



Population change in the
rural developing world
Making the transition

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Report
March 2016

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Acknowledgments and disclaimer

Many thanks to Gustavo Anríquez from the Universidad de Chile for encouraging comments on an earlier draft and to Nick Martin for formatting.

The interpretations and opinions expressed in the report are, however, not necessarily those of the above mentioned, nor of the Overseas Development Institute. The authors are solely responsible for any errors and omissions.

ODI Shockwatch: Managing Risk and Building Resilience in and Uncertain World.

Abbreviations

ART	Anti-Retroviral Therapy
CBR	Crude Birth Rate
DALY	Disability Adjusted Life Year
DHS	Demographic and Health Surveys
EAP	East Asia and Pacific
EU	European Union
FAOSTAT	Food and Agriculture Organization Statistical Database
FP	Family Planning
GDP	Gross Domestic Product
GNI	Gross National Income
HDI	Human Development Index
HIV and AIDS	Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome
IMR	Infant Mortality Rate
LAC	Latin America and Caribbean
MENA	Middle East and North Africa
PDA	Population and Community Development Association, Thailand
SSA	Sub-Saharan Africa
TFR	Total Fertility Rate
UAE	United Arab Emirates
UNDP	United Nations Development Programme
WDI	World Development Indicators

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Summary

Women's power to decide: An uneven story

The last 55 years have seen remarkable population growth, with the world population rising from 3 billion in 1960 to an estimated 7.3 billion by the end of 2015. Since the industrial revolution began, two demographic transitions in which populations go from high to low rates of birth and death have taken place. One began in the late 1700s in the early industrialising, now high-income countries and which was largely completed by 1950. The other started after the Second World War in the developing world and is still not complete for most countries, with some notable exceptions such as China.

While population change in the developing world is most evident in the growth of cities and towns, demographic changes are just as marked in rural areas. By and large, those interested in agricultural and rural development have paid relatively little attention to rural demography. It has been taken as read that rural populations are growing, and often rapidly, with the implication that agricultural and rural economic growth have to outstrip such increases, while pressure on natural resources mounts. Meanwhile, thanks to a population explosion in rural areas, migrants leave rural areas, leading, it is commonly thought, to overly-rapid urbanisation marked by the profusion of slums.

This report investigates demographic change in rural areas of the developing world since 1990 to address the following questions:

- What is special about demography in rural areas of the developing world? What are the main changes being seen these areas?
- What are the main drivers of rural demography, and how are they evolving?
- What, given these drivers, is likely to happen to rural populations in the future? What does this imply for policy?

Secondary sources have been used to answer these questions, drawing on existing databases that compile statistics from censuses, demographic and health surveys, and the literature. To explore changes at country level, 16 relatively populous developing countries were selected to represent their regions: for Asia, *Bangladesh, China, India, Indonesia and Vietnam*; for the Middle East and North Africa, *Egypt, Iran and Morocco*; for Latin America, *Brazil, Costa Rica, Mexico and Peru*; and for sub-Saharan Africa, *Ethiopia, Ghana, Kenya and Senegal*.

A simple framework has been adopted from McFalls (2007) that states that populations change as people are added through fertility, subtracted through mortality, and move through migration. Populations pass through demographic transitions in which death rates fall first, then fertility and birth rates fall after a lag, with population growing rapidly in-between. Accompanying this is usually a transition that sees populations urbanise.

Rural areas differ demographically from urban areas in developing countries in three main respects

One difference is that mortality tends to be higher in rural than urban areas, largely owing to high mortality of children under age five. Higher mortality stems from lower incomes and more malnutrition, less clean water and sanitation, and fewer medical services. This comparison, however, may only be valid at the mean: informal urban settlements often suffer all the health disadvantages that rural areas experience, and sometimes worse.

A second difference is that fertility in rural areas tends to be higher than in urban areas. That again may be a function of lower incomes, but may also be associated with agriculture – where it is easier to combine child-raising with farm work compared to, say, working in a factory.

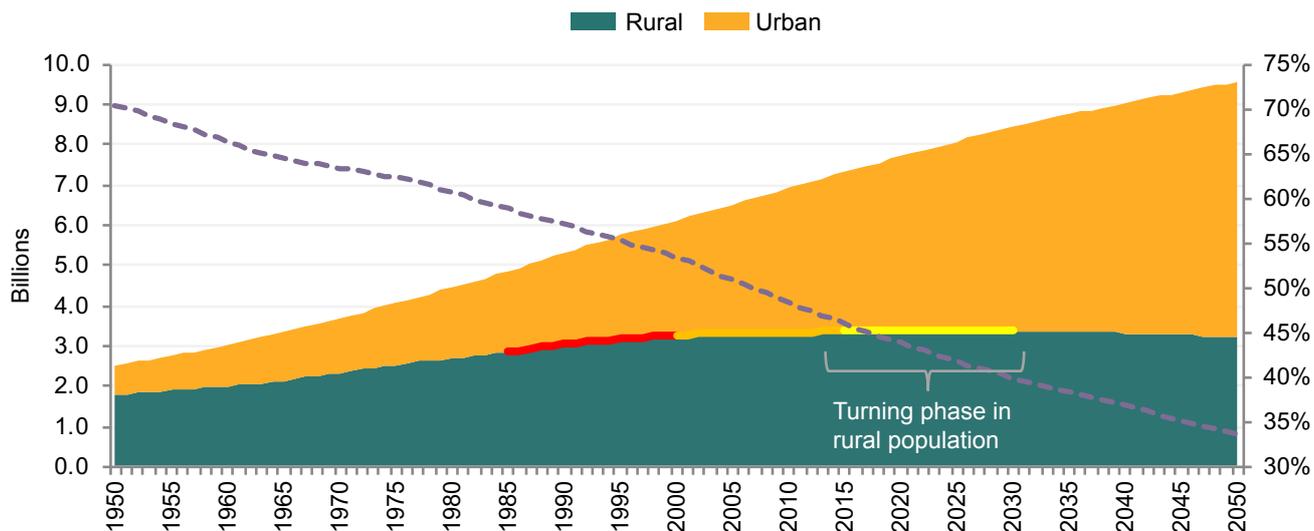
The combination of higher mortality and fertility may mean that demographic transitions in rural areas are delayed, with higher rates of natural population growth in rural areas.

Such growth does not necessarily show in the actual rural population rising so quickly because of the third difference: that most rural areas see out-migration to urban areas. That is why cities grow faster than rural areas. Migration may also reduce the ratio of working to dependent population in the countryside, although falling fertility may more than compensate for that effect.

Patterns in rural population change

The world is becoming less rural (Figure A). Not only have we passed the point at which more than 50% of the world's population is urban (reached in 2007), but it is also expected that between 2015 and 2030 the world's rural population will peak, at about 3.3 billion, and then decline.

Figure A: World population, 1950 to 2050 projection, rural and urban

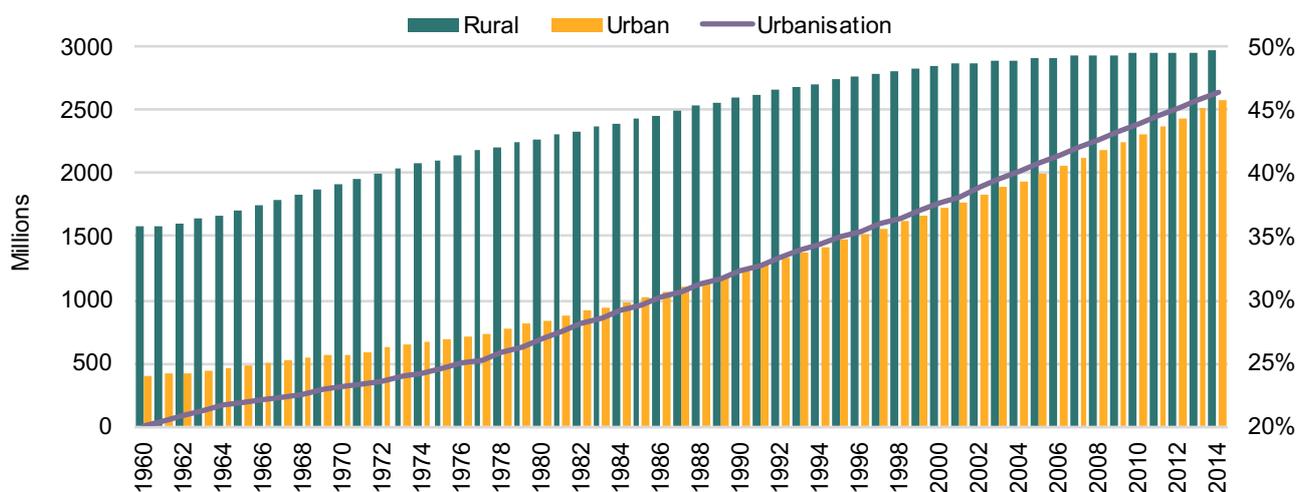


Source: FAOSTAT data

The developing world remains, however, more rural than urban – just (see Figure B). Urbanisation has risen from 20% in 1960 to 46% in 2014. Rural population growth has slowed notably since the turn of the new century: indeed, between 2004 and 2014 the net addition to rural populations of the developing world was just 68 million persons – just 2.3% in ten years. The overall view hides considerable differences across the developing world: rural populations are already in decline in East Asia and Latin America; those for South Asia and the Middles East and North Africa are growing ever more slowly; while rural populations in sub-Saharan Africa (SSA) continue to grow rapidly.

Given rapid population growth in the last 50 years, rural populations have inertial growth since their younger cohorts are so much larger than older cohorts. More recent trends that will eventually drive population growth, however, can be glimpsed by looking at changes in the youngest cohort (0-4 years old). In the 16 selected countries, while only five have rural populations that are declining, in 13 cases the population in the 0-4 cohort has already peaked and that cohort is now getting smaller. The exceptions are all from sub-Saharan Africa, where rural fertility still remains high, even if in decline. Africa apart, the rest of the developing world seems clearly headed towards declining rural populations in the near future.

Figure B: Rural and urban population, developing world, 1950 to 2014



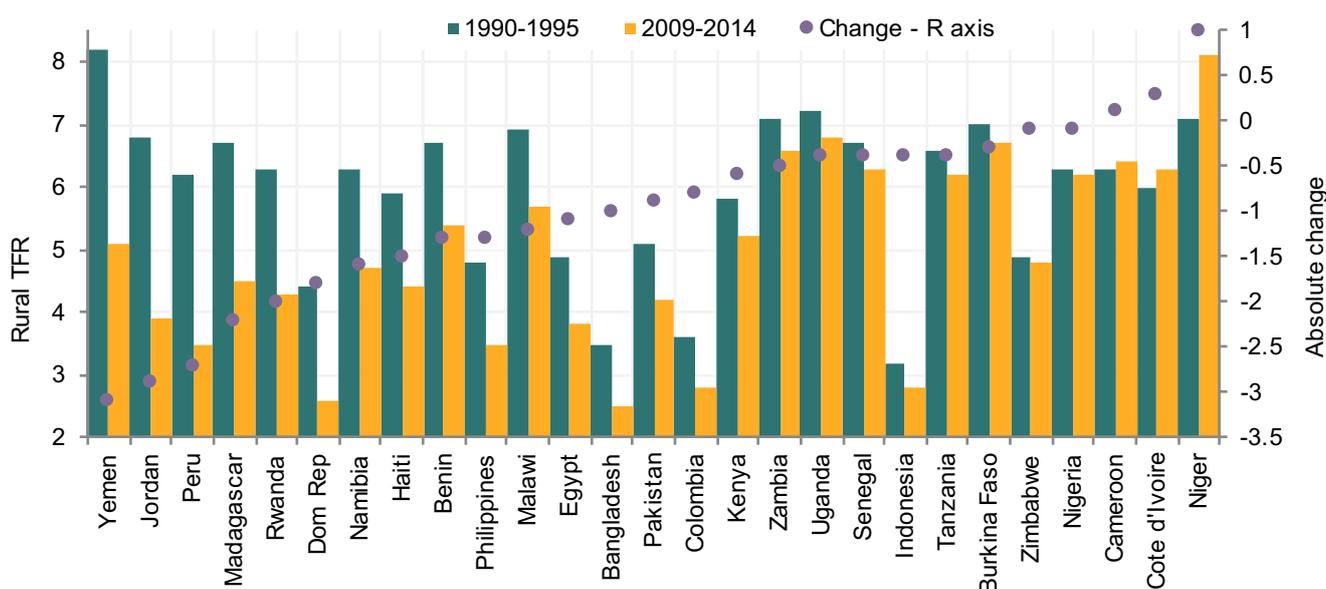
Source: World Development Indicators

Fertility

Total fertility rates (TFRs) fell across the world between 1961 and 2013. Globally, the TFR halved, falling from just over 5 to less than 2.5. Between 1995 and 2013, fertility rates fell faster than the global average in South Asia, the Middle East and North Africa (MENA), Latin America and the Caribbean (LAC), and SSA, though slower in East Asia and the Pacific (EAP) – the latter partly because the region was already quite far through the transition to low fertility by 1995.

Rural fertility tends to be higher than urban, typically by about 1.5 children per woman in childbearing years. Most rural fertility rates in the developing world have been declining over the last three decades, with only a few exceptions such as Cameroon, Côte d'Ivoire and Niger (Figure C).

Figure C: Changes in rural fertility rates, 1990-1995 to 2009-2014, 27 countries



Source: DHS Statcompiler

Note where more than one observation between 1990 and 1995 or between 2009 and 2014 exists, in the former case the earliest, and in the latter case the latest were chosen.

The causes of fertility decline can be grouped into four sets. One is mortality, and especially child mortality: when mortality falls, fertility tends to fall as well because parents set their desired numbers of births in the light of the expectation that some children will not survive.

A second set of reasons are economic. Historically, more children have provided the household with more workers as well as more offspring that might care for the parents in their old age. Increasingly, however, the development of economies has created jobs with much higher returns for those with the requisite education and skills. Even in rural areas, returns to education can be high, but that requires some investment, so parents face a trade-off between the quantity and quality of children they have. At the same time, more work opportunities have been created for women, so that the opportunity cost of bearing and raising

children has risen. In many parts of the developing world the economics of children have shifted from having many children to having fewer but better-educated offspring.¹

A third influence on fertility is cultural transmission, whereby desired fertility is affected by models seen in the media, both real and fictional, and among friends and neighbours. For example, TV soap operas feature wealthy and successful people who usually have small families.

A fourth driver is policy that may encourage lower fertility, either directly through exhortation and family planning services, or indirectly by reinforcing some of the drivers that lead to lower fertility.

Much debate arises around the strength of the different factors and the relationships between them. Rwanda's fertility decline in the late 2000s is typical in combining elements of increased child survival, increased

¹ Galor (2012) considers economics factors as the most likely explanation for the remarkable change that took place in fertility in today's high-income countries in the 1870s when, for the first time in history, rising incomes led to falling fertility – a pattern that has subsequently prevailed across the world.

incomes, more female education and a family-planning campaign involving communications and the provision of contraceptives.

Population characteristics, such as stage of development or demographic transition, may also affect the relative power of the drivers of fertility decline. For example, in rural Bangladesh older women had experienced high child mortality in the 1970s and this influenced their ideal family size: younger women respond more to economic factors, including the jobs for young women in garment factories. When land becomes short, that may influence parents' decisions. By the late 1990s in rural Nyeri, Kenya, people reported that their inheritance for their children could no longer be land, so that education was now the preferred endowment. Fertility rates dropped sharply.

The trends and drivers of fertility decline suggest that most developing countries that still have rural fertility rates well above replacement levels will see those rates fall in the future. The forces driving fertility decline, whether child survival, economic development, female education, exposure to mass media, and the impact of public efforts to limit fertility should continue to drive down fertility. The exceptions will be where these forces have been interrupted by strife, natural disaster and economic decline.

Sub-Saharan Africa, where fertility has fallen least and least consistently, may see slower declines. Limited fertility decline in the region, however, may simply reflect less progress on growth and development compared to other parts of the developing world. Nevertheless, cross-country regression models suggest that parts of Africa may have a stronger preference for larger families than elsewhere.

Culture, however, may be less persistent than imagined. Many countries in Latin America had fertility rates above six in the 1960s, a result that seemed linked to preferences for large families and Catholic Church prohibitions on modern contraception. Today, most of those countries have fertility at replacement levels. Norms have changed dramatically within a couple of generations.

Mortality

Life expectancy, for both rural and urban areas, has been increasing across the world, from an average of 52 years in 1960 to 71 years in 2013. Increases in the developing world have been greater than in high-income countries, so that life expectancy is tending to converge across regions. Only occasionally in some countries has the trend been reversed by war, famine and economic depression; when crises recede, any loss to life expectancy is quickly made up.

In the developing world, most of longer life expectancy stems from reduced deaths before the age of five. That said, mortality has been falling for both children and adults in most rural areas of the developing world. Rural mortality

is almost always higher than that in urban areas, although not only has it been falling in many places, but often faster than in urban areas, so that rural-urban differences are closing. That said, within-country differences in rural mortality across provinces can be large.

In some areas, above all in China and South Asia, mortality is unusually high for females, leading to the observation that many women are missing in these countries. The most recent estimates are of more than 120 million missing women. In the past, the effect was from higher mortality of girls than boys; increasingly it results from sex-selective abortions in places where ultra-sound scanning can indicate the sex of the foetus early in pregnancy, and where people have a preference for sons. Paradoxically, as parents opt for smaller families, the incentives to abort female foetuses may rise.

Reduced infant and child mortality stems from increases in income and wealth; more education of parents and especially of mothers; later marriage of mothers, later first births and increased spacing of births; and improved health services and better public health. For adults, income, education and public health have helped reduce mortality, especially when diseases such as malaria and tuberculosis have been controlled. In the last ten years, the introduction of anti-retroviral therapy for people living with HIV and AIDS has led to much-reduced mortality in those parts of Eastern and Southern Africa with high prevalence of HIV.

Because rural mortality rates are usually higher than urban, and rural mortality varies across regions, plenty of scope exists to continue to improve child survival in the future. As child survival improves, life expectancy will lengthen. Three consequences can be expected:

- Crude death rates in rural areas will fall in most developing countries, thereby tending to prolong rural population growth even while fertility may be falling. This will be attenuated in middle-income countries that are sufficiently far through their demographic transition to have large numbers entering their elderly cohorts whose eventual demise will tend to raise the death rate.
- As more children survive in rural areas, parents may plan for fewer children, realising that replacements for lost children are increasingly unlikely to be needed – thereby tending to push down fertility.
- Perhaps most importantly of all, child mortality is becoming relatively infrequent. With under-five mortality now commonly falling to less than 75 per thousand births, the large majority of children survive to age five and beyond. But it is not just about survival: lower mortality is almost always accompanied by lower morbidity and less growth retardation. Put simply, the quality of children is most probably improving, with future benefits for the individuals, their families, communities and society at large.

Migration

Most rural areas see net out-migration to urban areas. Measuring the extent of this and establishing trends are surprisingly difficult, owing in part to problems of definition and in part to the fluidity of migration in which many moves are temporary rather than permanent.

Migration from rural to urban areas responds to opportunities, such as higher pay and the chance to marry and to gain experience, as well as desperation. In most cases it seems opportunity is the main motive. Migration tends to increase along with capacities and aspirations of potential migrants, meaning it is not always the poorest who move most. Moreover, movements can be substantially influenced by social networks that provide information about opportunities, as well as initial support for migrants seeking work, housing and urban services.

Migration often benefits the sending household, widening the portfolio of income sources, reducing risk and usually gaining income through remittances. Although labour may be lost, increased earnings and remittances tend to allow for compensating investments in farms and rural businesses, such as hiring of extra labour.

Migration is not without dangers and drawbacks. Leaving the household is often stressful and lonely for both migrants and the rest of the family. Migrants run the risk of being badly treated in their workplaces, living in poor conditions, and suffering discrimination in access to urban services.

Even if migration is complex, at least two things can reasonably be expected in the future. One is that rural to urban migration will continue, and quite strongly. The relation between economic growth and urbanisation is well established: the higher per capita incomes, the greater the level of urbanisation. Given that the (crude) natural rate of increase in rural areas exceeds that of urban areas in most developing countries, then any increase in urbanisation has to come from rural to urban migration. To urbanise when the rural population is growing faster than the urban requires large numbers to migrate from village to town: probably around 5% to 10% of the rural population every decade.

The second is that migration of all kinds – from rural to urban and from rural to rural, permanent and temporary – may well increase. If migration is largely a function of capabilities and aspirations, then the rising level of formal education in rural areas and the increasing awareness of opportunities in other places conveyed by media and personal communications is likely to stimulate more young people to move. Climate change will enhance this: few activities are affected by the climate as much as agriculture. As weather patterns alter, so too will the agricultural potential of affected areas. Some farm households may relocate from areas that have lost potential to those that have gained, within the limitations posed by borders and access to land.

Policies for changing rural populations

Policy can help ease transitions already underway or speed transitions occurring more slowly than desired. Three key areas of policies are relevant for rural areas.

One is to **slow population growth**. Direct measures include influencing preferences for family size through messages ranging from advice given in public health services to writing them into the plot lines of soap operas. Regulations to ban child marriage are another measure.

Family planning can close the gap between wanted and realised fertility, gaps that are often at one to two children per mother. Family planning has been criticised, but it often has been effective and some notable successes have been seen, above all in Thailand where the key was making services available in villages.

Some question the need for family planning, but surveys consistently show the gap between wanted and actual births. Others wonder if family planning is cost-effective, but studies show that costs are more than offset by savings in services for infants that were never born, while stemming unwanted pregnancies saves young mothers' lives. Last but not least, family planning has been stigmatised by coercive population control in the past: by forced sterilisations or an association with one-child policies. Family planning should not be, and does need to be, coercive: some well-known cases of coercion, including China's one-child policy, show that draconian measures have little or no effect on fertility.

The key to effective family planning is to provide services tailored to local conditions and linked to other health measures.

Indirectly, other policies can reduce fertility and slow the growth of population. Measures that reduce poverty and inequality can reduce fertility, above all through better education, particularly for girls. Indeed, measures that raise women's status and allow them to realise their potential through education and skills – ranging from controls on early marriage, women's inclusion in workplaces, action to reduce violence against women, equal rights, and gender-sensitive social protection – will usually lead to high fertility being reduced towards replacement levels. Better health care that cuts premature deaths of young children and mothers is also likely to reduce fertility.

A second area pertains to policies that can be introduced to facilitate land transfer to specialised farmers in cases where the rural population has begun to decline and rural economies diversify away from agriculture. In some cases, (local) markets may move land from part-time to full-time farmers, but these may work better when informal rights to land are registered and officially recognised. Land transfers are not necessarily about changing ownership: more often it is rights to operate the land that change hands, while households that no longer farm full-time retain their property rights. Occasionally, formal programmes to consolidate holdings where these have become highly

fragmented may help to create fields that can be worked more effectively by machinery.

The third policy area concerns policy that explicitly **discourages rural-to-urban migration**. By and large, attempts to restrict movement have not stemmed migration but rather increased the costs and dangers to migrants. Better policy would seek to facilitate rural household choices by: providing better information on opportunities at destinations; reducing the cost of sending remittances; protecting the rights of migrants as workers and in accessing services (simple identity cards can make a difference); and by developing rural financial services that could avert migration undertaken to accumulate capital for investment back in the village.

Consequences of population change in rural areas

Three significant changes are evident from this review. One is the way in which **demographic changes promote women's empowerment in rural areas**. Changes to demography affect women and girls more than men and boys. Lower infant and child mortality, lower maternal mortality, later marriages and longer intervals between births improve women's health and wellbeing. They also allow women, when combined with girls' schooling, more scope to seek jobs, even to migrate, and to gain income, status and autonomy. Even when women stay at home, lower fertility reduces time spent on raising children and on domestic chores, allowing women a better balance between their reproductive roles and other aspects of their lives.

Shifting norms linked to valuing girls and boys equally, that empower and enable women to choose ways of fulfilling aspirations increasingly delinked from their ability to marry, rear children, and otherwise look after the domestic sphere are more suggestive of a sea change than a marginal adjustment. A gentle revolution may be underway: one from which the daughters and granddaughters of the current generation will hopefully continue to benefit.

A second change is the slowing of rural population growth and the eventual decline in rural populations. As this happens, **dependency ratios fall in rural areas** – even allowing for migration's removal of part of the rural working-age population. Slowing rural population growth is therefore delivering a 'demographic dividend', with more people in their active working years. Potentially this can lead to more output, consumption, savings and investment. Although studies of this effect are few, it may well provide a significant boost to growth: one study estimates that a 1% change in the dependency ratio can change per capita production by 1.4%. At the household level, lower dependency ratios are associated with lower workloads and higher incomes.

When rural population starts to fall, however, then labour shortages are likely in agriculture, particularly at peak periods such as planting and harvest. Labour scarcity may lead to the search for labour-augmenting technical improvements, such as simple machinery, or for more external inputs, such as fertiliser. Since the early 2000s, for example, China has seen the emergence of a thriving rental market for farm machinery.

Labour shortages, however, are likely to have an even more important effect: wages for unskilled labour in rural areas will be bid up. Rural wages are rising across many Asian countries, in some cases with signs that the increases have accelerated since the mid-2000s.

With less labour in agriculture and more machinery, the advantage of small-scale cultivation for labour supervision will be undercut, thereby making larger-scale farms economically viable. The stage will be set for land consolidation – but not beyond a scale that can be managed by the family with the help of rented machinery.

A third element is out-migration from rural areas, which will continue and quite probably intensify. Migration responds, at least to some degree, to combinations of individual capacity and aspirations, allied to social networks. All these factors are likely to apply more strongly in the future.

Future trajectories in the rural areas of the developing world are thus likely to be very different to what has typically been seen in the last half century or longer, when rural populations have grown rapidly. Demographically, rural areas are likely to see:

- Loss of population as the natural rate of growth slows, possibly even turns negative, while people migrate out of the rural areas.
- Population concentrating more in the working-age cohorts and delivering a demographic dividend, at least initially. Migration would be expected to remove people from working-age cohorts, mitigating this effect, but from the evidence of falling dependency ratios since 1990, it seems it is not able to entirely offset this effect.
- In time, the large cohorts from times of rapid population growth will progress out of the workforce into retirement, when dependency ratios will once again rise. Where migration is strong this could lead to a countryside with relatively few of working age and with many elderly persons.

Economically, these changes to population will contribute to processes in which:

- Agriculture mechanises and uses less labour.
- Land markets steadily concentrate operated holdings, although not necessarily ownership, in the hands of a minority of households in each village who specialise in farming full time. They may not operate all the land: some of the households that gain most of their income off the farm may still retain part of their owned land for part-time and hobby farming.

-
- Rural wages rise as labour becomes scarcer. While wages may rise, they may well still lag behind those in urban areas, since productivity typically remains lower in agriculture than most urban occupations.

These changes will take place as rural areas become better connected to urban areas, owing either to improved transport links or to local rural centres growing to become substantial urban areas. Improved connections are likely to create new opportunities for the rural economy, such as supplying the towns and cities with high-value perishable produce, providing leisure and amenity facilities for urban dwellers, and generating environmental services such as water supplies for urban areas. For rural areas sufficiently close to sizeable towns, commuting to work in urban centres may be another option. By and large, more connectivity to urban areas should reinforce the processes described.

In sum, the economic consequences of slowing population growth in rural areas with continuing

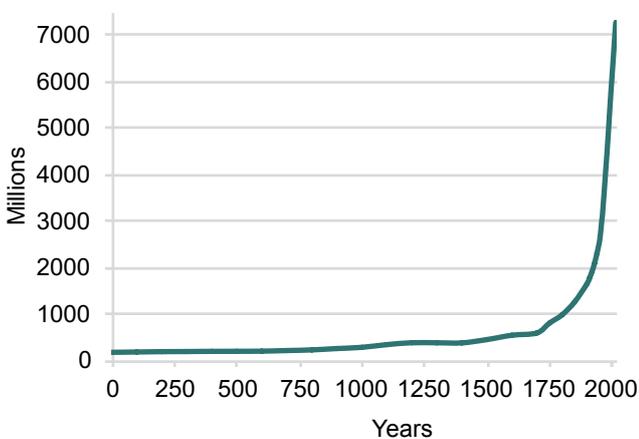
out-migration should be largely positive, and hence be encouraged. Changes to the lives of women and girls look equally positive and may well have economic benefits as the latent talents of women in production have more of an outlet: a possible 'gender dividend'.

A final point concerns the environment. While population has been growing in rural areas, the chief concern has been natural resources coming under pressure from cropping, grazing, extraction and settlement to the point of being depleted and degraded, in some cases to the point of putting at risk key ecological functions. With falling rural populations, some of those pressures may ease. 'May', however, is the operative word: if demand to use natural resources for production continues to rise from urban populations, lower rural populations will make little difference. Better stewardship of rural natural resources probably depends more on increased demand for ecosystems services, correction of market failures, and deliberate policies to conserve the environment.

1. Introduction

The last 55 years of population growth have been remarkable. Since 1960 the world population has grown from 3 billion to an estimated 7.2 billion. Both the rate of growth of population and the absolute increases have no precedent in recorded history (Lam, 2011). When plotted on a chart, the result can be dramatic (Figure 1.1).

Figure 1.1: World population growth



Source: For AD0 to 1950, (9) Data from History Database of the Global Environment. K. Klein Goldewijk and G. van Drecht, 'HYDE 3.1: Current and historical population and land cover', in Eds. A. F. Bouwman, T. Kram, and K. Klein Goldewijk, 'Integrated modelling of global environmental change. An overview of IMAGE 2.4', Netherlands Environmental Assessment Agency (MNP), Bilthoven, The Netherlands; from 1950 from US Census Bureau

Two things in particular are striking. One is the way in which world population has exploded since the industrial revolution began in the 1700s in the UK. Until then, population growth had been very slow: from around 1550 to 1820, for example, the population doubled from 500 million to 1 billion, taking more than 250 years to do so. Since 1820 the population has increased seven times, in less than 200 years. The reason for this explosion was a fall in mortality rates, mainly those of infants and children, arising from a combination of rising incomes, better nutrition, improved public health, water and sanitation, and advances in medical science that led to life-saving innovations such as vaccination and antibiotics.

The other feature is the apparently exponential growth of population since the industrial revolution that might suggest that population growth is unstoppable. That is what some imagined in the 1960s: in fact, while population growth rates increased in most years until the mid-1960s when the increase was more than 2.2% a year, the rate of population growth has subsequently slowed owing to reduced fertility, so that by 2015 it was estimated at less than 1.1% (Figure 1.2).

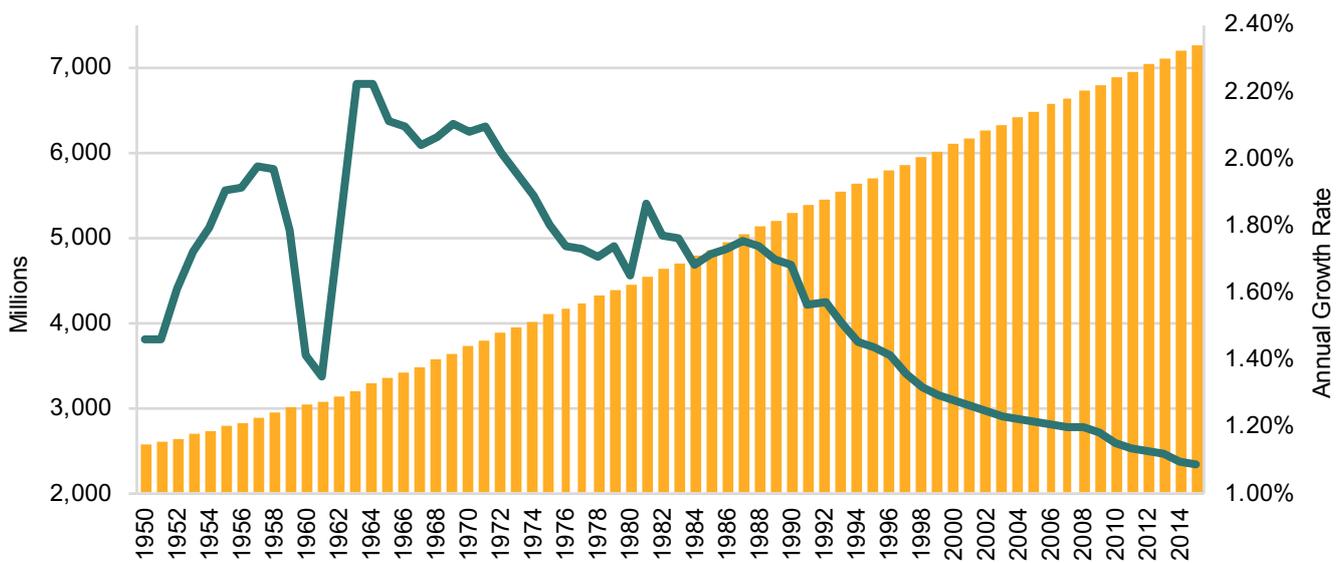
The history of world population since the industrial revolution can be seen as one of two demographic transitions in which populations go from high to low rates of birth and death – the details will be set out below. One such transition began in the late 1700s in the early industrialising, now high-income countries and which was largely completed by 1950 (Guinane, 2011; Galor, 2012). The other has taken place since the Second World War in the developing world and is still not complete for most countries, with some notable exceptions such as China.

While population change in the developing world is most evident in the growth of cities and towns, demographic changes are just as marked in rural areas. By and large, those interested in agricultural and rural development have paid relatively little attention to rural demography. It has been taken as read that rural populations are growing, and often rapidly so, with the implication that agricultural and rural economic growth have to outstrip such increases, while pressure on natural resources mounts. Migration from rural areas to cities has also been much commented upon, usually to the effect that it should be stemmed to prevent the growth of urban slums. In most writing about agricultural and rural development these have been taken as background facts, but not explored in any detail.

This report aims to conduct just such an exploration. It responds to the following questions:

1. What is special about demography in rural areas of the developing world?
2. What are the main changes being seen in rural areas across the main regions of the developing world?
3. What are the main drivers of rural demography?
4. What, given these drivers, is likely to happen to rural populations in the future?
5. What are the main policy implications?

Figure 1.2: Rate of world population growth, 1950-2015



Source: US Census Bureau. Note: the drop in growth rates seen in the early 1960s largely results from extraordinary deaths in famine that accompanied the Great Leap Forward in China 1958-1961

To answer these questions, secondary sources have been used. Existing datasets have been searched for demographic data, that have then been summarised, presented in charts, and in some cases further analysed. Statistics have been compiled for the main regions of the developing world, and for 16 developing countries selected to be representative of their regions, as well as being, in most cases, populous countries. These are: for Asia, *Bangladesh, China, India, Indonesia* and *Vietnam*; for the Middle East and North Africa, *Egypt, Iran* and *Morocco*; for Latin America, *Brazil, Costa Rica, Mexico* and *Peru*; and for sub-Saharan Africa, *Ethiopia, Ghana, Kenya* and *Senegal*.

The literature was searched for reviews and analyses of rural demographic issues. Where the literature was very

large, such as on child mortality, the search focused on studies in the 16 selected countries. Literature searches show that some countries are much more frequently documented in academic literature than others: for example, for mortality, much could be found for Bangladesh, China and India in Asia, but very little for Indonesia.

The rest of the report proceeds as follows. Questions about rural demography and the main changes being seen are addressed in the Section 2, after which the following three sections address the drivers of fertility, mortality and migration. Section 6 concludes by reviewing likely paths for future rural populations and discussing policy implications.

