Effects of High Fertility on Economic Development

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ABSTRACT

Developing countries that are integrating into the global economy are faced with challenges that result from the relationship between demographic change and economic outcomes. In recent years, general agreement has emerged to the effect that improving economic conditions for individuals generally lead to lower birth rates. But, there is much less agreement about the proposition that lower birth rates contribute to economic development and help individuals and families to escape from poverty. This paper examines recent evidence on demographic change and economic conditions across global regions with respect to developing economies. This aspect of the debate, concludes that the burden of evidence now increasingly supports a positive conclusion, examines recent trends in demographic change and economic development and argues that the countries representing the last development frontier, those of Sub-Saharan Africa, would be well advised to incorporate policies and programs to reduce high fertility in their economic development strategies.

Keywords: economic development, family planning, millennium development goals, population, high fertility

1. INTRODUCTION

Economists, demographers, and other social scientists have been debating how high fertility and rapid population growth affect economic outcomes since the time of Malthus. There are at least four basic forms of the debate. The population of sub-Sahara Africa has grown from 186 million to 856 million people from 1950-2010. That's about 11 million people a year for the past 60 years or approximately 670 million people in 60 years. From the limited data available, the United Nations observed that death rates in Africa have fallen slowly in recent decades while birth rates have remained high or even risen (World Bank, 2010). Consequently, the natural rate of increase has mounted each decade. There are at least four basic forms of debate on the issue:

i. Does a large number of children diminish a family's present well being and future prospects?

ii. Does rapid population growth adversely affect the overall performance of the economy and its ability to achieve and sustain general well being?
iii. Does low income, or poverty, contribute to high fertility?
iv. Is rapid population growth a symptom, rather than a cause, of low national output and poor economic performance?

In other words, the debates occur at both the macro- and the micro-levels and are about the direction of causality.

Despite these debates, a broad consensus has developed over time that as incomes rise, fertility tends to fall. There is little debate about the causal relationship between rising prosperity and declining fertility. Generally speaking, there has been a uniformly high correlation between national income growth and falling birth rates, and between family incomes and fertility. Economists and demographers for the most part agree that important ingredients of improved living standards, such as urbanization, industrialization and rising opportunities for non-agrarian employment, improved educational levels, and better health all lead to changed parental perceptions of the costs and benefits of children, leading in turn to lower fertility. In other words, there is no longer much debate about whether or not improved economic conditions, whether at the family level or at the societal level, lead to lower fertility. There are, of course, important differences between countries, and even within countries, regarding the timing and the pace of these changes, but that there is a causal relationship running from improved living standards to lower fertility is no longer in much dispute (National Research Council 1986).

Where debate remains active and at times quite contentious has to do with whether causality runs the other way—i.e. does reduced fertility improve the economic prospects of families and societies? Here there is anything but consensus, although, as I will argue in this paper, there appears to be a slowly growing convergence of views in favor of an affirmative answer to this question. This paper, in other words, addresses the question of whether reduced fertility, and more particularly public policies designed to reduce fertility, can lead to higher incomes and improved living standards.

A good deal of research, of course, has been conducted on this question. This paper attempts to summarize the present state of such research and the conclusions that emerge from it today. My purpose is to try to identify what policymakers can conclude from the present state of research and then to speculate on what might be accomplished between now and 2050 if policymakers were to pursue what I take to be the course of action suggested by the research findings.

2. MACRO PERSPECTIVE

Through the nineteenth and the first half of the twentieth century, intellectuals were roughly divided between the followers of Malthus and the followers of Marx. Crudely stated, Malthusians believed that high rates of population growth condemned societies to more or less permanent states of underdevelopment and that only by breaking the iron linkage of high fertility to poverty could real improvements in standards of living be achieved. Marx, on the other hand, argued that high fertility was a symptom, not a cause, of poverty and said that only by bringing about a radical transformation in the underlying causes of poverty would living standards rise and birth rates begin to fall.

