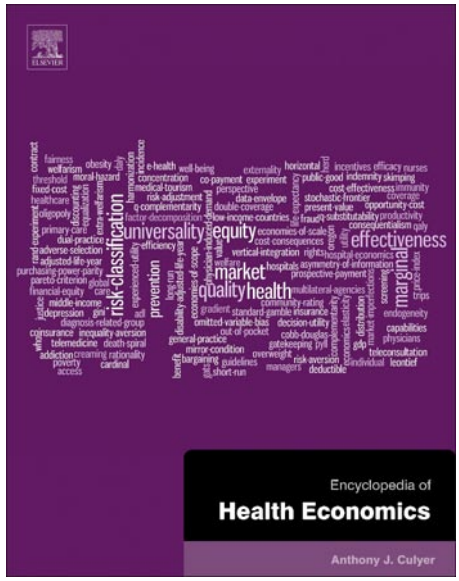

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Fertility and Population in Developing Countries

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Glossary

Demographic dividend Term describing the benefit to a country of having a large working population following a fertility slowdown.

Demographic transition Theoretical model used to explain population changes over time from a context characterized by high fertility and mortality rates to low fertility and mortality rates.

Dependency ratio An age–population ratio of those typically not in the labor force and those typically in the labor force. It is calculated by dividing the number of people younger than 15 years and older than 65 years by the number of people aged 15–64 years.

Hypergamy Marriage into an equal or higher caste or social group.

Missing women Pattern of high sex ratios in census data indicating sex discrimination toward females.

Patrilocality Custom in many societies with son preference that adult children live with the husband's parents.

Replacement rate The number of children each woman needs to have to maintain current population levels.

Sex ratio Ratios of males to females in the population.

Introduction

In the mid-twentieth century, many developing countries experienced a 'demographic transition': a transition from a society in which women had many births and many infant deaths, to a society with lower fertility and lower infant mortality. This pattern was particularly pronounced in China and India, which enjoyed rapid improvements in public health and steep declines in death rates among infants and children. In the early 1960s, following sharp declines in infant mortality which had exceeded 100 per 1000, the total fertility rate (TFR) – the number of children a woman would have in her lifetime at prevailing age-specific rates – of both countries exceeded six births per woman, resulting in massive young cohorts. Government policies and changing social norms led to rapid fertility decline in the 1970s in China and in the 1990s in India, leaving both countries with massive cohorts born during their respective baby booms, and much smaller cohorts before and after. This peculiar age structure is associated with a set of advantages and challenges that will be discussed later in this article.

A similar story has begun to play out in sub-Saharan Africa, where recent declines in mortality have led to a rapid increase in population growth. Much of Africa's population is extremely young, posing a challenge in the short run but possibly aiding economic growth in the long run. Africa's age structure is also affected by the human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) epidemic, which generally affects young adults, leaving children and the elderly behind to fend for themselves. This has resulted in a very young age distribution in Africa, similar to the situation in China and India in the 1970s and 1980s. The lesson of China's and India's present may be useful for Africa's future.

The rapid fertility decline in China and India was also accompanied by an alarming pattern: the 'missing girls' phenomenon. The combination of traditional son preference, the need to reduce fertility, and the diffusion of ultrasound technology led to a sharp increase in the sex ratio at birth in both countries. Scholars estimate that more than 100 million girls are missing worldwide, 80 million of which are due to sex discrimination in China and India alone. Both countries are at the cusp of an explosion in the sex ratio of the adult population, which may have important implications for society in general, and health in particular. Recent increases in China's syphilis rate have alarmed policymakers, and the dynamics of both countries' populations could generate a challenging scenario for public health officials.

In this article, the author examines the causes and consequences of these population patterns, focusing on health as an outcome. The author begins in Section A Modern History of Fertility in Developing Countries with a general overview of fertility trends that gave rise to rapid demographic transition. The experiences of China, India and Africa are examined, as each are at a different stage of the demographic transition. In Section Demographic Transition and the Implications for Economic Growth and Public Health, issues related to where each country finds itself in the context of its demographic transition are examined. For China, the most pressing concern is to provide old age support for its rapidly aging population. For India, the challenges the country faces in providing medical care to its large young population are described. How the African experience with HIV/AIDS will shape its country's future, in light of the disease's pronounced effect on the age distribution is examined. In Section Missing Women and Implications for Public Health, the focus is on the impact of China's and India's skewed sex ratios on health in a variety of contexts, including its impact on sexually transmitted infections (STI), care for infants, and other pathways, such as the emergence of a large unmarried elderly population. In Section Conclusion, the author concludes with a brief discussion of policy recommendations for public health planning in the developing world as it relates to the demographic patterns observed.

A Modern History of Fertility in Developing Countries

The demographic transition involves four stages. In the first stage, society is characterized by high birth and death rates that keep the population in balance. All human populations

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are believed to have had this balance until the late eighteenth century, when this stage ended in Western Europe. Developing countries found themselves in this predicament of high birth and death rates until the twentieth century.