2. Rural demography: principles and trends

2.1 Demography: basic principles and transitions

McFalls (2007) defines demography as ‘the study of human populations: their size, composition, and distribution, as well as the causes and consequences of changes in these characteristics.’ Populations, he notes, ‘are never static’.

In McFalls’s framework, populations change as people are added through fertility, subtracted through mortality, and move through migration. **Fertility** is most commonly measured by an estimate of the number of children who would be born to the average woman through her reproductive lifetime (see Table 2.1). Fertility then feeds through birth rates, modified by the composition of the population: for any given level of average fertility, birth rates rise when the share of people in their reproductive years in the total population is large.

A key indicator of **mortality** is the life expectancy of a new-born. Where life expectancy is low, it is usually caused by the deaths of children before their fifth birthday, and

often before their first birthday. Epidemics, such as HIV and AIDS, can in exceptional cases significantly reduce life expectancy by raising mortality among adults in their prime years. Death rates, as with birth rates, are a function partly of life expectancy and partly of the age structure of the population. Countries where large fractions of the population are elderly will have relatively high death rates, even when life expectancy is long.

Population change is marked by lagged effects owing to the length of human life. Changes in fertility and mortality may not be fully reflected in the overall population for a generation or more. For example, although falling fertility may mean that the current 0–4 age cohort is smaller than the preceding one, implying a shrinking population in the long run, this may not be seen for many years if younger age-cohorts are large and those of elderly are small, as often applies after episodes of rapid population growth.

Table 2.1: Key variables for population change analysis defined, with examples

	Definition	Comment	Examples
Growing the population			
Crude Birth Rate (CBR)	The number of births for every 1,000 people in a given population over a year	CBR depends on the age structure of the population: when many are in their reproductive years, CBR will be higher than in populations with large numbers of young or elderly.	CBR in 2013 ranged from a low of 7.9 in Hong Kong and Portugal, to a high of close to 50 in Niger, and in the mid-to high 40s in Angola, Burundi, Chad, and Mali. It averaged 36 in LICs, and about 12 in HICs.
Total fertility rate (TFR)	The average number of children each woman will have during her reproductive lifetime	TFR is estimated by taking rates of childbearing observed for women in different age cohorts for a given year, to calculate the number of children a woman would have, were she to have the same rates as she progresses through the age cohorts.	TFR 2013 estimates range from lows of 1.08 in Macao, 1.12 in Hong Kong, and 1.19 in South Korea and Singapore, to over 7 in Niger and between 6 and 7 in Burundi, Chad, Somalia and Mali. On average the rate in HICs was 1.72, while in LICs it was 4.84. TFRs tend to be higher in rural than urban areas.
Adolescent fertility rate	The number of births per 1,000 women in any given population aged 15 to 19	Adolescents are twice as likely to die in childbirth as women who wait to their 20s to begin childbearing (Haub, 2013).	Ranges from rates below 4 in North and South Korea, Switzerland, Hong Kong, Macao, Singapore, and Slovenia to 130s in Cote d'Ivoire, Malawi, and Chad; 140s in Guinea and Mozambique, 160s and 170s in Angola and Mali, and rates of just over 200 in Niger.

	Definition	Comment	Examples
Replacement TFR	The fertility rate at which the population will neither shrink nor grow	For rich countries with low levels of early mortality, this rate is around 2.1 (allowing for some mortality before children reach child-bearing age themselves). In poorer countries with higher mortality among the young, the replacement TFR can be considerably higher.	The global replacement TFR, 1995-2000, was 2.34 (compared to a TFR of 2.82). Rates by country varied from less than 2.1 to nearly 3.5. In more developed regions replacement TFR was 2.09, while in least developed countries it was 2.37 on average (Espenshade et al., 2005).
Desired or Wanted TFR	The average number of children each woman would have if only desired (wanted) births occurred	This reflects preferences for children and family size. Typically, the number desired tends to be lower than actual, particularly in poorer countries, given women's imperfect access to family planning.	In Burundi in 2010, actual fertility was almost two children higher than desired, 6.4 compared to 4.5; while in Niger in 2012, actual TFR was very close to desired – 7.6 compared to 7.4. Rural desired and actual fertility tend to be higher than urban ones.
Shrinking the population			
Crude Death Rate	Number of deaths per 1,000 people in a population over a year	Like the CBR, this depends on the relative age structure of the population, does not necessarily indicate people living healthier or longer lives. High-income countries with healthy environments and good medical care can have relatively high death rates since so many of their citizens are elderly.	Estimates for 2013 range from 1 in the United Arab Emirates (UAE), to about 7.5 in MICs, 8.8 in HICs, 10.2 in LICs, and as high as 17 in Botswana and 17.2 in Sierra Leone.
Life expectancy from birth	Average number of years that a new-born is expected to live if current mortality rates continue to apply	This summarises the pattern of mortality that prevails across all age groups.	2013 estimates range from around 83 years in Hong Kong, Japan, and Iceland, to 45 in Sierra Leone, 47 in Botswana, and 49 in Swaziland and Lesotho. The 32 countries with the lowest life expectancies were all in Africa, although these have been improving rapidly since 2000. Afghanistan had the 33rd lowest life expectancy at 60.5 years and the lowest in Asia. Yemen had the lowest for the Middle-East at 62.9, while Bolivia had the lowest for Latin America, at 67.2.
Infant Mortality Rate (IMR)	Number of deaths of infants under one-year old per 1,000 live births	Most early deaths of children take place before the first birthday. Indeed, many infant deaths occur in the neo-natal period of 4-6 weeks following birth.	2015 figures ranged from 1.5 to 2 in Luxembourg, Iceland, Finland, Japan, and Norway, to 85 in Somalia and Chad, 87 in Sierra Leone, 92 in the Central African Republic, and 96 in Angola.
Under-five mortality rate	Number of deaths before age five per 1,000 live births		In 2013, the world average was 46 per 1,000, 73 for LICs; and ranged from a low of 2.6 in Finland to a high of 167 for Angola.
Moving the population			
International migration	The movement of people across national borders		Just over 3% of the world's population are estimated to be international migrants (UNDP, 2013). Varies by country: more than 10% of Mexicans are currently migrants in the US (Shroff, 2009).
Domestic or internal migration	The movement of people within a country	Typically, this vastly outstrips international migration. It can be permanent or temporary, the latter including seasonal and cyclical moves.	Domestic migrants are estimated to make up at least 12% of world population (Bell and Charles-Edwards, 2013).
Dependency ratio			
Dependency ratio	Ratio of non-working age population (young and elderly) to the working population	Dependency ratios can be separated into young and old dependency, but are most often expressed together. The working age population is often but not always defined as 15-64 year olds.	In 2014, dependency ratios varied from almost 113% in Niger, to 17% in UAE. Old-age dependency ratios varied from almost 42% in Japan to 1.2% in UAE. Youth dependency ratios varied from 107% in Niger to around 16% in Hong Kong, UAE, and Macao.

Demographic transitions

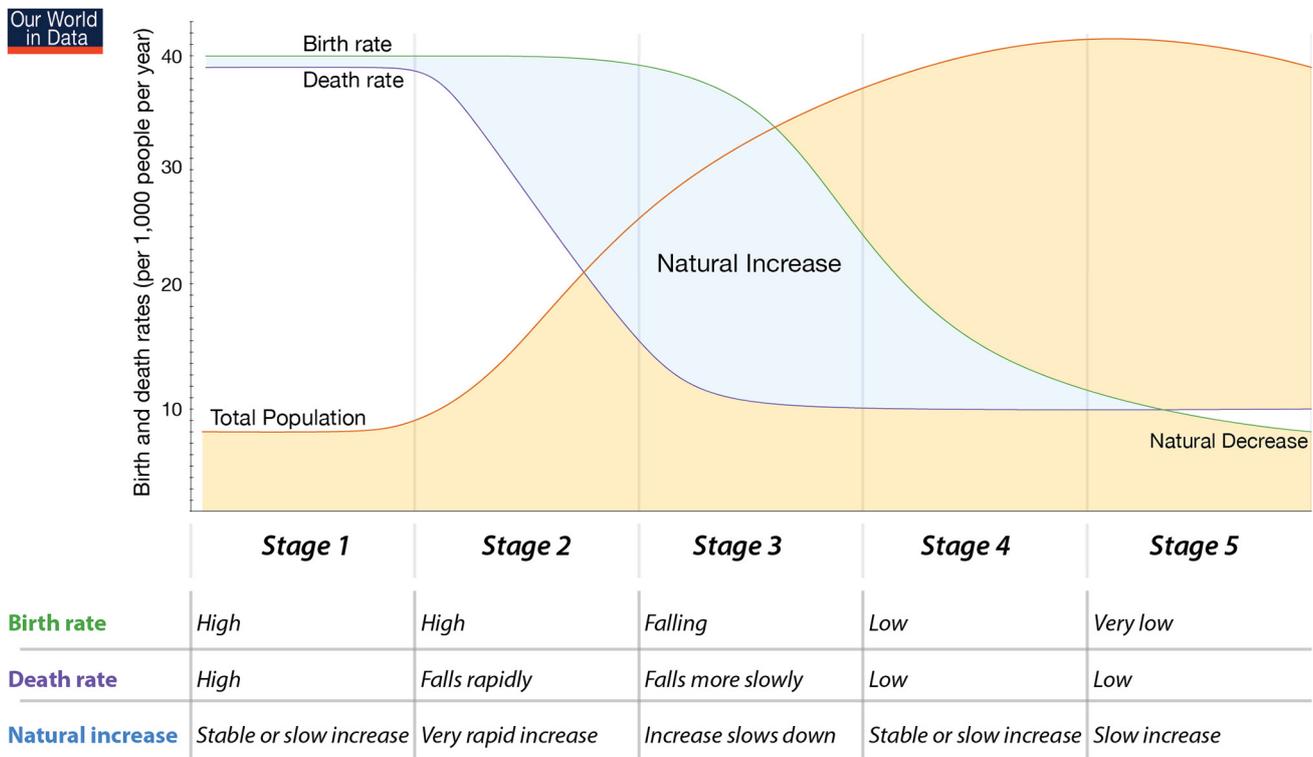
Since the industrial evolution, high-income countries and an increasing number of emerging economies have gone through a demographic transition, from high rates of birth and death to low rates. Death rates typically fall first, then fertility and birth rates fall after a lag. Population grows rapidly between these points, until birth rates come down to close to the death rate. Figure 2.1 shows the stylised pattern of births, deaths and population.

The patterns are similar between the historical experience of high-income countries such as Germany and Sweden, where the transition had begun by the early 1800s, and developing countries where it began much later, after the Second World War (Figure 2.2).

It is relatively easy to account for the fall in death rates – largely reductions in under-five mortality – for the reasons mentioned above: rising incomes and better access to food; cleaner, healthier environments with safe water and sanitation; and advances in medicine, particularly vaccination (Rutstein 2000 details experience in the developing world in the 1990s).

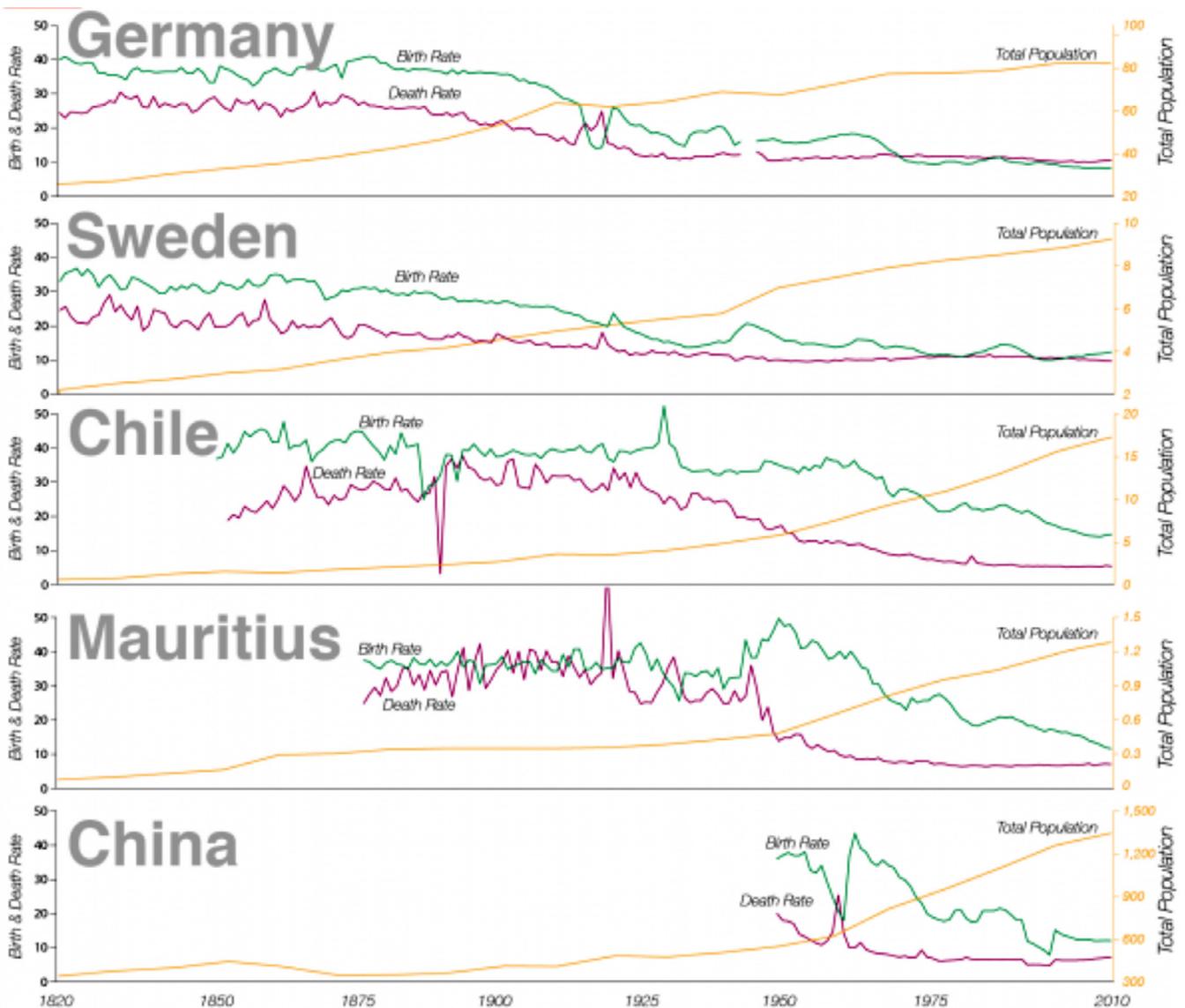
Less easy to explain are the falls in fertility. Until the industrial revolution, increased incomes had tended to raise fertility, as Malthus expected. But from that time, and very markedly after 1870 or so, rising incomes in early industrialising countries began to result in lower fertility (Guinnane, 2011; Galor, 2012; Lipton and Eastwood, 2012).

Figure 2.1: Demographic transitions



Source: Roser (2015)

Figure 2.2: Demographic transitions, 1820-2010, Germany, Sweden, Chile, Mauritius and China



Source: Roser (2015)

Historians have pondered why that took place. Galor (2012) argues that the 1870s coincided with a second phase of the industrial revolution in which technical innovations raised the demand for skilled and educated labour. The value of children was no longer in their number, but in their education, so that parents reduced their fertility to invest in the education of their children. At the same time, the new jobs in industry were more accessible to women, being more a matter of brain power and dexterity over physical strength. More women went to work, and so the opportunity cost of bearing and raising children rose. Guinnane (2011) adds that these changes were reinforced by urbanisation where the costs of additional accommodation for large families was a deterrent to fertility, by-laws that increasingly outlawed child labour in factories and mines, and the widespread

introduction of compulsory, and often free, education. Both authors find little evidence to support competing explanations, such as increased child survival or the development of new forms of contraception.

Whatever the exact reasons for reduced fertility, the switch in the effect of higher incomes on fertility has been revolutionary, changing a norm that had persisted for millennia. Moreover, this new pattern, that took hold first in a handful of early industrialising nations, rapidly became a global norm. Twentieth-century examples of countries where rising incomes were not been accompanied by falls in fertility are few and far between. As will be seen in Section 3, the contemporary association between national income per capita and average fertility rates is very close.

2.2 Rural demography

Rural areas differ demographically from urban areas in developing countries in three main respects.

One is that mortality tends to be higher in rural than urban areas, largely owing to high mortality of children under the age of five. Higher mortality stems from lower incomes and more malnutrition, less clean water and less sanitation, and fewer medical services. This comparison, however, may only be valid at the mean: informal urban settlements often suffer all the health disadvantages that rural areas experience, and sometimes worse. Hence it is no surprise that infant and under-five mortality when measured for such informal settlements are often at rural levels, if not higher.²

A second difference is that fertility rates in rural areas tend to be higher than in urban areas. That again may be a function of lower incomes but, as will be seen in Section 3, may also be associated with agriculture – where it is easier to combine child-raising with farm work compared to, say, working in a factory.

The combination of higher mortality and fertility may mean that demographic transitions in rural areas are delayed, with higher rates of natural population growth in rural areas. Such growth does not necessarily show in actual rural population rising so quickly because of the third difference, which is that most rural areas see some out-migration to urban areas. The result is that regardless of underlying natural growth cities are growing faster than rural areas and urbanisation is increasing. Not only does out-migration slow rural population growth and in some cases lead to declining rural population, but also it can also

affect the composition of the rural population, depriving working-age cohorts and in some cases skewing the sex ratio if either men or women are disproportionately prone to migrating. Migration out of rural areas is not only to urban areas: for some areas, typically densely settled ones, rural people migrate to less settled areas in search of land. Countries such as Brazil and Indonesia have seen major moves into forests to clear new fields.

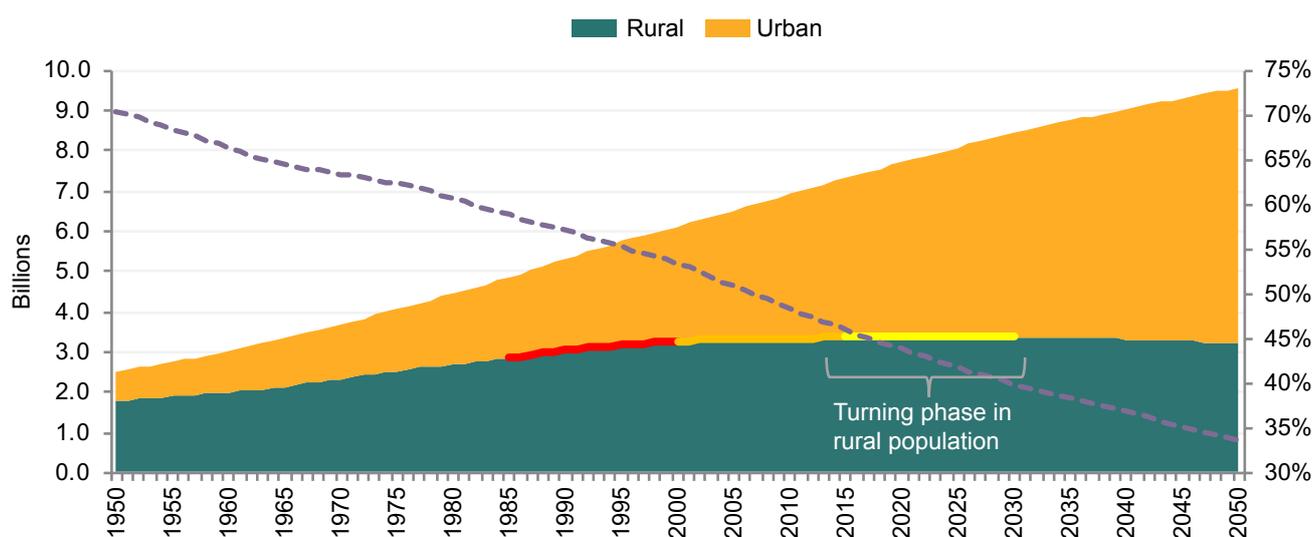
Broad trends in these three factors are for rural mortality and fertility to fall faster than in urban areas and to converge on urban norms, although much variation can be seen and policy matters. Migration out of rural areas will probably increase rather than decrease, as urban opportunities multiply and increasingly better educated and healthier rural young people have the chance to move.

Patterns in rural population change

The world is becoming less rural (Figure 2.3). Not only have we passed the point at which more than 50% of the world's population is urban (reached in 2007), but between 2015 and 2030 the world's rural population is expected to peak at about 3.3 billion persons, and then decline.

The pace of rural population growth has dropped from an average annual rate of 0.9% between 1985 and 2000 to 0.18% between 2000 and 2015. It is projected to reach zero and then turn negative over 2015-2030. At the same time, the world's urban population has been growing relatively steadily over the last 30 years, at an average annual rate of 2.4% between 1985 and 2000, and 2.2% between 2000 and 2015. Since the definition of urban varies by country (see Box A), these statistics are not necessarily precisely correct, but in broad terms realistic.

Figure 2.3: World population, 1950-2050 projection, rural and urban



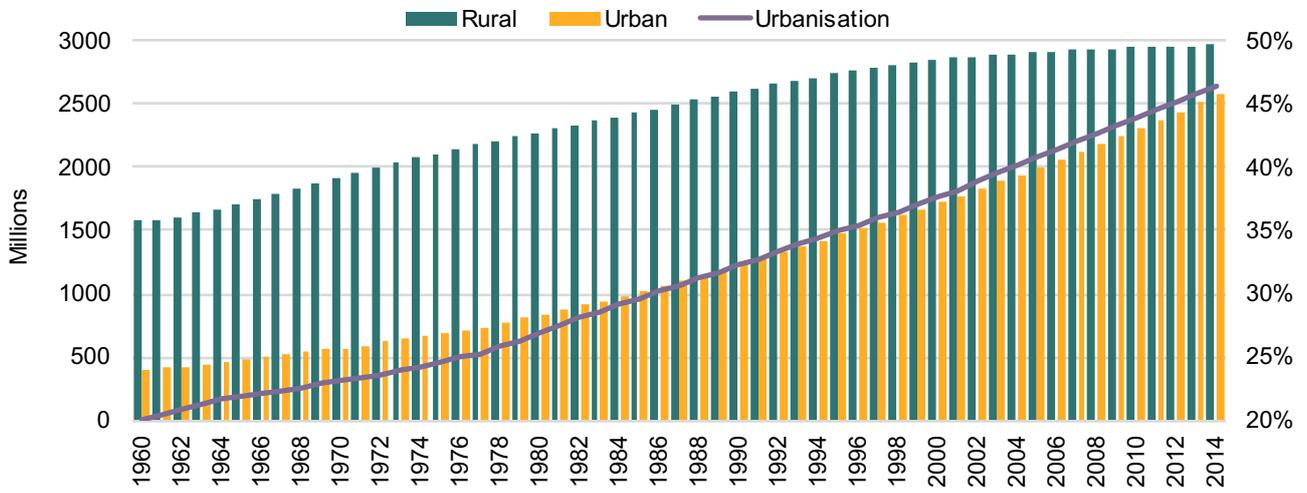
Source: FAOSTAT data

2 Tacoli et al. (2008) (Table 2.1) provide examples of infant and under-five mortality rates in urban and rural areas of Kenya, including Nairobi and informal settlements in Nairobi, Kibera and Embakasi

The developing world, however, just about remains majority rural with urbanisation at 46% in 2014 (Figure 2.4) The rate of growth of rural populations has slowed

notably since the turn of the new century, with just 68 million people added to the rural population between 2004 and 2014.

Figure 2.4: Rural and urban population, developing world, 1950-2014

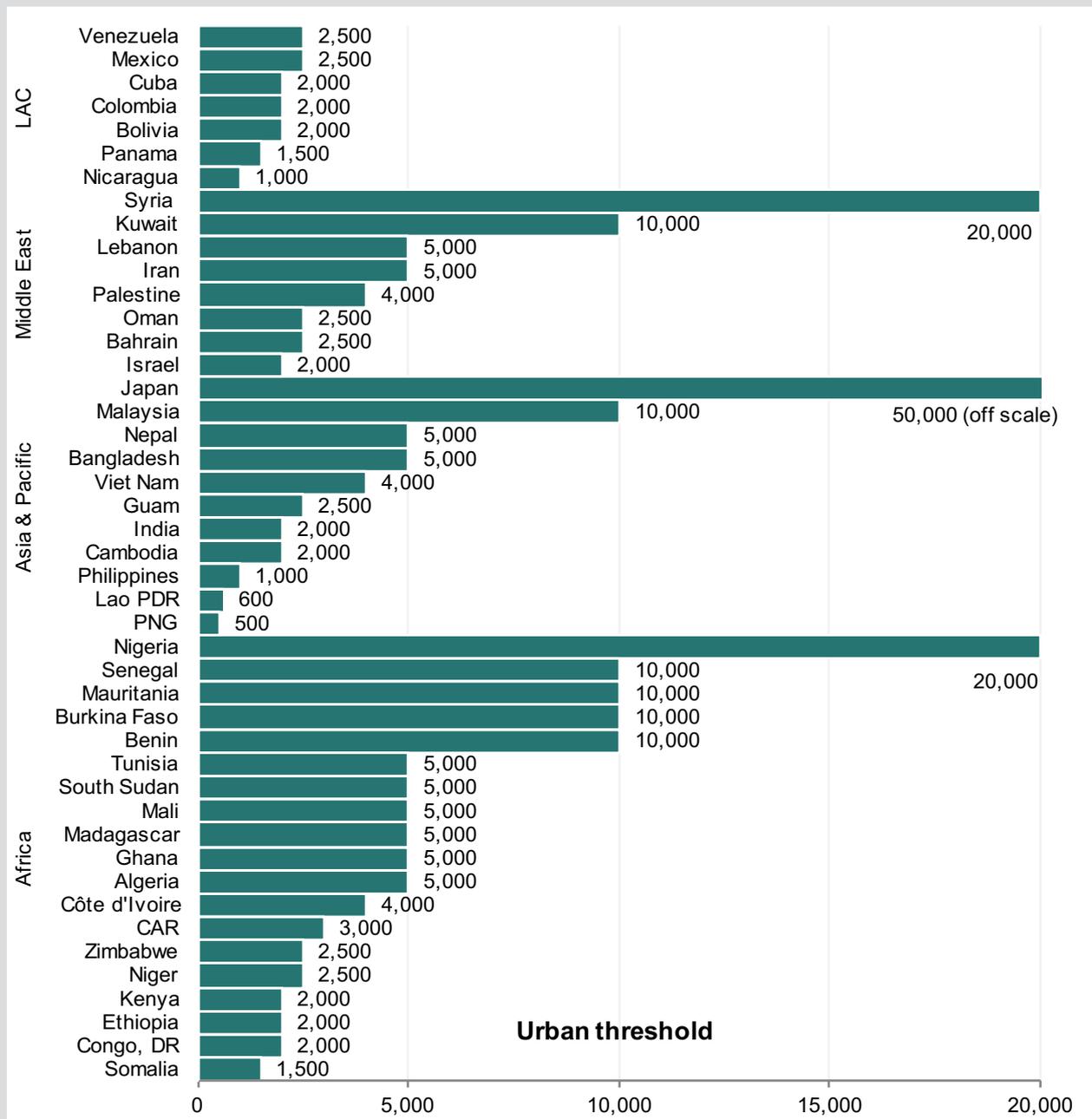


Source: WDI

Box A: Defining urban areas

Because countries define urban in different ways, comparisons across countries can be misleading. No standard definition of urban exists. Criteria used to define ‘urban’ include settlement size, population density, proportion of people engaged in agriculture, administrative designations, and so on. Settlement size is perhaps the most common criterion, but even with this, major differences arise in the threshold adopted, ranging from as many as 50,000 in Japan to as few as 200 for Denmark, Greenland, Iceland, and Sweden (Figure A1).³ Moreover, the criteria may change through time.

Figure A1: Thresholds to qualify settlements as urban, by country



Source: UN DESA Population Division (2014)

3 Figure A1 in the annex provides a full sample of thresholds published in UN DESA Population Division (2014).

Thresholds matter, as these examples show:

- In China, the urban share in 1999 could have been 24%, 31%, or 73% depending on definitions of urban population.
- In Mexico in 2000, more than 74% of the population was officially urban, given that settlements of more than 2,500 qualified as urban. Had the threshold been 15,000, the urban share would have been 67%.
- In Mauritius in 2000, the urban population was counted as 43%, yet many rural people lived in settlements between 5,000 and 20,000. Reclassifying them as urban would have caused urban share to rise to more than two-thirds (Uchida and Nelson, 2008).

The *World Development Report* for 2009 created an urbanisation index that could be applied across all areas. This defined a settlement as urban if the density exceeded a threshold of 150 persons per square kilometre and it had access to a settlement of more than 50,000 persons within some reasonable travel time, 60 minutes by road. The authors of the report were able to apply this for one year, but the data demands were too great to allow this to be computed for all territories through time (World Bank, 2009).

Given, however, the increasing level of interactions between rural and urban areas, not everyone would agree that the distinction are absolute or even that useful, as Montgomery (2008) argues:

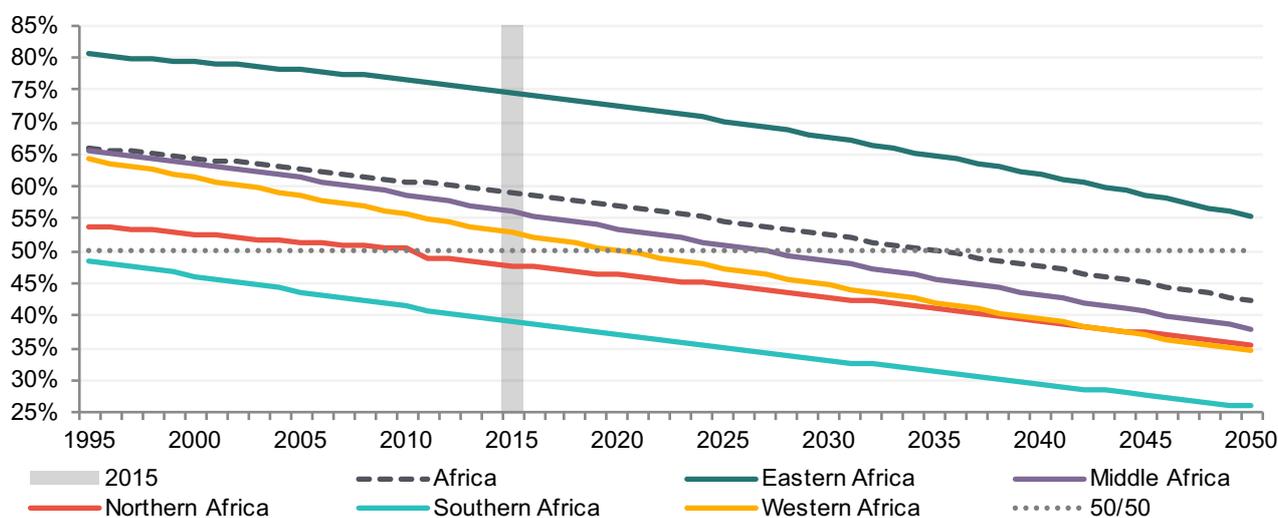
Urban researchers too are increasingly critical of the practice of declaring some places to be definitively urban and others rural, as evidence grows of the multiple linkages and flows across space of people, goods and information. Although the conventional, binary, urban–rural distinction still retains value, a consensus is emerging that future classification schemes will need to reserve a place for additional categories and degrees of urban-ness as well as the rural and urban ends of the spectrum.

The overall pattern masks large differences across the regions of the developing world. (More detail on the country cases selected within these regions are provided in Annex II.)

Although the trend across Africa is growing urbanisation, rural population continues to dominate, and is projected to do so for another 20 years (Figure

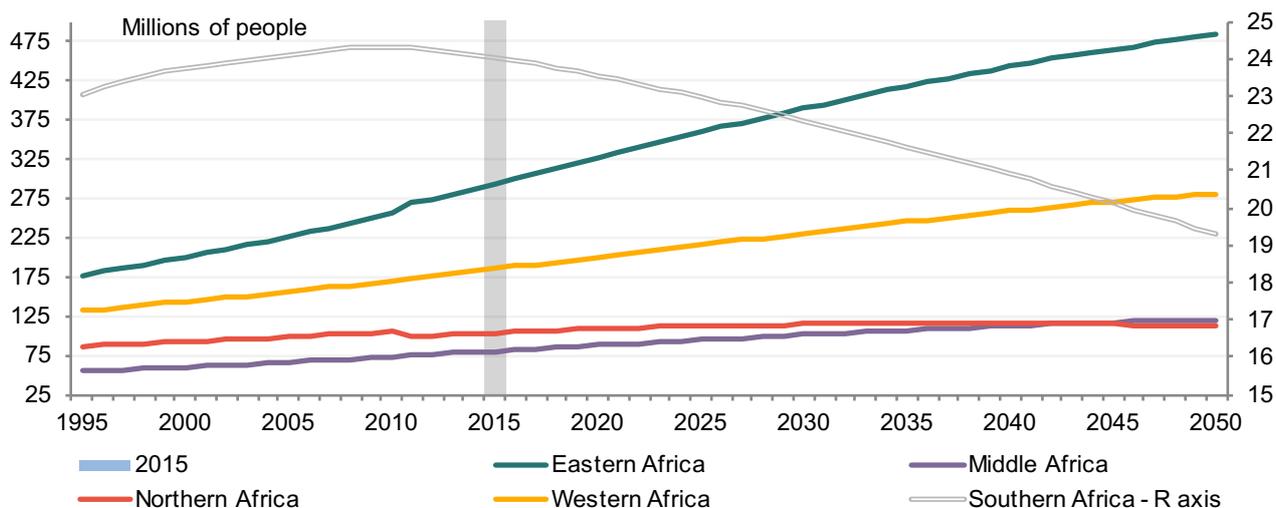
2.5). Across the continent, rural population grew from 473 million in 1995 to 687 million in 2015, while urban population went from 243 million to 479 million. Southern Africa alone has started to see rural population declines (since 2011). This is also the region with the smallest rural population in absolute terms as well as relative to the urban population (Figure 2.6).