In the modern era, which is to say since World War II, there have been three broad stages of economic thinking on the relationship between rapid population growth and economic performance. In the first stage, which followed the post war discovery by demographers of extremely rapidly expanding populations in many parts of the developing world, the work of scholars such as Coale & Hover (1958), Myrdal (1968) and Enke (1970) came to be widely accepted. It was decidedly neo-Malthusian, arguing

that only by bringing rapid population growth under control could countries hope to achieve improved economic performance and high standards of living. While this work hardly represented a consensus among development economists, it did capture the imagination of policymakers, particularly in the richer countries, and contributed to the formation of the modern 'population movement' as we have known it since the 1960s. This movement took as a given fact that rapid population growth harmed the prospects for development and that strong policies to reduce population growth rates were an essential precondition of sustained economic development (National Academy of service 1971).

The second stage, which can be dated from around 1986, was what economist Kelley called the 'revisionist' period (Kelley 1986). The emblematic work of that period was the 1986 US National Research Council (NRC) publication, '*Population growth and economic development: policy questions*'. The work of an expert committee, the 1986 NRC report, concluded that as one of its authors, Birdsall (1988) put it, 'rapid population growth can slow development, but only under specific circumstances and generally with limited or weak effects'. This was a return to mainstream neo-classical economics, which had always viewed Malthus's views as one-dimensional and simplistic, and which generally expressed skepticism about the strength of the relationship between high fertility and economic growth.

In an important sense, the NRC report broke the back of the population movement and ushered in a period of uncertainty about the priority that should be given to population policies, as well as about what the content of policy should be. It is fair to say that the NRC report fits nicely with the ideological predispositions of the Reagan Administration in the USA, which in 1984 had announced at the International Conference on Population at Mexico City that 'population growth is in and of itself neither good nor bad; it is a neutral phenomenon'. The NRC report also reinforced the views of feminist and human rights critics of the population policies of the 1960s–1980s who successfully lobbied for wholesale changes in orientation away from population control and towards a rights-based approach, culminating in the reproductive health and rights agenda that emerged from the International Conference on Population and Development at Cairo in 1994 (Singh 1998).

An important conclusion to be drawn from the history recounted thus far is that the views of economists matter a great deal. Indeed, notwithstanding Robert McNamara's deep commitment to population stabilization and his personal efforts to promote population policies during his presidency of the World Bank, the Bank's cadre of professional economists has for years succeeded in keeping population at a relatively low priority in terms of bank lending operations. More often than not, the macroeconomic and sector analytic work of the Bank pays scant attention to population dynamics, even in such chronically high fertility regions as Sub-Saharan Africa.

This brings us to the third, and current, stage of economic thinking on population and economic development. A new group of development economists decided to look at the impact, not only of reducing population growth rates, but also of changing age structures on economic outcomes (Bloom & Canning 2006). They reasoned that rapidly declining fertility is accompanied by changes in the ratio between the economically active population and dependent population. As fertility falls, a larger proportion of the population is in the age range 15–65, compared with the under 15 and over 65 categories. This one-time 'demographic bonus' ought to be associated with increased economic output at the same time that social services requirements for those not yet economically active (e.g. for education and health care) decline. Thus, assuming countries also pursue sensible pro-growth economic policies, the demographic bonus ought to translate into a jump in income *per capita*. Applying the model to the Asian Tigers (Korea, Singapore, Taiwan and Thailand), these economists found that the data fit the model extremely well. Countries that incorporated strong and effective population policies within the broader context of social and economic development policies were able to cash in very profitably on the demographic bonus. So, by looking at a changing age structure in addition to declining fertility,

economists were now able to discern a highly plausible causal connection between demographic change and economic growth—a connection that was much more difficult to see in the less sophisticated analysis of the 1986 NRC study and the prior revisionist research on which it reported (Merrick 2001; Greene & Merrick 2005).

Table 1. Average Annual Growth Rates of Population, Per Capita GDP, and GDP, World Regions, 1820 to 1913, 1913 to 2010, and 1820-2010.