In the second stage of the demographic transition, the death rate drops due to improvements in food supply, sanitation, and access to medical care, leading to lower infant mortality rates and longer life spans. The size of the population grows rapidly during this phase, and the decline in death rates among infants and children result in a very young population. In the third phase, birth rates fall due to several factors. These include increased access to contraception, reduced need for farm labor, and increased participation of women in the workforce. A key factor in lowering the fertility rate is a growing recognition among parents that births will likely survive to adulthood, reducing the need for very high fertility to compensate for high child death rates. This gives way to the fourth phase, where countries experience low birth and low death rates, and balance reemerges, slowing population growth.

The Demographic Transition in China, India, and Africa

The current phase of each region analyzed is shown in Figure 1, showing China near the conclusion of its transition, India in the transition process, and Africa which is yet to experience transitional fertility decline.

China

In China, the demographic transition narrative fits the country's population history tightly, and the country has now entered the last stage. In China, throughout the 1960s the TFR exceeded six births per mother. This rapid population growth alarmed Chinese officials, and the Communist Party subsequently enacted a series of fertility control policies, including new restrictions on women having more than two children during the 1970s. These early policies were immensely successful and from 1970 to 1980, the TFR fell from 5.8 to 2.3 births per woman. Family planning officials were instructed to enforce an even stricter policy starting in 1979, when China instituted its one-child policy. Under this policy, China's TFR declined to 1.5, below replacement and among the lowest rates in the world.

In the short run, the benefits to China's fertility program are indisputable. At present, the fraction of China's population that is in their working years (ages 15–64) is 73.5%. This has contributed to the country's stellar growth record, which, in turn, has been an important factor in the improvement in health outcomes. Recent estimates from nationally representative surveys put life expectancy at birth at 74.8 years for females and 72.8 for males, levels that approach those of the world's more developed countries. However, a crisis is looming. The size of the country's population aged 60 and above will increase dramatically in the coming years, growing from 200 million in 2015 to more than 300 million by 2030. The challenges stemming from this rapid population aging is discussed in the next section.

India

The Indian population narrative is similar to China's, but occurred roughly two decades later. Between 1951 and 1976, India's crude death rate dropped by more than half, from 28.6 to 13.8 – and the crude birth rate only fell by a quarter, from 45.9 to 34.4. This period featured rapid population growth, and India's improvements in infant health continued during the 1980s and 1990s.

The population explosion has left India with a very young population, and on the cusp of becoming the world's most populous nation – possibly by 2020. At present, more than half of India's population is under 25 and more than 65% is below the age of 35. In recent years, Indian fertility has slowed, partly due to government mandates and partly through the normal mechanisms highlighted in the demographic transition framework, such as increasing female education, which has led to wider take up of contraception. Birth cohorts in recent years are smaller than in the previous decade, as reflected in Figure 1. Still, India's explosive population growth for several decades has left the country with an extremely young population.

As a result of this currently favorable age distribution, India is currently enjoying its demographic dividend, with economic growth exceeding 7% every year since 1997. The country continues to enjoy a low dependency ratio, with 65.2% of the population in their working years. However, the country still lags behind developed countries in life expectancy. Life expectancy at birth for men is 66.1 years and for women 68.3 years, reflecting challenges in providing adequate health care to its massive population. The country has also struggled with providing sufficient primary and secondary education. Further investments in health and human capital can position the country to continue cashing in its demographic dividend. However, although India is still decades away from facing an aging population, the country will almost certainly face challenges similar to those that China will face, albeit in a delayed fashion.

Sub-Saharan Africa

During the 1980s, the population of sub-Saharan Africa grew at a rate of 3.1% per year, the highest of any developing region. The population growth occurred due to rapid mortality decline and only moderate fertility decline. In 1970 Africa's TFR was 6.7. By 1990 it had declined 12% to 5.9 with an additional decrease of 24% to 4.5 by 2010. However, childhood mortality rates declined more rapidly, with the under-five mortality rate declining from 180.6 to 125.3, a 31% decrease, between 1980 and 2010. The combined impact of rapid declines in mortality and more modest declines in fertility have left sub-Saharan Africa with a very young population, with 44% of the population under the age of 15. If the Indian and Chinese precedent is followed, it is reasonable to expect that fertility will begin to level off in Africa, though when this will occur is unclear, and less effective government fertility regulations imply that intervention will need to come from voluntary family planning participation. Should Africa succeed in encouraging faster fertility decline, the region may enjoy its demographic dividend earlier. In any scenario, however, the population should continue to grow at robust rates for many years, leaving the continent with a very young