Figure 2.5: Rural population as a proportion of urban population, 1995-2050 projected, Africa



Source: FAOSTAT data

Figure 2.6: Rural population across regions of Africa: 1995-2050 projection



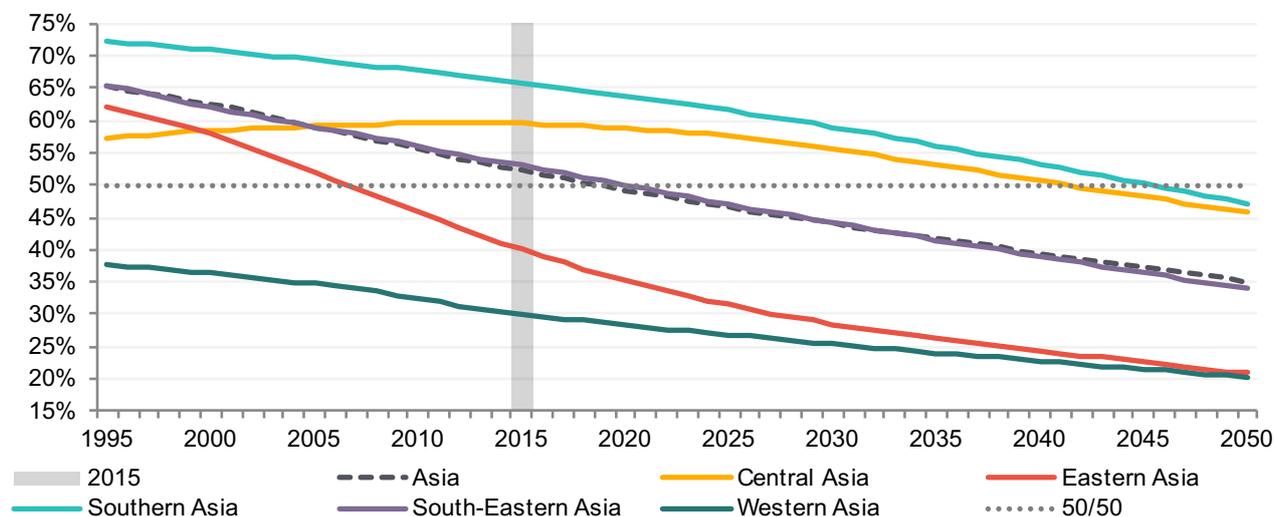
Source: Data from FAOSTAT

Note: Countries comprising regions at <http://unstats.un.org/unsd/methods/m49/m49regin.htm>

Asia has nearly reached parity between urban and rural dwellers – a threshold it is expected to cross in the next five years. By region, Western Asia is the most urban, and Southern Asia the least. Central Asia is unusual in that

since 1995 it has become more rural. Over the last 20 years, Eastern Asia has seen the most rapid urbanisation of all Asian regions (Figure 2.7).

Figure 2.7: Rural population as a proportion of urban population, 1995-2050 projected, Asia

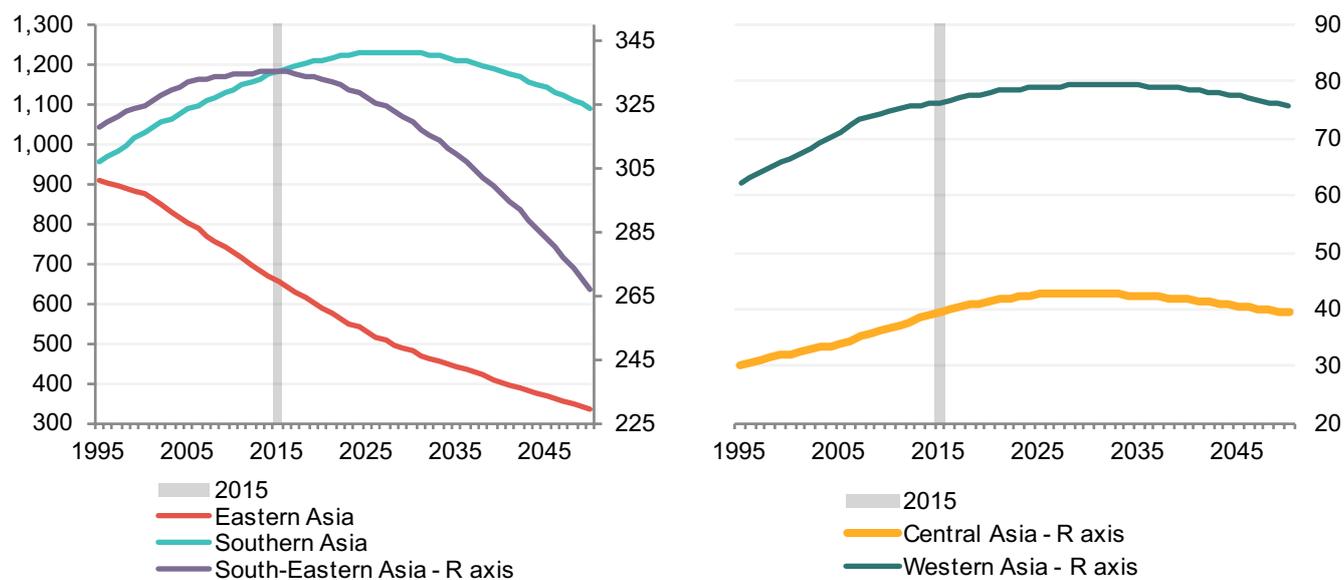


Source: FAOSTAT data

The rural population of Asia grew only marginally since 1995, from 2,273 million in 1995 to 2,288 million by 2015, and is projected to fall to 2,254 million by 2020. At the same time, Asia’s urban population grew from 1,210 million in 1995 to 2,297 million in 2015, and is projected

to reach 2,328 million by 2020. By region, East Asia stands out for having seen a falling rural population over the last 20 years. Only South-Eastern Asia has also started to turn this corner. In the Southern, Central, and Western regions, rural populations continue to rise (Figure 2.8).

Figure 2.8: Rural population across regions of Asia: 1995-2050 projection



Source: Data from FAOSTAT

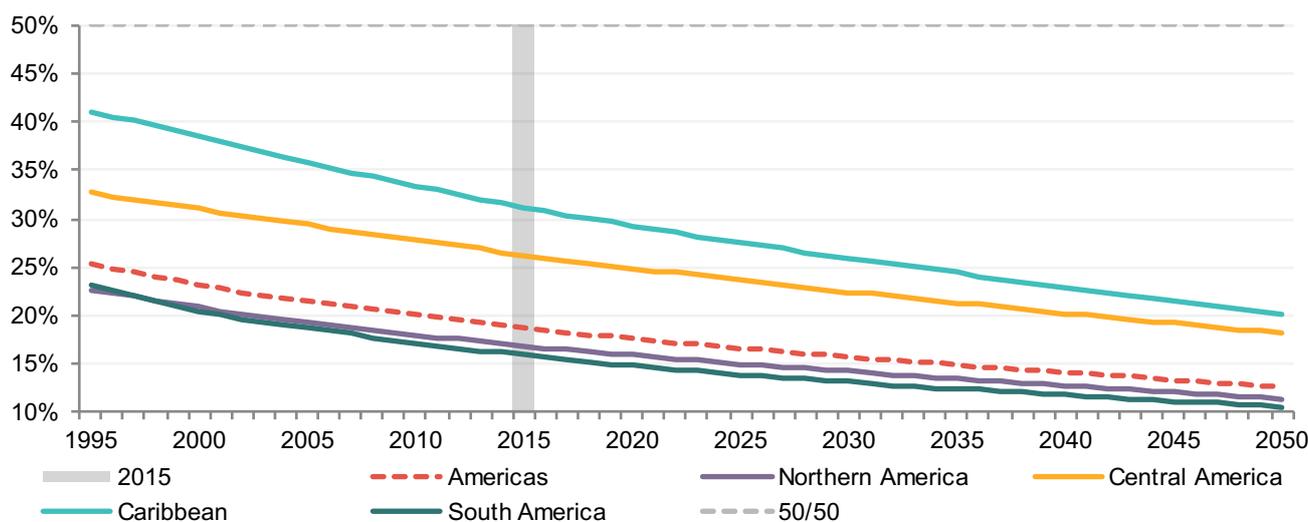
Note: Countries comprising regions at <http://unstats.un.org/unsd/methods/m49/m49regin.htm>

The Americas have been more urban than rural for more than 20 years, although this may partly owe to relatively low thresholds for urban centres. In 1995 about a quarter of Americans were rural: this is set to fall below 15% by 2035 (Figure 2.9).

In South America, the rural population fell from around 74 million in 1995 to 66 million in 2015, expected to fall

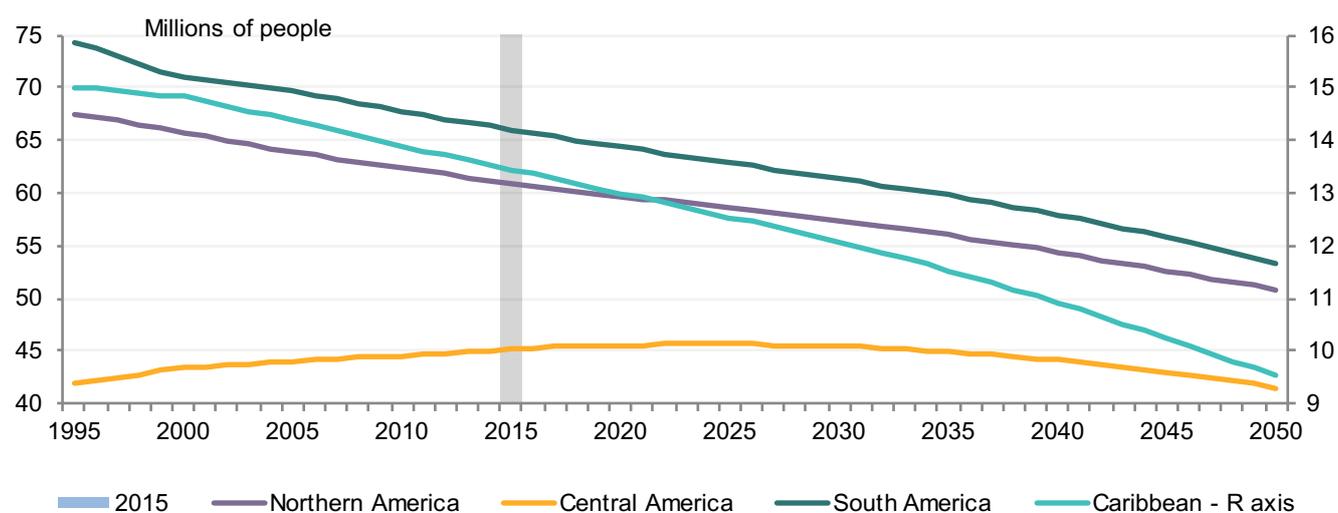
to 64 million by 2020. Declines were also seen in North America, from around 68 million in 1995 to 61 million in 2015; and in the Caribbean, from 15 million in 1995 to 13 million in 2015. Only in Central America did population rise over the past 20 years; from around 42 million in 1995 to 45 million in 2015. It is projected to start falling in 2025, however (Figure 2.10).

Figure 2.9: Rural population as a proportion of urban population, 1995-2050 projected, Americas



Source: FAOSTAT data

Figure 2.10: Rural population across regions of the Americas: 1995-2050 projection



Source: Data from FAOSTAT

Note: Countries comprising regions at <http://unstats.un.org/unsd/methods/m49/m49regin.htm>

Country examples

When country trends are examined, even more variations appear in the patterns seen. For the 16 selected countries, available census data has been used to compile the rural population count through time, as well as the numbers in the 0-4 years old cohort (the size of which should act as an early warning of future tendencies in rural populations). After episodes of rapid growth – most of the 16 countries have experienced rural population growth at 2% a year or faster at some point in the last 50 years – the rural age structure tends to be a pyramid, with large cohorts among the young, and increasingly smaller ones for the middle-aged and elderly. Hence a reduction in rural fertility would not greatly affect total rural population for a generation or longer, but it would show up almost immediately in the numbers born and entering the 0-4 cohort. When the size of this cohort begins to fall, then eventually natural growth will cease in the population. For rural populations, the effect will be all greater given that most rural populations experience some out-migration to urban areas (Figure 2.11).

In Asia, rural population growth has stopped in China and Indonesia: their rural populations are now shrinking. In both cases the 0-4 cohort stopped growing several decades ago: in the 1990s for China and in the 1980s for Indonesia.

For Bangladesh and India, rural population continues to grow, but in both cases the size of the 0-4 cohort peaked in the early 2000s and is now in decline, presaging eventual population declines. Vietnam is unusual: the census indicates that the 0-4 cohort has been falling since the late 1980s, yet the rural population continues to grow, albeit slowly.

In the Middle East and North Africa, Egypt's rural population continues to grow, as does that of Morocco, although in both cases the 0-4 cohort peaked in the early 1980s (unusually, however, the 0-4 cohort in Egypt subsequently increased). Iran has falling population and a 0-4 cohort that peaked in the 1980s. The sharp reversal in the growth of Iranian population in the 0-4 cohort may have actually preceded the change in policies in the late 1980s, when pro-natal policies were replaced by family planning services (more detail in Section 3).

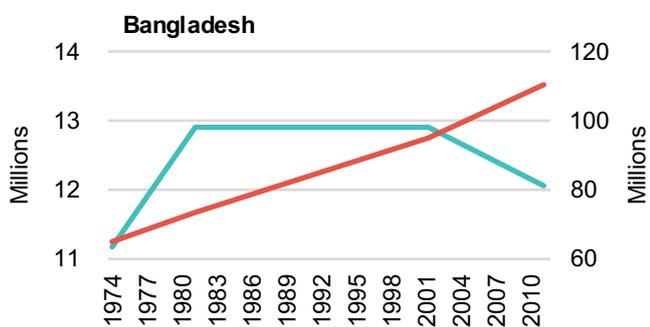
In Latin America, Brazil's rural population and the numbers in the 0-4 cohort peaked around 1970. For Costa Rica the two statistics peaked in the mid-1990s. Both Mexico and Peru still have slowly growing rural populations, but in each case the numbers in the 0-4 cohort peaked in the early 1980s.

Sub-Saharan Africa presents three cases, Ethiopia, Ghana and Kenya, where both rural populations are growing and so are the numbers in the 0-4 cohort, with little sign of completing the demographic transition in the near future. Senegal has a growing rural population, but the numbers in the 0-4 cohort peaked in the late 1990s.

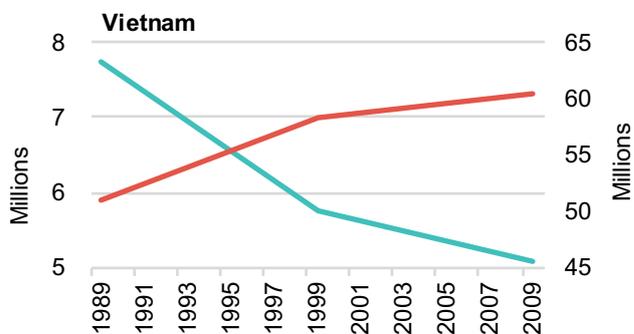
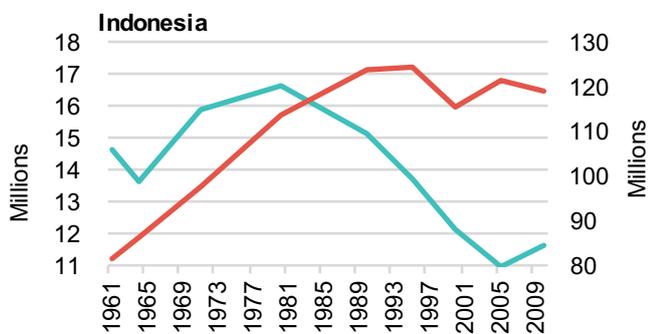
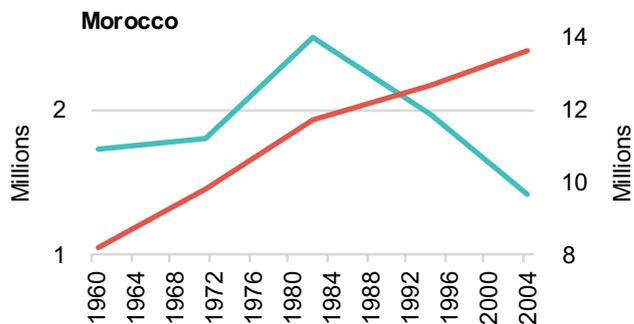
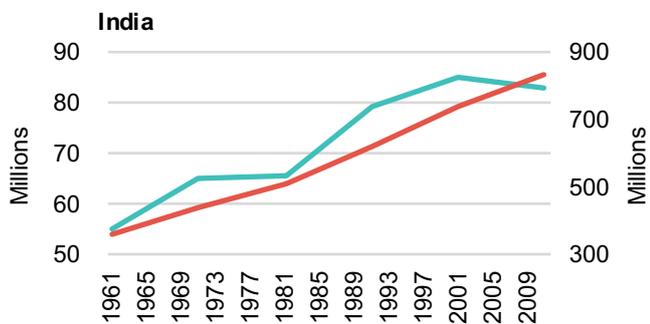
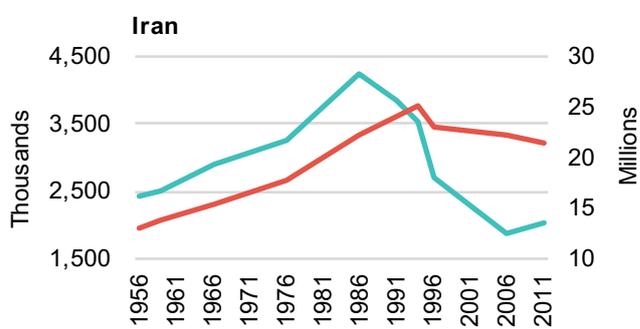
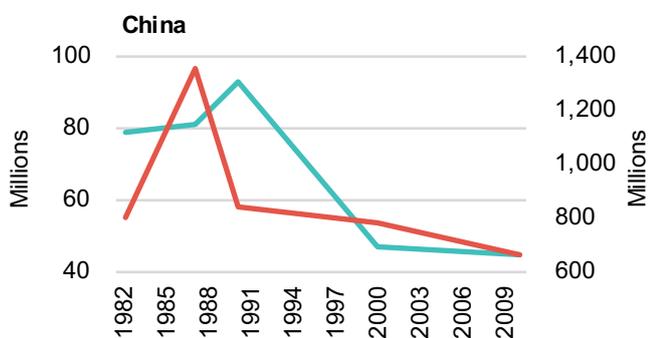
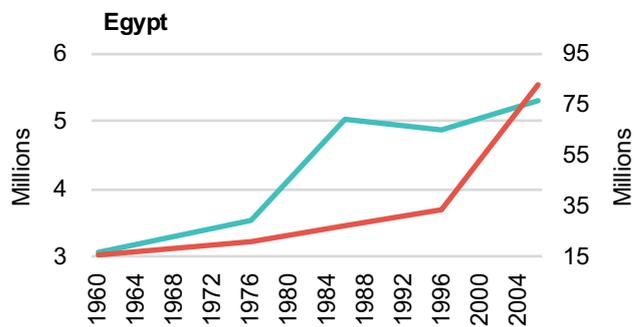
In sum, only five of the 16 countries have rural populations that are declining, but in 13 cases – 12 if Egypt is excluded – the population in the 0-4 cohort has peaked and that cohort is now getting smaller. The exceptions are all from sub-Saharan Africa where, as will be seen, rural fertility still remains high, if in decline. This region aside, the rest of the developing world seems clearly headed towards declining rural populations in the near future.

Figure 2.11: Rural population (red, right hand scale) and 0-4 age cohorts (blue, left hand scale), since 1960s, 16 selected countries

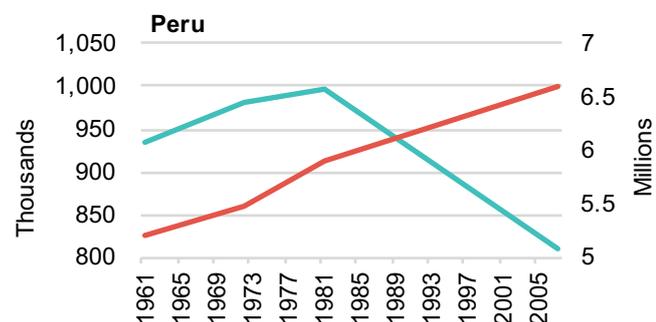
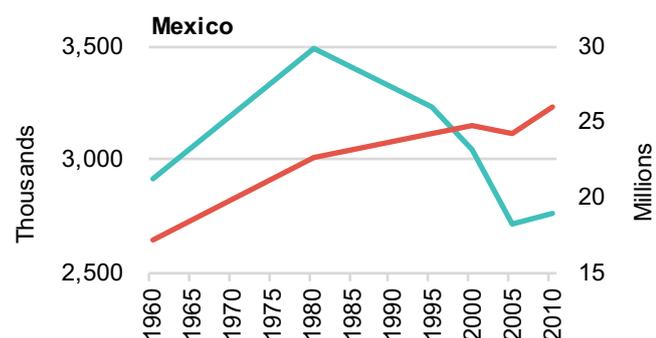
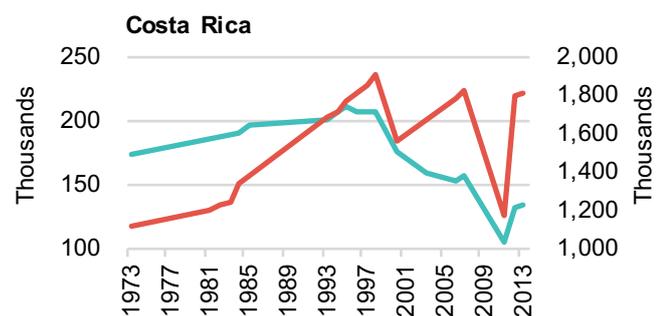
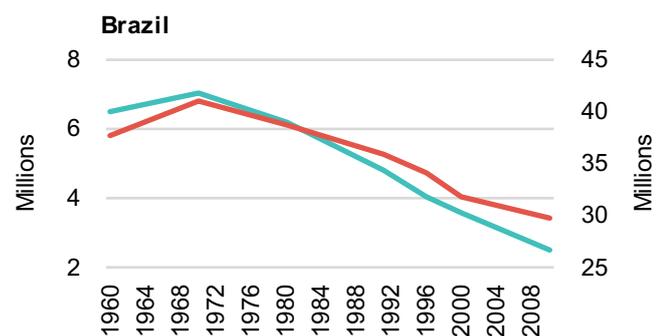
Asia



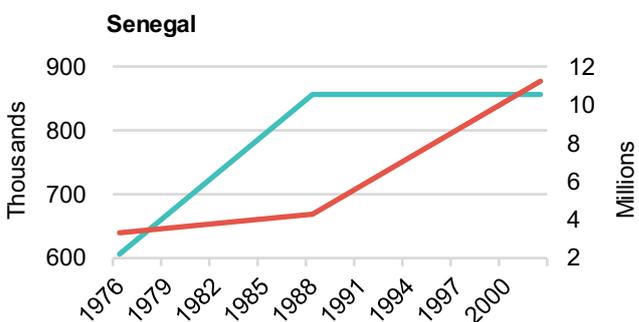
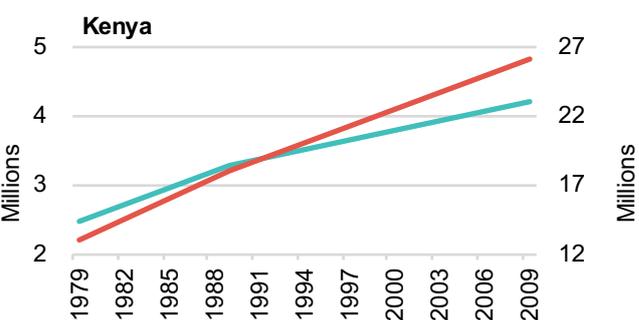
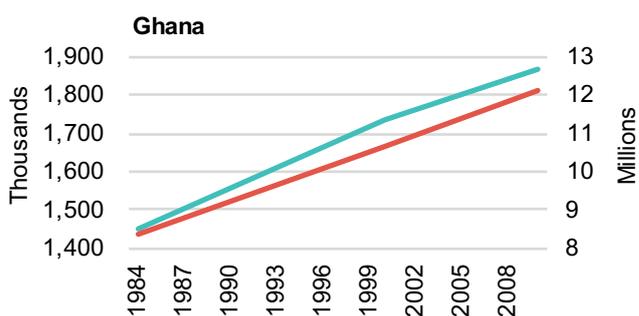
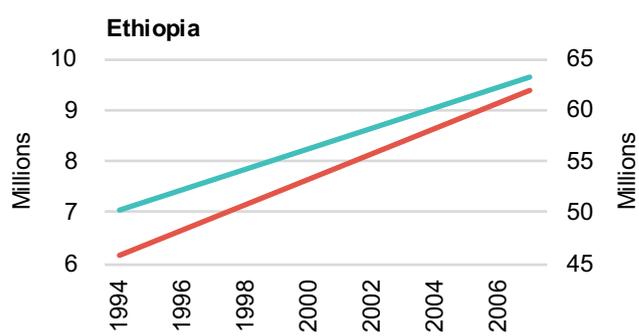
Middle East & North Africa



Latin America



Sub-Saharan Africa



Source: UN Population Data
Notes: Lines join census counts

3. Fertility

This section sets out how fertility rates have changed through time both nationally and, where available, in rural areas. It sets out a framework for the causal paths that lead to changed fertility, and then examines the main influences on fertility.

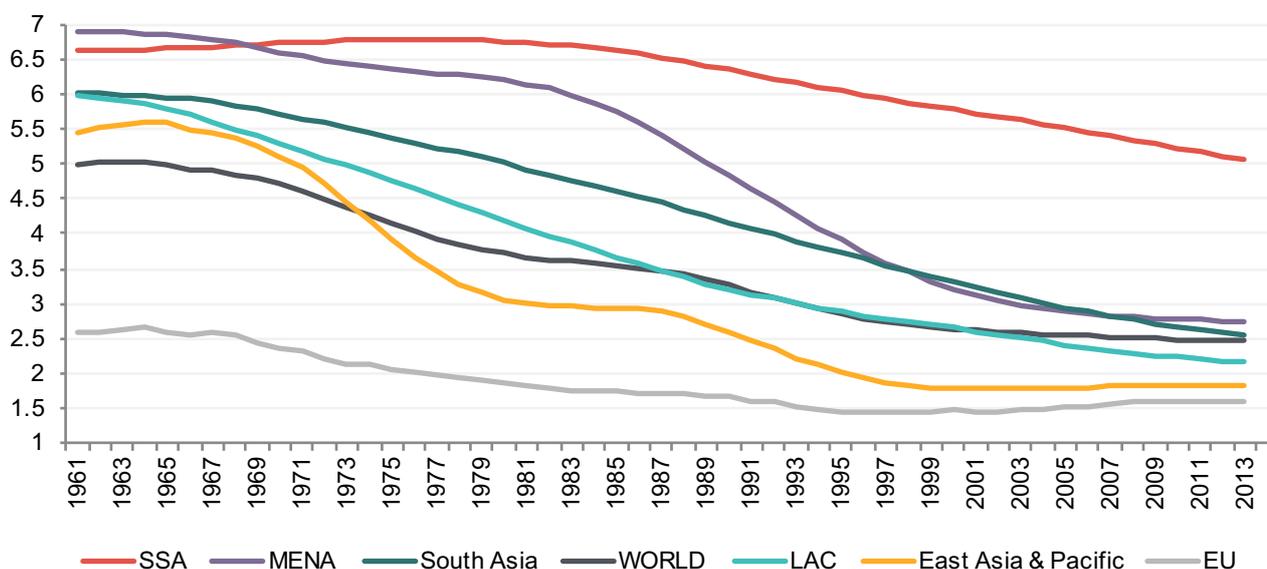
3.1. Changes observed in fertility rates

Total fertility rates (TFRs) fell across the world between 1961 and 2013 (Figure 3.1). Globally, the TFR halved over this period, falling from just over 5 to less than 2.5. Strong declines were seen in MENA (a decline of 4.1), LAC (3.8),

EAP (3.6), and South Asia (3.5). Falls were more modest in SSA (a decline of 1.6), and the European Union (EU) (a decline of 1, although levels were already relatively low in 1961).

Between 1995 and 2013, fertility rates fell faster than the global average in South Asia, MENA, LAC, and SSA, though slower in EAP and the EU⁴ (Figure 3.2). Rates in East Asia and the Pacific (dominated by East Asian, and here Chinese rates) are changing slowly because the region is already quite far through the transition to low fertility. Changes in South Asia are remarkable. It is on course to hit East Asian fertility levels before 2015. The same goes for the MENA and LAC, leaving sub-Saharan Africa as the exception.⁵

Figure 3.1: Trends in fertility in selected regions: 1961-2013

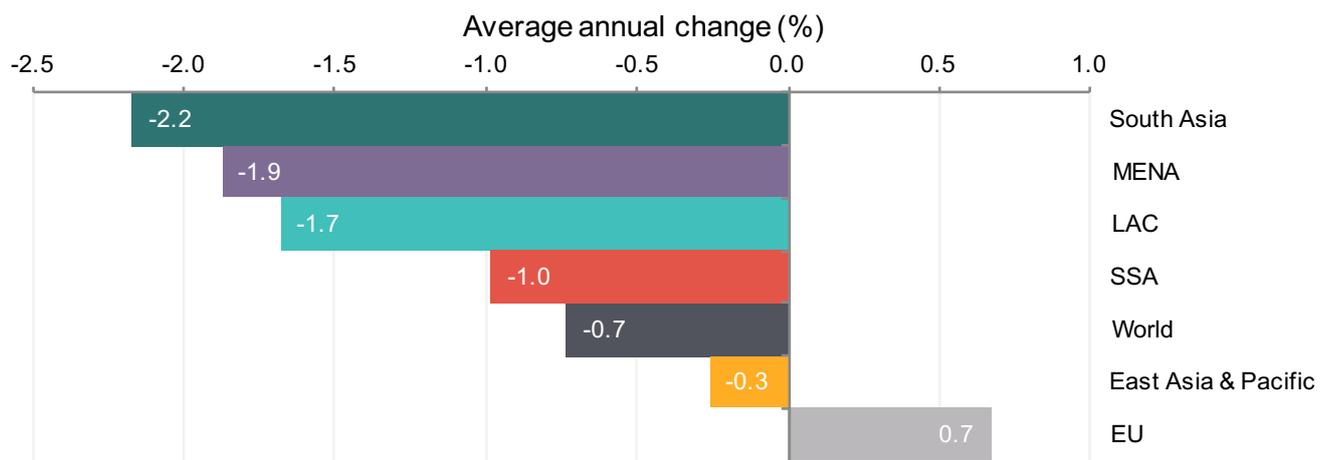


Source: Data from World Bank WDI.

4 The slight increase in fertility in the EU towards the end of the series is curious. It could result from immigration of people with higher fertility norms into the EU; or it may be an example of the phenomenon mentioned by Myrskylä et al. (2009), who showed that at high levels of development (as measured by the Human Development Index), further development can reverse the declining trend in fertility. It probably does not stem from new members to the EU having higher fertility than longstanding members, since regionally the Europe and Central Asia trends move similarly.

5 If fertility is to decline at the rates seen between 1995 and 2013, LAC is on track to reach EAP rates of around 1.8 by 2020; South Asia by 2023, and MENA by 2025. At this rate, SSA will only reach rates of 1.8 by 2073 (though assuming a steady rate of decline over such a long period is not likely; acceleration is more feasible).

Figure 3.2: Average annual change, fertility rates, 1995-2013, by region

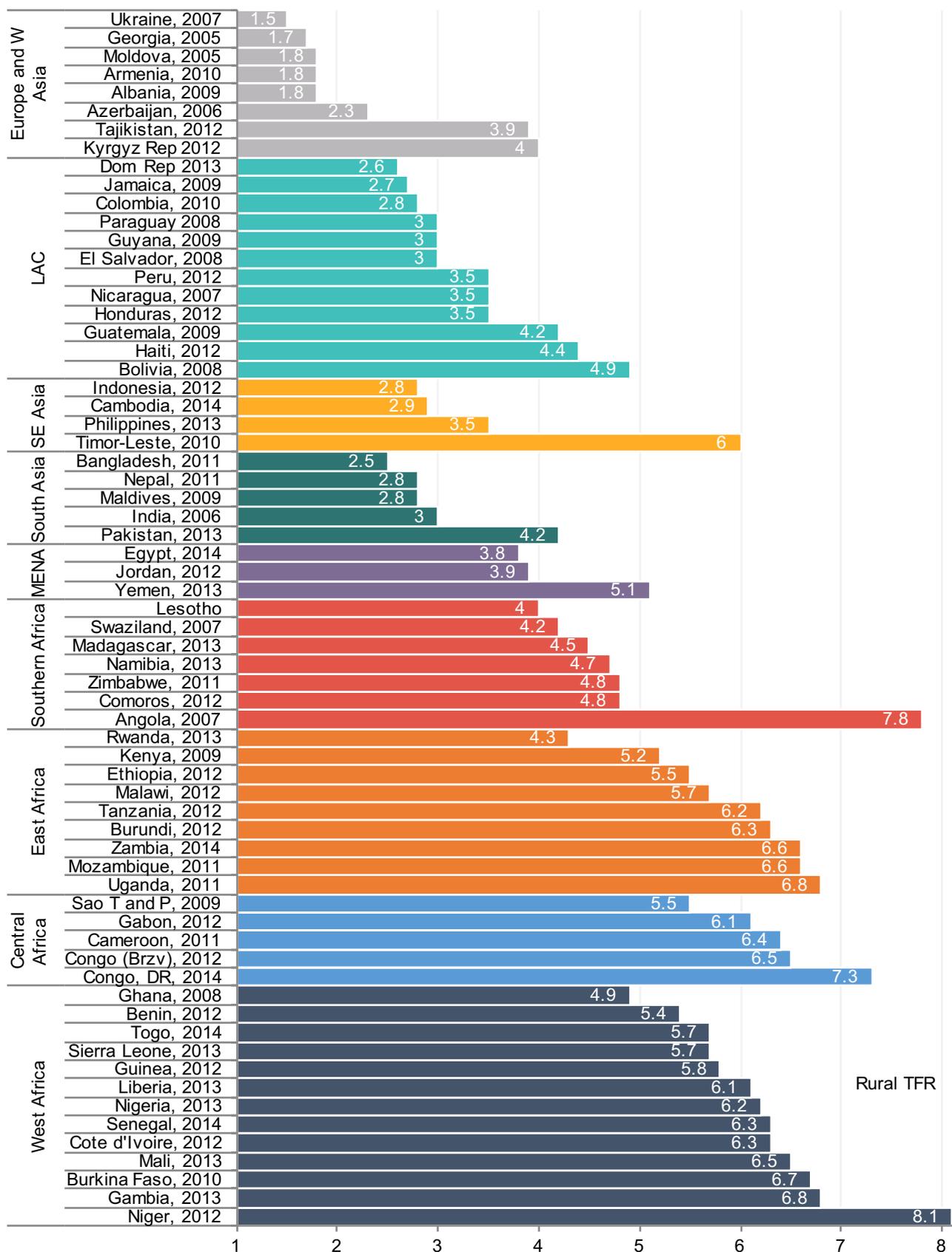


Source: Constructed with data from World Bank WDI

3.1.1 Rural fertility rates

Observations of rural fertility rates are less readily available than national rates, although Demographic and Health Surveys (DHS) allow for these to be tracked in several countries since the mid-1980s. Figure 3.3 shows the most recent figures, ordered by region.