Region	1820-1913 Population	1820-1913 per capita GDP	1820-1913 GDP	1913-2010 Population	1913-2010 per capita GDP	1913-2010 GDP	1820-2010 Population	1820-2010 per capita GDP	1820-2010 GDP
Western Europe	0.73	0.94	1.67	0.47	1.85	2.32	0.60	1.40	2.00
Eastern Europe	0.84	0.60	1.44	0.42	1.79	2.21	0.62	1.21	1.83
Former USSR	1.13	0.49	1.62	0.66	1.70	2.36	0.87	1.11	1.98
Western offshoots[a]	2.47	1.50	3.97	1.29	1.79	3.08	1.84	1.64	3.48
Latin America	1.43	0.97	2.40	2.05	1.52	3.57	1.75	1.25	3.00
Asia	0.34	0.17	0.51	1.48	2.28	3.76	0.93	1.25	2.18
Africa	0.26	0.67	1.23	2.17	0.83	3.00	1.38	0.75	2.13
World	0.58	0.83	1.41	1.38	1.67	3.05	0.99	1.26	2.25

Source. World Economics (2016) and U.S. Census Bureau (2016) for population; The Maddison Project (2013) for per capita GDP growth; and author's calculations.
Note. The dates 1820, 1913, and 2010 were chosen because there is more complete country and regional information for those dates in the Maddison data set. USSR = Union of Soviet Socialist Republics.
[a]Western offshoots are the United States, Canada, Australia, and New Zealand.

Table 1 can shed light on the timing of the demographic transition in various parts of the world. The demographic transition consists of an initial phase during which both crude birth and mortality rates are high and population growth is slow. As societies modernize, mortality rates fall while birth rates remain high leading to high population growth rates. Eventually, birth rates begin to decline resulting in a return to lower population growth as the transition is completed. This process appears to have run its course in Europe by the beginning of the 20th century and somewhat later in the western offshoots, while many countries in Africa, Asia, and Latin America have yet to complete it.

Table 2 shows that average annual world population growth over the period was about 1% but has varied considerably across regions and over time. Europe and the countries formerly included in the Soviet Union had relatively slow population growth overall with levels that were lower in the 20th century than in the 19th. One reason for slower population growth in Europe was the substantial emigration to Latin America and the "western offshoots" where high population growth rates were recorded between 1820 and 1913. While European population growth rates slowed during the period 1913 to 2010, they accelerated somewhat in Africa, Asia, and Latin America. Note that a constant annual population growth rate of 1% means that population doubles every 69.3 years. World population in 1820 was just over a billion people compared with about 6.9 billion in 2010 (World Economics, 2016 and World Bank, 2017).

Table 2. Average Annual Growth of Population, Real Per Capita GDP, and Real GDP (Percent), Selected Countries, 1820 to 1913 and 1913 to 2010.

Country	Population 1820-1913	Per capita GDP 1820-1913	GDP 1820-1913	Population 1913-2010	Per capita GDP 1913-2010	GDP 1913-2010
France	0.30	1.21	1.51	0.47	1.87	2.34
Germany	1.03	1.31	2.34	0.24	1.79	2.03
Italy	0.66	0.45	1.11	0.48	2.15	2.63
Norway	0.99	1.20	2.19	0.71	2.51	3.22
United Kingdom	0.82	0.93	1.75	0.33	1.62	1.95
Former USSR[a]	1.13	0.77	1.89	1.36	0.47	1.83
Canada	2.43	1.71	4.14	1.51	1.78	3.29
United States	2.45	1.46	3.91	1.19	1.80	2.99
Mexico	0.88	1.09	1.97	2.13	1.54	3.67
Japan	0.55	0.78	1.33	0.94	2.85	3.79
Korea	0.13	0.40	0.53	1.59	3.92	5.51
India	0.40	0.25	0.65	1.44	1.66	3.10
China	0.15	-0.01	0.14	1.15	2.76	3.91
Indonesia	1.14	0.54	1.68	1.59	1.74	3.33
Iran	0.56	0.57	1.13	1.97	1.92	3.89
Jordan	0.51	0.57	1.08	2.98	1.78	4.76
Iraq	0.42	0.57	0.99	2.48	0.49	2.97
Brazil	1.78	0.18	1.96	2.19	2.20	4.39
Argentina	2.86	1.40	4.30	1.74	1.02	2.76
Ghana	0.60	1.34	1.94	2.55	0.93	3.48
Morocco	0.69	0.54	1.23	1.89	1.79	3.68
Egypt	1.14	0.69	1.83	1.97	1.60	3.57
South Africa	1.48	0.82	2.30	2.18	1.19	3.37
World	0.54	0.83	1.37	1.40	1.67	3.07

Source. Author's calculation based on data from World Economics (2016) and The Maddison Project (2013).
Note. USSR = Union of Soviet Socialist Republics.
[a]Countries formerly included in the USSR.