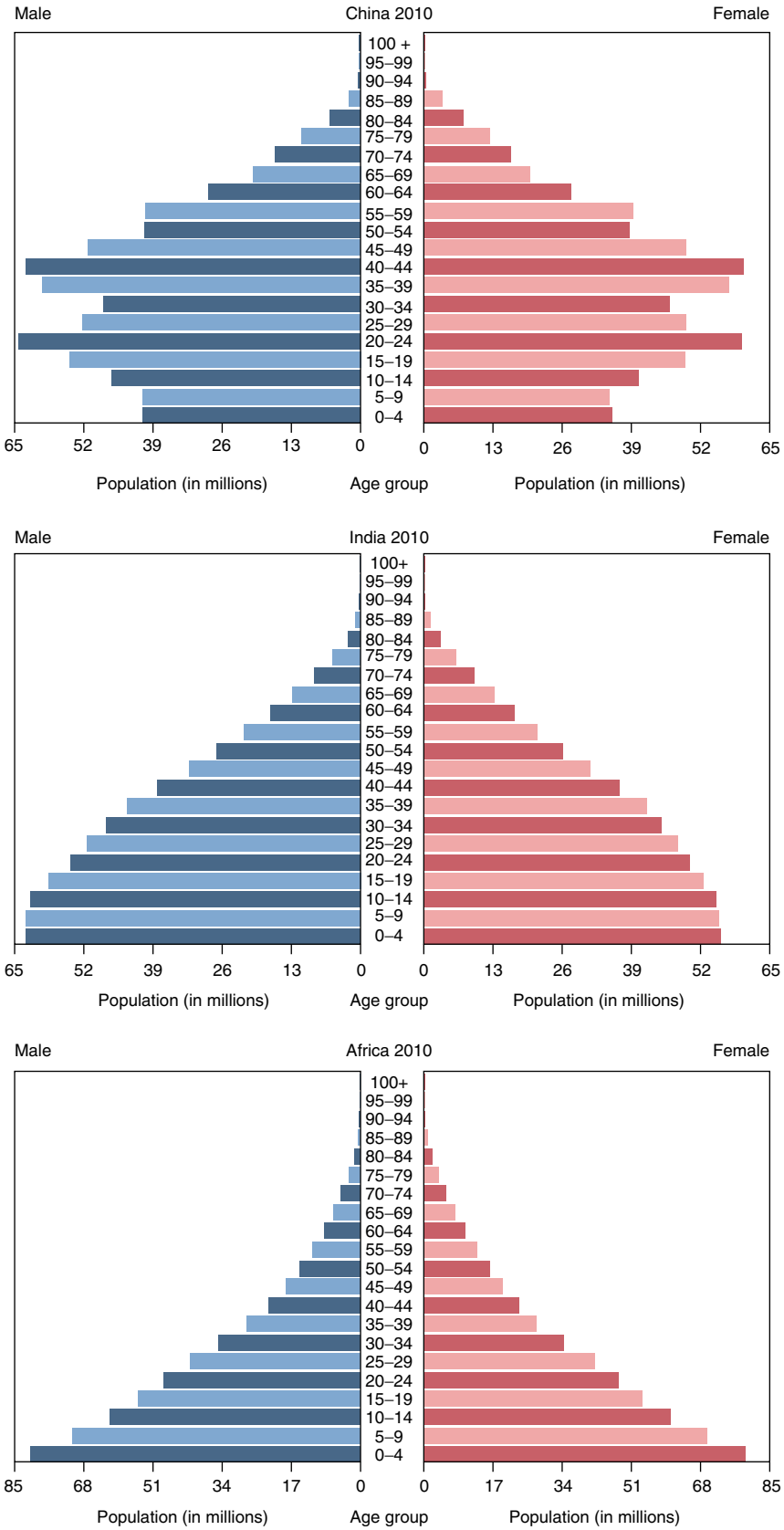

Figure 1 Age pyramid in China, India, and Africa – 2010. US Department of Commerce (http://www.census.gov/population/international/data/idb/informationGateway.php).

population in the coming decades. This could prove to be a boon to economic growth, as the eventual fertility decline and subsequent population aging will leave Africa with a huge working population. Some policymakers, however, fear that poor management of African economies may leave them unable to capitalize on the favorable age structure.

However, as shown in Figure 1, the massive young cohorts in Africa may pose a challenge in the near-term, as the region grapples with a high dependency ratio. Note that this is in part related to the consequences of the HIV/AIDS epidemic, which has resulted in millions of deaths to people who are in their prime working years, as the disease peaks in prevalence among individuals between ages 20 and 49. There is little reliable national-level data describing the distribution of deaths by cause for sub-Saharan Africa, and the World Health Organization's mortality database lists HIV-related causes for only one sub-Saharan nation (South Africa). An examination of cause-specific death data available for two countries, Tanzania and South Africa, revealed an increase in the probability of dying between ages 15 and 50 from HIV-related causes of up to 127% for males and 153% for females. Recent evidence indicates, though, that deaths from HIV have begun to plateau, which is an encouraging sign that the epidemic will not continue to worsen. However, for several high-prevalence countries such as Botswana and Zimbabwe, HIV has shortened life expectancies by several decades. A lack of further progress containing HIV could prevent the region from enjoying the benefit of its favorable age distribution, should the population of workers continue to suffer from high mortality.