Figure 3.3: Recent measures of rural fertility rates, 66 countries



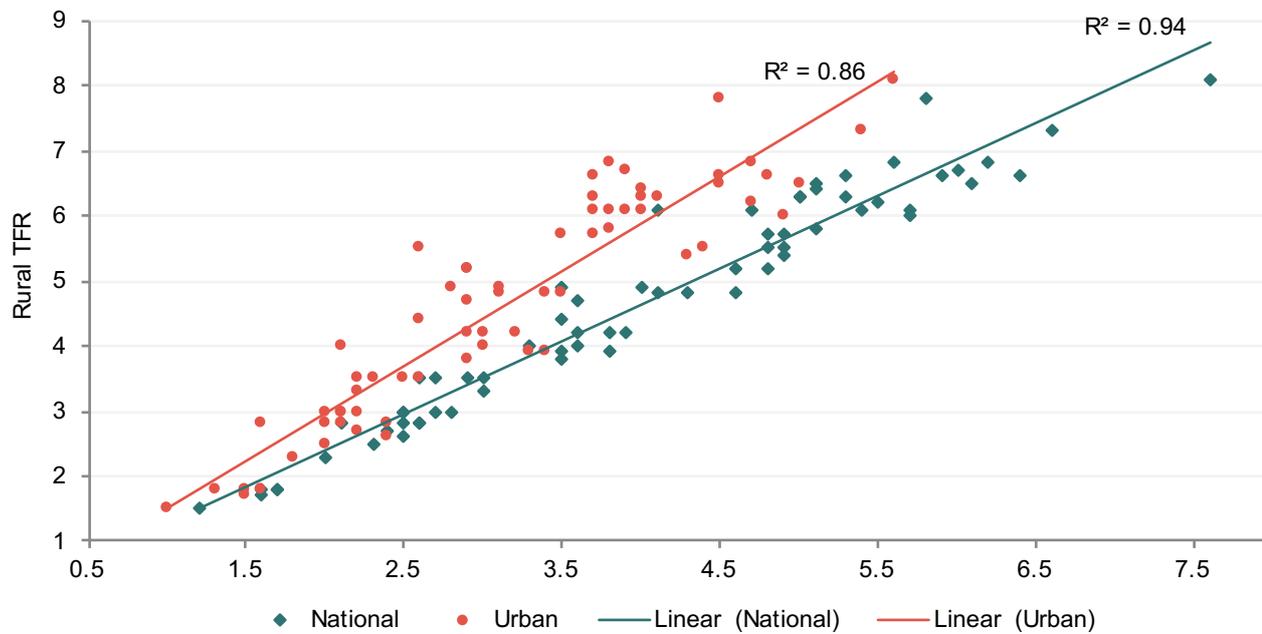
Source: Data from DHS Statcompiler – most recent available data point from 2005 onwards

Rural fertility tends to be higher than urban. On average, recent measures for 66 countries showed rural fertility to exceed urban fertility by a factor of about 1.5 – ranging from less than 0.5 in Georgia, Armenia, the Dominican Republic, Moldova, and Indonesia, to over 2.5 in Angola, Burkina Faso, Cote d’Ivoire, Ethiopia, Uganda,

and Zambia. Rural and urban fertility correlate closely, with a correlation of 0.93 for 66 countries (Figure 3.4).

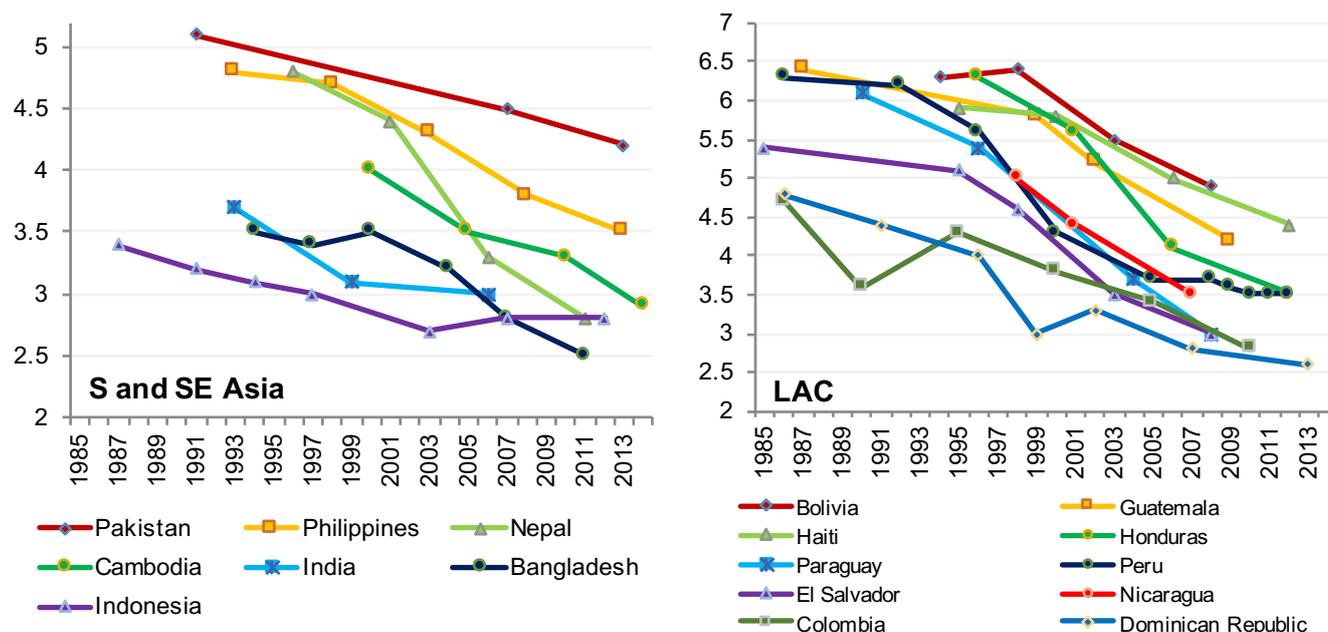
Most rural fertility rates have been declining over the last three decades, with only a few exceptions such as Mozambique and Niger⁶ (Figure 3.5).

Figure 3.4: Rural, urban and national fertility, since 2005, 66 countries



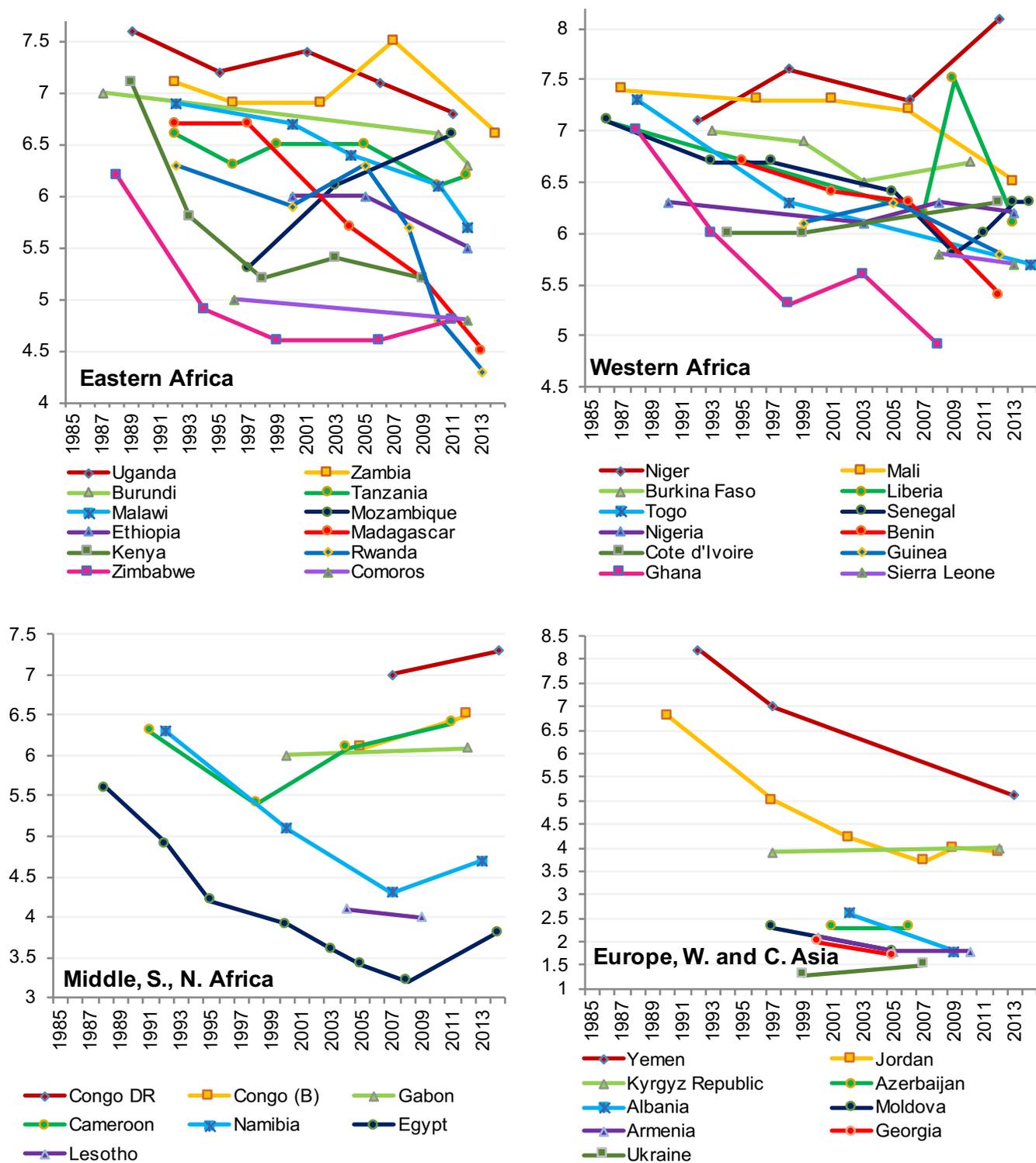
Source: Data from DHS Statcompiler for latest point between 2005 and 2014 for 66 countries.

Figure 3.5: Changes in rural total fertility rates, 1985-2014, in 57 countries by region



⁶ Other countries such as DR Congo and Congo show rises in recent years, but with insufficient numbers of data points to really establish a trend. Some countries show seemingly considerable variation across years – for instance Liberia in 2009 at 7.5, falling to 6.1 by 2013 – which may indicate data for certain surveys are less reliable.

Figure 3.5: Continued



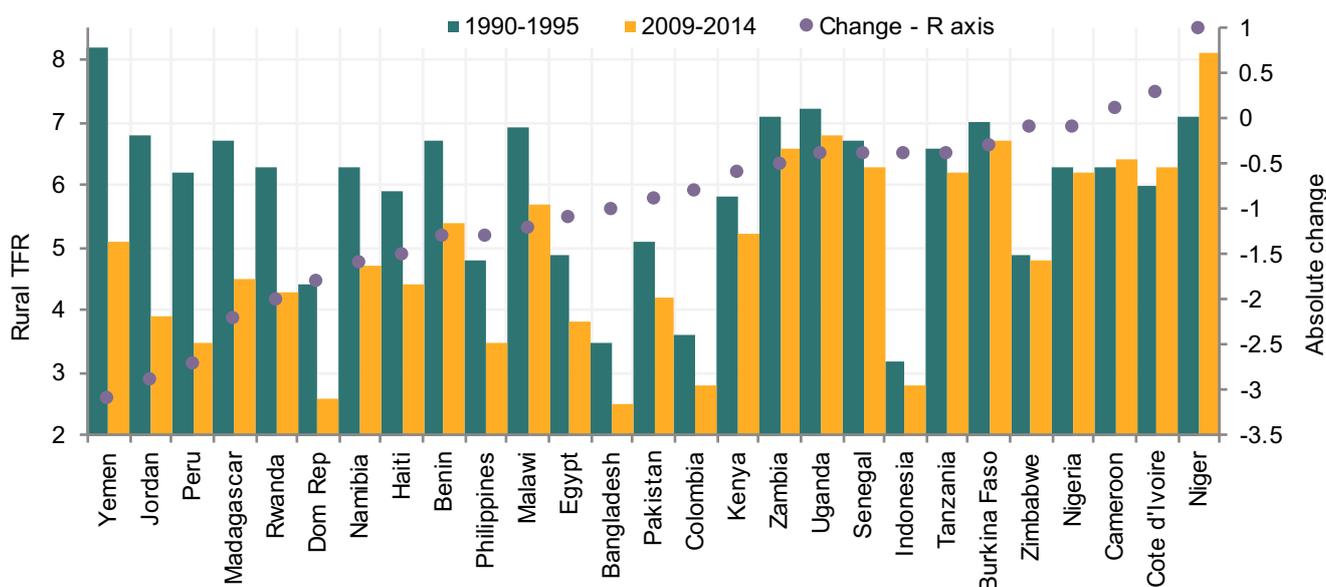
Source: DHS Statcompiler. Note: UN regional classifications used

Progress appears less consistent in Africa compared to Asia and LAC. Nonetheless, some of the most dramatic declines in rural fertility have been observed in Africa; especially in Rwanda and Madagascar.

For 27 of the cases shown in Figure 3.5, at least one data point exists between 1990 and 1995 and another between 2009 and 2014, allowing for change over some two decades to be plotted (Figure 3.6). The largest falls in rural fertility over this period appear on the left-hand side

of the graph, while the smallest falls (and in three cases rises) are shown on the right. Of the 10 countries with the largest falls, two are in MENA, three in LAC, four in SSA, and one in Southeast Asia. Of the 10 countries with the smallest falls, all but one are in SSA. Nonetheless, large falls can be seen for countries in almost all regions: nothing is therefore geographically determined.

Figure 3.6: Changes in rural fertility rates, 1990-1995 to 2009-2014, 27 countries



Source: DHS Statcompiler.

Note where more than one observation between 1990 and 1995 or between 2009 and 2014 exists, in the former case the earliest and in the latter case the latest were chosen.

3.2. What drives changes in rural fertility rates in the developing world?

Though the overall pattern of declining (rural and urban) fertility rates in most countries is well documented, the drivers of these declines are debated. Causes of fertility change are multiple. They can be seen to arise at three levels: from the immediate influences, such as the use of contraception; to the drivers of such immediate factors, for example, the risk of children not surviving; to the background influences on the drivers, such as farm technology (Figure 3.7).

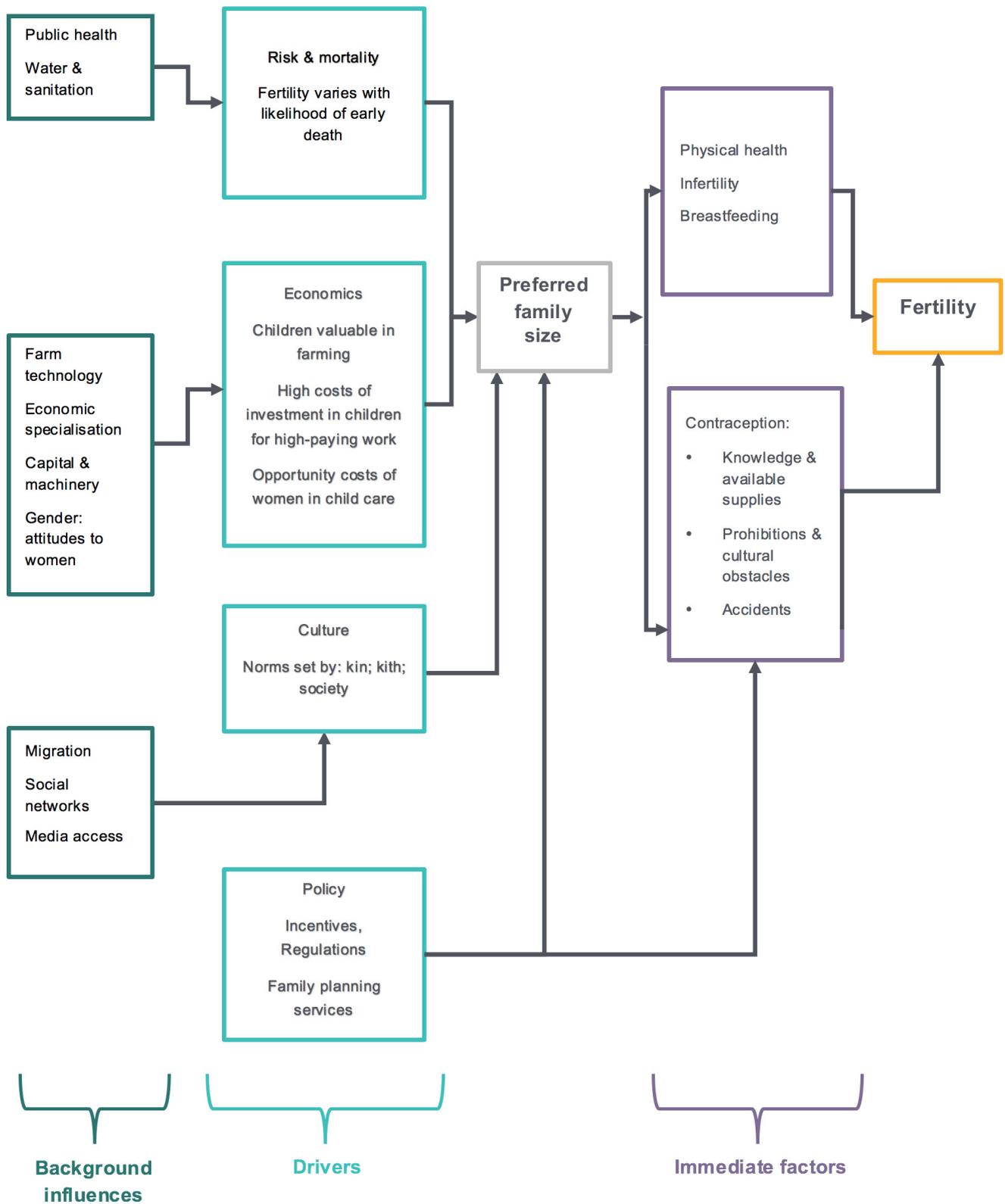
The key debates surrounding the relative influences of different drivers can be grouped into four sets: mortality

and extrinsic risk; economic costs and benefits; cultural transmission of fertility social norms (Shenk et al., 2013); and policy interventions to reduce fertility.

In practice, many studies of fertility trends discuss drivers that straddle more than one of these categories. Several include intermediary factors driving fertility change, such as the use of contraception.

The next section details some support for the different models seen in recent literature and data. Included are studies featuring several countries, cases focused on particular areas within a country, and literature touching upon experiences from many countries and regions.

Figure 3.7: Influences and determinants of fertility



3.2.1. Risk and mortality

Mortality and extrinsic risk to young children may affect fertility if parents plan for surviving children rather than actual births, so that if the risk of children not surviving their (early) childhood is high, then they will have more children to compensate for expected loss. As child survival increases, owing for instance to improvements in access to health care, antenatal care, child immunisation and so forth (see Section 4); so fertility will decline. Most studies focus on the causal link between mortality and fertility declines, though some have also examined the influence of fertility on child mortality.⁷

Fertility among **Nepali** women was found to be higher among women who had experienced child death (Adhikari, 2010). In **rural Matlab, Bangladesh**, higher infant and child mortality was linked to raised fertility, while living in a health intervention area was associated with lower fertility (Shenk et al., 2013). Among agro-pastoralists in four villages in **Oromia Regional State, Ethiopia**, women with higher child survival (and higher fertility) chose to adopt modern contraception sooner rather than later, leading to longer birth-spacing (Alvergne et al. 2013).

In a cross-country study of a sample of **118 countries over 1960 to 2000**, Angeles (2010) looked at the role of **child mortality** as a driver for fertility change using

multivariate regression analysis. Changes in mortality were found to have a large impact on reducing fertility, accounting for a major proportion of the fertility change seen in demographic transitions. The most significant effects were observed when lags were included – with contemporaneous effects of child mortality on fertility only really significant when lagged values of mortality were left out. Effects of mortality were larger than some other explanatory variables included – GDP per capita, and the urban ratio. Only education had a similar magnitude of effect in some regressions.

Not all studies of fertility deal with child mortality. Some exclude child mortality on the grounds that other variables included, such as female education, and improvements in living standards, would capture most of the effects. For example, in Bundervoet (2014):

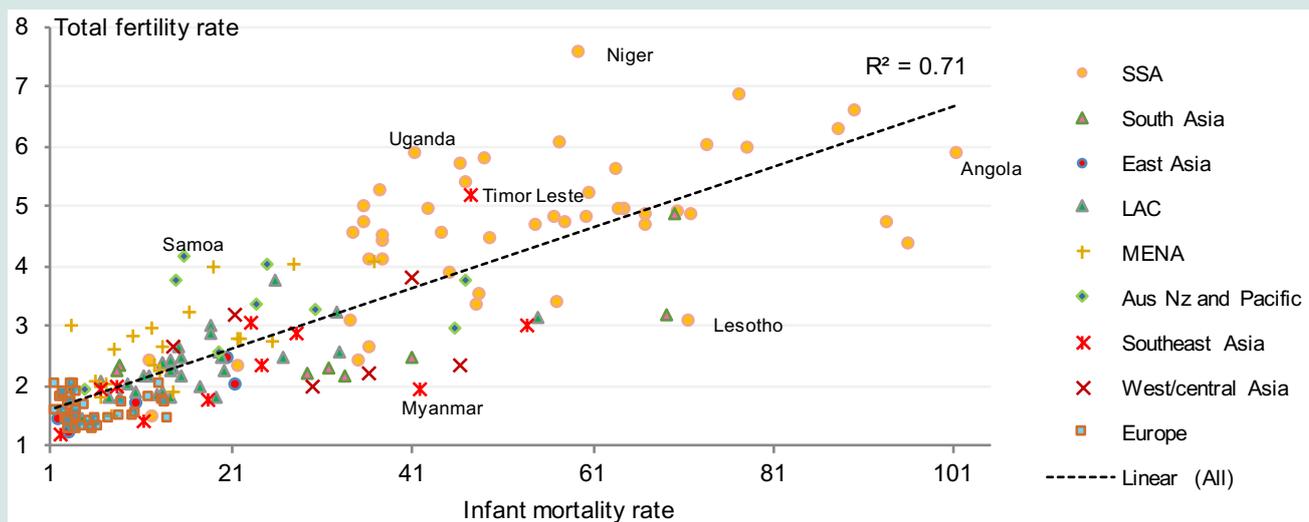
a substantial part of the impact of child mortality on fertility operates through the effects of female education and household living standards on lowering child mortality (Schultz, 1994). As female education and household living standards will be included in the analysis, these variables will partly control for the impact of decreased child mortality.

Spotlight on infant mortality rates and total fertility rates

National infant mortality rates (IMRs) are closely related to total fertility rates (TFRs), with correlation coefficients

between TFR and IMR between 0.70 and 0.86 – suggesting at least half the variation in fertility is related to infant mortality – for the years 1960, 1980, 2000, and 2013.⁸

Figure 3.8: Comparing infant mortality and fertility, 2013 across nations



Source: Data from World Bank WDI for 187 countries

⁷ Lawson et al. (2012), looking at a sample of 27 SSA countries between 2003 and 2008, found that the effect of fertility on under-five mortality was substantial and significant (adjusting for maternal characteristics – age at childbirth, height, education, wealth, marital status – and rural versus urban). For every additional maternal birth, the odds of survival for each child decreased by 14%. High fertility thus accounts for a small proportion of child deaths.

⁸ Somewhat unexpectedly, stronger correlations are observed in the later years, but possibly because fewer data points are available for 1960.

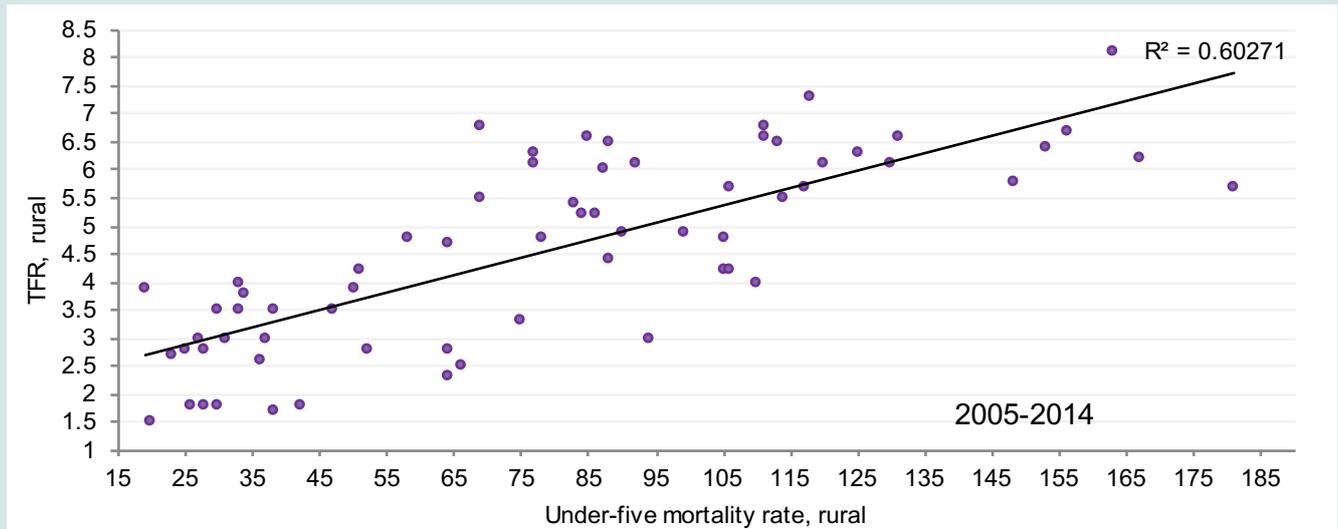
Plotting the relationship (Figure 3.8) shows for the most part, countries in Europe and East Asia (blue squares and red circles) have lower TFRs for their IMRs than might be predicted by a linear relationship, while countries in a region like MENA (purple plusses) have mostly higher TFRs than might be predicted from their IMRs.

Looking through time at a country level, the relationship between TFR and IMR tends to be positive.

Figure 3.10 provides 18 country examples, using data covering 1960-2013. Since IMR tends to decline through time, the period covered in these graphs can be read from right to left (typically 1960s in top right, recent years in bottom left).

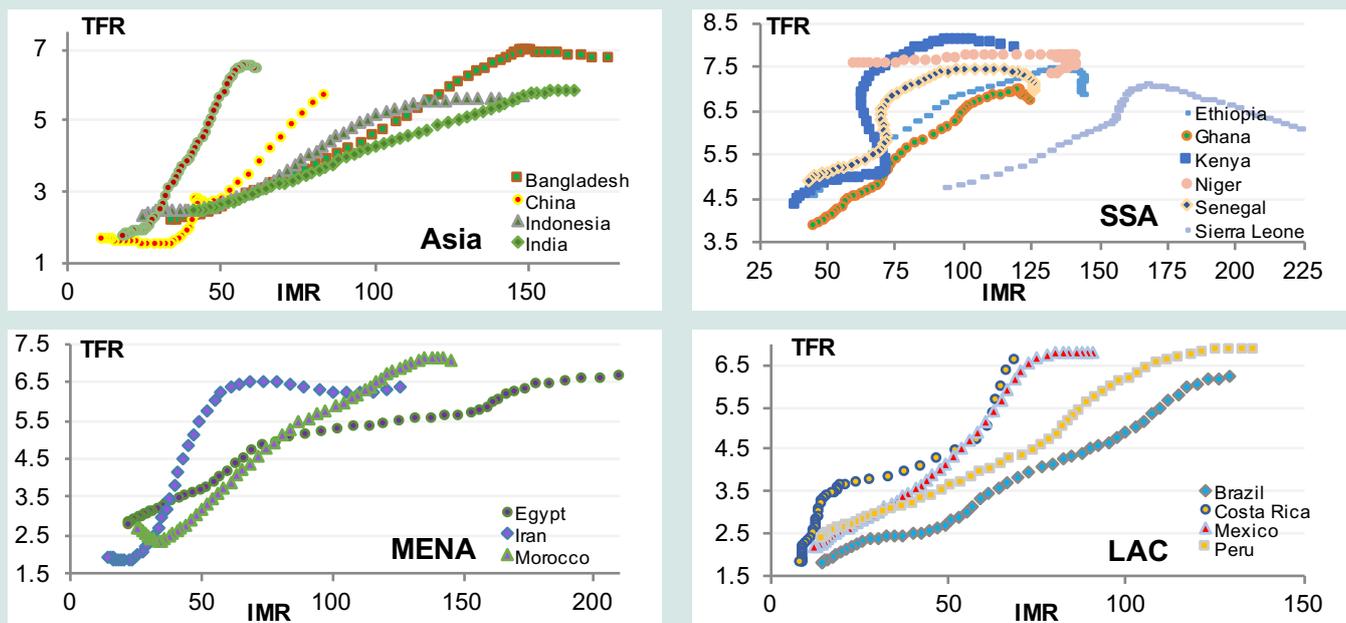
All over the world, as infant mortality falls, fertility comes down. Trajectories in SSA are, however, less regular than elsewhere.

Figure 3.9: Comparing rural under-five mortality to rural fertility



Source: Data from DHS Statcompiler for 66 countries with data from 2005 or later (latest point chosen)

Figure 3.10: Comparing rural under-five mortality to rural fertility



Source: Data from World Bank WDI.

Note: When IMRs were very high in some cases towards the start of the series – for instance Bangladesh, Sierra Leone – the relationship even appears negative

Tracking the relationship between rural TFRs and rural under-five mortality rates again shows the African countries deviating more often from the general pattern. Most countries for which data are available from the late

1980s/early 1990s to more recently (2007/08 onwards) show a positive relationship between declining rural under-five mortality and rural TFRs (Figure 3.11).

Figure 3.11: Rural fertility and rural under-five mortality, late 1980s/early 1980s to present, selected countries

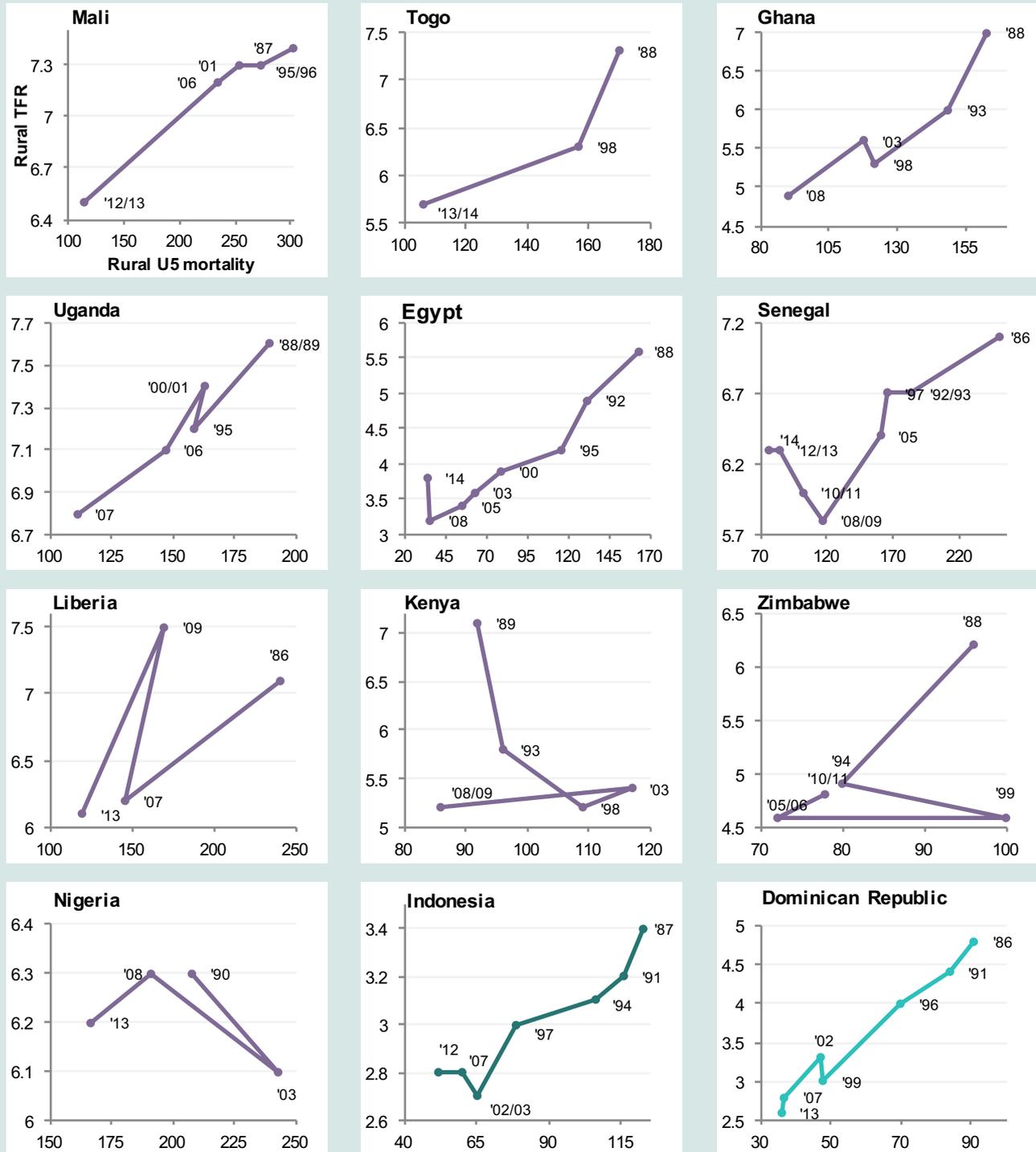
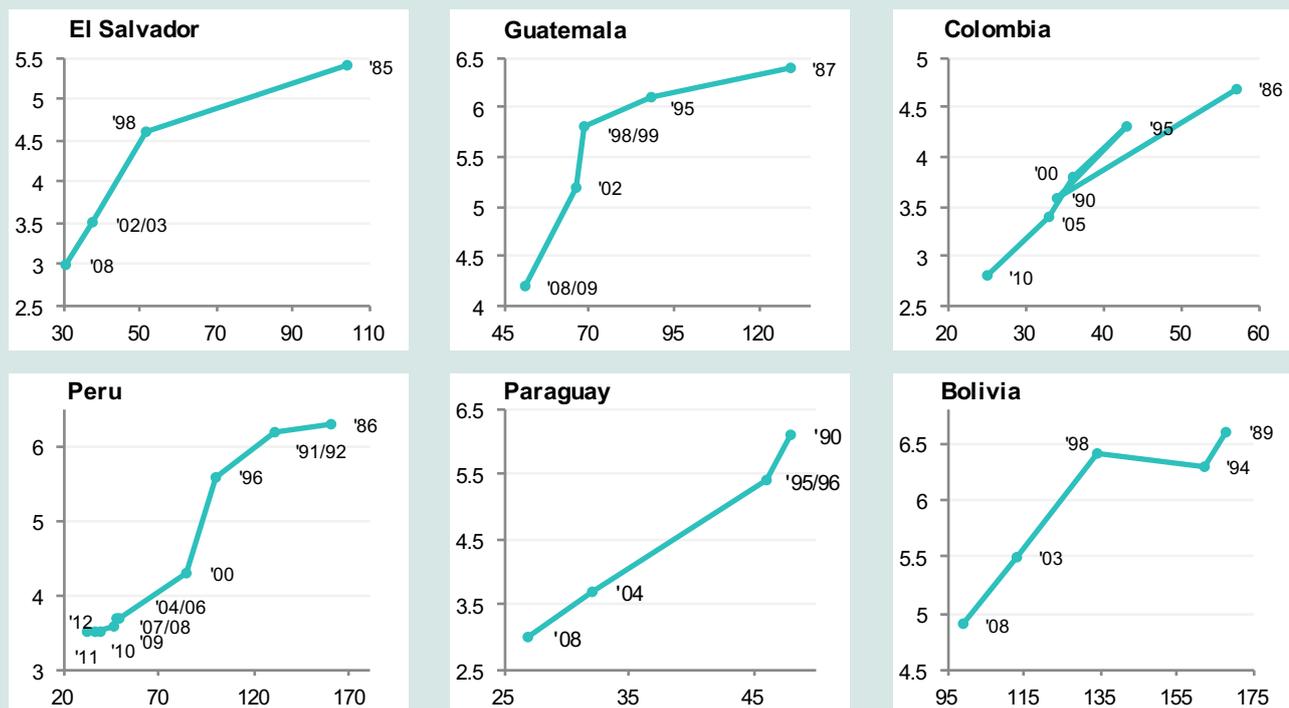


Figure 3.11: Continued



Source: Data from DHS Statcompiler
 Note: Survey years shown in labels.

