $\overline{n}$, followed by movement along the black dotted line, where $\overline{n}$ no longer binds. By contrast, a number of East Asian countries experienced strict population policies that imposed new family size norms, such as China's one-child family. This rapid, top-down social change coincided with worsening sex ratios, education levels that rose more quickly for women than for men, and persistent female hypergamy (women marrying men with higher socioeconomic status). These shifts had profound and lasting consequences for the marriage market. In this context, $\overline{n}$ in Figure 3 declined more rapidly than in the European case, constraining today's fertility at lower levels.

This conceptual framework offers a way of approaching several open questions in the fertility literature. Why is there no consistent relationship between declining fertility and rising human capital or per-capita GDP within countries over time? We argue that fertility responses can be constrained by institutional, health, and cultural factors that mitigate the effect of economic factors on fertility. Will fertility in sub-Saharan Africa eventually converge and drop below replacement levels once economic forces become strong enough? In the absence of institutional reforms related to land property, marriage or inheritance customs, this appears unlikely. Can policy prevent fertility in East Asia from dropping below one child per woman? In the absence of institutional or cultural changes that raise $\overline{n}$, policies that only target the cost of having children are unlikely to succeed.

[6] See Mahler, Tertilt and Yum (2025) for a recent discussion on the determinants of ultra-low fertility in OECD countries.

Solving the Puzzle: Economic Development Matters, but under Specific Family Institutions

The model delivers one testable implication: economic development should matter more for fertility decline when family institutions are already favorable to small families. To identify prevailing family institutions in the data, we use data from the Ancestral Characteristics database (Giuliano and Nunn, 2018). These data provide worldwide country-level measures for the share of the current population that has a given pre-industrial ancestral characteristic. The Ancestral Characteristics database is based upon the Ethnographic Atlas, which is an ethnicity-level database covering over 1,200 pre-industrial societies (Murdock, 1967). This allows us to classify countries as either (historically) primarily monogamous or polygamous, and as adhering mainly to partible or impartible inheritance systems.[7]

To assess the explanatory power of economic and health factors conditional on family institutions, we focus on two time periods: 1975–85 and 2003–13. We average all annual country-level variables within each decade to account for data gaps and then compute the differences between periods. We regress changes in total fertility rate (TFR) on changes in economic variables (log of real per-capita GDP and secondary school enrollment) and health variables (maternal and child mortality). Using the estimated coefficients, we predict fertility changes and compare them to actual changes.