The Missing Girls of China and India

As China and India experienced rapid fertility decline, many parents were unwilling to complete fertility without having a son. The value of sons is in part religious, as both Confucianism and Hinduism designate the son as having the responsibility to perform certain rites. However, a primary explanation for son preference is the custom of patrilocality, practiced in both countries. Patrilocality refers to the firmly-entrenched cultural norm for elderly parents to coreside with their adult son, and for a woman to 'marry in' and assist him in this function. Patrilocality is the custom in almost every country with missing women. In a world without social security and with limited ability among individuals to generate financial wealth, this is the primary method of guaranteeing support in one's old age. In this context, it is perhaps unsurprising that parents have resorted to sex selection in a period of fertility decline, when parents will have to rely on fewer children to care for them in their old age.

When Amartya Sen first coined the term 'missing girls' in a 1990 New York Review of Books article, it was unclear exactly how these women went missing. Although some presumed that daughters suffered higher mortality rates throughout childhood, later scholarship documented that infanticide and sex-selective abortion were the primary explanations, with the latter becoming increasingly prominent after ultrasound's diffusion in China in the late 1980s and early 1990s in India.

Historically, Chinese and Indian parents discriminated against girls on birth and throughout childhood to ensure the survival of a son to adulthood. However, this practice was muted during the baby boom of the 1960s, which allowed the vast majority of parents to have an adult son without engaging in sex selection. However, in both China and India, increasingly strict enforcement of fertility limits put parents in a more difficult position. Strict enforcement of China's one-child policy throughout the 1980s forced parents to curb fertility. In India, overzealous promotion of family planning occurred through activities such as sterilization camps, and the country later adopted a two-child limit for public officials. In both countries, the need to have a son at an early parity became paramount. Following the introduction of ultrasound technology, parents were able to identify the sex of the fetus after 4 months of pregnancy, a technology that significantly lowered the time and psychic cost of engaging in discrimination against girls. A steep rise in the sex ratio at birth was observed in both countries in the 1990s, and has remained disturbingly high. As shown in Figure 2, this increase was concentrated among births following daughters, when parents would have felt compelled to have a son but be in violation of the one-child policy.

The most recent census data for both countries indicates that the sex ratios are at the highest levels ever recorded for each country. The naturally occurring sex ratio at birth is 106 (106 boys for 100 girls). In China, the 2005 Chinese Population Survey and the 2010 census reported that the sex ratio at birth was 118 and 119 males to females respectively, suggesting that the distorted sex ratios will continue to be a problem well into the twenty-first century. In India, the problem is somewhat less severe, though still shocking in magnitude. India's 2011 sex ratio among ages 0–6 was 109 as a ratio of males to females, representing deterioration from the 2001 sex ratio of 108. In Northern Indian states with strong son preference such as Haryana and Punjab, the ratios are similar to those in China, with reported sex ratios of 120 and 118, respectively. This long running problem has left both countries with extremely distorted sex ratios among the young. In China, there were nearly 25 million more boys than girls under 20 in the 2010 census.

Demographic Transition and the Implications for Economic Growth and Public Health

As the large cohorts born during the second phase the demographic transition enter their prime working years, a window of opportunity is provided for rapid economic growth, as slowing fertility yields a large mass of workers. However, as these cohorts enter old age, they place pressure on the system; the large mass of elderly, with smaller population cohorts before and after them, represents a challenge.

In this section, the author briefly describes a set of unique challenges facing China, India, and sub-Saharan Africa, related to the demographic transition in each context. In China, how the country will deal with a large elderly population without extensive pension programs is examined. In India, the challenges with providing health care to its large, poor, and rural population is discussed. In sub-Saharan Africa, the focus is on the most pressing concerns in the area of public health, which

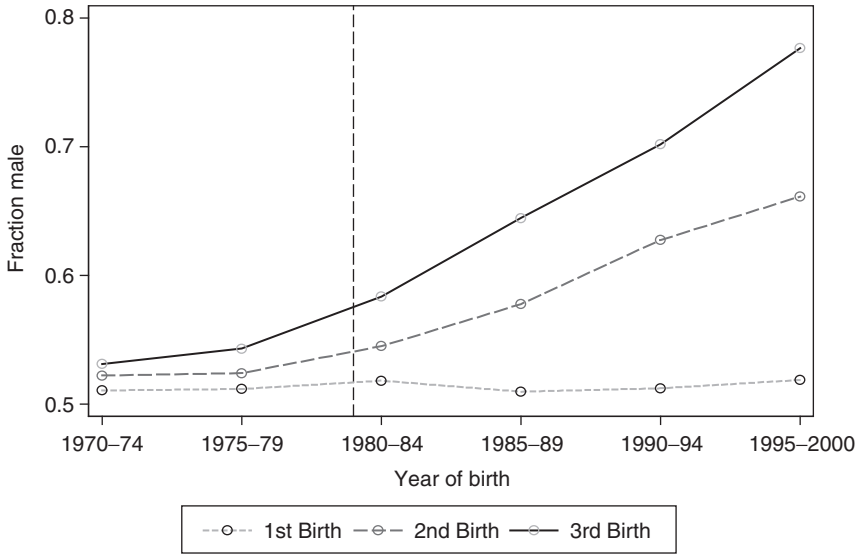

Figure 2 Sex ratios at birth following daughters, China 1980–2000. China census 1982–2000. Sample restricted to mothers ages 21–40. Vertical line indicates year of introduction of China's one child policy (1979). Reproduced from Ebenstein, A. (2010). The 'missing girls' of China and the unintended consequences of the one child policy. *Journal of Human Resources* **45**(1), 87–115. © 2010 by the Board of Regents of the University of Wisconsin System. Courtesy of the University of Wisconsin Press.