3.2.2. Economic and investment models

Economic or investment approaches compare the costs and benefits of having children. In agrarian societies when land is readily available, additional labour is highly prized. From a relatively young age, children can work on the farm. Moreover, children may be seen as a source of support to parents in old age, so that having more children increases the chance that one or more will oblige. When land frontiers close, and economies become less agrarian, labour needs to have more formal skills, so the costs of schooling have to be taken into account, as does a delayed entry into the work force. Women may have opportunities to earn as the economy develops, so that pregnancy and child care entail an opportunity cost. As societies develop, more sources of support become available for the elderly through either state or private pensions. Hence the costs and benefits of the number of children can change

considerably on the path from from an agrarian society, where quantity of children may be valued, to a more developed economy, where the quality of children is what counts.

In **rural Matlab**, Bangladesh, Shenk et al. (2013) tested economic and investment models to explain fertility decline in comparison to other sets of factors (Table 3.1). Overall fertility declines were best explained by models emphasising economic factors and related motivations for parental investment, although results also demonstrated strong synergies between models: ‘implicating multiple causal pathways in the rapidity and degree of recent demographic transitions’ (Shenk et al., 2013). Key drivers in the economic/investment model include **women’s education**, the **degree to which the family owns land** and is **engaged in agriculture**, and **household income**.

Table 3.1: Explanations of fertility decline in rural Bangladesh

Risk/mortality model		Economic/investment model		Cultural transmission model	
Variable *†	Sign Importance	Variable *†	Sign Importance	Variable *†	Sign Importance
Total fertility		Total fertility		Total fertility	
Child deaths in bari	+ 1.00	Woman's level of education	- 0.95	Woman's level of education	- 0.98
Woman in intervention area	- 0.86	Whether family owns land	+ 0.91	Husband's location	- 0.85
Infant mortality rate ±	+ 0.83	Husband's primary occupation	- 0.87	Woman in intervention area	- 0.78
Life expectancy at birth ±	+ 0.74	Family engaged in agriculture	+ 0.73	General fertility rate ±	+ 0.69
		Household income	+ 0.66		
Surviving children		Surviving children		Surviving children	
Child deaths in bari	+ 0.95	Family engaged in agriculture	+ 0.99	Woman in intervention area	- 0.78
Infant mortality rate ±	+ 0.81	Whether family owns land	+ 0.98	Woman's level of education	- 0.70
Woman in intervention area	- 0.69	Woman's level of education	- 0.67	Husband's location	- 0.67
		Household income	+ 0.64	General fertility rate ±	+ 0.67
				Exposure to modern media	+ 0.61

* Variables are listed in order of importance.

† Woman's age and age at marriage are included as control variables in all models.

± Figure given for year of the woman's marriage, when childbearing is likely to begin.

Source: Table 2, 'Most parsimonious model for each model class', in Shenk et al. (2013)

The strength of different drivers differs depending on the stage of fertility decline: in this case, risk and mortality explain more of the fertility decline in older⁹ compared to younger generations of women, for whom economic and investment factors provide the most compelling explanation of fertility decline.

Economic motivations were found by Alvergne et al. (2013) to be influential in the early adoption of modern contraception among more than 800 women in rural Ethiopia. Initially slow uptake of contraception was associated with high mortality rates and low sibling competition. But when competition between offspring for resources appeared, along with incentives to pursue education for children and women, preferences for lower fertility emerged in the form of contraceptive uptake.

In a more holistic look at Ethiopia's fertility decline,¹⁰ Teller et al.'s 2011 framework centred largely on economic and investment drivers but equally highlighted the role of cultural transmission. Drivers such as migration and off-farm labour mobility and female education, as well as intermediate variables including delayed marriage, and lower family size norms predispose the predicted acceleration of rural fertility decline, with human and economic development and cultural diffusion seen as the main pathways to the incipient fertility transition. Population pressure, land fragmentation, landlessness, urban youth unemployment, especially among women

aged 20-29, along with higher school enrolment, greater youth aspirations, basic rural health services, women's empowerment, and a 2005 Family Law raising the legal age of marriage to 18 years, all served to delay marriage and lower desired family size, including the proximate determinants of abortion and contraceptive use.

Socio-cultural changes were documented among younger generations in even small towns and villages across much of Ethiopia: community norms about family were shifting towards older ages at marriage and lower fertility expectations, while the growing cost of living and raising a family was reinforcing lower fertility desires. Increases in primary education, secondary enrolment, communication and urban diffusion, mobile phone use, mass communications and geographic mobility were all posited to be affecting lifetime goals such that value of children, early marriage and kinship ties were weakening.

The effects of education feature heavily in more recent studies of fertility change. In our framework, education could be an economic factor, as well as something that helps to change cultural norms.

The drop in fertility rates in rural Rwanda from 6.3 in 2005 to 4.8 in 2010 has been the subject of several studies. Of the immediate causes, use of contraceptives rose among married women rose from 17% in 2005 to 52% in 2010 (Westhoff, 2012). In ever-married or cohabiting women, high fertility was found to be significantly driven by unmet

9 This is the case particularly when measuring fertility as total fertility as opposed to surviving children, given a quarter of the women in the sample had lost children. Older women (>60) in the sample faced very high levels of mortality during their child-bearing years (owing to Bangladesh's 1971 Liberation War, as well as floods and famines in 1974-1975). When Shenk et al. (2013) limited their sample to women under 60, the risk/mortality model became less convincing compared to the economic/investment model, with IMR becoming an insignificant variable.

10 The case of Ethiopia is particularly interesting, given it has Africa's largest rural-urban fertility gap, with particularly low fertility levels in its capital; by far the lowest maternal health service coverage, the highest percent of illiterate mothers, and largest population of food insecure (Teller et al., 2011).

need for contraception, women's desire for children, women's number of siblings, delayed sexual debut, and by couples desiring different numbers of children (Ndahindwa et al., 2014).

Looking at the drivers of these changes, most of the fall resulted from younger cohorts of women having substantially fewer children than older cohorts at the same age – differences that were largely explained by more female education. Between 2005 and 2010, the proportion of women who completed primary school (eight years in Rwanda) increased by almost 50%, while the proportion of women that never went to school dropped from 23.4% in 2005 to 15.5% in 2010 (Bundervoet, 2014). Significant but lesser drivers were improved household living standards, together with a progressive move toward non-agricultural employment. While most working women were still engaged in agriculture in 2010 (75.9%, compared to 83.4% in 2005), non-farm employment had

become increasingly important and the share of women with non-agricultural jobs grew from 10.6% in 2005 to 19% in 2010 (Bundervoet, 2014 citing NISR, 2012). Increased female education and higher household wealth also were significant drivers of lower fertility reported by Ndahindwa et al. (2014).

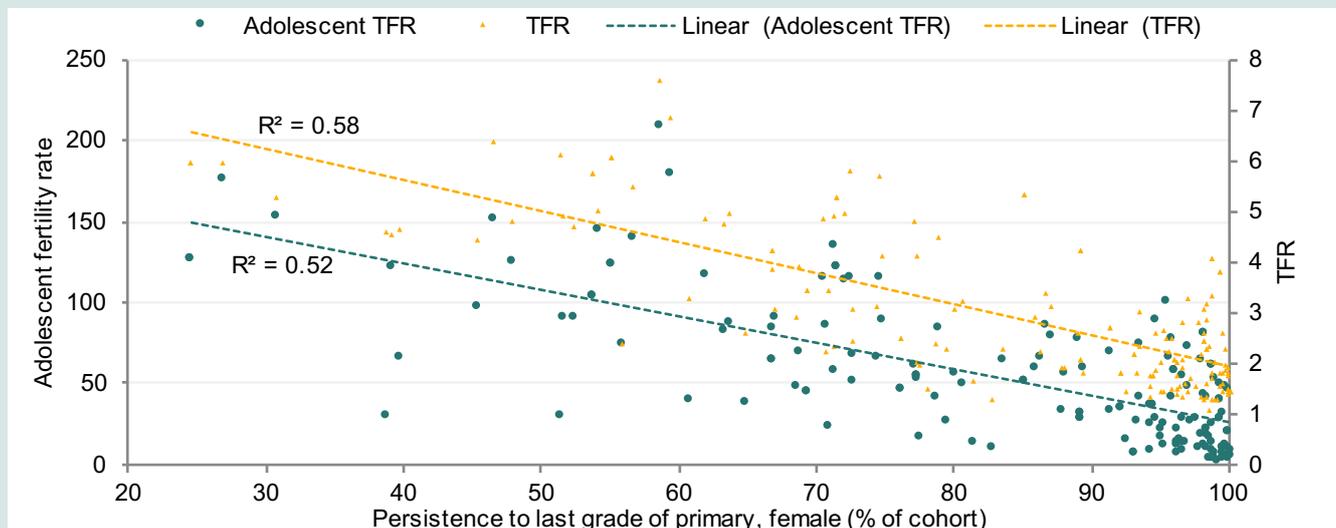
Across 34 states of India, greater educational opportunities were found to reduce female marriage before the legal age while increasing the use of modern contraception, the immunisation of children, attendance at antenatal care clinics during pregnancy, and births at health facilities. Poorer women were less likely to adopt these practices, wanting more children and marrying before the legal age. Urbanisation and the availability of health centres showed no significant effects, except for increasing institutional delivery and antenatal care visits, while regional variations were moderately significant (Sengupta et al., 2012).

Spotlight on girls' schooling and fertility

Girls' education leads to lower fertility. At national level, total fertility correlates fairly well with girls' primary school completion, with a coefficient of -0.76, while adolescent fertility correlates with girls' primary schooling

with a coefficient of -0.72. Figure 3.12 plots both of these relationships for a sample of over 160 countries – a linear relationship appearing to explain just over half of the variance in both cases.

Figure 3.12: Girls' primary school completion and fertility rates since 2008



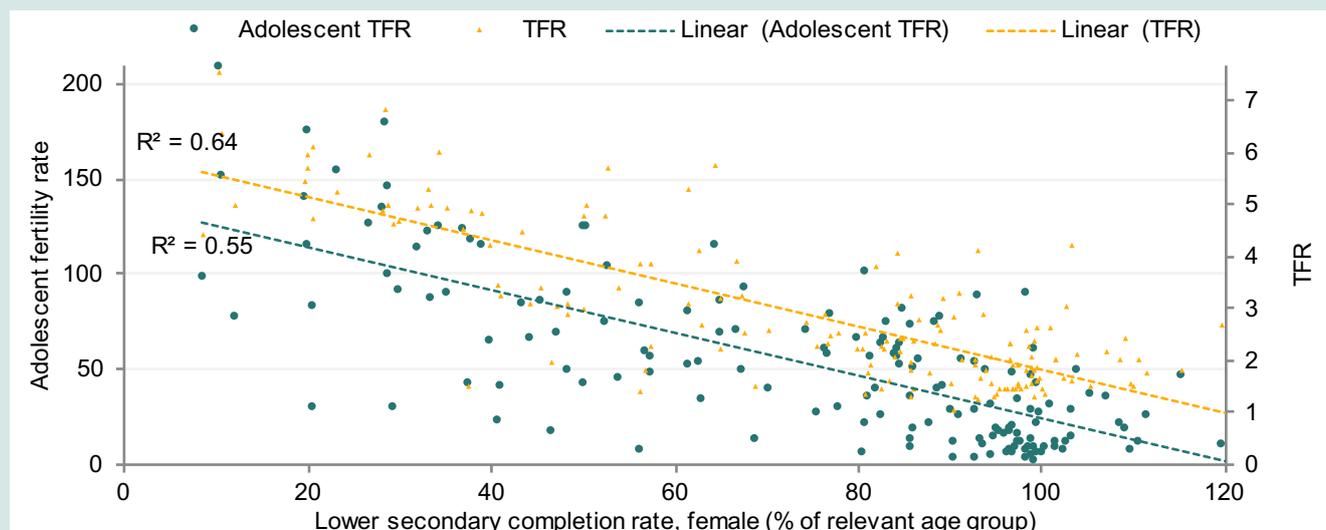
Source: Data from WDI. Persistence to last grade of primary the latest available point since 2008 (data to 2012); TFR and Adolescent TFR estimates for 2012. Data plotting the relationship with adolescent TFR includes 164 countries; for TFR includes 166 countries.

Note: Adolescent fertility rate measures the number of births per 1,000 women in any given population aged 15 to 19.

An even stronger link might be expected between fertility and secondary schooling. Data for girls' completion rates of lower-secondary school are available for over 150 countries. The correlation coefficient between girls' lower secondary completion rate and adolescent

fertility is -0.74, while it is -0.80 for total fertility. Figure 3.13 plots these nationally, showing a linear relationship explains over half of the variance in the adolescent case, and close to two-thirds in the overall case.

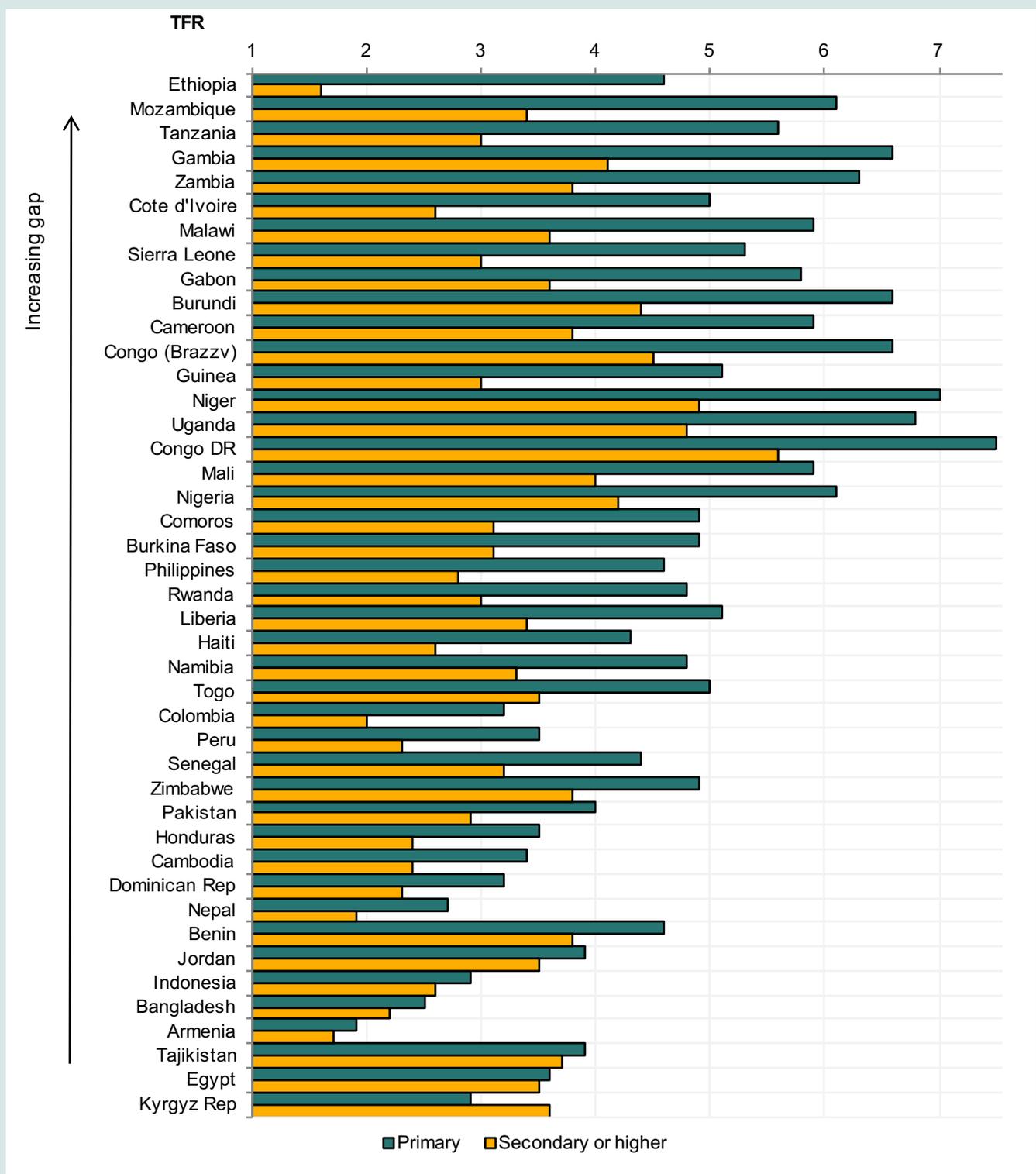
Figure 3.13: Girls' secondary schooling and fertility



Source: Data from WDI. Lower secondary completion rate the latest available point since 2008 (data to 2013); TFR and Adolescent TFR estimates for 2012. Data plotting the relationship with adolescent TFR includes 158 countries; for TFR includes 161 countries.

Note: Horizontal scale exceeds 100% as this rate is calculated at the number of new entrants in the last grade of lower secondary education, regardless of age, divided by the population at the entrance age for this grade; thus if children of lower or higher ages are entering the final grade of secondary education, the scale will exceed 100%. Data from DHS surveys provides broad support for higher levels of education driving fertility declines. For 43 countries for which data on TFR by level of schooling is available in recent years (2010 to 2014), the median TFR among women with a primary level of education was 4.9, while for women with secondary or higher education, the median TFR was 3.3. Only in one case (Kyrgyz Republic) were fertility levels slightly higher for women with secondary and higher education compared to only primary education (Figure 3.14, with countries ordered by difference in fertility for women with different levels of education). The largest differences are seen for Ethiopia – a particularly striking case, given the fertility rate of women with secondary and higher education is less than 2.

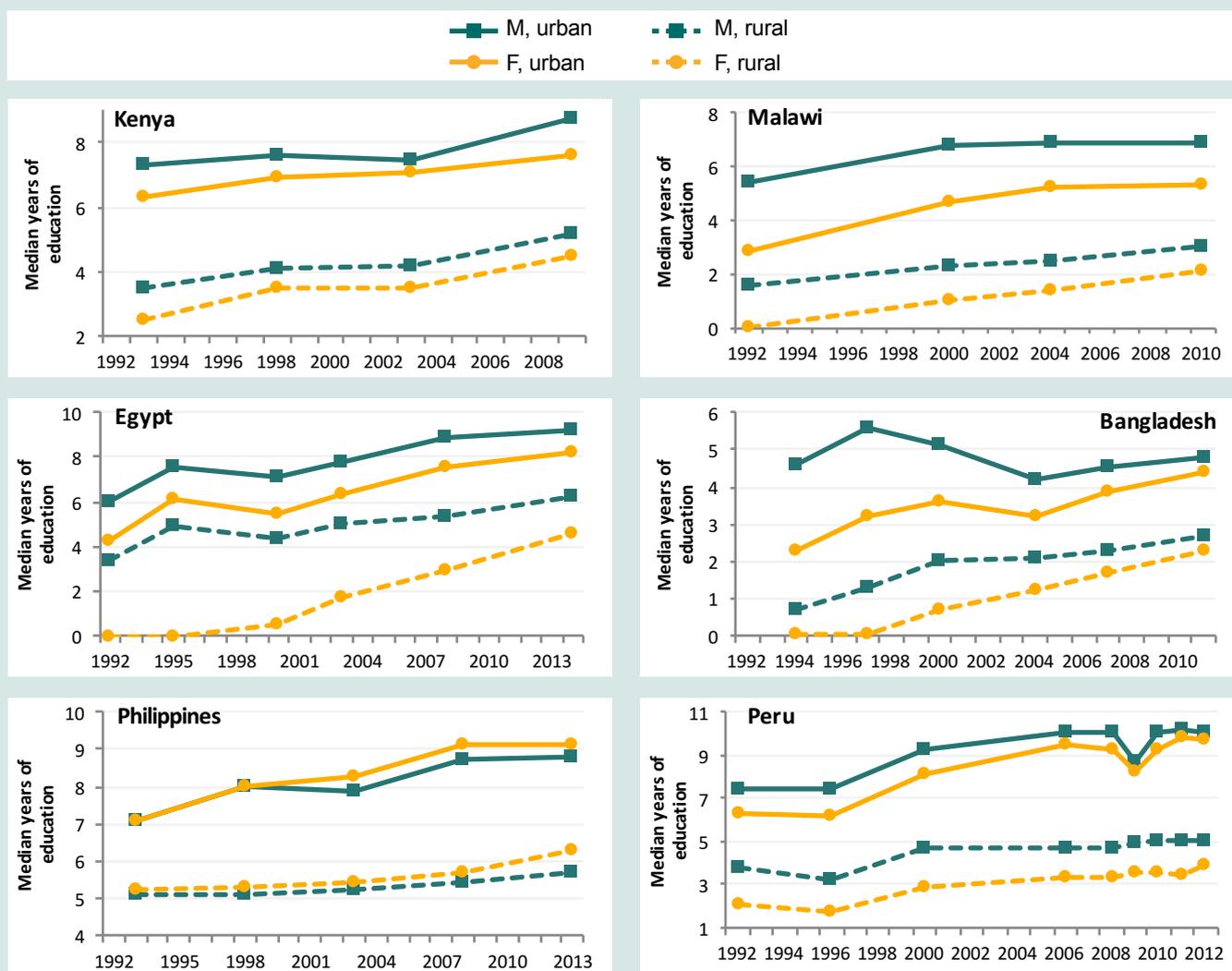
Figure 3.14: National fertility rates by women’s education, primary and secondary or higher, since 2010



Source: Data from DHS Statcompiler. Data is taken for all country cases with a measurement after 2010 (to 2014)

That education of girls tends to be lower in rural compared to urban areas likely contributes to the higher rates of fertility seen in rural areas. Although the gap between rural and urban education is improving in many places, it remains significant (Figure 3.15).

Figure 3.15: Male and female education, rural and urban, early 1990s to recent years, selected countries



Source: Data from DHS Statcompiler

With improved education of women, shifting norms about women entering the labour market, and the growing need for more adults to work for wages to cover household expenses, some studies have looked at how fertility changes with increases in women’s participation in the workforce (particularly in non-agricultural work).

In rural northern Senegal, a recent boom in exports of cherry tomatoes from large farms from 2005 onwards had led to local women working on these farms, resulting in their households having higher incomes than comparable households without women workers. Female employment significantly decreased number of children to working women by between 22% and 33%. Employed women had a significantly higher age at marriage and first childbirth, as well as significantly fewer children. Interestingly, the effect was equally large for poor and non-poor women. The effect was seen among illiterate women, but not for literate women. Older, married, and Muslim women had more children, as did those who were the wife of the household

head, and those in households with a female head or an older head (van den Broeck and Maertens, 2015).

It seems that female employment affected fertility through three channels: an income effect, whereby female employment contributes to household income that can be invested in raising more children or in improving quality of childcare – and could lead to more or less fertility, although generally fertility drops as income rises; a substitution effect, whereby employed women have a higher opportunity cost of raising children and substitute productive for reproductive labour resulting in lower fertility; and an empowerment effect, whereby women working outside households and earning their own income become empowered or are exposed to wider social networks, thereby increasing knowledge about family planning. This case suggests that since economic opportunities can arise suddenly, changes to fertility may be equally sudden.

In nine Provinces of China — Heilongjiang, Liaoning, Jiangsu, Shandong, Henan, Hubei, Hunan, Guangxi, and

Guizhou – women employed off the farm preferred and had fewer children: they preferred an average of 1.4 children, against a realised average of 1.2, while women without jobs off the farm preferred more, 1.8, and had 1.6 children. This difference was more marked for with women with younger rather than older children (Fang et al., 2013). China is unusual in that wanted children generally exceed actual children: in many developing countries the reverse is true. The only exceptions, other than China, in a sample of 63 countries are Georgia and Jamaica.¹¹

Being employed off the farm reduced the chance of a women having two or more children by 29%. Those with more household income preferred and had more children. Having a son as a first child significantly decreased preferred and actual fertility (son preference is discussed further in the next section), as did education and poor health status. Married women with health insurance were more likely to prefer more children. Women in provinces that were less developed economically (Guangxi and Guizhou) or those that were heavily agricultural (Henan, Hubei, Hunan) had and preferred to have more children (Fang et al., 2013).

The economic context of women's employment also affects fertility. In 18 countries in Latin America, when unemployment rose, fertility declined: for instance, a change in unemployment from 5% to 12% was found to reduce fertility from 4.34 to 4.1, while it reduced the proportion of women with three or more children from 73% to 68.5%. Effects were stronger among urban, more educated, and younger women. Fertility slowdowns were most acute over the most severe years of the Latin American debt crisis in 1983 and 1984 (Adsera and Menendez, 2011).

In general, childbearing was found to decline during economic downturns, attributed to increasing unemployment more than slowing of GDP growth. Although periods of unemployment may reduce the opportunity costs of having children, maternity tends to be decreased or postponed, especially among younger cohorts. Income effects apparently dominated when unemployment rose.

This same study also found that access to electricity and more years of education were associated with lower birth rates, although the size and significance of these effects were smaller for those born before 1960.

Land frontiers, resource scarcity, and rural fertility

Given the importance of agriculture in rural areas, longstanding theories suggest changes in land availability may influence rural fertility.¹²

In southern Brazil, Merrick (1978) showed that fertility decreased with settlement density by comparing 1970 census data for the agricultural frontier and for more

densely settled rural areas. Access to land was significant for increasing fertility, though literacy and child survival were equally significant for reducing it.

In rural areas of Nyeri District, Kenya, participants in focus groups held in 1999 reported the increasing scarcity of land as affecting their preferred family size:

Several topics were mentioned as primary reasons for people to limit their family sizes, including the increasing cost of goods and education, but land was clearly the primary theme in the discussions. Indeed, participants in all focus group discussions alluded to how land availability and the size of landholdings affect their economic circumstances, food cost and availability, and desired family sizes. (Shreffler and Dadoo, 2009)

The prime inheritance for children had once been land, but since land was now scarce in a densely settled rural area with rapidly rising population, people said that they substituted education as the inheritance for their offspring (Shreffler and Dadoo, 2009).

Similarly, changes to agricultural technology may influence the demand for labour, and through that the demand for children. In the western Chitwan Valley of Nepal, 1996, the use of tractors and other modern implements was associated with reduced subsequent births, even when allowing for other factors known to influence fertility preferences and behaviour (Bhandari and Ghimire, 2013). Technical improvements that required labour, such as fertilisation and weeding, had no such effects on fertility. Farm mechanisation, it seemed, could speed the fertility transition in such agrarian settings. In the same Chitwan Valley, availability of land was associated with early childbearing (Ghimire and Hoelter, 2007).

Spotlight on women's employment in agriculture and fertility

Women's employment in agriculture shows a strong relationship to fertility (Figure 3.16). The correlation coefficient between recent figures for share of female employment in agriculture to all female employment and the national fertility rates is 0.61 for a sample of 132 countries, suggesting that 38% of the variance in fertility might be explained by the share of working women in farming.

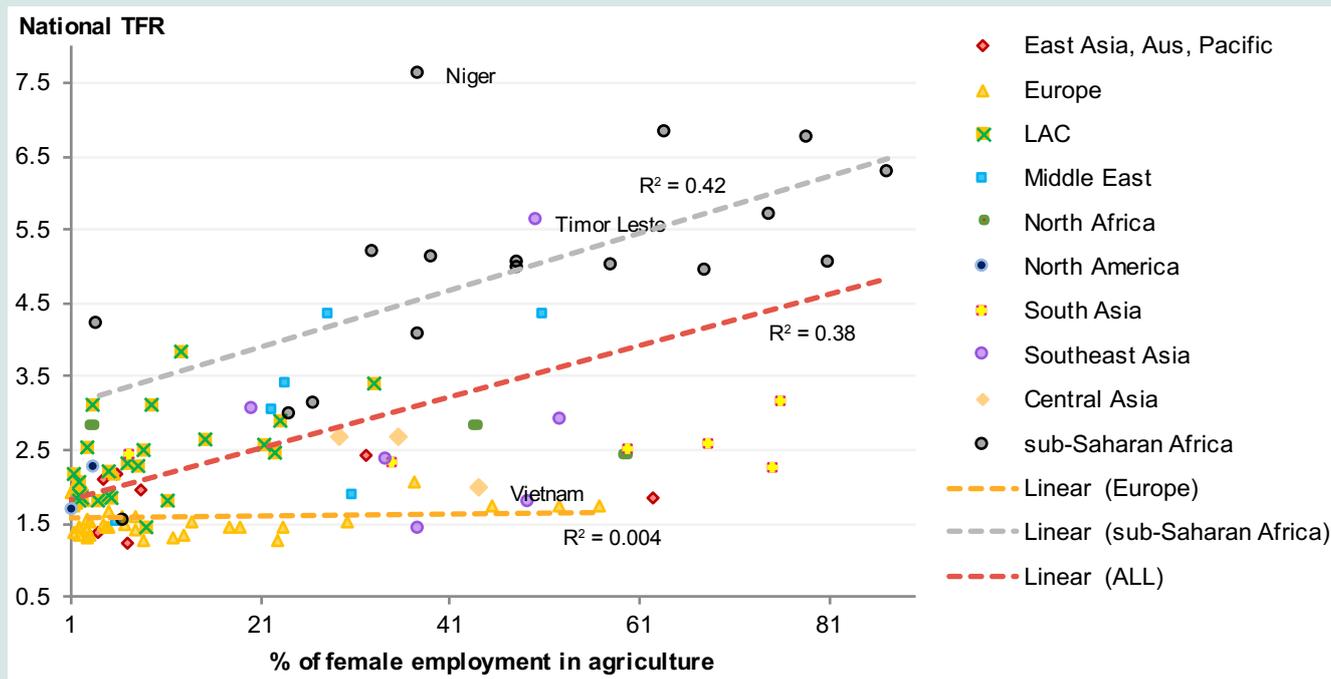
The relationship seems to differ by regions: the fit for SSA, for example, is far better at an R-square of 0.42 than for Europe, where the corresponding figure is just 0.004.

As might be imagined, the share of working women employed in manufacturing and services correlates inversely – a coefficient of -0.62 – with fertility.

11 Data for 63 countries from survey data from the DHS statcompiler from 2005 or later.

12 Although most of the concern in recent literature seems to have been with the impact of population density on agriculture, rather than the other way around – see for instance Josephson et al. (2014), Jayne et al. (2014), Headey et al. (2014) and Willy et al. (2015).

Figure 3.16: Women’s employment in agriculture and fertility, 2005 onwards, 132 countries



Source: World Bank WDI. Data from 2005 onwards available for 132 countries

Note: Data selected for the % of female employment in agriculture for the latest available year between 2005 and 2013, plotted against TFRs for corresponding years

Spotlight on agricultural indicators and fertility

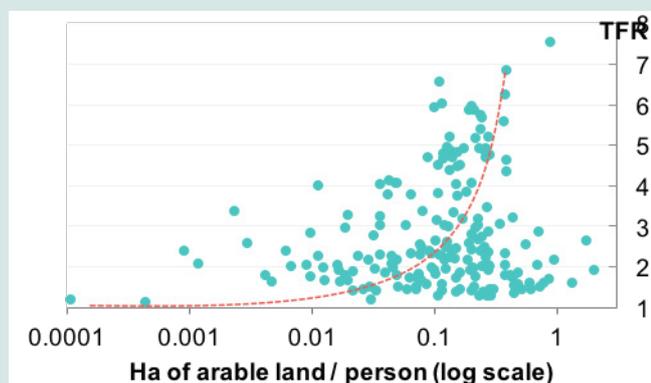
At national level, arable land per person and fertility shows a weak relationship (Figure 3.17), with a correlation coefficient of -0.005. If there is a relation, it is one where fertility falls rapidly when land available falls below 0.5 hectare per person.

Splitting the sample into countries for which agriculture makes up less than 10% of GDP in 2010 (118 countries), and those for which agriculture, value added, makes up

>10% (85 countries) of GDP, the correlation coefficient between arable land per capita and fertility for the first group is -0.07, while it is +0.19 for the second group.

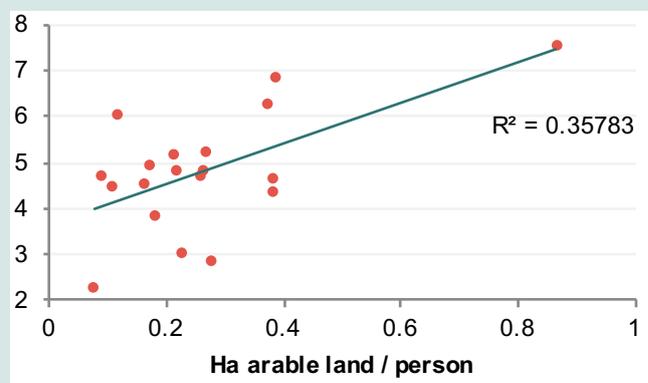
Further limiting the correlation to 41 countries with agriculture, value added, contribution to GDP >20% increases the coefficient to 0.36 (Figure 3.18); while for 19 countries with agriculture >30% of GDP, the correlation coefficient with fertility becomes 0.60

Figure 3.17: Arable land per person and fertility, 2013, 195 countries



Source: Data from World Bank WDI. Note: line not fitted but drawn on for illustrative purposes

Figure 3.18: Arable land per person and fertility, 2013, 41 countries where agriculture contributes >20% of GDP



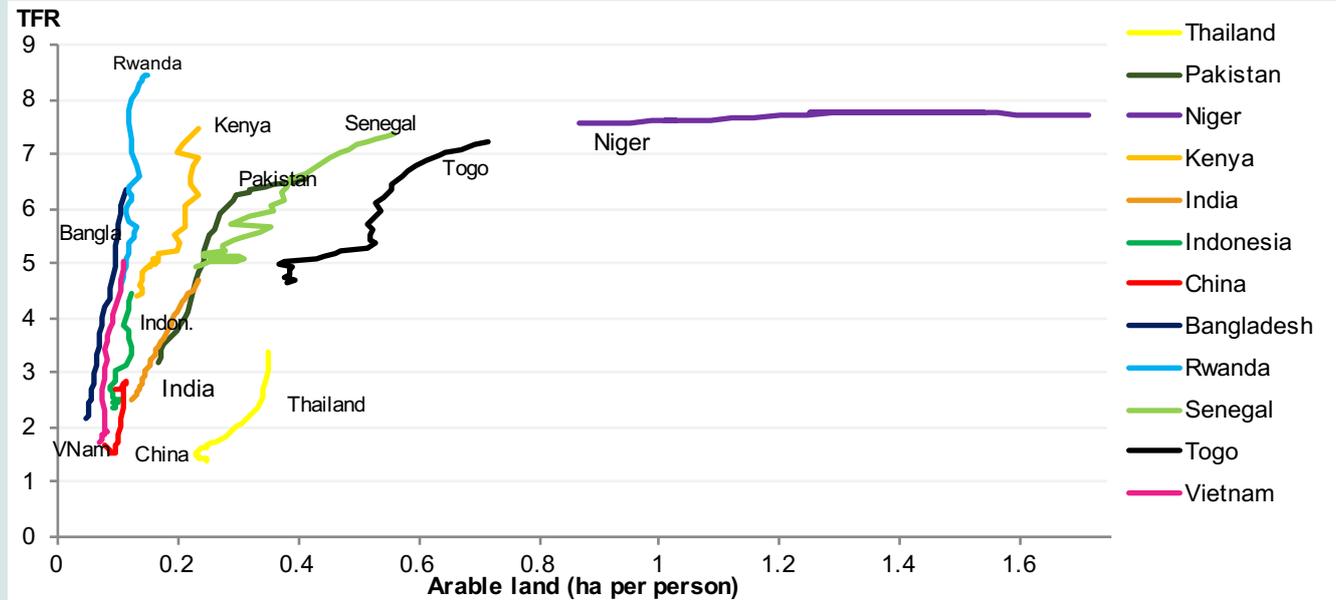
Source: World Bank WDI

Tracked from 1980 to 2013 for individual countries, the relationship of land to fertility shows that fertility does indeed fall as land becomes more scarce, but only after the area available falls below around 0.75 hectares per person.