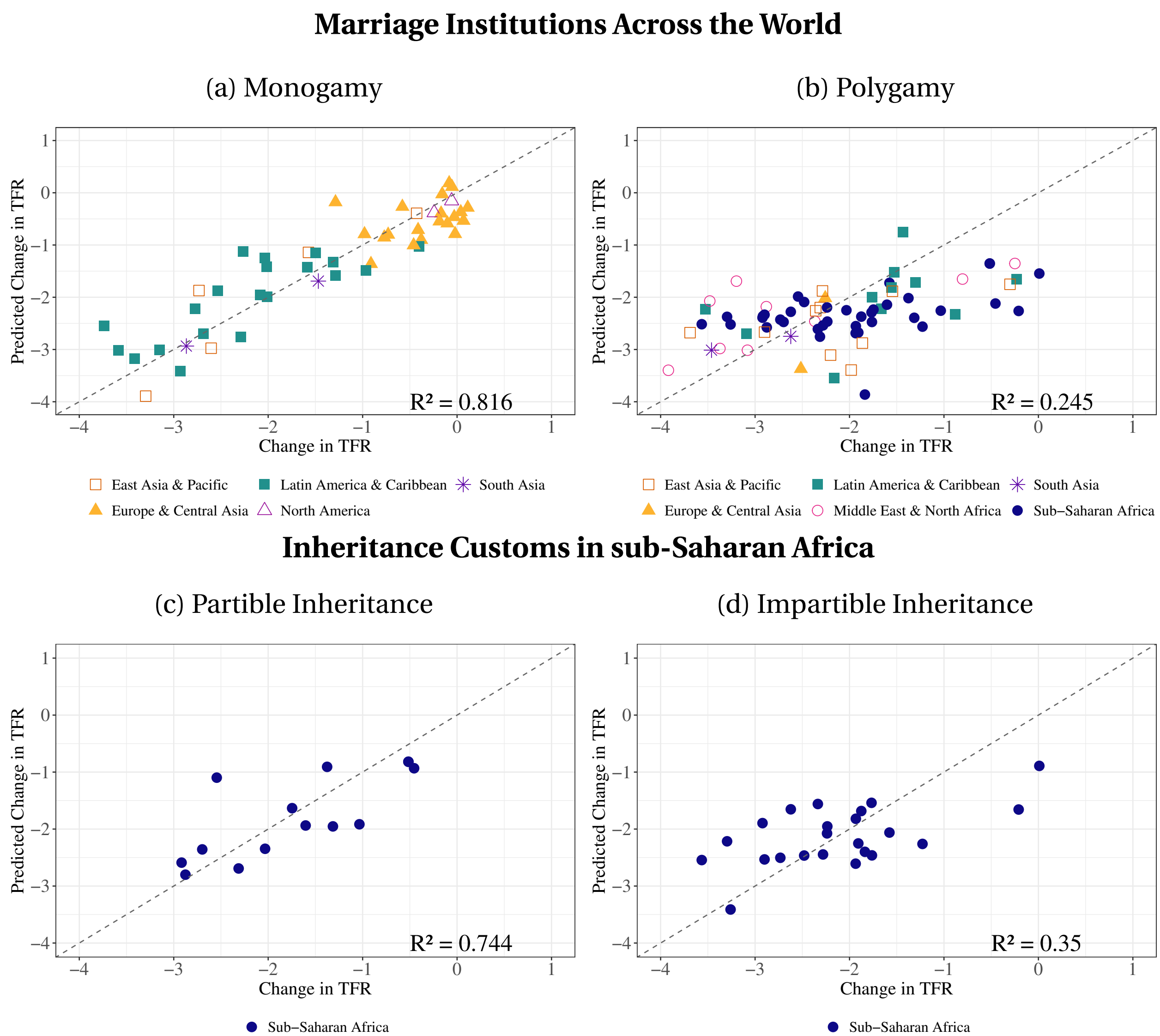
Panels 4a and 4b of Figure 4 show the results when we distinguish countries by marital institutions. Strikingly, economic and health factors explain a large share of the fertility changes over time within countries where monogamy is prevalent. In these settings, over 80 percent of the variation in fertility decline is accounted for by economic and health changes. This stands in stark contrast to our earlier findings in Figure 2, where no such association emerged when family institutions were not considered. Thus, when focusing exclusively on monogamous countries, the data appear largely consistent with classic theories of fertility decline. In contrast, in polygamous countries, the explanatory power of economic and health factors drops sharply, explaining less than 25 percent of the observed fertility changes.[8]

Panels 4c and 4d of Figure 4 focus on the second type of family institution: inheri-

[7]Specifically, we use the variables v9 and v75 for the prevalence of monogamous versus polygamous marriages and for partible versus impartible inheritance rules, respectively. We categorize a country as having monogamous or partible ancestral institutions if more than 50 percent of its population descends from groups that historically practiced monogamous marriage or partible inheritance.

[8]The detailed presentation of the regression findings in Appendix Figure A.1 further shows that most of the explanatory power comes from economic variables, with health variables contributing little in polygamous contexts.

Figure 4: Family Institutions: Marriage Institutions and Inheritance Customs



Notes: Time period: 1975–85 and 2013–23. We estimate a linear regression of changes in TFR on changes in economic factors (log GDP per capita, secondary school enrollment) and health factors (maternal mortality, child mortality). Data are from the World Bank (2025). All variables are averaged over the two decades (1975–85 and 2013–23), and changes are computed as differences between these averages. Using the estimated coefficients, we predict changes in TFR and plot them against the observed changes.

tance customs. Here, we focus our analysis on countries of sub-Saharan Africa, where the Ethnographic Atlas offers particularly rich data capturing ethnic variation in inheritance customs within countries. Outside the countries of Africa, most other countries harmonized their inheritance laws during the nineteenth and early twentieth centuries, meaning that ancestral practices no longer reflect the legal institutions in place during the second half of the twentieth century. Again, we observe that the explanatory power of economic and health factors depends on the underlying family institution. In countries where partible inheritance is the norm, these factors explain nearly 75 percent of fertility changes, a magnitude similar to monogamous countries. However, in countries with impartible inheritance, the explanatory power declines to around 35 percent.[9]

Altogether, Figure 4 highlights that the pace of fertility decline cannot be understood without reference to family institutions. Economic and health improvements predict fertility decline only in contexts where non-economic factors already favor smaller families, such as monogamous marriage systems or partible inheritance. These results underscore that economic modernization alone is insufficient to trigger rapid fertility decline: its effects critically depend on preexisting social and institutional conditions that shape how families respond to economic incentives.