3. MICRO PERSPECTIVE

One might expect that economists interested in examining the impact of fertility on household income would pay more attention to the micro-level than to the macro-level, but this is not the case. Much more research has been conducted at the macro-level than at the micro-level, probably because of the greater availability of appropriate datasets. The truth is, that only detailed household panel surveys or randomized interventions (or actual or natural experiments) are adequate to accurately estimate the impact of fertility at one point in time on household income at subsequent points. Such datasets are comparatively rare because of the time and expense required to construct them. In the absence of longitudinal household information, it is nearly impossible to address the issue of what economists call the 'endogeneity of fertility problem' and thus the direction of causality: does poverty reinforce high fertility or does high fertility lead to poverty?

Fortunately, in just the last few years, datasets have become available (or have been discovered by economists) that permit sophisticated micro studies of the fertility–poverty relationship (Merrick 2001). One of these is the Indonesian Family Life Survey, a panel study that covered several years and that permitted investigators to look at the effect of changes in desired and actual fertility at one point in time on subsequent household poverty. Canning & Schofield (2007) found that over a three-year period, one birth on average reduced the likelihood of female labor force participation by 20 percent. This decline in women's contribution to household income, in turn, reduced expenditure *per capita* in the household, pushing a significant number of families into poverty and preventing the escape of a significant number from poverty.

One of the economists who has been most demanding of a solid evidence base for conclusions about the effect of fertility on economic development or poverty is T. Paul Schultz. Schultz, while willing to stipulate the plausibility that high fertility acts as a barrier to economic growth and poverty reduction, has nonetheless for many years remained skeptical that the relationship is as strong or as stable as many neo-Malthusians assert it to be. However, Joshi & Schultz (2007) conducted a study, 'Family planning as an investment in development: evaluation of a program's consequences in Matlab, Bangladesh', using data from the famous Matlab family planning quasi-experiments of 1974–1996 and the associated surveillance system. Schultz and Joshi found that in the 'program', villages and individual households fertility declined by some 15 percent more than in the 'control' villages. They then looked at the impact of that decline 'on a series of long run family welfare outcomes: women's health, earnings and household assets, use of preventive health inputs, and finally the inter-generational effects on the health and schooling of the woman's children. Within two decades many of these indicators of the welfare of women and their children improve significantly in conjunction with the program induced decline in fertility and child mortality. This suggests social returns to this reproductive health program in rural South Asia have many facets beyond fertility reduction, which do not appear to dissipate over two decades'.

The question of whether or not high fertility leads to, or exacerbates, poverty and whether this in itself should be grounds for policy interventions ultimately revolves around the question of parental intentions with respect to childbearing. If parents perceive children as good in and of themselves and are willing to forego other forms of consumption for the sake of having a large number of children, most economists would argue it is hard to make the case that they should be urged to have fewer of them. If, on the other hand, many of the children very poor parents are bearing are the result of unintended pregnancies, the case for public policies to assist them in having fewer would seem to be stronger.

From the remarkable series of surveys that began with the World Fertility Survey in the 1970s and continues to this day as the Demographic and Health Surveys program, we know a great deal about fertility intentions in a large number of countries around the world, and the inescapable conclusion is that a significant proportion of births in developing countries are the result of unintended pregnancies. For example, an estimate by the Global Health Council in 2002 revealed that roughly one-quarter of the 1.2 billion pregnancies that occurred in the developing world between 1995 and 2000—some 300 million—were unintended (Daulaire et al. 2002). Since these estimates are the result of ex-post surveys of the women who had the pregnancies, many of whom may have changed their minds about the 'wantedness' of the pregnancies after they realized they were pregnant, it is quite likely that estimates of the number of unwanted pregnancies in fact understate reality. The ever rising numbers of abortions and of maternal deaths that result from abortion are additional evidence of the incidence of unwanted pregnancy around the world.