Figure 3.19: Arable land available per capita and fertility, 1980-2013, 12 countries

Employment in agriculture as a share of total employment also appears at a country level to have a positive relationship with fertility (Figure 3.20).

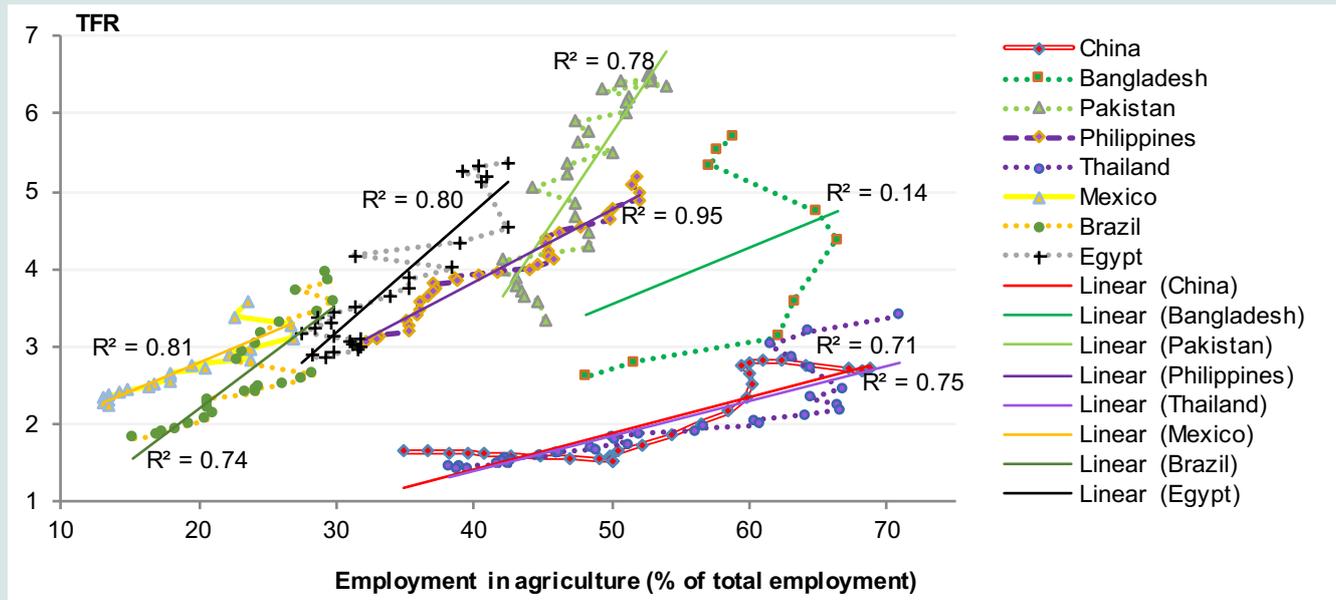
Figure 3.19: Arable land available per capita and fertility, 1980-2013, 12 countries



Source: Data from World Bank WDI

Note: lines trace data points from 1980 to 2013. In most cases arable land tends to become less available and fertility levels fall, thus lines are read from top right (1980) to bottom left (2013)

Figure 3.20: Share of employment in agriculture and fertility, 1980-2012, eight countries



Source: Data from World Bank WDI. As above, lines might be generally read from top right to bottom left. First and last data points: for China and Egypt 1980-2011; for Bangladesh 1984-2005; for Pakistan 1980-2011; for Philippines and Thailand, 1980-2012; for Mexico, 1988-2011; and for Brazil; 1981-2011.

3.2.3. Cultural transmission of fertility norms

Parents' desired fertility can be influenced by cultural norms of fertility, expressed in intermediate factors such as ideal age for marriage or first birth, contraceptive use, or preference for sons. Such norms may be conveyed through social networks, family, friends and neighbours, as well as transmitted through media, or in schools, places of worship or through public education campaigns. Models may matter: in the past, people of high status typically had large families. In more recent times, cultural norms have moved towards smaller families, with high-status families choosing to have smaller families.

Cultural transmission can be difficult to assess, given available data. As has been seen with risk/mortality and economic/investment models, studies that include elements of cultural transmission models also often include variables fitting within the other broad theories (as already discussed for instance in the case of Shenk et al., 2013; Teller et al., 2011; or in Adhikari, 2010 and Westoff, 2012 detailed below).

In rural villages of Minya Governorate in Egypt, household norms significantly affected young women's desired family size, while influences within neighbourhoods affected young men's desired family size. In households with at least one adult preferring a small family, young women were 78% more likely to desire a small family themselves, while in households with one or more young people preferring a small family, young women were 37% more likely to want small families themselves. In neighbourhoods with more people keen on small families, young men were a third more likely to want small families themselves (Harbour, 2011).

In both rural and urban areas of Nepal, 2006, the most important variables explaining variance in fertility included perceived ideal number of children; religion with more children born to Muslim women; and exposure to mass media, with fewer children born to women exposed to radio and television. In addition, more children were born to those who married younger, to rural women, to illiterate women and to women with experience of child

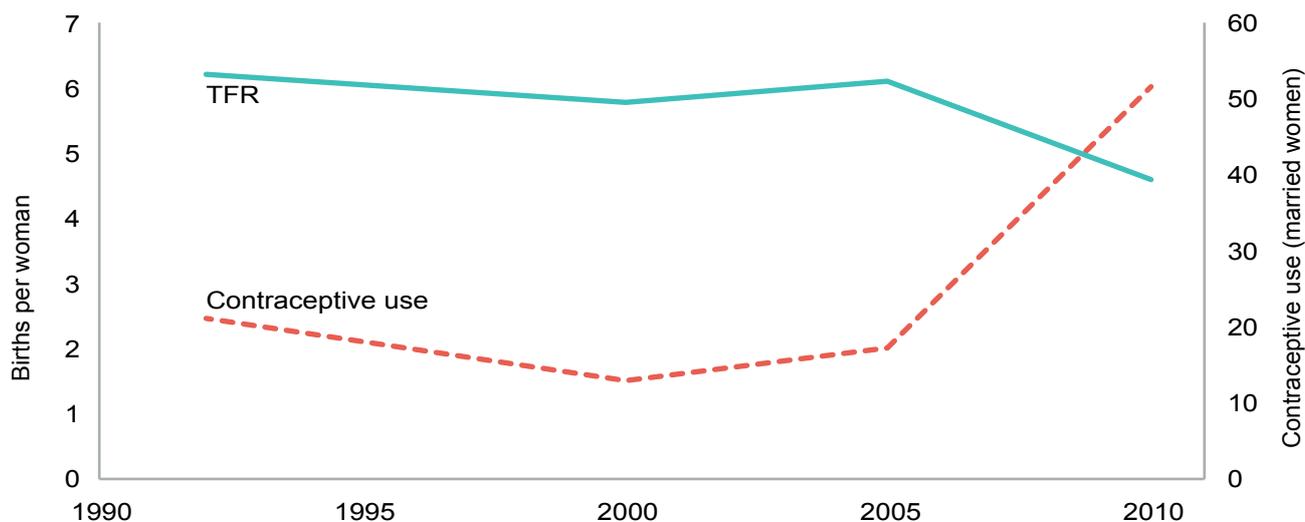
death, while fewer children were born to women in female-headed households (Adhikari, 2010).

Media exposure has been found to relate strongly to reproductive variables. For more than half a million women in 48 developing countries between 2000 and 2008 (DHS data), watching television was strongly linked to fertility: the more TV women watched, the more likely they were to use modern contraceptives and the fewer children they wanted – even among young never-married women, and the fewer children they had. Findings persisted even when controlling for other covariates including education, wealth, urban residence, and age: frequency of watching TV was a strong correlate of fertility. Women who watched TV were twice as likely to have used modern contraception than those who did not watch; while television was more powerful an influence than radio (Westoff and Koffman, 2011).

In Rwanda, fertility decline from the mid-2000s was associated with exposure to mass media, particularly the radio, in addition to more education for girls, economic growth and greater survival of children (Westoff, 2012). A family-planning programme adopted in 2003 set targets for fertility and contraception use, both of which were exceeded by 2010. To reach them, the programme mainstreamed fertility issues into health and adult literacy courses, provided reproductive health services at district level, ensured private medical providers, included family planning within their services, mobilised parliamentarians to lead by advocating family planning and promoting ideals of small family sizes, and launched a national media campaign. Cultural transmission played a key role: 'the dissemination of information about family planning through personal contact at health centers contributes to a high level of desire for family limitation' (Ndaruhuye et al., 2009, cited in Westhoff, 2012).

The result was more use of contraception, rising among married women from 17% in 2005 to 52% in 2010, and falling fertility (Figure 3.21).

Figure 3.21: Fertility and contraceptive use, 1992-2010, Rwanda



Source: Adapted from Figure 1 in Westoff, 2012. Original Source: DHS Surveys

Rural electrification and television

Rural electrification has been associated with reduced fertility, the main pathway being that electricity leads to more television viewing. Strong connections between media exposure and use of modern contraception, number of desired children, and fertility were found in an analysis of 48 developing countries. Television viewing was considered particularly important (Westoff and Koffman, 2011).

Analysis of data from **Bangladesh, Ghana, Indonesia, Morocco, Nepal, Nicaragua, Peru, Philippines, and Senegal** shows a negative correlation between rural electrification and fertility, with improved access to information technologies a key driver. Electrification reduced fertility at the median by 0.6 children (IEG, 2008).

In **Brazil** soap operas portray rich and successful people, most of whom have small families. The effect of this on fertility has been strongest with women on low incomes (La Ferrara et al., 2008). In **India**, women's fertility and acceptance of domestic violence (self-reported) both fell with the introduction of cable TV in villages (Jensen and Oster, 2009). In **Côte d'Ivoire** rural electrification reduced fertility, although it raised urban fertility (Peters and Vance, 2011).

In **Indonesia**, a 65% rise in electrification between 1993 and 2010 was seen to account for 18-24% of subsequent declines in fertility. Exposure to television, found to influence fertility preferences and increase effective use of contraception, was a key channel, explaining about a quarter of the full effect. It was not all a matter of culture, however: another important channel appeared through reduced child mortality associated with electrification (Grimm et al., 2014).

Migration, particularly from less-developed to more-developed areas, might act on fertility in opposing ways: boosting it if remittances allow for greater support to children; or lowering it by exposing households in originating communities to cultural norms of lower fertility seen at destinations.

In western highland **Guatemala**, little evidence was found that migrant households see rapid declines in fertility, although contraception and family planning norms appeared to diffuse from migrant destinations (in this case the US) at the community level over time (Davis and Lopez-Carr, 2010).

In 22 high-fertility communities in Poland, fertility rates converged towards a small family size with increases in community-level education. Less-educated women had fewer children than would be expected according to their education level because they had taken on the norms of more highly-educated women in the community who formed part of their social networks. Those norms trumped individual influences on fertility (Colleran et al., 2014).

Spotlight on contraceptive uptake and fertility

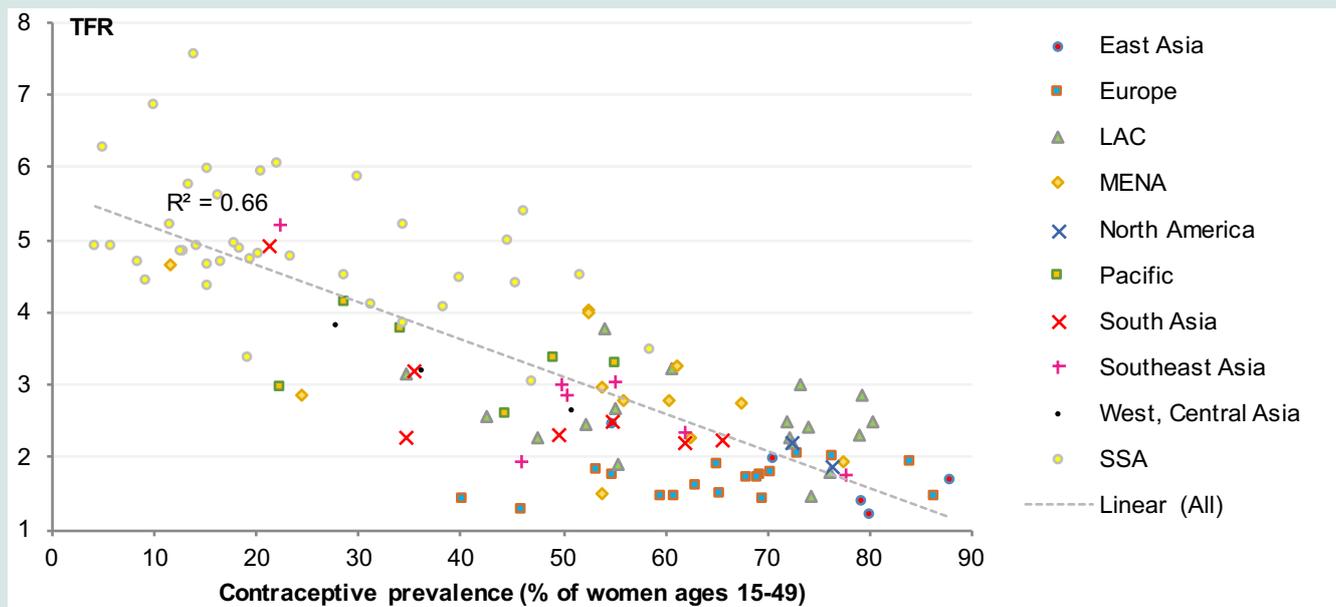
Use of contraceptives and fertility at national level are strongly related. The correlation coefficient between fertility (TFR for 2013) and prevalence of contraceptive use (latest since 2008) was -0.81 for 116 countries, suggesting that as much as two-thirds of the variation in TFR might be explained by use of contraceptives (Figure 3.22).

SSA has many outliers where considerable use of contraception still allows high fertility, though this could be a feature of the measure for contraception including

any form (modern or other less successful methods). More curiously, European countries with less than half of women reporting contraception show very low fertility, which is something of a puzzle.

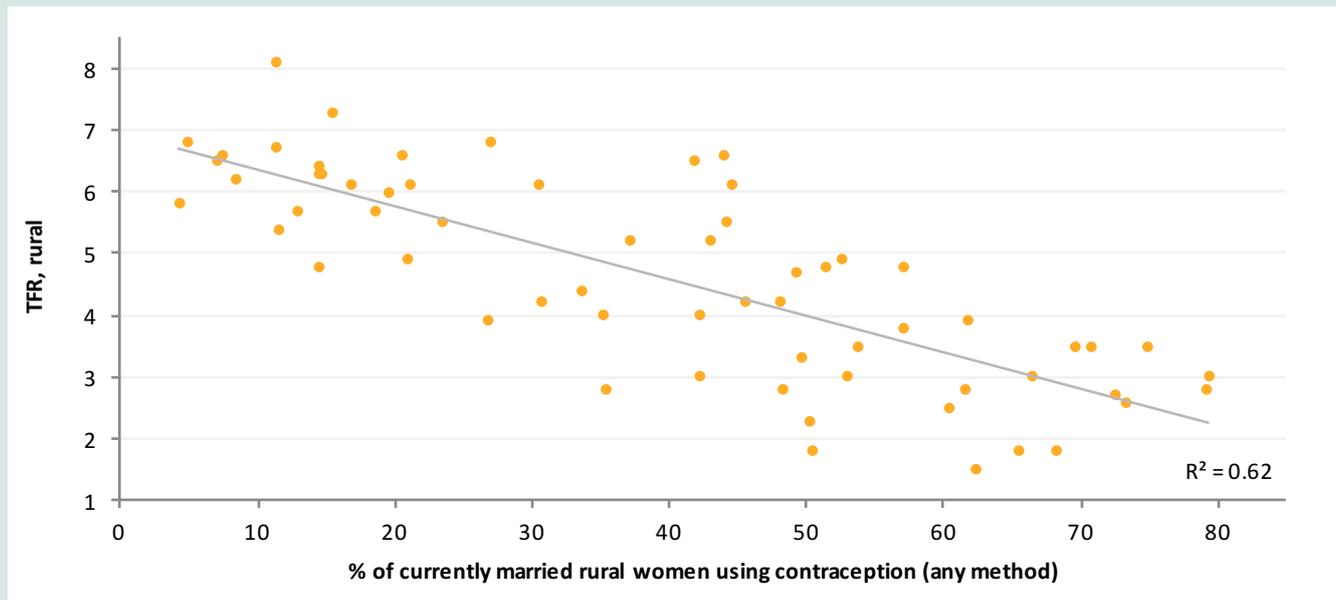
Rural data for 64 countries corroborates this relationship, with recent rural fertility correlating with rural married women's prevalence of contraception use, with a correlation of -0.79, suggesting that 62% of the variance in rural fertility may be explained by contraceptive use (Figure 3.23).

Figure 3.22: Use of contraceptives and fertility, since 2008, 116 countries



Source: Data from World Bank WDI on percent of women aged 15-49 practicing any form of contraception. Contraceptive prevalence is data for the latest available point since 2008 (data to 2014); TFR estimates for 2012. Data includes 116 countries

Figure 3.23: Married rural women using contraceptives and fertility, recent years, 64 countries



Source: Data from DHS Statcompiler. Note: most recent data point since 2005.

Son preference and fertility

The preference for sons over daughters – see accounts for China (Fang et al., 2013), and Nepal (Bhandari and Ghimire, 2013) – is quite common, especially in Asia, in particular South Asia.¹³ This preference might result in families being willing to continue having children, possibly beyond their means to maintain them, until they have sons.

In a rural community in eastern Nepal, son preference was found to lead to higher levels of fertility (Rai et al., 2014). The existing-child sex ratio (male: female) of respondents not desiring more children was 1.41. While birth spacing after a male baby was 3.09 years, it was 2.71 years following a girl. Families with only girls had a significantly increased desire for more children compared to families with a boy.

When strong preference for boys arises when small family sizes are preferred, this can result in selective female abortion. Looking at the contribution of declining fertility rates to India's problem of missing women, Jayachandran (2014) found a large causal effect. The desired sex ratio increases sharply as fertility rates fall, with fertility decline explaining roughly half of India's increase in sex ratio over the past 30 years.

The same study also reported that women's education that generally led to more progressive attitudes could counter-intuitively cause the sex ratio to be skewed further to males, since although it reduces desired sex ratio at any given family size, it also reduces desired family size. Technology that allows early identification of the sex of the foetus has also contributed. India has seen estimated selective female abortion rise from close to zero in the early 1980s to 6 million in the 2000s (Jha et al., 2011).

In China, where levels of selective female abortion have been the highest in the world (Bongaarts, 2013), this practice may be declining, owing partly to the relaxation of the one-child policy (Zhou et al., 2012).

Vietnam is reportedly also seeing an increase in selective female abortion (Huq et al., 2012). Although people's access to such technology grows as they become wealthier, these trends are far from inevitable. Son preference has declined in South Korea, despite rapidly rising wealth and access to technology. This may be due in part to government action (Huq et al., 2012), but also social and economic development that has been accompanied by the diffusion of new social norms, with women able to get good jobs in the knowledge and service economy, and with increased wealth meaning the elderly no longer need to depend on support of sons in old age (Chung and Das Gupta, 2007). The proportion of South Korean women who reported that they 'must have a son' declined from

nearly 50% in 1985 to less than 20% in 2003. Bangladesh is another example of a country not following India's trend for selective abortion, with evidence of the success of policies introduced to counter it (Huq et al., 2012), as well as improvements in women's empowerment (Box B).

3.2.4 Policy interventions

The final driver of fertility preference to be discussed is public policy. This influences the other three sets of drivers by promoting economic growth, education, and child survival as well as policy that directly targets fertility.

Most policy aimed at fertility in recent decades in the developing world has tried to reduce fertility, although in the past some governments have had pro-natal policies. Policies to restrict fertility include those that aim to change preferred family sizes and those that close any gap between preferences and fertility outcomes. The former include: education, information and propaganda to convince parents to limit their family sizes, implemented through schools, advertising, and story-lines in soap operas; incentives to have smaller families or penalties for large families, such as tax differences, or access to public jobs; and regulations and laws governing age of marriage. The latter is largely about family planning to make sure that couples wanting to limit their fertility can do so.

Much attention has been paid to the vexed question of how much governments wishing to restrict fertility could or should coerce parents to achieve their aims. Both China and India have used such policies: the former through the one-child policy, the latter through a forceful programme for sterilisation during the Emergency of 1975 to 1977. The effectiveness of both these policies has been questioned. Diamond-Smith and Potts (2010) found little evidence that the coercive population policies of **India** and **China** could be held responsible for fertility declines observed in those countries, given that fertility had already been declining in both countries before the policies were implemented:

In China, the total fertility rate (TFR) had already fallen to 2.9 before the institution of the One-Child Policy. In India, fertility continued to decline at roughly the same rate before, during and after 'The Emergency'. Regardless of government mandates, couples in both countries before the policies and since have shown a desire to reduce their family size and when given access to family planning, have voluntarily limited the number of children they chose to have. (Diamond-Smith and Potts 2010)

¹³ Though tends not to be so in Africa, where traditionally women have a bride price (the opposite of a dowry). This is because children have been highly valued in land-abundant, labour-scarce economies.

Box B: Declining boy-preference in Bangladesh linked to women's empowerment

Bangladesh exemplifies this change in attitudes away from favouring boys over girls. Kabeer (2012) described fieldwork in the village of Amarpur, Bangladesh in the 1979, when women expressed strong desires for boys, while commonly perceiving daughters as burdens. Returning to the same village in 2008 she reported:

Using the same approach to measure women's preferences with regard to sons and daughters, we found a discernible shift away from son preference towards indifference to the sex of the child. It seemed that most of the women studied wanted fewer children and that they no longer cared too much if they had a boy or a girl.

In 2010, detailed interviews helped explain why. Improved status and power of daughters-in-law, and growing value given to daughters stood out as explanations. Younger women's improved status came from their better education and greater ability to earn income on a scale unthinkable 30 years before, through for instance working in the growing export garment industry that largely hires female labour, as well as from their exposure to different cultural norms through television.

Young women enter marriage on far less dependent terms than they used to in the past and are less willing to put up with abuse from either their husbands or their in-laws. ... Families have become nuclear, with husbands and wives more focused on ensuring the future of their own children than seeking to engage with the husbands' extended family group.

Parents increasingly look to their daughters for support in old age rather than their sons, having provided more and more support for daughters in education and other investments, enabling them to be more independent and empowered.

Source: Kabeer (2012)

This is echoed by Sen (2015) for China:

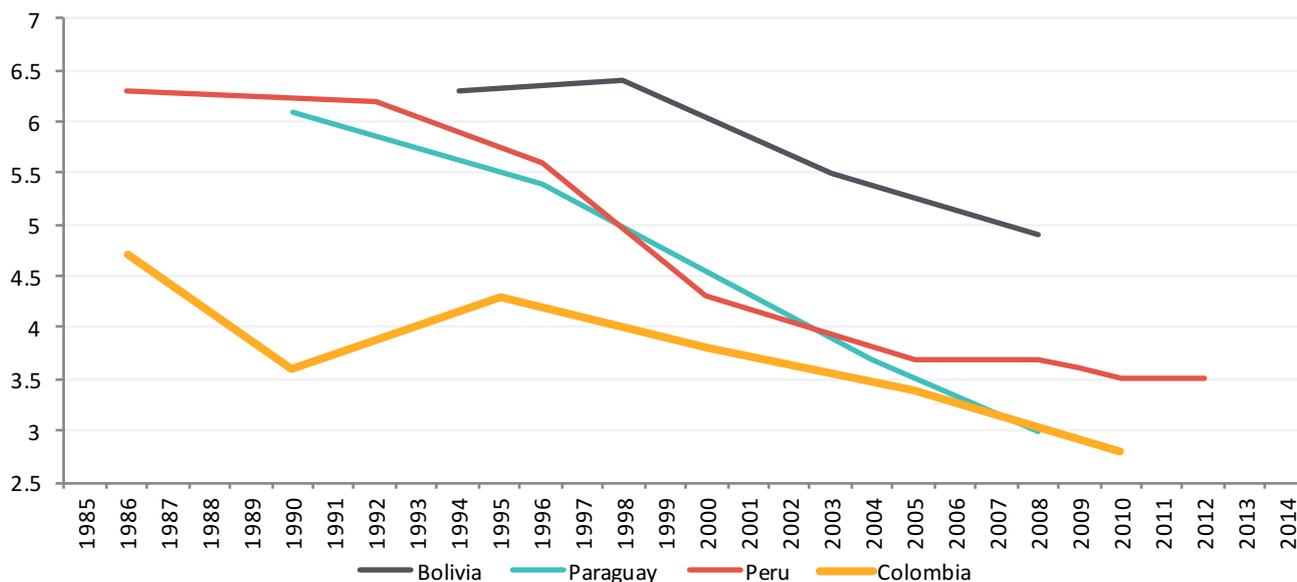
The one-child policy was introduced in 1978. But the fertility rate had already been falling rapidly for a decade before that – from an average of 5.87 births per woman in 1968 to 2.98 in 1978. After that huge drop, the fertility rate continued to fall with the new draconian policy in force, but there was no plunge – only a smooth continuation of the falling trend that preceded the restriction. From 2.98 in 1978, the rate has declined to 1.67 now.

Clearly, something more than the one-child policy has been affecting birth rates in China. Statistics that compare different countries, as well as empirical analysis of data from hundreds of districts within India, indicate sharply that the two most potent factors that induce fertility reduction globally are women's schooling and women's paid employment. (Sen, 2015)

Peru also attempted an aggressive family planning programme including inducements to female sterilisation in the mid-1990s. Reports suggest health workers used bribes, coercion, and even force to meet the large sterilisation quotas they were given. It is estimated that forced sterilisation led to women affected having 0.33 fewer children by 2000, and 0.85 fewer children by 2004, than comparable women not subject to the programme (Byker and Gutierrez, 2012).

Simple inspection of fertility changes in rural areas of Peru and neighbouring countries (Figure 3.24) shows that fertility decline was accelerated at the time of the programme, but not that greatly. Some neighbours, such as Bolivia and Paraguay experienced similar declines without such drastic measures.

Figure 3.24: Rural fertility rates, 1985-2013, Peru and neighbouring countries



Source: DHS Statcompiler

Peru’s policy was not associated with substantial improvements in welfare. It seems that, under conditions of imposed birth control, the benefits of making choices about fertility did not necessarily accrue directly to the women involved and their households (Byker and Gutierrez, 2012).

Many developing countries have tried to narrow the gap between preferred and actual fertility through family planning programmes. When contraception is used, fertility declines. For example, in SSA between 1950 and 2005, as contraception use rose to 49% of the urban population, fertility fell by almost half; in rural areas, increasing use of contraception reaching 28% coverage saw fertility fall by 14% (Garenne, 2014).

In 1989, Iran’s government reversed its pro-natal population policy, launching an ambitious and innovative family planning programme aimed at rural families (Salehi-Isfahani et al., 2010). By 2005, the programme covered over 90% of Iran’s rural population, and had contributed to reducing average births per rural woman to replacement level, from as high as eight in the mid-1980s. One part of the programme set up small health centres in villages. These were found to have contributed to between 4% and 20% of the fertility declines seen between 1986 and 1999. The significance of village health centres was also reported for rural Fars province (Mirahmadizadeh et al., 2015).

In Ethiopia, access to family planning in 1990 was found, by 2004, to reduce fertility by more than one child

among women without education. For women with some formal schooling, there was no effect, suggesting family planning and education were acting as substitutes, at least in a low-income setting (Pörtner et al., 2011).

Intermittent reductions in **contraceptive supply in Ghana** resulting from cuts in US donor funding between 1984 and 1992 and from 2001 to 2008, were associated with a 22% reduction in supply of contraceptives and a 10% increase in pregnancy. Some of the effect was offset by increased abortion, but only in non-poor women, thus the burden of the fertility increases was largely borne by poorer women, especially in rural areas where NGOs supplying contraceptives reduced their outreach (Jones, 2013).

In Rwanda, family planning was integrated into health services and contraceptives supplied for free. By 2010, some 91% of Rwanda’s current contraceptive users were obtaining their supplies from government facilities (Westoff, 2012).

Given the many factors that influence fertility, can fertility be modelled in terms of some of the leading candidate explanatories? Box C reports on a cross-country regression model of fertility. It suggests that almost 80% of the variation seen across national fertility may be explained by just four significant variables: infant mortality, female secondary schooling, female employment in agriculture and a dummy for SSA.

Box C: Cross-country regression: determinants of fertility

A simple regression can model the relative contribution of different determinants to fertility across countries. To explain differences in national TFRs in 2013 across a sample of 157 countries, seven potential explanatory variables were modelled:

- IM:** infant mortality in 2013 – from the World Bank WDI.
- FSS:** female lower secondary school completion rate, most recent value since 2008 – from the World Bank and supplemented by additional data sources.
- AL:** Arable land per capita in 2013 – from the World Bank WDI. This was included to test whether fertility is higher in countries where land is relatively abundant.
- FA:** Female employment in agriculture – the proportion of economically active females engaged in agriculture, from FAOSTAT.
- AVA:** Agriculture value added as a percent of GDP in 2010 – from the World Bank WDI and supplemented by additional sources.
- GDP:** GDP per capita in 2013, logged – from the World Bank WDI.
- SSA:** A dummy variable for countries in sub-Saharan Africa.

Some of these variables are imperfect: for instance, women may be economically active in agriculture as well as other sectors, and links between fertility and lower secondary school completion rates might not be as strong as those to upper secondary school, for which data were unavailable. To some extent factors may also be correlated, such as infant mortality and wealth.

Other potential explanatory variables were excluded owing to lack of sufficient data covering a large enough range of countries: for example, proportion of women using contraception, or alternative measures of female employment in agriculture.

Results of the regression yielded the following equation:

$$\text{TFR} = 3.7^{***} + 0.023\text{IM}^{***} - 0.013\text{FSS}^{***} + 0.128\text{AL} + 0.006\text{FA}^{**} - 0.006\text{AVA} - 0.092\text{GDP} + 0.505\text{SSA}^{***}$$

Note: *** = highly significant, ** moderately significant, (no stars) not significant. The adjusted R square of the regression was 0.79, and the F-test 5.9×10^{49} .

Infant mortality, female secondary schooling, female employment in agriculture, and the sub-Saharan dummy were all significant, as was the constant. The insignificant parameter for GDP suggests that although fertility correlates highly with GDP, the causal path lies not through incomes but through changes to health and education that tend to improve with higher national wealth.

While the model is significant, with infant mortality, female schooling, and women's work confidently explaining variations in TFR, the large value for the intercept (a base of 3.7 children) coupled with the relatively small coefficients on the parameters suggests the model is not as strong as the high R-square statistic might suggest. Factors excluded from the model such as family planning may be significant omissions.

The SSA dummy proved significant and positive, suggesting that independently of the factors modelled, the region may have a preference for larger families than elsewhere. That said, a glance at the residuals (Table C1) shows countries from the region with both higher and lower fertility than predicted by the model. If there is an SSA effect, it is thus not universal across the region.

Table C1: Profile of model residuals

Top 20 lowest residuals: countries have lower fertility than predicted			Top 20 highest residuals: countries have higher fertility than predicted		
	Predicted TFR	Residual		Predicted TFR	Residual
Central African Rep	5.95	-1.59	Niger	5.40	2.17
Lesotho	4.37	-1.33	Congo	3.41	1.56
Bulgaria	2.68	-1.18	West Bank & Gaza	2.45	1.56
Pakistan	4.36	-1.17	Mali	5.31	1.54
Bangladesh	3.26	-1.08	Israel	1.50	1.53
Mauritius	2.52	-1.08	Timor-Leste	3.82	1.38
Thailand	2.45	-1.05	Zambia	4.32	1.36
Lao PDR	4.07	-1.05	Saudi Arabia	1.57	1.08

Bhutan	3.23	-1.00	Jordan	2.26	0.98
Vietnam	2.71	-0.97	Oman	1.90	0.96
Nepal	3.21	-0.91	Guatemala	2.84	0.94
Moldova	2.32	-0.86	Malawi	4.45	0.94
Swaziland	4.15	-0.81	Burundi	5.18	0.85
Botswana	3.42	-0.80	Kuwait	1.75	0.85
India	3.26	-0.78	Kyrgyz Rep.	2.44	0.76
Germany	2.07	-0.69	Tajikistan	3.07	0.74
South Africa	3.07	-0.68	Qatar	1.41	0.61
Lebanon	2.14	-0.65	Chad	5.68	0.58
Sierra Leone	5.30	-0.60	Madagascar	3.89	0.58
Cabo Verde	2.89	-0.59	Congo, DR	5.36	0.57

Source: Regression results. Note: SSA countries in bold.

The three large South Asian countries – Pakistan, Bangladesh, and India – all have lower fertility than the model predicts. Thailand, known for its successful family planning programmes, also has lower fertility than predicted.

Among those countries with higher than predicted fertility can be seen a cluster of Middle Eastern countries, including the West Bank and Gaza, Israel, Saudi Arabia, Jordan, Oman, Kuwait, and Qatar; only Lebanon has notably lower-than-expected fertility.

3.2.5. Summary

Given the importance of fertility limitation for human development and its key contribution to the dramatic global demographic shifts seen over the last century, there is a vast interest in drivers of fertility change in the developing world, in different settings and situations, among academic and policy communities. This is reflected in the wealth of literature on the subject. This section has summarised only a fraction of the literature, focusing on recent studies to look at both drivers of desired family size (such as infant mortality, women's education and labour market participation, availability of agricultural land and transmission of cultural norms), as well as proximate determinants of fertility (such as access to contraception and family planning).

In many cases, fertility reduction results from a combination of factors: Rwanda's fertility decline in the late 2000s is typical in combining elements of increased child survival, increased incomes, more female education and a family planning campaign involving both communications and provision of contraceptives (Westoff, 2012; Bundervoet, 2014; Ndahindwa et al., 2014; Ndaruhuye et al., 2009).

Characteristics of populations, such as stage of development or demographic transition, may also affect the relative power of drivers of fertility decline. For example, in rural Bangladesh older women had more experience of child mortality; in China, non-farm jobs affected the fertility of younger rather than older women.

Land availability may play a role once a threshold of land scarcity has been passed.

Influences have sometimes been shown to interact in unexpected ways. In the case of Nyeri, Kenya, for instance, increasing children's education was adopted as a strategy to cope with having children who might not be able to inherit land in a context of scarce land availability, rather than a driver of declining fertility.