The evidence presented thus far is not intended to establish causality. Family institutions are shaped by deep-rooted determinants, such as climatic and geographic conditions as well as the characteristics of original tribes and early settlers,[10] and these determinants may also mediate the effect of economic development. The purpose of our analysis is to highlight the strong interplay between family institutions, health, and economic factors in shaping fertility outcomes. In the long-run, these interactions are even stronger than illustrated here, because institutions and culture are themselves endogenous to economic and health factors. For instance, the transition from polygamy to monogamy can be explained by changes in income distribution. With economic development, human capital accumulation, social mobility and redistribution, monogamy becomes more attractive for both women and men, because the pool of marriageable men increases and the returns to large families decline (de la Croix and Mariani, 2015). Another example the emergence of the European Marriage Pattern, which can be traced to a single dramatic event: the Black Death of the mid-14th century. The resulting increase in the land-to-labor ratio is thought to have shifted agricultural production from grain to livestock, an activity in which women had a comparative advantage. This improved female employment prospects and contributed to later marriages (Voigtländer and Voth, 2013). Institutional change may therefore result from the combination of health shocks and economic transformations.

[9]Appendix Figure A.2 further distinguishes the effect of economic and health factors.

[10]See Fernández and Fogli (2006) and Haddad (2024) on cultural persistence and Jones (2003, p. 15-21) on geographic conditions: comparing the European Marriage Pattern with Asian societies, he argues that the recurrence of natural disasters in the Indian subcontinent encouraged early marriage as a strategy to achieve high birth rates, providing demographic insurance against recurring environmental shocks.

Conclusion and Policy Implications

Determining the optimal population size and growth rate is far from straightforward (Golosov, Jones and Tertilt, 2007; de la Croix and Doepke, 2021), and some philosophers even argue it is impossible (Parfit, 1984; Arrhenius, 2000). Historically, fears of "population explosion" or "population decline" have motivated coercive antinatalist or pronatalist policies in many countries, though such approaches have increasingly come under criticism (Hartmann, 1997; De Silva and Tenreyro, 2017). Today, most state interventions instead focus on narrowing the gap between desired and actual fertility. The United Nations, for example, has recommended investing in reproductive health and family planning to "enable women and couples to achieve their desired family size" (United Nations, 2020). In practice, governments typically aim to keep fertility close to the replacement rate, around two children per woman.

Given the complex interplay among economic, health, institutional, and cultural factors highlighted in this essay, interventions targeting any single dimension seem unlikely to generate large changes in fertility. Mitigation policies aimed at directly influencing fertility–whether to reduce it in high-fertility countries or raise it in low-fertility ones–tend to have only modest effects. In high-fertility settings, current strategies focus on improving access to contraception; as discussed earlier, such measures have limited impact when desired fertility remains high, though they are essential to facilitate the decline once couples are willing to control births. In low-fertility contexts, policies such as financial incentives, childcare provision, and infertility treatments have similarly modest effects (see the review by Bergsvik, Fauske and Hart, 2021), but can help slow the pace of decline.

Addressing multiple contributing factors simultaneously poses a major challenge and there is little knowledge on when it is optimal to push one factor versus another, making a policy-induced global fertility rebound improbable in the near future. In light of this, adaptation policies-those aimed at managing the wide array of consequences of ongoing fertility decline-seem unavoidable.

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A Online Appendix

A.1 A Stylized Model of Fertility Transitions

Consider an economy or social group in which the average number of children per woman at the end of her reproductive life reflects a decision-making process in which individuals or couples weigh several factors when making fertility choices: economic factors (e), institutional factors (i), cultural factors (s), and health-related factors (h). Fertility in a given society, denoted by F, can thus be modeled as a function of these determinants:

$$F = f\left(e, i, s, h\right).$$

Economic factors (e) include wages, education, assets, returns to human capital, the economic value of child labor or old-age support. Examples of family institutions (i) are marriage institutions, such as the European Marriage Pattern in historical Europe or polygamy in sub-Saharan Africa, and inheritance rules, which may be partible or impartible. Culture (s) relates directly to fertility through the ideal family size, and indirectly through religious beliefs, attitudes towards sex and contraception, educational expectations (e.g., competitive schooling environments), or gender roles in society. Finally, health-related factors (h) encompass child and maternal mortality, access to contraception and the availability of infertility treatments.