It seems justified to conclude that the burden of evidence from micro-analysis is that high fertility reinforces poverty and makes an escape from poverty more difficult. As Birdsall et al. (2001) conclude in their overview chapter in *Population matters*: *demographic change, economic growth and poverty in the developing world*, ' … the essays in this volume do point to a conclusion which links concern about population growth and change more directly to concern about the welfare of millions of people in the developing world. In their entirety, they put together a newly compelling set of arguments and evidence indicating that high fertility exacerbates poverty, or better put, that high fertility makes poverty reduction more difficult and less likely'.

4. The Millennium Development Goals (MDGs)

In order to address the problem of poverty and promote sustainable development, the United Nations Millennium Declaration was adopted in September 2000 at the largest ever gathering of heads of States committing countries both rich and poor to do all they can to eradicate poverty, promote human dignity and equality and achieve peace, democracy and environmental stability. The goals include those dedicated to eradicating poverty, achieving universal primary education, promoting gender equality and empowering women, reducing child mortality, improving maternal health, combating HIV/AIDS, malaria and other diseases, ensuring environmental sustainability and developing a global partnership for development.

The eight main targets, using 1990 as a baseline, are:

1. **Eradicate extreme poverty and hunger**

2015 target Halve proportion of people living on less than $1 a day, and those suffering hunger

2. **Achieve Universal Basic Education**

2015 target Achieve universal primary completion

3. **Promote Gender equality**

2005/2015 target Eliminate gender disparities in primary and secondary education enrolment by 2005, and achieve equity at all levels by 2015

4. **Reduce Child Mortality**

2015 target Reduce by two thirds the child mortality rate

5. **Improve maternal health**

2015 target Reduce by three quarters the proportion of women dying in childbirth

6. **Combat AIDS, Malaria and Other Diseases**

2015 target Halt and begin to reverse the incidence of HIV-AIDS, malaria and other major diseases

7. **Ensure environmental sustainability**

Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

2015 target reduce by half the proportion of people without access to clean drinking water and basic sanitation

By 2020 achieve a significant improvement in the lives of at least 100 million slum dwellers

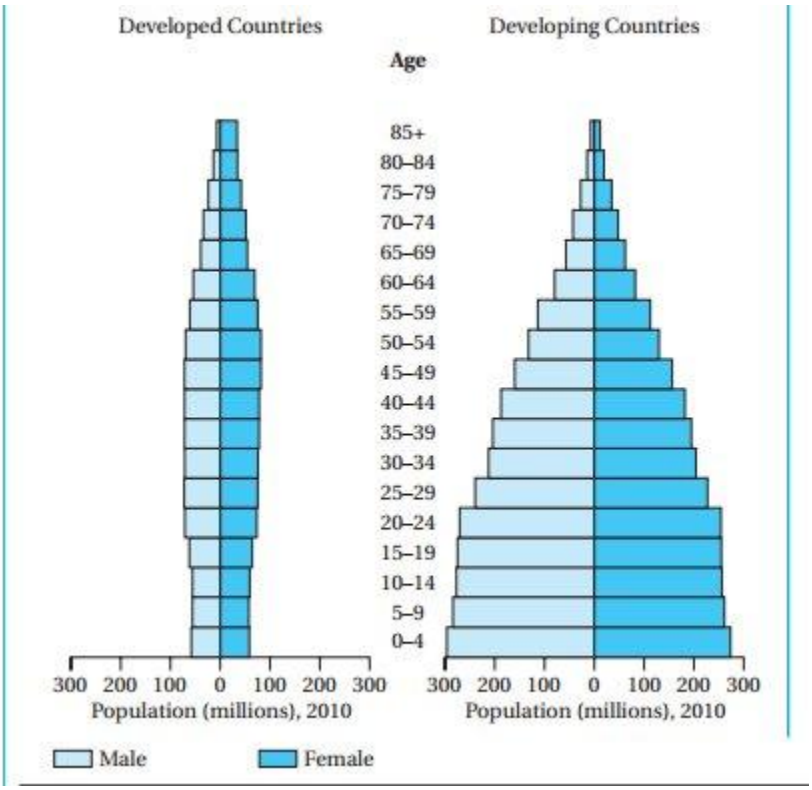
8. **Develop a Global Partnership for Development**

The problem of development is a global challenge and the MDGs is a response by world leaders. There are limitations to utilizing the MDGs as a framework for delivering or measuring development. But they provide a platform to engage the development process. By 2015 which is the target year of the MDGs, on matters of live and death, 2015 outcomes were not on track to happen. Some shifts were dramatic, and Africa was responsible for many of the greatest incremental gains. However, outcomes on basic needs were mixed. The diversity of trends prompts clear questions of why. What differences in public and private action led to such different results across geographies and issues?