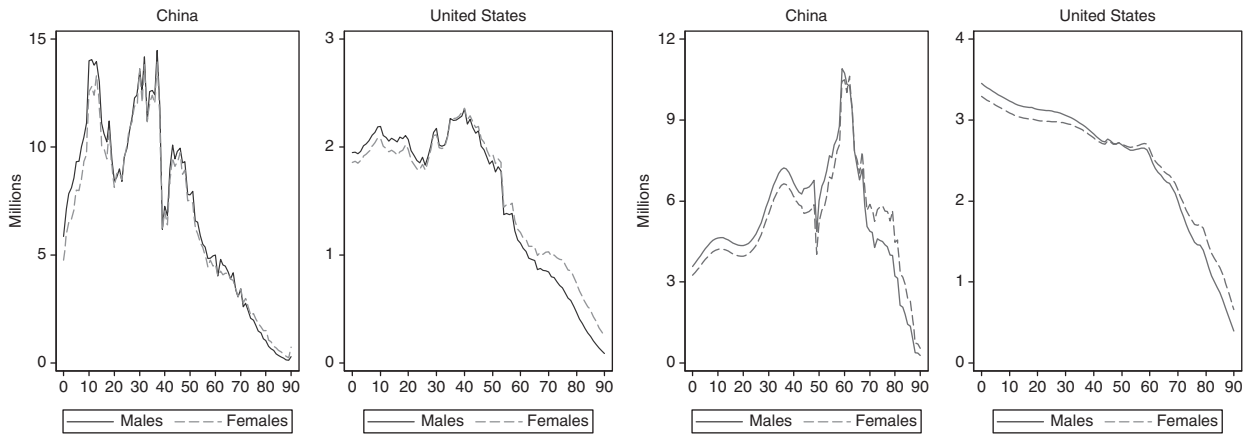

Figure 3 Age distribution in China and the US in 2000 and 2050. Results for China based on 2000 census and simulations. Results for the US taken from 2000 census and projections by the social security administration (2007). Mortality rates for China are based on Banister and Hill (2004). Reproduced from Ebenstein, A. and Sharygin, E. (2009). The consequences of the 'missing girls' of China. *World Bank Economic Review* **23**(3), 399–425, with permission from Oxford University Press.

are to lower infant and maternal mortality, and provide wider access to contraception.

China

In China, the chief implication of the age distribution is that the country has to rapidly prepare for a heavy burden on each worker to support multiple retirees. For example, the one-child policy has resulted in a 4-2-1 problem, where four grandparents turn to two adult children for support, who only have one child of their own, leaving a great burden on each young person to provide old age support. The need for pension programs in China is acute, but programs are limited. The rural pension programs attracted reasonable participation rates, especially among individuals without sons, but complications in implementing the programs prevented their expansion. The massive expansion in the elderly population forecasted has already led many to call for a relaxation of the one-child policy. However, government officials have ignored these proposals and called for an extension to the policy in its most recent five-year plan.

China's age distribution is highly skewed, relative to the US (Figure 3). China experienced two baby booms: the first in the 1960s, and the second in the late 1980s, when the earlier boom cohorts had children. However, in the wake of government-mandated fertility control, each successive cohort in China is now smaller than the last. The magnitude of

China's baby boom cohort dwarfs that of the US's that occurred following World War II. Although the US is anticipated to converge to a normal population distribution with a modest fraction of elderly in the population, China is predicted to have a massive population of retirees. This will place pressure on the system to provide for these retirees later in the twenty-first century. Forward-thinking policy would dictate that the government access funds from the current generation of workers to provide for the future generation of retirees, as it seems unlikely that the next generation of workers will be able to support the large population of retirees.

India

In India, a critical challenge is how to provide proper care to the massive young, poor, and primarily rural population. India's young population, if provided proper access to education and health care, should allow the country to be highly productive for several decades. New initiatives have been launched in India, such as the National Rural Health Mission, which will serve to increase access to medical professionals in India's rural areas. Challenges have also plagued the expansion of rural health insurance. While 70% of India's population lives in villages, less than 2% is insured. Issues of cost sharing and access to services have made insurance either not financially viable or unattractive.

In many rural areas, there is an insufficient supply of properly trained physicians. In areas with skilled physicians, absenteeism is a challenging issue. It has been estimated that absenteeism can be as high as 40% among primary health providers and among teachers. They found absenteeism rates were related to the quality of infrastructure, and doctors were often working more hours at private facilities instead of publicly accessible facilities. This highlights the challenge of making medical services affordable and available.