We adopt a functional form for f that incorporates economic factors e into the individual decision problem. A representative household chooses fertility n based on an indirect utility function of quadratic form:

$$U(n) = b(e)n - \frac{c(e)}{2}n^2 \quad \text{with} \quad \underline{n}(i,s,h) \leq n \leq \overline{n}(i,s,h)\,.$$

Here, $b(e)$ represents the intrinsic benefits from children, while $c(e)$ captures their costs, following Akerlof (1997). Economic factors thus influence both the marginal benefits and the marginal costs of having an additional child in our setup, in line with standard economic models of fertility. Note that the exact shape of $b(e)$ and $c(e)$ is often the focus of economic theories of the fertility transition. For simplicity, we normalize benefits to $b = 1$ and assume that the cost of children increase with economic development, i.e., $\frac{\partial c}{\partial e} > 0$.

Importantly, our framework also captures that individual decisions are made within a broader societal context, shaped by factors that are often not fully incorporated into standard economic models of fertility. Specifically, we consider a combination of family institutions i, health technology h, and culture s. These factors impose bounds on fertility choices, such that fertility n must satisfy:

$$\underline{n}(i,s,h) \le n \le \overline{n}(i,s,h) \; .$$

These bounds also imply that economic factors may no longer influence fertility outcomes if optimal choices lie at the boundary of what is feasible. In other words, when fertility is constrained by prevailing family institutions, culture, or health factors, changes in economic incentives no longer influence fertility behavior.

Our stylized framework encompasses several classes of models that analyze fertility transitions. Demographers often focus on how these bounds change over time when health factors (h), such as child mortality or the availability of contraception, vary. In our framework, $\underline{n}$ declines as child mortality drops and when birth control technologies become available. Social scientists typically stress the role of family institutions, i, in shaping fertility bounds. For example, the European Marriage Pattern historically led to high female ages at marriage, which implied a lower $\underline{n}$ than a marital institution where age at marriage is very young. Finally, diffusion models of the fertility transition focus on how changes in the bounds propagate through changes in cultural factors, s. While stylized, the model highlights our key point that the environment imposes constraints on household choices that may restrict how fertility choices respond to economic forces. Suppose we want to understand why economic development and fertility decline do not always go hand in hand; that is why changes in human capital and GDP per capita are not strongly correlated with changes in fertility within countries.

The optimal fertility chosen by the household, n^*, is given by

$$n^* = \min\left\{\max\left\{\underline{n}(i,s,h), \frac{1}{c(e)}\right\}, \overline{n}(i,s,h)\right\} \; . \tag{A.1}$$

This expression gives rise to two thresholds, determined by institutions, culture, and health factors. To the left of the first threshold and to the right of the second threshold, economic factors no longer influence fertility, that is, when the economic cost of children approaches zero or infinity. Between these thresholds, fertility responds to economic factors in the way predicted by standard economic theories of fertility. We can thus distinguish three possible equilibria: the standard interior equilibrium and two corner equilibria, in which economic factors cease to affect fertility.

1. The *interior equilibrium*, where $n^* = 1/c(e)$. In this case, fertility responds directly to economic factors. Standard economic mechanisms–such as the quan-

tity–quality trade-off and the opportunity cost of time–shape fertility decisions. Historically, this corresponds to the early stages of fertility transitions, when economic development is low and family labor or old-age security are important. As the transition progresses and the cost of raising children increases, fertility declines. If these costs become extremely high, the result may be ultra-low fertility.

2. The *lower corner equilibrium*, where $n^* = \underline{n}(i, s, h) > 1/c(e)$. In this case, fertility is higher than predicted by economic factors, because the environment (i, s, h) makes very small families difficult or impossible. This pattern is characteristic of early-transition societies, where prevailing norms, institutional settings, or health conditions hinder the adoption of low fertility.