3.3 Prospects for fertility decline

Trends and the causes of fertility decline suggest that most developing countries that still have fertility rates well above replacement levels will see those rates fall in the future. The forces driving fertility decline – whether child survival, economic development, female education, exposure to mass media, or the impact of public efforts to limit fertility – should continue to drive down fertility. The exceptions will be where these forces have been interrupted by strife, natural disaster and economic decline.

One region that may defy these forces is sub-Saharan Africa, where fertility has fallen least, and least consistently. Given that many countries in the region have seen slow progress on various dimensions of growth and development, there may be nothing unusual in this: as and when those countries see similar progress to that of other developing countries, then their fertility rates may well decline. But it does leave the possibility that there may be some cultural preference for larger families in Africa so

that fertility may not soon decline to the extent that it has in Asia and Latin America.

Yet culture may be less persistent, or less important, than imagined. Many countries in Latin America had fertility rates above six in the 1960s, a result that seemed linked to preferences for large families and Catholic Church prohibitions on modern contraception. Today, most of those countries have fertility at replacement levels. Norms have changed dramatically within a couple of generations.

4. Mortality and child survival

4.2 National and regional trends in mortality

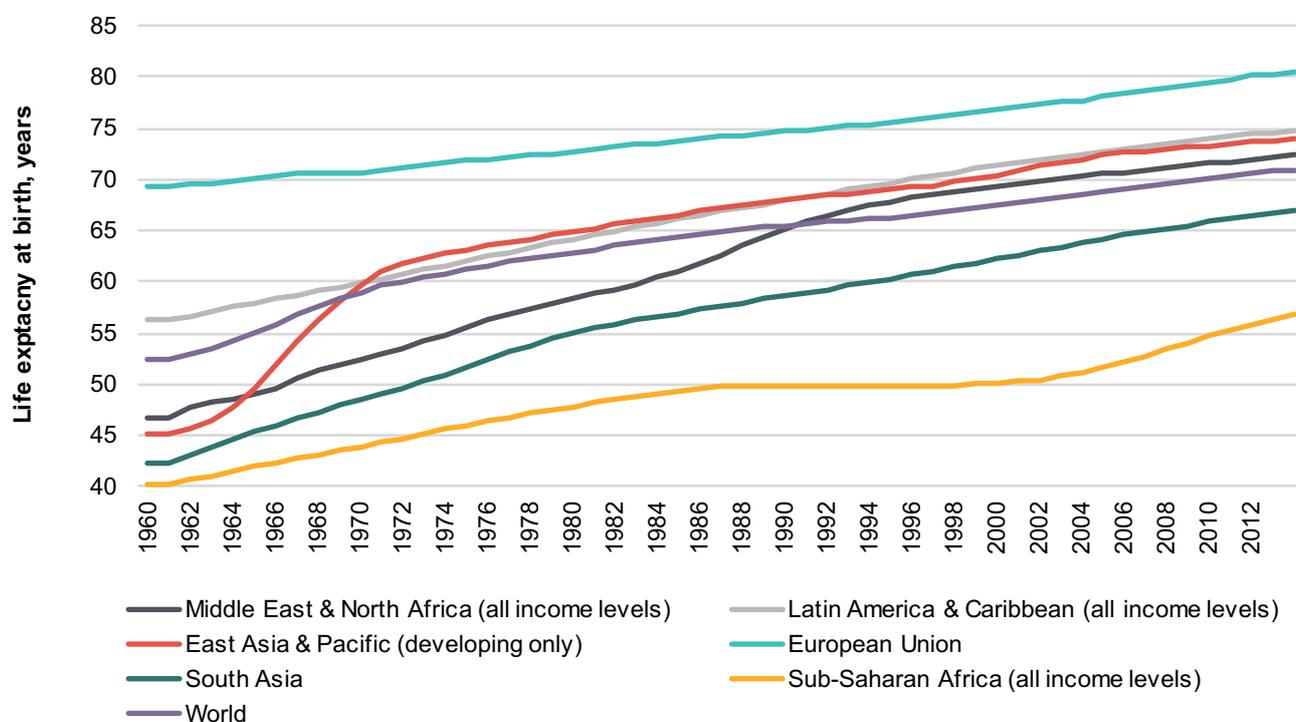
Overall life expectancy (for both rural and urban areas) has been increasing across the world (Figure 4.1), rising from 52 years in 1960 to 71 years in 2013. Increases in the developing world have been more marked than in high-income countries, so that life expectancy is tending to converge across regions.

At country level, the overall pattern is similar: rising life expectancy in all cases, with the largest gains in those countries that once had the shortest life expectancy (Figure 4.2). That said, interruptions appear, with periods in some countries when life expectancy has become shorter. These

correspond to wars and civil strife (Iran early 1980s, Bangladesh early 1970s, Vietnam 1970s), famine (Ethiopia 1985), or severe economic depression (Kenya from the mid-1980s to late 1990s). Almost all such episodes have lasted for less than a decade (Kenya is the exception); thereafter, increases of life expectancy have more than compensated for the reduction seen during crisis.

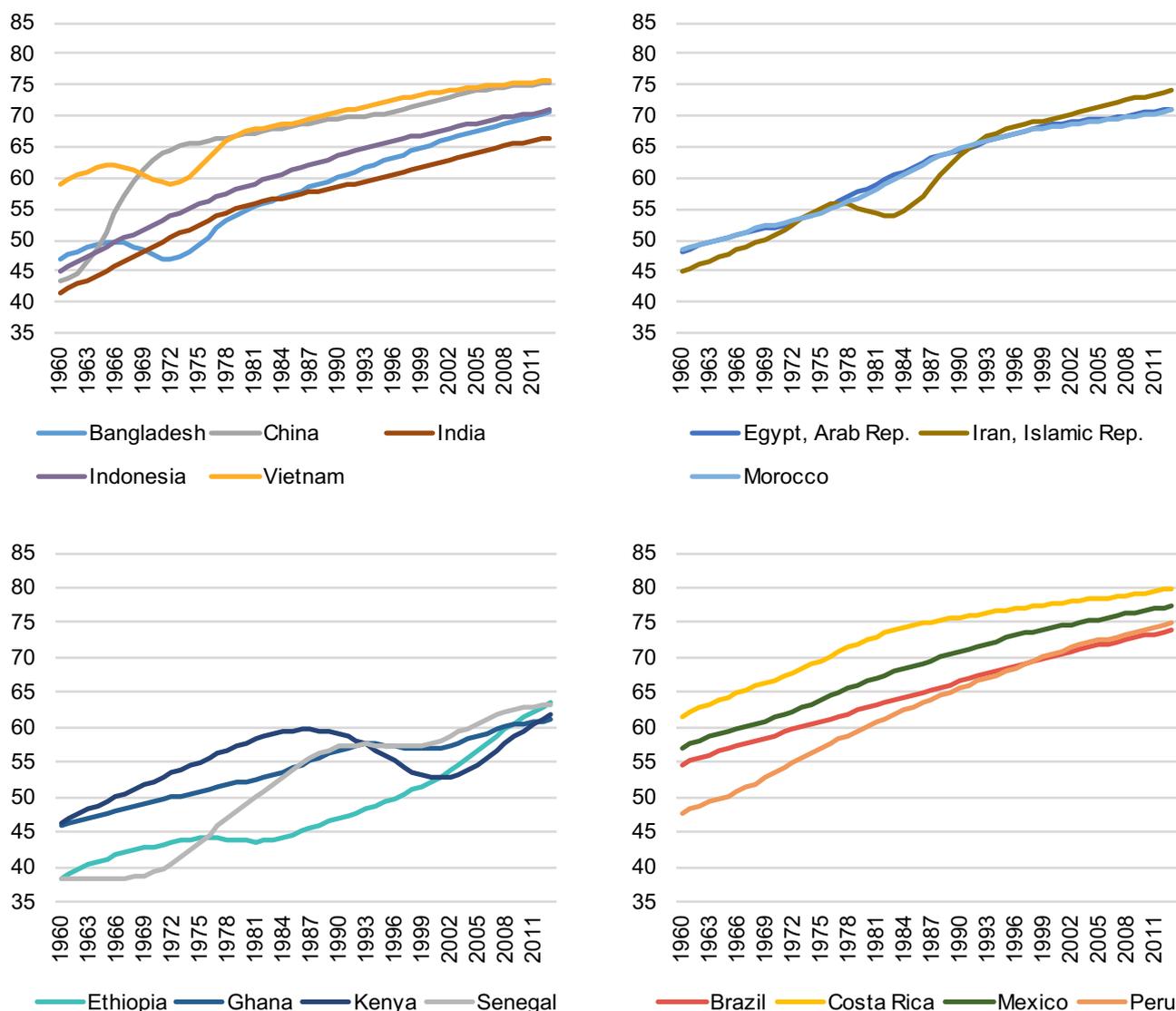
In the developing world the increases in life expectancy have come overwhelmingly from reductions in the mortality of children before they reach five years of age. Most child deaths take place before the first birthday: indeed, it is estimated that, worldwide, 41% occur within four to six weeks of birth (neonatal deaths – Bhutta, 2015).

Figure 4.1: Life expectancy, 1960-2013, world and major regions



Source: World Development Indicators

Figure 4.2: Life expectancy in years, 1960-2013, selected countries



Source: World Development Indicators

4.2 Mortality in rural areas

4.2.1 Mortality of infants and young children in rural areas

Mortality of children is usually higher in rural than urban areas by on average 40% in the developing world (Figure 4.3).

In China, for example, under-five mortality in 2012 was 2.75 times more likely in rural than urban areas (Jiang et al., 2015). Neonatal mortality risk was between 2.2 and 2.7 times more in rural than urban areas in 1996-2000, although that subsequently fell to two times more by 2005-2006 (Wang et al., 2010).

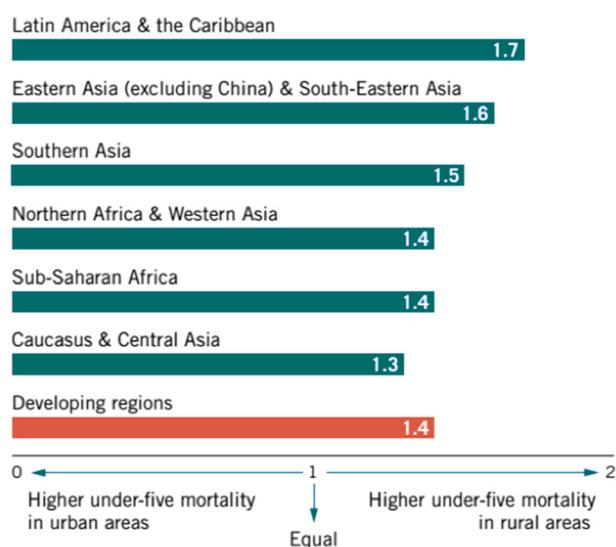
In Ghana, rural rates of infant and under-five mortality have varied between 14% and 66% higher than in urban

areas, although the differences have tended to fall between 1988 and 2008 (Figure 4.4) (Kanmiki et al., 2014)

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Figure 4.3: Ratio of rural to urban under-five mortality, 2000-2008, developing world regions



Note: Analysis is based on 80 developing countries with data on under-five mortality rate by residence, accounting for 73 per cent of total births in developing regions in 2008.

Source: UN (2011)

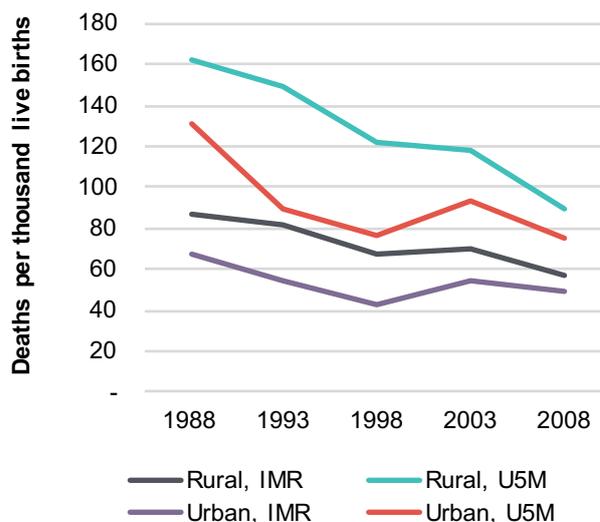
But exceptions to this pattern can be found. In **Kenya** the infant mortality rate in 2010 was 9% higher in urban than rural areas (Gilbert and Gichuhi, 2014): in 2003 the rural rate had been higher, but while much progress was made in reducing infant mortality in rural Kenya, improvements in urban Kenya stalled. In neighbouring **Ethiopia**, surveys of mothers in kebeles in rural Tigray from 2010 to 2013 revealed an infant mortality rate of 47 per thousand live births, lower than regional and national levels (Weldearegawi et al., 2015). Life expectancy in rural Pondicherry, India, was slightly longer than in urban areas in 2010-2011 (Sarkar et al., 2014).

Mortality of children has been falling in almost all rural areas – other than in places subject to conflict – of the developing world, and quite rapidly so. In most cases, reductions in deaths of infants and children have been greater than in urban areas, so that rural-urban disparities have diminished.

In **Iran**, between 1993 and 2008 in 41 rural areas, under-five mortality was more than halved, falling from 46.3 to 21.6 deaths per thousand live births (Figure 4.5) (Moradi-Lakeh et al., 2013).

Similarly, for rural Fars province, Iran, infant mortality fell from 31.5 to 16.2 per thousand live births between 1990 and 2009 (Mirahmadizadeh et al., 2012).

Figure 4.4: Infant and under-five mortality, 1988-2008, rural Ghana



Source: Compiled from DHS data reported in Kamniki et al. 2014

China's infant mortality fell by 72% in coastal China, by 63% inland, and by 58% in remote regions between 1996 and 2008. (Figure 4.6), (Wang et al., 2012). The differences in reduction between regions were largely down to those in post-neonatal mortality.

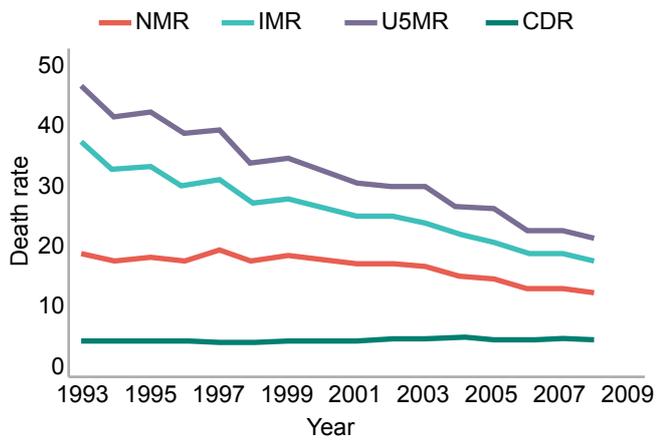
In **Bangladesh**, under-five mortality in rural Matlab sub-district fell from more than 130 deaths per thousand live births in 1982 to around 40 per thousand in by 2005 (Figure 4.7) (Saha, 2012).

Infant mortality in **India** has been falling faster in rural than urban areas. In 1980 rural rates were 124 per thousand live births, when urban rates were 65: by 2009 the corresponding figures were 55 and 34, so that rural rates had been cut by 56%, compared to 48% for urban areas (Figure 4.8) (Narwal and Gram, 2013).

Progress in India has been seen among some of the most disadvantaged groups, the Scheduled Tribes. Between 1992-1993 and 2005-2006, rates of under-five mortality fell from 140 to 100 deaths per thousand live births for members of this group (Sahu et al., 2015).

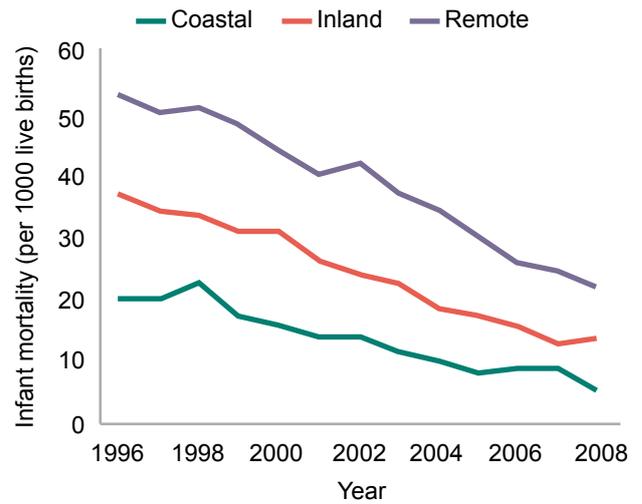
Variations in mortality of young children can, however, vary considerably across rural areas. For example, in India in 1998-1999, under-five mortality ranged from a low of less than 20 per thousand live births in Kerala to almost 150 in Madhya Pradesh (Figure 4.9).

Figure 4.5: Neonatal, Infant and under-five mortality rates, 1993-2008, rural Iran



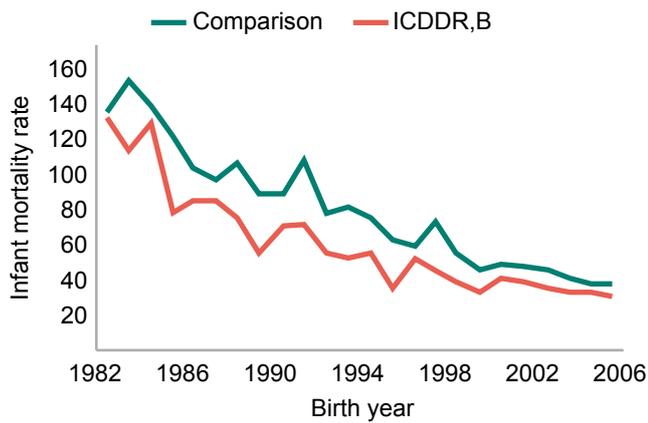
Source: Adapted from Moradi-Lakeh et al. 2013, drawing on surveys in 41 rural zones of Iran

Figure 4.6: Infant mortality, 1996-2008, rural China



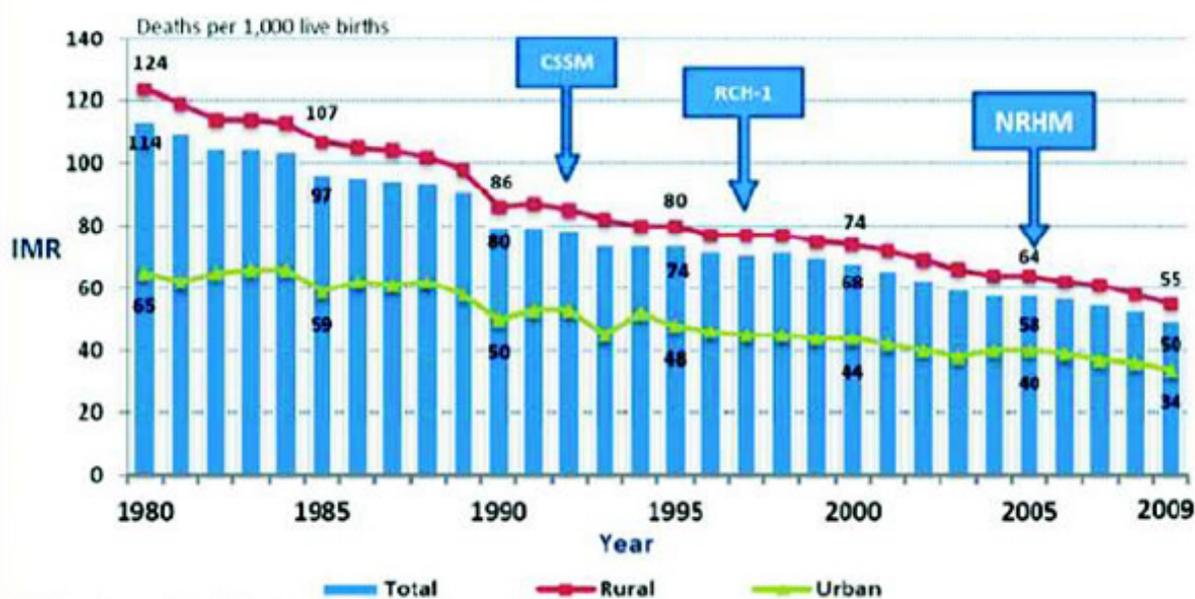
Source: Adapted from Wang et al. (2012)

Figure 4.7: Infant mortality, 1982-2005, Matlab district and comparison rural areas, Bangladesh



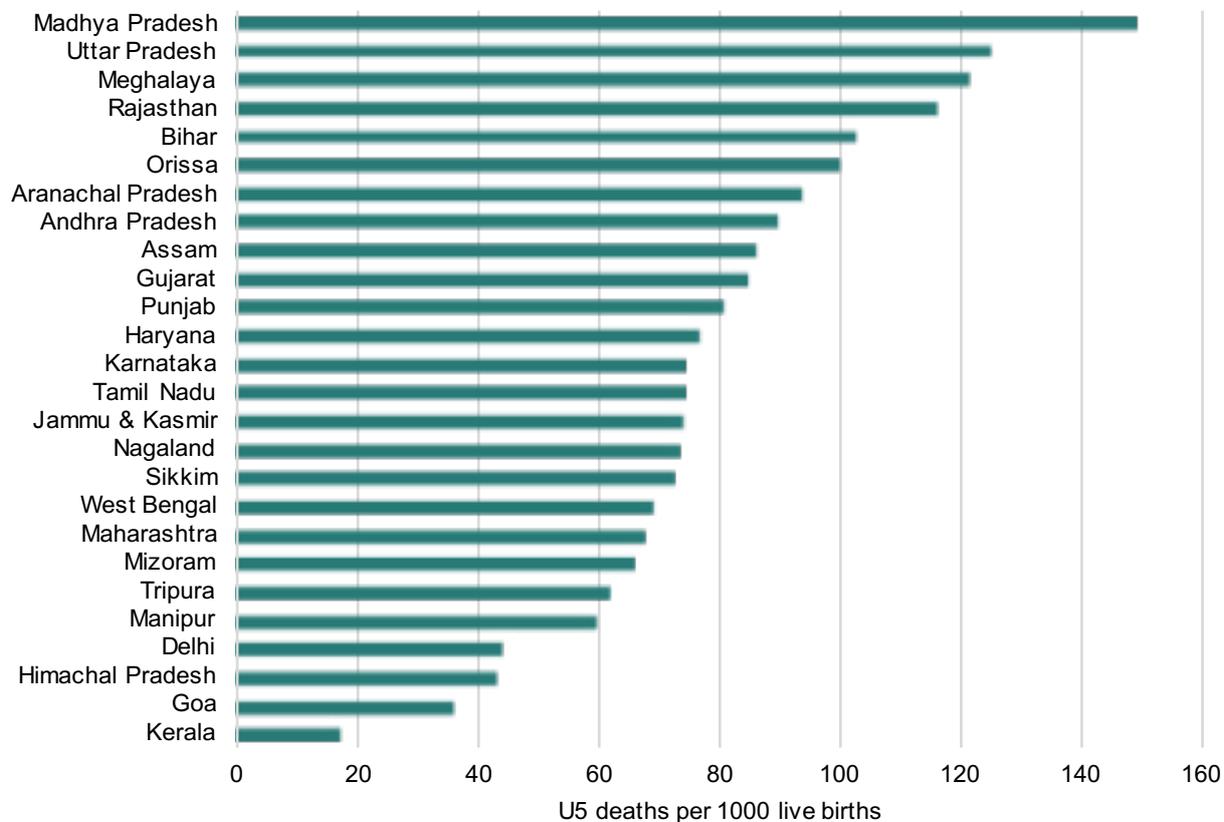
Source: Adapted from Saha (2012) drawing on Matlab DSS data

Figure 4.8: Infant mortality, 1980-2009, rural and urban India



Narwal and Gram 2013, drawing on data from Sample registration System, Registrar General of India

Figure 4.9: Under five mortality, 1998/99, rural India, by state



Source: National Family Health Survey 1998/1999 of India reproduced in van de Klaauw and Wang (2011).

Subsequently, from 2000 to 2009, rates of under-five mortality have fallen in most rural areas of India and have tended to converge across space. The median rural under-five mortality rate across the states and territories in 2000 was 57 per thousand live births, with a standard deviation of 23, in 2000; by 2009 the median had fallen to 42, while the standard deviation had closed to 16 (Narwal and Gram, 2013).

In rural Iran, under-five mortality rates ranged from just 7.8 per thousand in southern Tehran Province, to more than 40 per thousand in rural Sistan and Balouchestan Provinces in 2007. Regional disparities had, however, closed somewhat between 1993 and 2007 (Moradi-Lakeh et al., 2013).

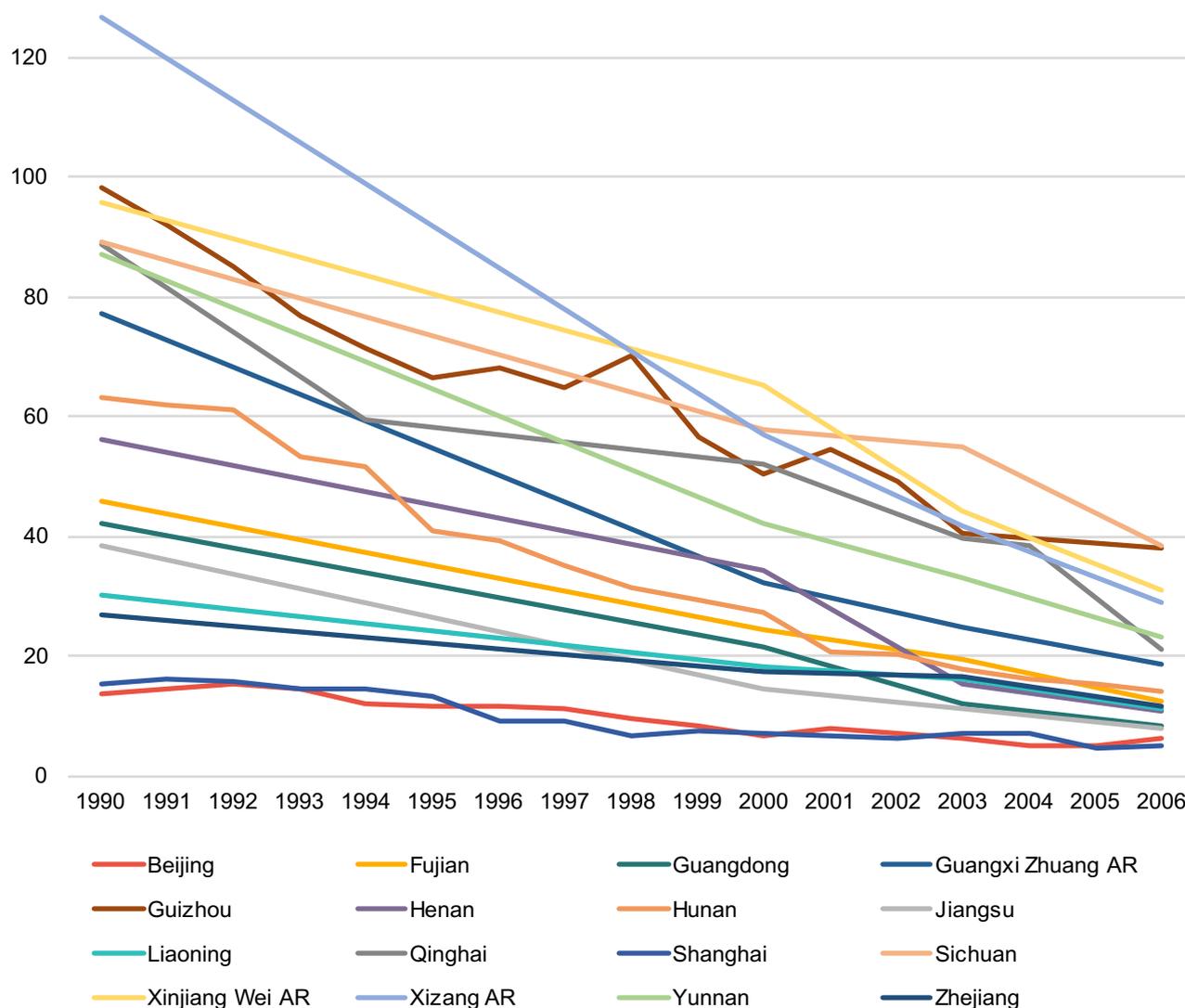
China has also seen notable convergence of rural under-five mortality across its Provinces (Figure 4.10).

The median across the regions has fallen from 54 to 19 deaths per thousand, while the standard deviation has been reduced from 27 to 9 (Feng et al., 2012). Some of the largest reductions have taken place in the far west of the country, in Xizang/Tibet, Xinjiang and Qinghai.

Ghana similarly shows large differences in rural under-five mortality between the better-off southern regions and the more impoverished regions of the north, with under-five mortality ranging from 75 in the south to 128 in parts of the north (Kanmiki et al., 2014).

In Kenya, large differences can also be seen across the provinces: 'the risk of post-neonatal mortality was 0.69 times lower in Eastern and 1.45 times higher in Nyanza with reference to Central region' (Gilbert and Gichuhi, 2014).

Figure 4.10: Under-five mortality, 1990-2006, rural areas of China, selected provinces



Source: compiled from data in Feng et al. (2012)

4.2.2 Mortality of adults in rural areas

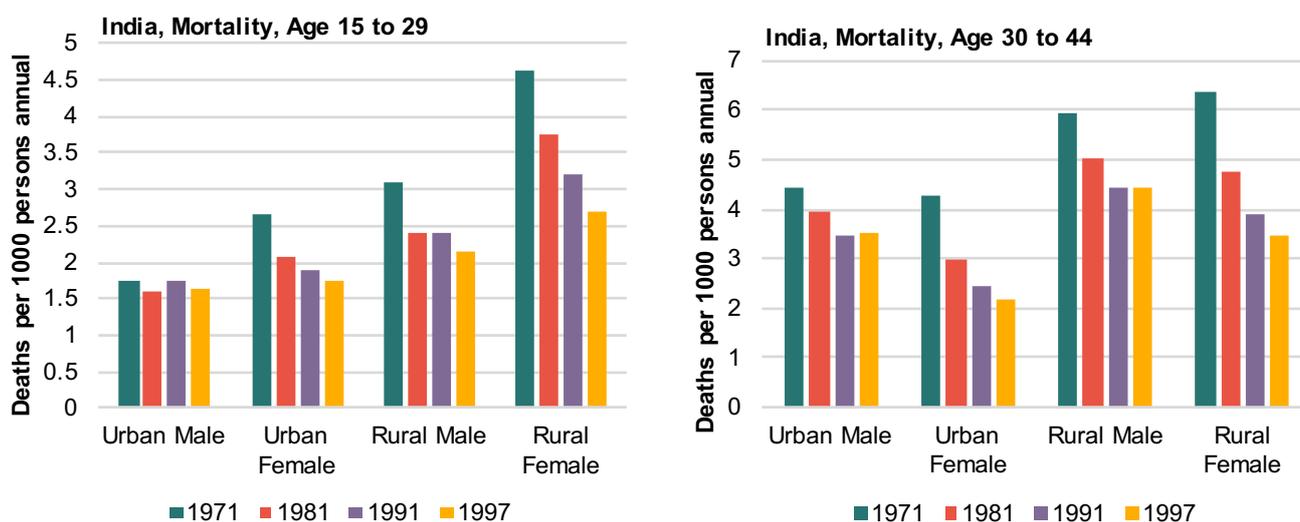
For both urban and rural areas, mortality has been falling in the 16 selected developing countries: the median probability of dying fell from 207.5 to 150 per 1000 between 1990 and 2012, a drop of 24% (WHO statistics). For rural areas, much less has been documented on levels and changes in mortality of adults: records in rural areas of developing countries are often not that well kept, with the notable exception of the effect of HIV and AIDS in Eastern and Southern Africa. Some country examples indicate some trends.

In India, rural adult mortality is higher than in urban areas, but the difference narrowed between 1971 and 1997 as rural adult mortality fell by more than urban adult mortality (Figure 4.11). Within rural areas, large variations can be seen across the states of India, but those differences narrowed between 1971 and 1997.

India also shows clear patterns by sex: in rural India in 1971 rates of mortality were considerably higher for adult females than males, most likely associated with poor maternal health as can be seen in the markedly higher female mortality for women of 15 to 29 years, a prime period for reproduction. By 1997, however, rural female adult mortality has been reduced by more than male mortality, so that young rural females of 15 to 20 years were only fractionally more likely to die than males: for those aged 30 to 44 years, rural female mortality had actually fallen below that of males. Very similar trends can also be seen among urban men and women.

Gender differences in mortality in some countries lead to the conclusion that the world is missing many women, and increasingly in some areas, infant girls. Box D provides more detail.

Figure 4.11: Adult mortality rates, rural and urban, male and female, 1971-1997, India



Source: Krishnaji and James (2002), using data from Sample Registration System

Box D: Missing women

In the early 1990s, Amartya Sen found marked differences in the sex ratios of populations in India, other parts of South Asia and China, and those ratios typically seen in Western Europe and North America. He concluded that as many as 100 million women were missing (Sen, 2003).

Since then several studies have revisited the question to wonder at the causes and the extent of the problem. When Sen first wrote about missing women, the apparent cause was neglect in care and medical attention that led to unusually high mortality rates for females and children. By the early 2000s a new reason was also apparent: sex-selective abortion. This had become possible owing to advances in ultra-sound scanning in the early 1990s that allowed the sex of the foetus to be identified earlier in pregnancy. Falling fertility and smaller families, when allied to strong preference to sons, make sex-selective abortion more likely.

The causes have been questioned. A biological hypothesis is that hepatitis B leads to higher rates of mortality for female compared to male foetuses. Put to the test, however, this possibility has been largely unable to explain the size of the bias in sex ratios seen (Bulte et al., 2011).§

Some of the most recent estimates made (Bongaarts and Guilmoto, 2015) see the number of missing women as 126 million in 2010, up from 61 million in 1970. Roughly half the current missing females come from sex-selective abortions; the rest comes down to excess female mortality. Half of the missing women are from China, where recent birth ratios show 120 males to every 100 females. Other countries with many missing women include India (though here the rates of female absence are in decline), Bangladesh and Pakistan.