They show that, especially on matters of life and death, 2015 outcomes were not on track to happen anyhow. Some shifts were dramatic, and Africa was responsible for many of the greatest incremental gains, not simply China and India.

However, outcomes on basic needs were mixed. The diversity of trends prompts clear questions of why: What differences in public and private action led to such different results across geographies and issues?

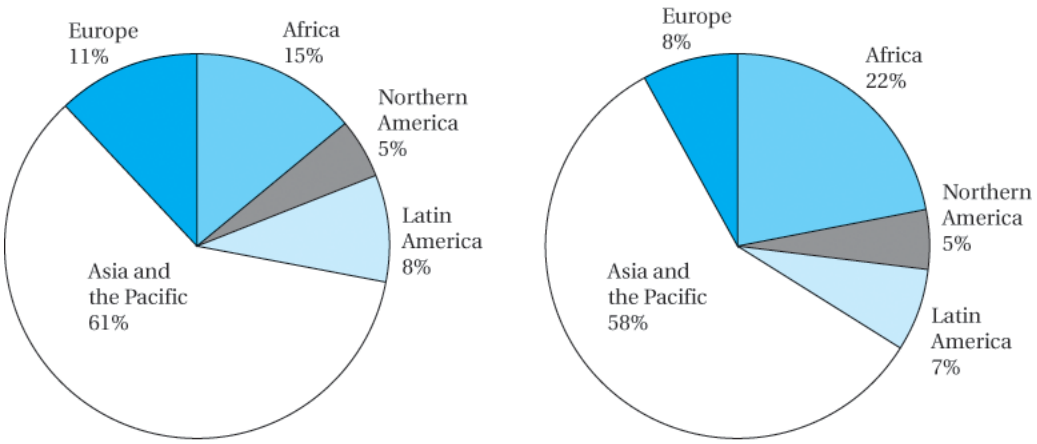
Population Pyramids of Developed vs. Developing Countries



Source: U.S. Census Bureau International Data Base, 2011 Update

Structure of the World's Population

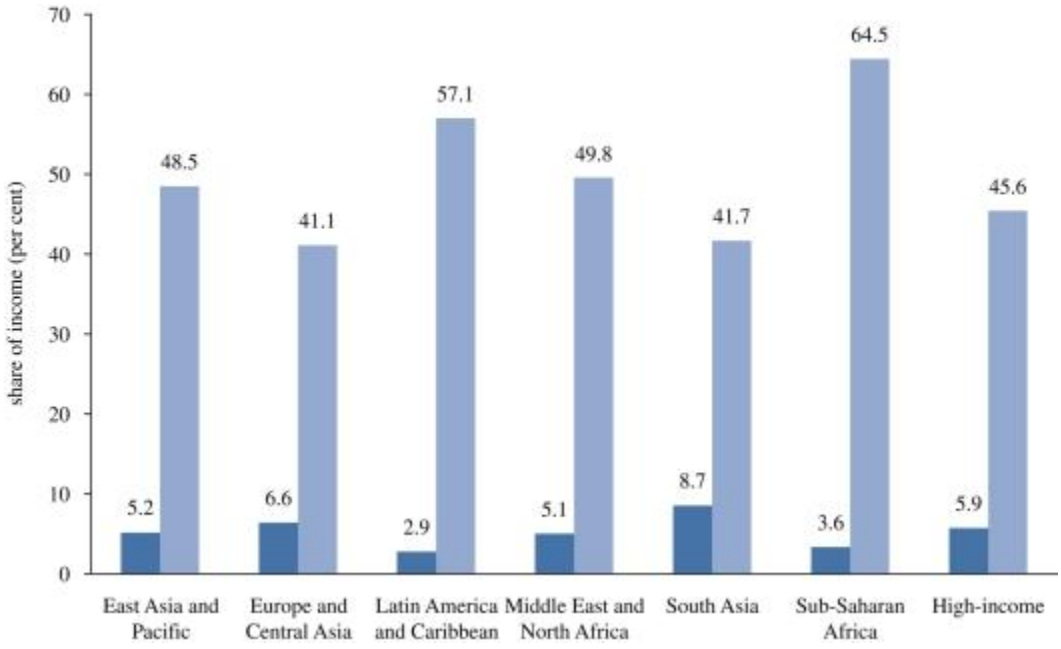
Geographic Region



Source: Data from Population Reference Bureau, World Population Data Sheet, 2010.