3. The *upper corner equilibrium*, where $n^* = \overline{n}(i, s, h) < 1/c(e)$. Here, fertility is lower than what economic factors alone would predict, because the maximum achievable fertility is constrained by the environment (i, s, h). This situation typically arises at the end of the fertility transition, when biological limits, delayed childbearing, or restrictive norms impose a binding ceiling on fertility.

A.2 Additional Tables and Figures

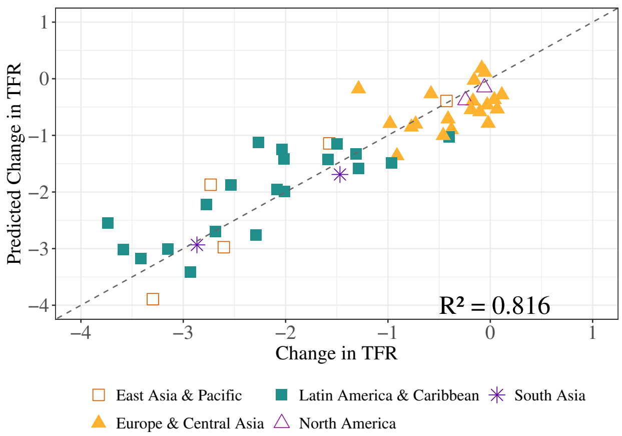
Table A.1: Selection of Recent Evidence from the Literature