Sub-Saharan Africa

Sub-Saharan Africa faces a set of unique challenges in the context of its demographic transition. The two primary issues are the need to (1) lower infant and maternal mortality and (2) expand access to contraception. Maternal mortality in sub-Saharan Africa with 500 deaths per 100 000 births is twice as high as in the next highest region, South Asia with 220 deaths per 100 000 births. More than half of all maternal deaths worldwide occur in sub-Saharan Africa. Likewise, under-five mortality exceeds 100 deaths per 1000 births, higher than in any region in the world. Although both of these rates have declined from even higher levels, they both represent challenges to development. High childhood mortality rates prevent the proper allocation of parental resources to children who will survive, and high maternal mortality rates leave many children without proper parental support. Both represent challenges necessary for sub-Saharan Africa to overcome in order to exit the poverty trap.

Sub-Saharan Africa's high fertility rate also poses a challenge for policymakers. For the region to enjoy a demographic dividend, fertility must be slowed. Fertility rates are highly negatively correlated with female educational attainment. This occurs through several channels affecting both desired family size and access to contraception to achieve the desired family size. Higher female education is associated with later marriage, greater autonomy of women in the household and over their fertility choices, and perhaps most importantly, higher opportunity costs of childbearing due to foregone wages. More educated women also have greater knowledge of an access to contraceptives, which is also partly responsible for lower fertility among more educated women. As such, increasing female education may be an effective policy tool for lowering Africa's fertility rate. In light of recent evidence that fertility declines in Africa are stalling, policy makers may wish to consider more proactive strategies for lowering fertility.

Missing Women and Implications for Public Health

In this section, the author examines how China's and India's 'missing girls' will affect public health in the coming years. The focus is on a set of health issues that have been examined by scholars that are related to the high sex ratios in Asian countries.

Unmarried Men in China

China is on the cusp of a dramatic deterioration in men's marital prospects. As shown in Figure 4, the sex imbalance between potential spouses is forecast to be at its worst by 2025, when the cohorts with the highest sex ratios (those born under the one-child policy) reach adulthood. China's one-child policy in combination with legislation regulating minimum age at marriage generates a problematic scenario. As birth cohorts age, they find that each successive generation is smaller than their own, giving rise to a 'kite-shaped' age distribution common in many Asian countries. It has been estimated that the fraction of men aged 25 and older who fail to marry will exceed 5% by 2020 and 20% by 2030. In the most optimistic scenario simulated, where the sex ratio returns to normal immediately, the share of men who fail to marry in 2060 will stabilize just below 10%. In light of historical patterns of hypergamy in China, it will likely be the men of lowest status who fail to marry, and the poorest regions of the country will have the highest rates of bachelorhood. This will generate a challenging situation for providing old age support at the local level as the population of 'bare branches,' or men who fail to marry and represent bare branches on the family tree, increases.

Trends in Sex Work and Sexually Transmitted Infections

Prostitution in China is widespread and has increased dramatically in recent years. Following Deng Xiaoping's campaign for economic reform in 1978, the market for sex work increased dramatically, as migration of both men and women to urban areas provided both increased demand and supply. Current estimates indicate that between 3 and 10 million women participate in this market, a steep increase from the hundred thousand estimated as recently as 1989. Informal prostitution rackets are common throughout China,

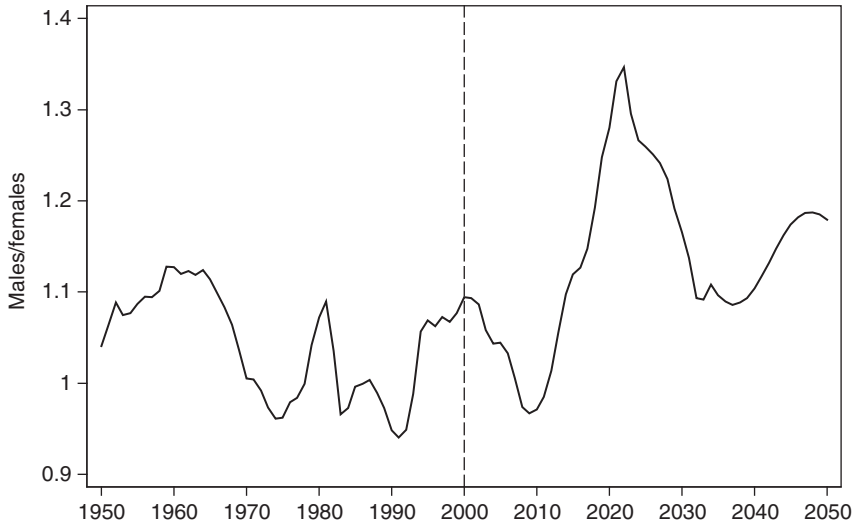

Figure 4 Sex ratio of the marriage market in China, 1950–2050. The marriage market is defined as men aged 22–32 and women aged 20–30. The sex ratio for each year is calculated using data from the 2000 census, modeling population changes with age-sex-year specific mortality rates. The population is simulated forward from 2000 using fertility assumptions described in Ebenstein and Sharygin (2009) and a sex ratio at birth of 1.09 from 2005 and beyond. The vertical dotted line indicates the year 2000. Reproduced from Ebenstein, A. and Sharygin, E. (2009). The consequences of the 'missing girls' of China. *World Bank Economic Review* **23**(3), 399–425, with permission from Oxford University Press.

sometimes involving high-school girls. However, government response is generally limited in China. Authorities attempt crackdowns through controversial 'shame parades' where Chinese prostitutes are forced to endure the embarrassment of being marched down a public street. In spite of these efforts, most scholars believe that the government is unwilling or unable to seriously tackle the problem.

