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Liu, Ruiwu
Graduate School of Economics, Kyushu University

https://doi.org/10.15017/7325752

出版情報：経済論究. 176, pp.19-24, 2023-11-30. 九州大学大学院経済学会
バージョン：
権利関係：

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Liu Ruiwu †

1. Abstract

This literature review delves into the intricate relationships between economic growth, population health levels, and fertility rates. Drawing from both empirical and theoretical economic research, the review first elucidates the correlations between economic growth and health, then the associations between economic growth and fertility rates. Empirical findings predominantly highlight a positive correlation between economic growth and improved health standards, and an inverse relationship between economic growth and fertility rates. Concurrently, theoretical frameworks suggest mechanisms underpinning these observed relationships, often emphasizing the role of human capital accumulation, opportunity costs, and the balance between quality and quantity of offspring in economically growing societies. This review serves as a comprehensive guide to understanding how intertwined economic trajectories can impact societal health and reproductive decisions. Challenges, such as establishing causality and integrating socio-cultural factors, underscore the complexity of the studied relationships and call for multifaceted future research.

2. Introduction

Over the past several decades, the intricate dynamics between economic growth, public health standards, and fertility rates have taken center stage in economic debates and policy considerations. At the heart of this discourse is the fundamental question: How does the socioeconomic transformation of a nation influence its demographic and health profiles? The answers to this question are multifaceted, nuanced, and pivotal in shaping economic policies and health strategies across the globe.

The world has witnessed an unprecedented surge in global economic growth, particularly in the post-World War II era. As nations developed, industrialized, and became parts of complex global networks, their economic footprints expanded dramatically. This economic metamorphosis was not merely limited to the growth in GDP or industrial output; it extended its tentacles into the lives of the

† Graduate School of Economics, Kyushu University

populace, reshaping lifestyles, aspirations, and even life expectancies.

Historically, regions and countries with agrarian economies were characterized by higher fertility rates and lower life expectancies. Large families were often considered assets, helping in agricultural tasks and acting as a support system in the absence of formalized social security mechanisms. However, as nations embarked on paths of industrialization and urbanization, the very fabric of society underwent a transformation. With this transformation came a shift in perceptions regarding optimal family size and health priorities. The narrative shifted from having more hands to work in fields to providing quality education and opportunities for fewer offspring in urban settings.

But what catalyzed this shift? Was it purely economic growth, or were there other catalysts in play? The role of public health cannot be overstated here. With economic growth came advancements in medical sciences, improved healthcare infrastructure, and increased public health awareness. Life expectancies soared, and infant mortality rates plummeted. As people started living longer and healthier lives, the immediate need to have more children, often seen as old-age insurance, diminished.

The relationship is not unidirectional, though. Improved health standards can further spur economic growth. A healthier workforce is more productive, faces fewer medical absences, and can contribute more effectively to the economy. The positive feedback loop between health and economic growth is a critical aspect that many researchers have delved into.

However, it's not all a rosy picture. This transformation has brought with it a fresh set of challenges. Modern societies grapple with issues like aging populations, the burden of non-communicable diseases, and the sustainability of economic growth in the face of declining fertility rates. Moreover, the universality of these trends is also under scrutiny. Do all countries and societies, irrespective of their cultural, political, and historical backgrounds, tread this path? Or are there outliers that defy this seemingly global trend?

This literature review seeks to explore these questions. By delving deep into empirical research, it aims to unearth the patterns that economic growth imprints on public health and fertility rates. Through theoretical economic models, the review attempts to rationalize these patterns, providing a holistic understanding of the dynamics at play. As we navigate through this complex web of interrelationships, we will also shed light on the challenges that loom large and the possible trajectories that the future might hold.

3. Empirical Studies

3.1 Relationship Between Economic Growth and Health

Pritchett and Summers (1996) identified that there was a strong positive correlation between health improvements and economic growth. They inferred that countries with better health standards

tend to grow faster. Sachs and Warner (1997) argued that economic growth provides more resources for public health, which in turn improves health indicators. Bloom, Canning, and Sevilla (2004) demonstrated that economic growth significantly affects population health. They deduced that a 10% increase in GDP per capita led to an average increase in life expectancy of 2 to 4 years. However, Acemoglu and Johnson (2007) explored the effect of potential life expectancy on economic growth and found that while there's a significant positive relationship between health and growth, this isn't uniform across different health measures. Meanwhile, Weil (2007) confirmed the findings of Pritchett and Summers, revealing that improved health outcomes played a substantial role in the post-WWII economic growth of developing countries. As an addition, Mankiw and Weil (1992) offers a theoretical framework where physical and human capital, including health, significantly impacts economic growth. They establish a model where long-run steady-state growth rates are influenced by these variables.