Determinant	Effect on Fertility*	Method	Context	References
I. Economic Factors				
QQ trade-off	-20%	Micro, causal	Increase in school enrollment in Prussia mid-19th century	Becker, Cinnirella and Woessmann (2010)
QQ trade-off	-20%	Micro, causal	Increase in returns to schooling in the US in 1910s	Bleakley and Lange (2009)
QQ trade-off	-0.1 child or -4%	Micro, causal	Free primary education in sub-Saharan Africa	Collins, Guarnieri and Rainer (2025)
Child labor	-0.25 child	Micro, causal	Switch from agriculture to manufacturing in the US in 1890s	Ager, Herz and Brueckner (2020)
Child labor	-0.5 child	Micro, causal	Decline in subsistence farming in Burkina Faso today	Dupas et al. (2023)
(Old-age) Social security	-1 to -1.3 child	Micro, causal	Extension of old-age pensions in Namibia and Brazil in 1990s	Rossi and Godard (2022); Danzer and Zyska (2023)
Social security	-0.25 child or -21%	Macro, quantitative	US in 2000. Response to a 10% tax increase to finance social security.	Boldrin, De Nardi and Jones (2015)
Social security	-0.7 to -1.6 child	Macro, quantitative	Increase in the size of social security by 10% of GDP in the US in 2000	Boldrin, De Nardi and Jones (2015)
Female time costs	-0.15 child	Macro, quantitative	12% increase in women's wages between 1980 and 1992 in the US	Caucutt, Guner and Knowles (2002)
Female time costs	+1 to 2 child	Macro, descriptive	Lack of wage employment in SSA compared to other LMIC today	Zipfel (2025)
Household technology	+0.4 child	Macro, quantitative	Diffusion of household technology from 1940 to 1960 in the US	Greenwood, Seshadri and Vandenbroucke (2005)
Labor market competition	+0.55 child	Macro, quantitative	Increased female labor market competition after WWII in the US	Doepke, Hazan and Maoz (2015)
Economic uncertainty	+0.6 child	Micro, causal	Lower economic uncertainty for US cohorts in 1933 relative to 1910	Chabé-Ferret and Gobbi (2025)
TFP shocks	-0.25 child (1930), +0.6 child (1950)	Macro, quantitative	Fertility cycles in the US induced by TFP shocks 1930 (TFP shock: -13.1%) vs. 1950 (TFP shock: 7.5%)	Jones and Schoonbroodt (2016)
II. Health Factors				
Child mortality	negligible	Macro, quantitative	Decline in mortality in England in late 19th century	Doepke (2005)
Child mortality	-0.14%	Macro, empirical	Mortality decline of 1%; Panel of 119 countries from 1950 to 1999	Herzer, Strulik and Vollmer (2012)
Maternal mortality	+0.4	Macro, quantitative	Improvement in maternal health and mortality; US 1930-1960	Albanesi and Olivetti (2016)
Life expectancy	-1.4%	Macro, causal	Increase in life expectancy by 1%. Panel of 47 countries.	Cervellati and Sunde (2011)
Contraception	negligible	Micro, RCT	Financial barriers in Burkina Faso, Ethiopia, Zambia today	Desai and Tarozzi (2011); Ashraf, Field and Leight (2013); Dupas et al. (2025)
Contraception	-40%	Micro, causal	Introduction of the pill in the US; Effect on marital fertility 1955-1965	Bailey (2010)
Family planning programs	-5% to -35%	Review of micro	Family planning programs in LMICs in 20th century	Miller and Babiarz (2016)
Family planning programs	-9%	Micro, causal	US Program expansion; Reduction in births among newly eligible	Kearney and Levine (2009)
Family planning programs	-19 to -30%	Micro, causal	US roll-out of programs 1964 to 1973; Effect among poor women	Bailey (2012)
Infertility treatments	+3%	Micro, causal	Universal subsidy of treatments in Sweden today	Bögl et al. (2024)
III. Institutional Factors				
Marriage	-20% to -40%	Macro, descriptive	Marriage Patterns in Europe in 14-19th century	Voigtländer and Voth (2013); Perrin (2022)
Marriage	+40%	Macro, quantitative	Polygamy in sub-Saharan Africa today	Tertilt (2005)
Inheritance	-0.5 child	Micro, causal	Partible inheritance in France in 18th century	Gay, Gobbi and Goñi (2025)
Inheritance	+1 child	Micro, causal	Impartible inheritance in sub-Saharan Africa today	Fontenay, Gobbi and Goñi (2025)
Inheritance	-1 child	Micro, causal	Inheritance rights for widows in Namibia in 1990s	Sage (2025)
Women's rights	-0.2 child or -7%	Micro, causal	Legal and economic rights to women in the US in late 19th century	Hazan, Weiss and Zoabi (2022)
Childcare coverage	+44%	Macro, empirical	Access to childcare in Europe today on having a second child	d'Albis, Gobbi and Greulich (2017)
Childcare	+27.6%	Macro, quantitative	Price decline of childcare; Effect on the highly educated in the US	Bar et al. (2018)
Labor market institutions	-0.22 child	Macro, quantitative	Temporary contracts and split-shift jobs; Spain; cohorts 1966-1971	Guner, Kaya and Sánchez-Marcos (2024)
IV. Cultural Factors				
Religion	-1 child	Micro, causal	Secularization in France in 18th century	Blanc (2023)
Religion	+0.5 to -1 child	Macro, descriptive	Beliefs in the role of ancestors in sub-Saharan Africa today	Álvarez-Aragón (2025)
Culture	0.4 child	Micro, causal	Higher fertility in origin country; 2nd generation women; US; 1970	Fernández and Fogli (2009)
Media	-5%	Micro, causal	Brazil 1979–1991, Exposure to soap operas (novelas)	La Ferrara, Chong and Duryea (2012)
Media	-4.3%	Micro, causal	Teen births in the US 2009-10; Reality show on teenage childbearing	Kearney and Levine (2015)
Peer effect	-28%	Macro, quantitative	Status externalities in education in Korea today	Kim, Tertilt and Yum (2024)
Peer effect	-0.3 child	Micro, causal	Diffusion of fertility restrictions in China in 1970s	Rossi and Xiao (2025)

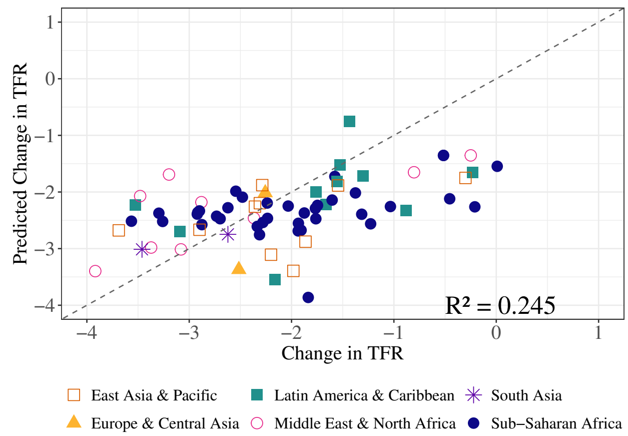
* Note: The precise measure of fertility varies across studies, and differences in sample restrictions may limit the direct comparability of the reported effects.