In a parallel and alarming trend, China has experienced a steep increase in the syphilis infection rate, with maternal transmission rates to newborns increasing by a factor of five between 2003 and 2008 in Shanghai. Although sex work may often have ambiguous welfare consequences, in the Chinese context, the concern is clear. Chinese men visit prostitutes frequently and they are reluctant to wear condoms, which are in combination a cause for concern. The low condom use rates, lack of institutional will to reduce prostitution, and the rising sex ratio will likely create challenges as men fail to marry. In light of evidence that many women participate in prostitution while being married in general and in China in particular, this is a serious concern for the future, as concurrent sexual relationships may speed the diffusion of HIV and other STIs.

Patterns in Breastfeeding

The differential fertility behavior after the birth of sons and daughters also manifests itself in subtle ways in India. In a recent paper, it was shown that boys are breastfed for longer than girls. The mechanism is not explicit gender discrimination among living children, but driven rather by the fact that sons are often the last child. Because breastfeeding makes women less fertile, mothers looking to have another child, as is often the case after a female birth, will discontinue breastfeeding their daughters sooner than after sons. As such, boys are treated to longer durations of breastfeeding, which is documented to have important health implication in India, where drinking water is often unsafe relative to breast milk. The difference in duration for boys and girls is shown in Figure 5, and it is estimated that this explains 14% of the excess child mortality for girls relative to boys. Although historically parents exhibited explicit bias in allocation of resources to boys over girls, now developing countries are faced with more subtle but no less problematic forms of discrimination.

Sex Ratios and Social Unrest

An additional concern in China is that the high sex ratios will lead to social unrest. There are several reasons for concern over having millions of surplus males, including the possibility for China to seek out an armed conflict, as occurred in the nineteenth century following a prior episode of elevated population sex ratios. One 2007 study focuses more narrowly on the incidence of crime rates and exploits timing of the implementation of the one-child policy by province, which generates variation in sex ratios regionally. Modest effects of the adult sex ratio on violent crime and property crime were found, with the rise in sex ratios responsible for roughly one seventh of the overall rise in Chinese crime rates during the period 1988–2004. The possibility that unmarried men will generate social unrest is very plausible, and has been advanced in popular media such as newspapers. Unfortunately, the literature is scarce as the hypothesis will not be fully testable using the Chinese experience until the cohorts with extremely skewed sex ratios reach adulthood, which will occur in the next decade. This is, however, an important issue that will need to be monitored.

The Gender Gap and Female Suicide

Chinese suicide rates exhibit several unique and alarming patterns. Suicide rates in China are twice the international

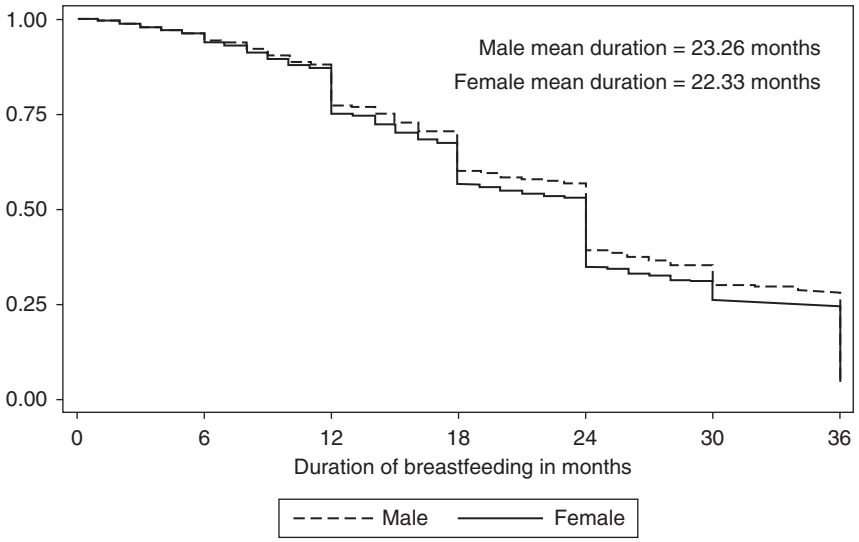

Figure 5 Breastfeeding duration by gender in India. The figure plots the proportion of children, by gender, who are still being breastfed at the duration (age) given on the horizontal axis. Reproduced from Jayachandran, S. and Kuziemko, I. (2011). Why do mothers breastfeed girls less than boys? Evidence and implications for child health in India. *Quarterly Journal of Economics* **126**(3), 1485–1538, with permission from Oxford University Press.