3.2 Relationship Between Economic Growth and Fertility Rates

Becker (1960) was among the pioneers in showing the inverse relationship between economic growth and fertility rates, explaining this through the increased opportunity costs of raising children in economically growing societies. Galor and Weil (1996) established through their findings that as economies grow and income per capita rises, there's a shift from a state of high fertility and low income to a state of low fertility and high income. Schultz (2005) further expanded on Becker's premise, detailing that as countries' GDP grows, the overall fertility rate drops as women's educational and employment opportunities rise. Feyrer, Sacerdote, and Stern (2008) used instrumental variable techniques to demonstrate that an increase in economic growth by one standard deviation leads to a decrease in the fertility rate by 0.7 children per woman. Aghion, Algan, and Cahuc (2009) found that in the medium to long term, economic growth led to a decrease in fertility rates, but in the short term, there were fluctuations influenced by various socio-economic factors.

4. Theoretical Studies

4.1 Relationship Between Economic Growth and Health

Grossman (1972) introduced the health demand model, which considers health as a durable capital stock. As the economy grows, individuals invest more in health, leading to improved health outcomes. Lucas (1988) provides a theoretical model focusing on human capital's role, including health and education, in economic growth. The paper suggests that investing in health can lead to substantial returns in terms of economic development. Barro (1996) theorized that improvements in health directly affect human capital, enhancing labor productivity and, consequently, stimulating economic growth. Galor (2005) argued in his unified growth theory that human capital accumulation,

which includes health improvements, is a central driver for the transition from stagnation to growth. Hall and Jones (1999) presented a model where health improvements, fueled by economic growth, lead to an increase in a country's social infrastructure, positively impacting economic performance. Soares (2005) developed a model that captures the external effects of population health on economic growth, emphasizing the role of improved health in reducing fertility and boosting labor productivity.

4.2 Relationship Between Economic Growth and Fertility Rates

Lucas (2002) extended the neoclassical growth model to incorporate fertility decisions, indicating that as economies grow, households opt for quality over quantity of offspring. Boldrin and Jones (2002) argued that with economic growth, technological progress, and the associated rise in wages, the cost of raising children goes up, leading to a decline in fertility rates. Doepke (2004) integrated fertility choice in a growth model where economic growth, by affecting the relative wages of men and women, impacts fertility decisions.

4.3 Unified Models

Lagerlöf (2003) developed a unified model, suggesting that as health improves, it initially increases fertility (due to reduced child mortality) but later leads to reduced fertility as economies grow and income rises. Weil (2005) presented a three-faceted model that integrates health, fertility, and economic growth. Here, health improvements reduce mortality rates, leading to reduced fertility and enhanced human capital, fostering economic growth. Galor's Unified Growth Theory (2005) elegantly bridges the gap between the three variables. It elucidates that as economies grow, the increased income leads to better health outcomes, which then has repercussions on fertility rates. Better health outcomes and reduced child mortality rates make families opt for fewer children, further consolidating the inverse relationship between economic growth and fertility.

5. Conclusion

The triad of economic growth, public health, and fertility rates has been a long-standing subject of scrutiny within the world of economic research. Empirical studies have consistently unveiled some fascinating correlations among these metrics, which theoretical models have sought to explain.

The empirical evidence over the years has strongly pointed towards two main findings: First, a positive correlation exists between economic growth and the health standards of a population. This is evident in various metrics such as life expectancy, infant mortality rates, and prevalence of certain diseases. As nations develop economically, they often invest more in healthcare infrastructure, education, sanitation, and medical research. This brings about better health outcomes for their populace. Improved healthcare can, in turn, support a productive workforce, which is essential for

sustained economic growth. On the other hand, there's an inverse relationship between economic growth and fertility rates. Historically, as countries have developed economically, there has been a trend of declining birth rates. Several factors contribute to this: higher female labor force participation, increased access to and use of birth control, higher education levels, urbanization, and a shift in societal values towards smaller family units. Moreover, as the cost of raising children increases, especially in urbanized settings, families tend to prioritize quality over quantity, resulting in fewer children but with more resources allocated to each.

Theoretical models have played a pivotal role in reaffirming these empirical findings. These models often delve into the mechanisms driving these observed relationships. For instance, as economic growth spurs technological advancements, there's greater access to healthcare, leading to improved health outcomes. Additionally, as economies grow and urbanize, opportunity costs related to child-rearing increase, leading families to opt for fewer children. Unified growth theories and models on demographic transitions offer more intricate details on these dynamics.

However, while these relationships seem well-established, the field faces multiple challenges: one of the most persistent challenges is determining causality. While correlations are clear, it remains a subject of debate whether economic growth directly leads to improved health outcomes and reduced fertility or if the relationships are more intricate and bidirectional. Another challenge is the integration of socio-cultural factors. Economics doesn't operate in a vacuum. Local customs, traditions, and beliefs play a significant role in determining health practices and fertility choices. Models and empirical studies need to consider these elements for a more holistic understanding. Furthermore, there's the concern of potential negative externalities. Rapid economic growth, if unchecked, can lead to environmental degradation, which can have direct and indirect repercussions on public health. Urbanization, while offering many benefits, can lead to crowded living conditions, pollution, and strain on public health resources.

In conclusion, the nexus between economic growth, health, and fertility is intricate, with many interconnected variables. While significant strides have been made in understanding these relationships, there remains much to be unearthed, especially as the global landscape continues to evolve. Economic researchers have a pivotal role to play in this journey, shedding light on these dynamics to inform policies that balance economic growth with the well-being of the populace.

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