More than three-quarters of the world's people live in developing countries; fewer than one person in four lives in an economically developed nation. The figure above shows the regional distribution of the world's population as it existed in 2010 and as it is projected for 2050. Population is relatively youthful in the developing world. As of 2011, children under the age of 15 constitute more than 40% of the total population of the low-income countries, 32% of the lower-middle income countries, but just 17% of high-income countries. In countries with such an age structure, the youth dependency ratio—the proportion of youths (under age 15) to economically active adults (ages 15 to 64)—is very high. Thus, the workforce in developing countries must support almost twice as many children as it does in the wealthier countries. In the United Sates, the workforce age group (15 to 64) amounts to about 67% of the total population, with 20% under age 15 and 13% over age 65 as of 2011; the corresponding ratios in the United Kingdom are similar: 66%, 18%, and 17% respectively. In the euro area, some 19% of the population is over age 65; and in Japan nearly one-quarter of the population already has reached age 65. The main problems in more developed countries relate more to their low population growth and old-age dependents (over age 65). By contrast, in Sub-Saharan Africa, the economically active workforce makes up about 54% of the total population (just 3% of the population is over age 65) as of 2011. In general, the more rapid the population growth rate is, the greater the proportion of dependent children in the total population and the more difficult it is for people who are working to support those who are not. This phenomenon of youth dependency also leads to an important concept, the hidden momentum of population growth.

Another measure of development, albeit one that is not universally accepted, is the distribution of income. Most development economists, however, view movement towards a more equitable distribution of income as an indicator of development and modernization. Improving income distribution usually accompanies poverty reduction and indicates improving opportunities and prospects for the lowest income groups. As can be seen in the figure below, the Asian countries show the most favorable income distributions among the major regions of the developing world.



Income distributions. Dark blue bar, poorest 20 per cent; light blue bar, richest 20 per cent. Adapted from World bank development Indicators (2015).

Some will not view the correlation between declining fertility and reduced poverty/improved living standards as causally connected or may persist in seeing them as connected in the opposite direction: improved living standards leading to lower fertility. I hope that the review of recent theory and research on this question earlier in this paper will persuade readers that there is a strong reason to believe that reduced fertility can in fact lead to economic development and higher standard of living.

My own view is that the fertility–economic development relationship is a mutually reinforcing one, where improvements in one tend to encourage and then accelerate improvements in the other—the so-called virtuous circle. Where countries succeed in stimulating economic growth and then encouraging its continuation (most of today's rich countries), declining fertility will usually follow (an exception is the oil-rich states where economic growth is an artefact of mineral extraction with non-indigenous labor and where modernization in its usual sense has not occurred). But, on the other side, where countries succeed in encouraging reduced fertility (Korea and Bangladesh), they put in place an important potential stimulant to economic development. Where the two occur simultaneously as part of a comprehensive development strategy, as they have in East Asia, the most virtuous of circles can develop.

CONCLUSION

In tracing the recent history of theory and research on the connection between demography and economics, we find a new consensus is emerging; that reductions in fertility and declining ratios of dependent to working age populations provide a window of opportunity for economic development and poverty reduction.

Empirical studies increasingly support the idea that countries which have incorporated population policies and family planning programs in their overall economic development strategies have achieved high and sustained rates of economic growth and that they have also managed significant reductions in poverty. Fertility reduction is by no means an economic development panacea and is certainly not a sufficient condition for economic growth, but it may well be a necessary condition, establishing conditions in which governments can invest more *per capita* in education and health, thus creating the human capital for sustained economic growth. Likewise, with fewer children to care for and raise, families can improve their prospects for escaping the poverty trap. At both the macro- and micro-levels, moderating fertility enhances economic prospects.