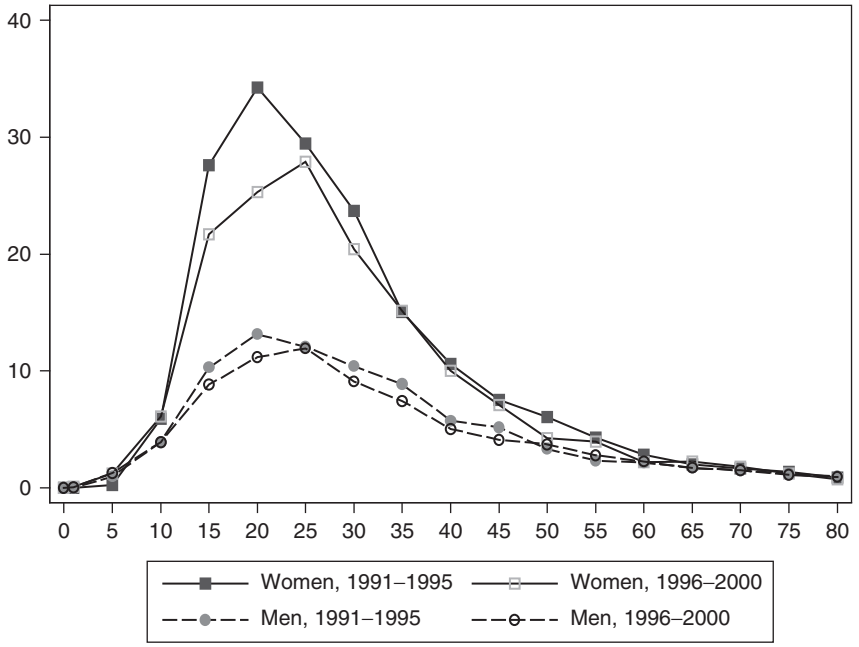

Figure 6 Percentage of rural deaths by age due to suicide, China 1991–2000. Author's Calculations from Chinese Disease Surveillance Points (1991–2000). Reproduced from Jayachandran, S. and Kuziemko, I. (2011). Why do mothers breastfeed girls less than boys? Evidence and implications for child health in India. *Quarterly Journal of Economics* **126**(3), 1485–1538, with permission from OUP.

average, and are nearly six times higher in rural China than urban China. China is also the only country where suicide rates are higher for women than men, with suicide accounting for nearly a third of deaths to young women in rural areas. In recent years, female suicide rates have declined sharply, with no parallel decrease for men, as shown in Figure 6. What explains these striking patterns in Chinese suicide? And what role has the rapid economic and social change in China played in the decline in suicide rates among women? India has also had challenges dealing with suicide among farmers, often after poor harvests, and high rates have been observed among the young. Among men, 40% of suicides were among people aged 15–29 but for women, it was nearly 60%. These patterns indicate that women continue to have difficult lives in these countries with traditional son preference. The high suicide rates in China and India among young women speak of a welfare gap by gender that has led to a serious public health concern, and is an area for future research.

Conclusion

The developing world is characterized by extreme population patterns. The rapid demographic transition of China and India has left both countries primed to capitalize on their favorable age distribution in the short run, but with challenges in the long run. Africa is now at the cusp of its own fertility decline, provided proper family planning is implemented it could likely begin to enjoy its own demographic dividend. The role that fertility change has played in determining economic outcomes in these countries is important, and will continue to be so as they each deal with the unique challenges associated with population aging, providing access to health care, and lowering mortality rates.

The high sex ratios in Asia also represent a complicated policy issue, as they relate to a set of health challenges in a wide range of contexts including crime, old age support, and prevention of STI. The impact of missing women on the future health status of these populations is not yet clear, as the cohorts born following the introduction of ultrasound technology have not yet reached sexual maturity. However, it is certain that this will be an important and challenging issue in the coming decades, and in the near future in China.

The policy lessons of the history of China and India are important for countries earlier in their demographic transition, such as those in sub-Saharan Africa. Sharp changes in fertility can generate rapid economic growth, and pull a country from a poverty trap. However, a highly skewed age distribution also generates a new set of challenges. For policymakers, it is critical to capitalize on the opportunity presented by having a large working population. This requires investment in education and health, to ensure these cohorts are productive. Eventually, these cohorts will age and represent a large responsibility, as will occur in China's near future. As such, it is critical to prepare for population aging during the period of demographic dividend. These lessons will be important as India and sub-Saharan Africa enter the next stage of their respective demographic transitions.

Acknowledgments

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See also: Abortion. Fetal Origins of Lifetime Health. HIV/AIDS, Macroeconomic Effect of. HIV/AIDS: Transmission, Treatment, and Prevention, Economics of. Sex Work and Risky Sex in Developing Countries. Social Health Insurance – Theory and Evidence. What Is the Impact of Health on Economic Growth – and of Growth on Health?

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