Figure A.1: **World**: Monogamy versus Polygamy

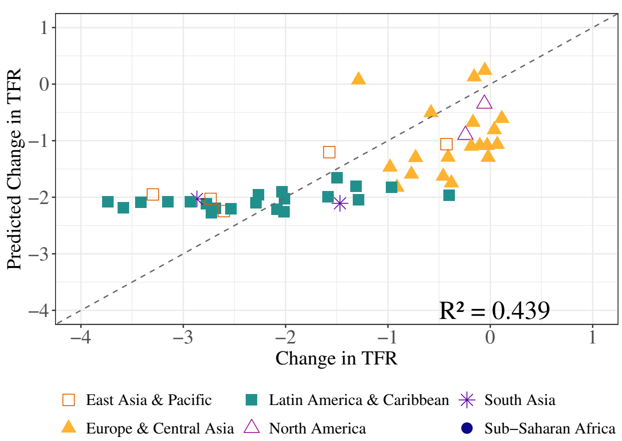
(a) All Factors - Monogamic



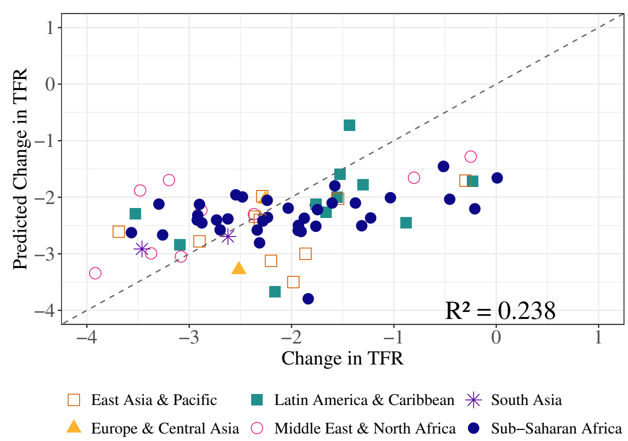
(b) All Factors - Non-Monogamic



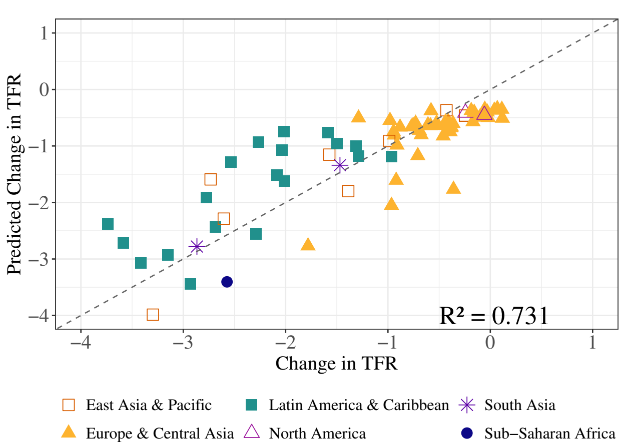
(c) Economics - Monogamic



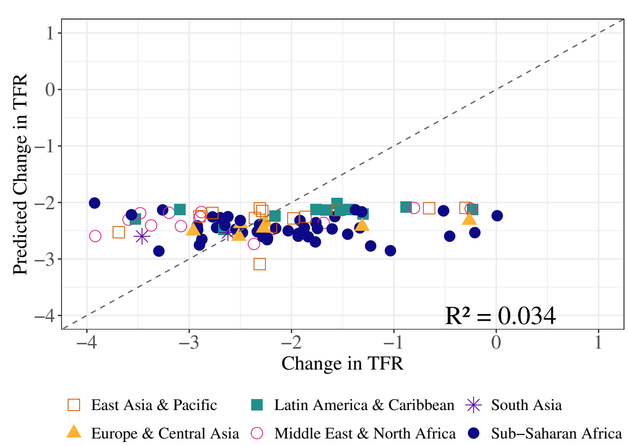
(d) Economics - Non-Monogamic



(e) Health - Monogamic

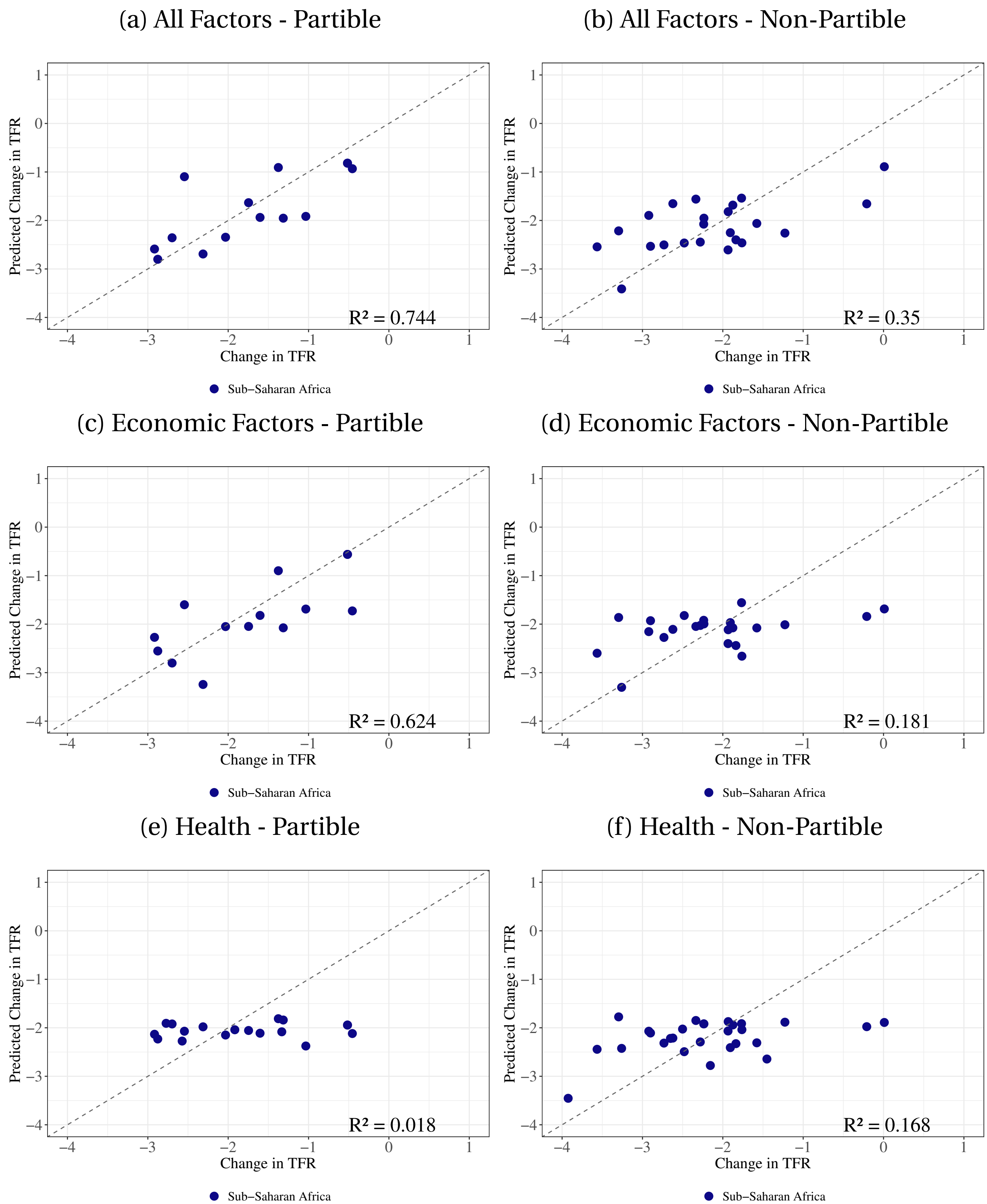


(f) Health - Non-Monogamic



Notes: Time period: 1975–85 and 2013–23. We estimate a linear regression of changes in TFR on changes in economic factors (log GDP per capita, secondary school enrollment) and health factors (maternal mortality, child mortality). Data are from the World Bank (2025). All variables are averaged over the two decades (1975–85 and 2013–23), and changes are computed as differences between these averages. Using the estimated coefficients, we predict changes in TFR and plot them against the observed changes.

Figure A.2: **Sub-Saharan Africa**: Partible versus Impartible Inheritance



Notes: Time period: 1975–85 and 2013–23. We estimate a linear regression of changes in TFR on changes in economic factors (log GDP per capita, secondary school enrollment) and health factors (maternal mortality, child mortality). Data are from the World Bank (2025). All variables are averaged over the two decades (1975–85 and 2013–23), and changes are computed as differences between these averages. Using the estimated coefficients, we predict changes in TFR and plot them against the observed changes.

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