Throughout the developing world, declining birth rates and rising living standards have gone hand in hand. The evidence suggests that the interrelationship between them represents a virtuous circle, whereby improvements in one reinforce and accelerate improvements in the other. The virtuous circle can be initiated either by investing in human development programs such as healthcare and education or by investing in programs to reduce fertility. But the example of the East Asian Tigers suggests that the best strategies have been those that do the two simultaneously.

These recent historical experiences hold important lessons for Africa, development's last major frontier. By drawing on these examples, as well as Africa's own success stories, and by recognizing the link between demography and economic development, African leaders and policymakers can devise integrated economic development strategies that give a prominent role to population policies that include strong reproductive health and family planning programs.

REFERENCES

- Birdsall N. 1988Economic approaches to population growth and development. In Handbook of development economics (eds Chenery H. B., Srinivasan T. N., editors.), pp. 478–536 Amsterdam, The Netherlands: Elsevier Publications
- Birdsall N., Kelley A. C., Sinding S. W. 2001Why population matters: demographic change, economic growth, and poverty in the developing world Oxford, UK: Oxford University Press
- Bloom D. E., Canning D. E. 2006Booms, busts and echoes: how the biggest demographic upheaval in history is affecting global development. Finan. Dev. 43, 8–13
- Canning D. E., Schofield H. 2007The effect of fertility on female labor supply and household poverty in Indonesia Boston, MA: Harvard School of Public Health
- Coale A. J., Hoover E. M. 1958Population growth and economic development in low income countries Princeton, NJ: Princeton University Press
- Daulaire N., Leidel P., Mackin L., Murphy C., Stark L. 2002Promises to keep Washington, DC: Global Health Council
- Enke S. 1970The economics of having children. Pol. Sci. 1, 15–30
- Greene M. E., Merrick T. 2005Poverty reduction: does reproductive health matter? Washington, DC: George Washington University Center for Global Health
- H. Cassen, Population Policy: A New Consensus (Washington, D.C.: Overseas Development Council, 1994).
- Joshi S., Schultz P. T. 2007Family planning as an investment in development: evaluation of a program's consequences in Matlab, Bangladesh New Haven, CT: Yale Economic Growth Center
- Kelley A. C. 1986 Population growth and economic development: a revisionist interpretation. Popul. Dev. Rev. 12, 563–568
- Merrick T. 2001Population and poverty in households: a review of reviews. In Population matters: demographic change, economic growth and poverty in the developing world (eds Birdsall N., Kelley A. C., Sinding S. W., editors.), pp. 201–212 Oxford, UK: Oxford University Press
- Myrdal G. 1968 Asian drama New York, NY: Twentieth Century Fund
- National Academy of Sciences 1971Rapid population growth: consequences and policy implications, vols 1 and 2 Baltimore, MD: Johns Hopkins Press for the National Academy of Sciences
- National Research Council 1986Population growth and economic development: policy questions Washington, DC: National Academy of Sciences. Committee on Population
- Phillips J. F., Bawah A. A., Binka F. N. 2006Accelerating reproductive health and child health programme impact with community-based services: the Navrongo experiment in Ghana. Bull. World Health Organ. 84, 949–953
- Singh J. S. 1998 Creating a new consensus on population: the International Conference on population and development London, UK: Earthscan Publications
- Schultz, W. Theodore (1973). New Economic Approaches to Fertility, Journal of Political Economy, Vol. 81, No. 2
- UK All-Party Parliamentary Group on Population Development and Reproductive Health 2006Return of the population growth factor: its impact on the millennium development goals. London, UK

- Todaro, M. P. Smith, S. C. 2015. Economic Development, Pearson Education, 12th Edition Upper Saddle River, New Jersey
- UNFPA and the Alan Guttmacher Institute 2004 Adding it up: the benefits of investing in sexual and reproductive health care New York, NY: United Nations
- United Nations Population Fund (UNFPA) 2004State of the world population 2004 New York, NY: United Nations
- World Bank (2008) Poverty Net Washington, DC: The World Bank
- World Bank (2015) Development Indicators, 2015 (New York, Oxford University Press)
- World Bank (2017) World Development Report, 2017 (New York, Oxford University Press)
- World Economics (2016) Maddison Historical GDP data