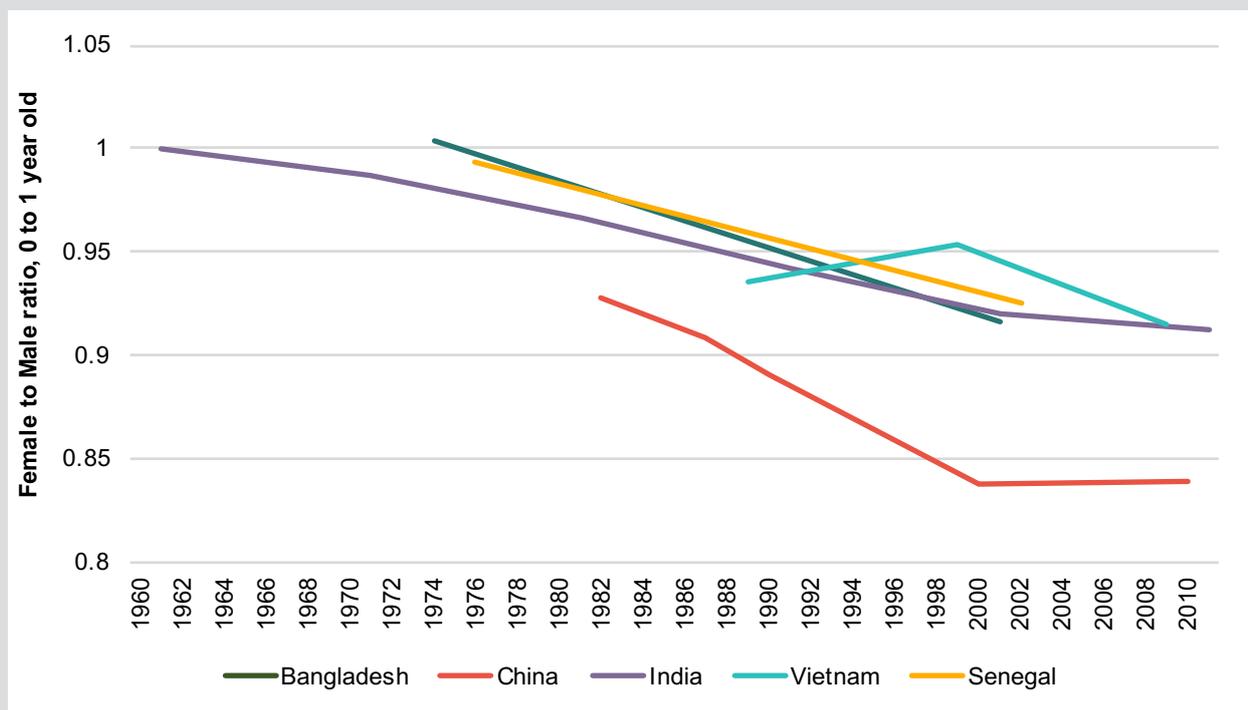
Some discussion surrounds the extent to which women may be missing in Africa. Nigeria has been picked out in the Bongaarts and Guilmoto (2015) estimates. Other parts of Africa may be susceptible, given observed life expectancy ratios and responses to Demographic and Health Surveys (DHS):

The potential for rising SRBs [sex ratio at birth] exists in parts of Africa where elevated life expectancy ratios point to latent son preference. In addition, desired sex ratios at birth measured in DHS surveys show elevated SRBs in Chad, DRC, Ethiopia, Ghana, Guinea, Mali, Mauritania, Niger, Nigeria, Rwanda, and Senegal. (Bongaarts and Guilmoto 2015)

Indeed, Anderson and Ray (2010) conclude that Africa did indeed have many missing women. Their methods, however, have been questioned for relying on simulated data rather than observations, and for using an inappropriate reference for male-to-female adult mortality ratios by taking the ratios seen in Western Europe in contexts of low overall mortality and with different disease profiles to those of Africa (Klasen and Vollmer, 2013).

For the 16 countries profiled in this report, it is possible to compare sex ratios for the cohort of children of less than one year old in rural areas, as recorded in censuses. Given the norm that 105 to 106 boys are born for every 100 girls, then a ratio of 0.95 female to male might be expected in the zero-to-one-year old cohort. In most countries the most recent statistic is close to this ratio. But in some countries there are notable departures and trends (Figure D1).

Figure D1: Female to male sex ratios, 0 to 1 year olds, since 1960, rural areas, selected countries



Source: UN Population Data

China stands out for an exceptionally low ratio of girls to boys, declining sharply since the early 1980s. The rates for Bangladesh, India and Senegal have all fallen considerably over the last thirty or more years. Vietnam also shows a recent shift in the same direction.

It would seem that in some countries there are disturbing trends in infant sex ratios. The 16 countries did, however, include one notable counter-example: Iran. In 1966 a low female-to-male ratio of 0.86 was recorded: in recent censuses the rate has been close to 0.95.

The scale of missing women is staggering: 126 million in 2010. The scale is many times that of catastrophes such as famines, earthquakes and tsunamis, or HIV and AIDS. The consequences may be ugly: ‘grossly male-biased sex ratios lead to increased crime, violence, local warfare, political instability, drug abuse, prostitution and trafficking of women’, argues Brooks (2012).

Missing women presents a double challenge. One is to make sure that infant girls get the care and medical attention so that they do not die unduly of neglect: the same applies to care for young mothers. Falling infant, child and maternal mortality suggests progress on this. The other challenge may be more difficult: overcoming preferences for sons so strong that couples are prepared to abort female foetuses. Although across Asia women are apparently becoming more empowered and valued, the statistics in Figure D1 tell a different story: that, in rural areas, however much women’s status may have risen, son preference remains strong.

Although India may be seeing female adult mortality rates fall, in other parts of the world female rates are sometimes below those males. In an area of rural **Senegal**, for example, male adult mortality was estimated to be 20% higher than female adult mortality (Duthé and Pison, 2008). Men were more likely to die than women owing largely to being more likely to abuse alcohol and to work in hazardous activities, such as fishing and climbing coconut palms.

Similarly, in rural **Tanzania**, adult women had lower mortality rates than men (Kitange et al., 1996) in two rural areas, with the exception of women aged 25 to 29 years in Hai and 20 to 34 years in Morogoro rural districts: ages where relatively high maternal mortality was a factor. In rural Burkina Faso, adult females were found to have slightly lower chance of dying before 60 years having reached 15 years, than their male counterparts (Sankoh et al., 2003).

Both these studies from **Burkina Faso** and **Tanzania** see diarrhoea and malaria as major threats to adults. For Tanzania, Kitange et al. (1996) posed the question of whether, given the relatively high levels of adult mortality seen in rural areas, adult health was getting enough attention: clearly the health of mothers and infants is a priority, but that does not mean that more could not be done to alleviate morbidity and mortality among adults.

The **HIV and AIDS epidemic**, whose incidence has been strongest across much of Eastern and Southern Africa, did much to raise adult mortality in the most affected countries from the early 1990s to the mid-2000s. The introduction of anti-retroviral therapy (ART) by the mid-2000s has, however, brought AIDS death rates, and with it adult mortality, down very considerably. For rural uMkanyakude, KwaZulu-Natal, South Africa, adult mortality fell by 36% between 2003 and 2010, owing almost entirely to a 54% cut in deaths to AIDS and associated tuberculosis (Mossong et al. 2012) In rural Karonga, northern Malawi, adult mortality was reduced by 40% between 2002 and 2012, largely owing to the introduction of ART and so fewer people dying of AIDS and tuberculosis (Glynn et al., 2014).

4.3 Causes of mortality

Most early childhood deaths occur very early in life: more than half before age one, and 40% or more in the first six weeks. Immediate causes include sepsis, prematurity and asphyxia and acute lower respiratory tract infections. Behind these, factors commonly cited leading to sickness and early death include: household income and wealth; education of parents and especially mothers; age that mothers marry, have their first child, birth spacing and birth order; health services and other public interventions.

4.3.1 Household income and wealth

Higher household incomes and more wealth generally lead to less child mortality.

In Ballabgarh, just south of New Delhi, **India**, under-five mortality improved from 102 to 25 deaths per thousand live births as indices of wealth increased (Krishnan et al., 2011). Across rural India, higher standards of living in households were associated with lower infant mortality (Dwivedi et al., 2013). In Fars Province, **Iran**, wealth was also associated with fewer infant deaths (Mirahmadizadeh et al., 2012), as was also the case of **Kenya** (Gilbert and Gichuhi, 2014).

Incomes and wealth could operate through several paths: it may mean that children are better fed, that they live in cleaner environments with running water and flush toilets, or that parents can afford medical care. In addition, income and wealth may correlate with other causes such as education.

4.3.2 Education

The children of more educated parents, and especially mothers, usually have markedly greater chances of survival.

In Matlab sub-district, **Bangladesh**, between 2002 and 2007, children whose mothers had secondary education were 38% less likely to die before age five than those with uneducated mothers. This relation was stronger in the early 2000s than it had been in the late 1990s. Fathers’ education also tended to reduce the risk of children dying early, but this effect was less strong than mothers’ education (Akter et al., 2015). More widely in rural

Bangladesh, better educated mothers have fewer instances of their children dying early (Afzal and Alam, 2013).

In rural **China**, maternal education was a key to reducing under-five mortality (Feng et al., 2012).

In rural **India**, surveys from 1998-1999 show lower infant mortality for mothers and fathers with more education (Dwivedi et al., 2013). Literate women from Scheduled Castes in India were 40% less likely to experience death of their children before age five than illiterate women (Sahu et al., 2015).

In Upper East Region of **Ghana**, one of the most deprived areas of the country, mothers with 'primary or junior high school education were 45% less likely to experience under-five death than mothers with no formal education at all' (Kanmiki et al., 2014). Across rural **Ghana**, the young children of mothers who participated in adult literacy classes had significantly lower mortality than those with other comparable mothers (Blunch, 2013).

Infants of mothers with secondary or higher schooling were 56% less likely to die before their first birthday in rural Tigray, Ethiopia, in 2010 to 2013 (Weldearegawi et al., 2015). In rural Fars province, Iran, infant mortality was lower among women who were literate (Mirahmadizadeh et al., 2012).

Only in one study was education of mothers not found to be significant, which was that of Kenya for infant mortality in rural areas (Gilbert and Gichuhi, 2014). The authors wondered whether this might have been because health facilities and clean water were common in rural areas, thereby reducing the advantages of education.

As with income, the paths through which female education lead to lower child death are probably several. Staying in school prevents early marriages and reduces early births that are riskier for mothers and children. The longer girls remain in school, the less likely they are to get married as children: **declining child marriage** also means that girls are more likely to complete education, less likely to suffer complications in childbirth, and more likely to take up jobs.

Progress is most dramatic when it comes to the marriage of girls under 15 years of age. Globally, 1 in 4 young women alive today were married in childhood versus 1 in 3 in the early 1980s. The proportion of young women who entered into marriage before age 15 declined from 12 per cent to 8 per cent over the same period. (UNICEF, 2014)

Education may confer knowledge of risks to infants and young children and how to reduce them. Education of women may be associated with more income in the hands of mothers who can use this to ensure their infants get a good diet, a clean environment and any paid medical services. More educated women may also be more confident and willing to take up health programmes.

4.3.3 Maternal factors: age of marriage, first child, birth spacing and order

Age of marriage and first birth are commonly found significant influences on child mortality; with children born to very young and relatively older mothers most at risk. In rural Tigray, **Ethiopia**, infants of mothers aged 15-19 years were more than 2.5 times more likely to die before their first birthday than those born to mothers aged 25-29 years. In Upper East Region, **Ghana**, infants born to mothers between 35 and 49 years of age were more than 11 times more likely to die before age five (Kanmiki et al., 2014). In the same region, women who were married were less likely to experience early death of their children than those who were single, divorced or widowed; and monogamous married women had fewer deaths of their children than those in polygamous marriages.

In rural **India**, 1998-1999, mothers aged less than 20 years were 1.5 times more likely to experience the death of their children before age one (Dwivedi et al., 2013). Among Scheduled Castes in India, infants born to women aged over 30 were 30% more likely to die before their first birthday than those born to mothers aged 20 to 29 (Sahu et al., 2015).

Birth spacing and order: young children are more likely to survive when the spacing between births is longer; those born later in the order are more vulnerable, as, in some cases, are first-born infants.

In **Kenya**, infant mortality was lower in rural areas for longer spacing between births and for the earlier positions in the birth order (Gilbert and Gichuhi, 2014). In rural India, 1998-1999, higher risks of infant mortality applied to either the first born child or to those born fourth or more in the order. Lower risks applied when the interval between births was more than two years (Dwivedi et al., 2013). Among Scheduled Castes, children born fourth or more in the order were 42% more likely to die as infants (Sahu et al., 2015). In Matlab, rural Bangladesh, the survival chances of children were also seen to improve with longer birth spacing, with contraception as the immediate instrument to lengthen spacing (Saha, 2012).

4.3.4 Health services and other public interventions

Comparatively simple health interventions can cut morbidity and mortality. For the very young, interventions start with better attention to births, since neonatal mortality accounts for a high proportion of early deaths. Antenatal checks and treatments and having deliveries in health centres has been seen to reduce chances of early death.

In **China**, neonatal mortality was twice as high in rural areas in 2005-2006 than in urban areas, much of the difference being owed to the prevalence of home deliveries in rural areas (Wang et al., 2010). Clean water and sanitation were seen as reducing under-five mortality in rural China (Feng et al., 2012).

The large differences in under-five mortality seen in rural **India** across states in 1998-1999 was not just a reflection of different income levels, but significantly also reflected public programmes.

A decomposition of these state-level fixed effects shows that lower child mortality is associated to higher schooling expenditures, higher female immunization rates, and lower poverty levels. This provides some additional evidence that state-level expenditures (and, thus, public policy) may be important in reducing infant and child mortality. The estimation results indicate that child mortality rates can be reduced substantially by improving educational attainments of women, reducing indoor air pollution, and providing safe water. (van der Klaauw and Wang, 2011)

The same surveys of rural India showed higher risks of mortality for infants whose mothers did not attend antenatal checks, who did not receive two tetanus toxoid doses, who did not consume iron tablets when pregnant, who did not deliver at a formal health facility and for infants who did not get colostrum after birth (Dwivedi et al., 2013).

Hospital deliveries also lowered risks of infant mortality for mothers in rural parts of Fars province, Iran (Mirahmadizadeh et al., 2012).

After birth, immunisation against common diseases and oral rehydration for infants with diarrhoea are two examples of treatments that have lowered under-five mortality. The benefits of primary health care extend to adults as well. The marked reduction in rural adult female mortality seen in India since 1971, described in section 4.2.2, is associated with three closely-related factors: lower fertility; safe motherhood including antenatal checks, treatments and delivery in health facilities; and general public health services (Krishnaji and James, 2002).

4.4 Prospects for mortality

During the last two decades, many countries have considerably reduced mortality of children under age five. Differences between urban and rural mortality rates have been cut. Yet rural rates are usually higher than urban; and rural rates vary much within countries. This suggests that there is plenty of scope to continue to improve child survival between 2015 and 2030. As child survival improves, life expectancy will lengthen. Three consequences may be expected:

- Crude death rates in rural areas will fall in most developing countries, thereby tending to prolong rural population growth even while fertility may be falling. This will be attenuated in middle-income countries that are sufficiently far through their demographic transition to have large numbers entering their elderly cohorts, whose eventual demise will tend to raise the death rate.
- As more children survive in rural areas, parents may plan for fewer children, realising that replacements for lost children are increasingly unlikely to be needed, thereby tending to push down fertility.
- Perhaps most important of all, child mortality is becoming relatively infrequent. With under-five mortality now commonly falling to less than 75 per thousand births, the large majority of children survive to age five and beyond. But it is not just about survival: lower mortality is almost always accompanied by lower morbidity and less growth retardation. Put simply, the quality of children is most probably improving, with future benefits for the individuals, their families, communities and society at large.

5. Migration: Populations on the move

This section examines the incidence of migration, categorised by destination and duration, and its drivers and impacts on rural populations in the developing world. Movement of refugees fleeing conflict or natural disasters is excluded from this discussion.

5.1 Incidence and patterns of migration

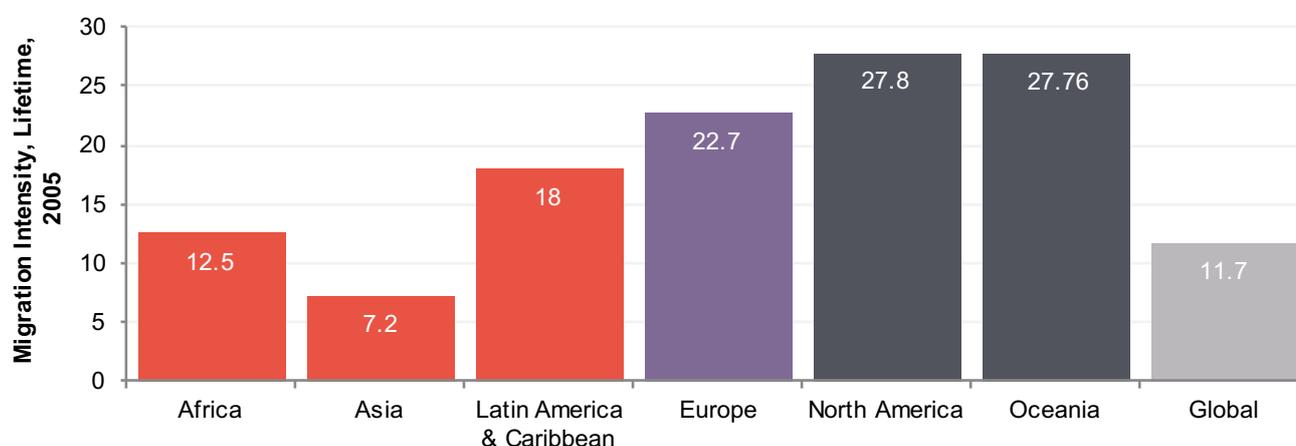
Migration as a concept can be as fluid and hard to pin down as the movements of the people migrating themselves. Spatially, migration may cross international borders, state lines, or merely parish boundaries; often it involves moves from rural areas to urban centres, but significant flows can be seen from rural to rural areas, and even from urban to rural areas. Migration may be

permanent, but many moves are seasonal, cyclical or otherwise temporary. Given all these distinctions, defining and tracking migration is not easy: even censuses struggle to record movements.¹⁴

International migrants are estimated to make up just over 3% of the global population (UN DESA Population Division, 2013), while domestic migrants make up at least 12% of world population (Bell and Charles-Edwards, 2013).¹⁵

Internal migration is greater in wealthier regions of the world (Figure 5.1). Migration rates differ strongly across the developing world, with Asia reporting significantly less migration than other parts of the developing world. Variations between countries are similarly large.

Figure 5.1: Intensity of internal migration, lifetime, 2005, world and major regions



Source: Bell and Charles-Edwards (2013)

Note: Intensity measures the proportion of all those in censuses and surveys declaring that they live outside their home region.

14 Censuses often ask where people were born, or where they were living at the last census. Much temporary migration may this be missed. How far a move constitutes migration is another tricky point: is the spouse, who moved a few kilometres to a neighbouring village to live with their new partner when he or she married, a migrant?

15 In some developing countries, migrant populations are far greater. For instance, more than 10% of Mexicans are currently migrants in the US (Shroff, 2009), while 15% of the Mexican rural population are migrants (Wainer, 2011). India estimated in 2011 that as many as 33% of the population were migrants (Indian census data, 2001 and 2011; UNESCO, 2014). Far more people receive remittances from internal rather than international migrants.

It is a common perception that migration is increasing, but the fraction of global population classed as international migrants has remained around 3% for many decades (de Haas, 2014), while trends in internal migration since 1990 show it rising, stable, and falling in different countries, with no clear overall pattern (Bell and Edwards-Charles, 2013).¹⁶

5.1.1 Rural to urban migration rates

Partly owing to differences in definitions,¹⁷ and partly to imperfect capture of movement by censuses or other national surveys, especially when it comes to temporary movements, precise statistics on migration remain elusive. It is not easy to establish the degree to which changes in rural population have been driven by migration as opposed to natural growth.

In theory, this might be answered by comparing rural population at time t to that in time $t-1$; then estimating what the rural population at $t-1$ would have become by t , by reference to rural birth and death rates. The difference between the estimate for t and the observed population should then be migration out of rural areas. That would account for most changes in the distribution of population between rural and urban areas, except for those caused by

the reclassification of growing rural settlements as urban and the expansion of city boundaries to include formerly rural areas on the periphery.

Unfortunately, reliable estimates of crude birth and death rates for rural and urban areas separately are simply not available over the period of interest for most developing countries. Hence a less precise computation is all that is possible: applying national crude birth and death rates to rural populations [net migration out of rural areas = rural population at $t - (1 + \text{national birth-death rate}) * \text{rural population at } t-1$]. The same calculation can be applied to urban populations as well, expecting in this case to find total growth to be greater than natural increase, the difference being net in-migration. This would be reasonable so long as the differences between rural and urban birth and death rates are relatively small, or that the natural increases are similar, and provided the effect of reclassification of settlements is minor.

Box E shows the results of this exercise for the 16 selected countries for 2000 to 2013. The results, however, are not that convincing, suggesting that the assumption that the natural rate of increase in urban and rural areas might be similar does not apply.

Box E: Simple estimate of rural to urban migration, 2000-2013, selected countries

For each year, the natural growth rate, birth minus death rate, was applied to rural and urban populations. The resulting population values were summed, then compared to the reported rural and urban populations.

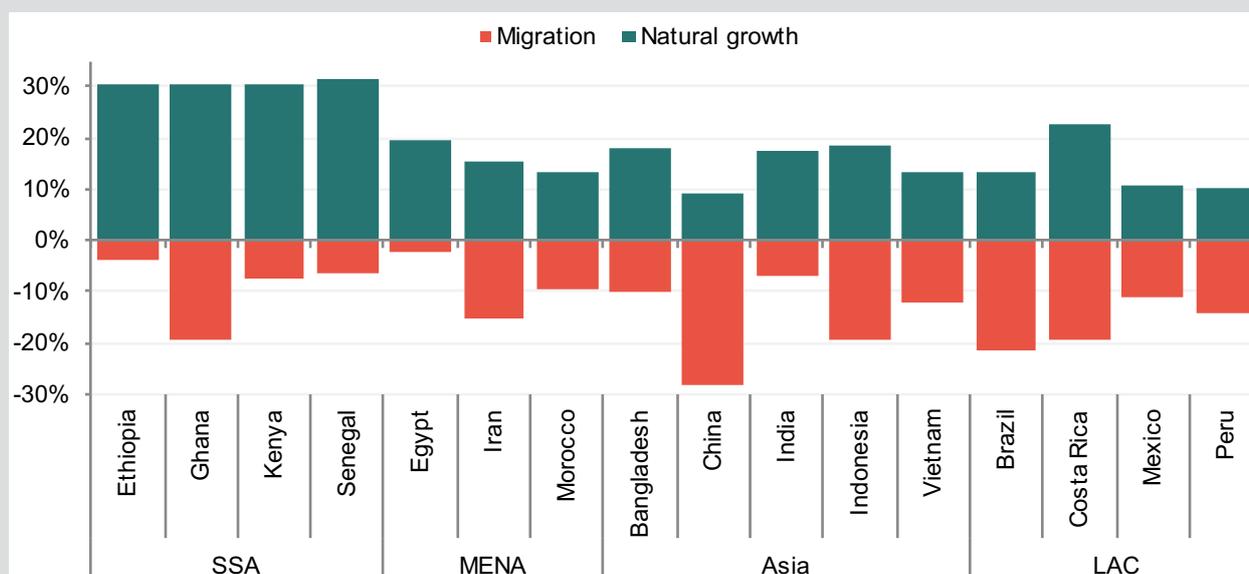
Although the urban and rural calculations of implicit migration should have been equal, in practice they were not. Indeed, only in nine of 16 cases – Brazil, China, Ethiopia, Ghana, India, Indonesia, Iran, Kenya and Vietnam – were the estimates within 30% of each other. The two figures of rural outflow and urban influx were thus averaged. The resulting absolute value was then expressed as percentage of the original rural population.

Rural out-migration was then compared to the estimated natural increase of the rural population, also expressed as a percentage, as shown in Figure E1.

16 Human history over the long run is about settlement, not movement. The great migrations that populated the continents lie in the very distant past: the agricultural revolution that began around 10,000 years ago saw people settle down, rather than move in search of what could be hunted and gathered (de Haas, 2014). Technical progress has tended to fix people in place, rather than encourage migration. On the other hand, very short-term moves such as commuting, business trips and tourism have increased with wealth and technical progress, but not evidently changes in residence (Wiggins and Keats, 2015).

17 Differences in definitions arise from considerations of time and location. For time, migration rates may be taken as any move during a lifetime, or a move in the last five or fewer years. For location, the question is the distance moved to count as migration. Generally people make more short moves than long ones: if then a census only records moves beyond a person's home state, province or region, there will many fewer movers than if it records moves out of their home parish, canton, municipality, ward or sub-location (Wiggins and Keats, 2015).

Figure E1: Rural population change, 2000-2013, from outmigration and natural growth



Source: constructed with data from World Bank WDI on crude birth and crude death rates, and UN population estimates from FAOSTAT

Note: Migration figures are negative as on balance the migration is from rural to urban areas.

In all cases, natural growth was positive, ranging from as much as 31% in Senegal, to as little as 9% for China. All rural areas experienced an estimated outflow, but with great variations from as little as 2.2% for Egypt to as much as 28% for China. In just four cases, Brazil, China, Indonesia and Peru, was rural out-migration sufficient to reduce rural population.

The results of this analysis are not wholly convincing. That the rural and urban estimates are often so far apart suggests that the two assumptions of roughly similar natural increases in rural and urban areas, and minor effects from reclassification, are significantly awry. Caution is therefore advisable in interpreting these estimates, although they may very roughly represent the breakdown expected between changes in rural population owing to outmigration and those owing to natural growth. Some patterns support existing expectations:

- In **sub-Saharan Africa** where fertility rates remain relatively high and countries have yet to enter far into the demographic transition, natural growth of rural areas far outstrips outmigration. Ghana stands out among them for having relatively high levels of rural out-migration, which may reflect strong out-migration from the north of Ghana (see Anaglo et al., 2014 or Amoah and Eshun, 2013).
- Natural growth represents a smaller proportion of growth in the **North African** examples, but rural outmigration is also relatively low, particularly in Egypt.
- **China** stands out among the Asian examples for its high out-migration from rural areas, as is well documented (see for instance Chan, 2013). Overall China's rural population shrank by 19% over the period, with natural growth only adding about 9% to the population between 2000 and 2013, the lowest of all the country cases. China's low natural growth is confirmed by Lam and Leibbrandt (2013): 'In China the number of children aged 0-4 will fall by 18 million from 2010 to 2030, a 22% decline, while in the least developed countries the number of children aged 0-4 will increase by 31 million, a 25% increase'.
- Rural outmigration may seem low for **India**, but this is consistent with studies that find rural to urban migration may be overstated, such as de Haan (2011). It could be that much of the internal migration in India is from rural to rural areas. It could also be a result of India's high threshold for urban settlements: many small market towns would remain rural by local definitions.
- Rural population falls in the Latin American examples were seen for Mexico, Brazil, and Peru, driven by moderately strong rural outmigration and relatively low natural growth (lower than levels seen in most of the Asian examples).

5.1.2 Patterns of migration

Experiences of rural migration are highly varied, depending on specific circumstances. Some broad generalisations can be drawn, however, about who migrates and why, the influence of land tenure, and whether migrants return home (Wiggins and Keats, 2015):

- **Age of migrants:** Generally, migrants tend to be young. This sometimes owes to their greater formal education, skills and information than older counterparts. It may be because there are fewer opportunities locally, including too little land to farm on their own account. It may also be that they need to earn and save to accumulate capital to marry, acquire land, buy tools, invest in a small business and so on. Older people, on the other hand, are often more tied down by their responsibilities – above all adult women expected to care for households and children.
- **Sex of migrants:** Great differences are seen. Men tend to be freer to move, with fewer responsibilities tying them to a household. Women may be more likely to migrate when they are young before marriage, and when they are allowed to. Striking regional differences emerge: in Latin America for instance, young women often leave rural communities to work in cities as domestic help, often intending to save and return home with capital. The Philippines has extraordinary numbers of young women who emigrate to work as domestic help or as nurses. In other areas, such as Middle East and North Africa, most young migrants are male. While cultural concerns might explain some of these differences, economic opportunity can outweigh longstanding ideas about women staying home: Bangladesh's experience of young women moving from rural to urban centres to work in the garment industry is a case in point.
- **Pulled by opportunity, or pushed by desperation?** Although more recent studies of migration stress the greater mobility of those with capabilities and aspirations, some remote areas with few local opportunities have long been centres of emigration – such as the Upper East region of Ghana, and further north, the Sahel. Local opportunity, counter-intuitively, can sometimes drive migration if it is the only way to generate funds to invest in the opportunity. For example, in Jharkhand State, India, some people left their districts when irrigation was introduced to earn enough to rent irrigated land. If rural credit markets worked well, people would not need to leave, but often a loan of sufficient size cannot be had.
- **Effects of land tenure:** Rural landless people are more likely to migrate to find better-paid work than those

with land. Farmers with insecure or ambiguous tenure can be discouraged from migrating when residence is key to retaining land rights. This might not prevent some members of the household from moving, but it does mean part of the household often remains to maintain access to land. Across much of SSA, residing in the community confers rights to farm land, to build a house and to use commons to graze animals and collect fuel wood and wild foods. Hence migration is rarely undertaken by the whole family: adult women, children and the elderly remain while men move.

- **Returning migrants:** Migration, particularly to cities, gives an impression of permanence. But it seems that for every permanent move, many more temporary moves may be undertaken. Indeed, it is now clear that some migrants may leave their home villages for decades, only to return home. The city has its attractions when working, but for retirement the village offers the security of land to farm, as well as a familiar social and cultural setting. That has long been seen in Africa, but it can also be seen in contemporary Thailand.

5.2 Drivers of migration

Migration responds to both economic incentives of higher pay on offer at destinations, as well as to social motivations of marriage and new experiences. Much of the migration from rural areas can be seen as a household decision to allocate labour to where it earns its highest net returns. Some of these moves effectively overcome limitations in rural insurance and capital markets (Wiggins and Keats, 2014).

Some migration of course takes place in desperation in order to ensure household survival, but more often it is a response to an opportunity. It tends to increase along with capacities and aspirations of potential migrants, meaning it is not always the poorest who move most. Moreover, movements can be substantially influenced by social networks that provide information about opportunities, as well as initial support for migrants seeking work, housing and urban services.

Households with migrants can increase their livelihood portfolio, reduce risk and enhance welfare. Moreover, sending households benefit from remittances which tend to be used for higher consumption, spent on food, medicines, consumer goods and better housing. They may also be invested in school fees, in businesses, and in land and agricultural production (See for instance Mohapatra and Ratha, 2011 from Tanzania and Kenya; Singh et al., 2011, 2012 for Bihar, India).¹⁸ Though labour may be lost, increased earnings and remittances tend to allow for

¹⁸ International remittance flows have boomed to more than \$430 billion a year in 2013, not including funds sent through informal channels: far more than official development assistance in the same year of under \$150 billion (World Bank, 2014).

compensating investments in farms and rural businesses, such as hiring of extra labour.

Migration has its drawbacks and dangers. Leaving the household is often stressful and lonely for both migrants and the rest of the family (for example Eversole and Johnson, 2014). Migrants run the risk of being badly treated in their workplaces, living in poor conditions (recent reports of abuse faced by migrant workers include Davey, 2014; Gulf Daily News, 2014; Unnikrishnan, 2014; Smith, 2014; Hawksley, 2014; Hosea, 2014; US Department of State, 2014), and suffering discrimination in access to urban services (see Rogaly et al., 2001 for examples of internal migrants in India, or Chan, 2010 detailing some of the hukou restrictions in China.)

5.3 Prospects for migration

Even if migration is clearly a complex phenomenon, at least two things can reasonably be expected in the future.

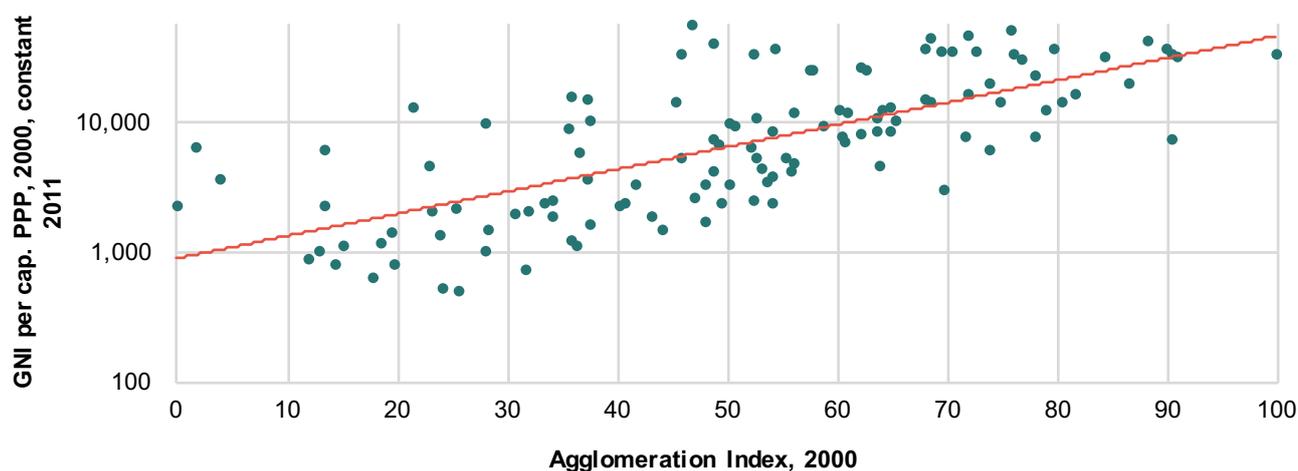
One is that rural-to-urban migration will continue and quite strongly. The relation between economic growth and urbanisation is well established: the higher per capita incomes, the greater the level of urbanisation (Figure 5.2). Just over half the variation in agglomeration may be explained by the level of per capita income.¹⁹

For the 16 selected countries, growth in incomes from 2000 to 2013 might then be expected to have raised their agglomeration indices by a median of 5.5 percentage

points, varying from less than one to 17 percentage points more, depending on economic growth. To increase urbanisation, either the natural growth of the cities has to exceed that of rural areas or else people have to migrate from rural to urban areas. Given that the (crude) natural rate of increase in rural areas exceeds that of urban areas in most developing countries (Jedwab et al. 2014), then any increase in urbanisation has to come from rural-to-urban migration. To urbanise when the rural population is growing faster than the urban requires large numbers to migrate: probably around 5% to 10% of the rural population every decade.²⁰

The second expectation is that **migration of all kinds from rural to urban and from rural to rural, permanent and temporary, will increase.** If migration is, as de Haas suggests, a function of capabilities and aspirations, then the rising level of formal education in rural areas and the increasing awareness of opportunities in other places conveyed by media and personal communications is likely to stimulate more young people to move. Climate change will enhance this: few activities are affected as much by the climate as agriculture, and as weather patterns alter, so too will the agricultural potential of affected areas. Some farm households may relocate from areas that have lost potential to those that have gained, within the limitations posed by borders and access to land.

Figure 5.2: Urbanisation and per capita income, 2000, 120 countries



Source: Agglomeration Index from World Development Report 2009, GNI data from World Development Indicators.

Note: The Agglomeration Index, a measure of settlement density and proximity to cities, is preferred to the usual country-defined measures of urbanisation since it uses the same measure of urbanisation across the world. Estimates, however, only exist for 2000.

19 Regressing logged per capita GNI PPP in 2000 on the Agglomeration Index gives a linear estimate of $Y = -62.56 + 12.86X$; the model has an adjusted R-square of 0.51; model and parameter estimates all highly significant (> 99.99%).

20 Imagine a country of 20 million persons that in the year 2010 has 14 million persons living in rural areas, growing at 2.75% a year natural rate of increase, while 6 million live in urban areas with natural increase of 2.5% a year (these rates are those seen in SSA in the 2000s). Urbanisation in 2010 is 30%. If that were to move to 35% in a decade, roughly the rate that modelling predicts, then to achieve 35% urbanisation by 2020, 1.43 million persons would need to migrate from rural to urban areas over the decade.

6. Key policies for population change

Demographic challenges facing rural regions in the developing world are significant, but policy can help ease transitions already underway, or speed transitions where they may be slower than ideal. Three key areas of policies are indicated: those to encourage reducing population growth; those to facilitate land consolidation; and those to help ease migration.

6.1 Reducing population growth

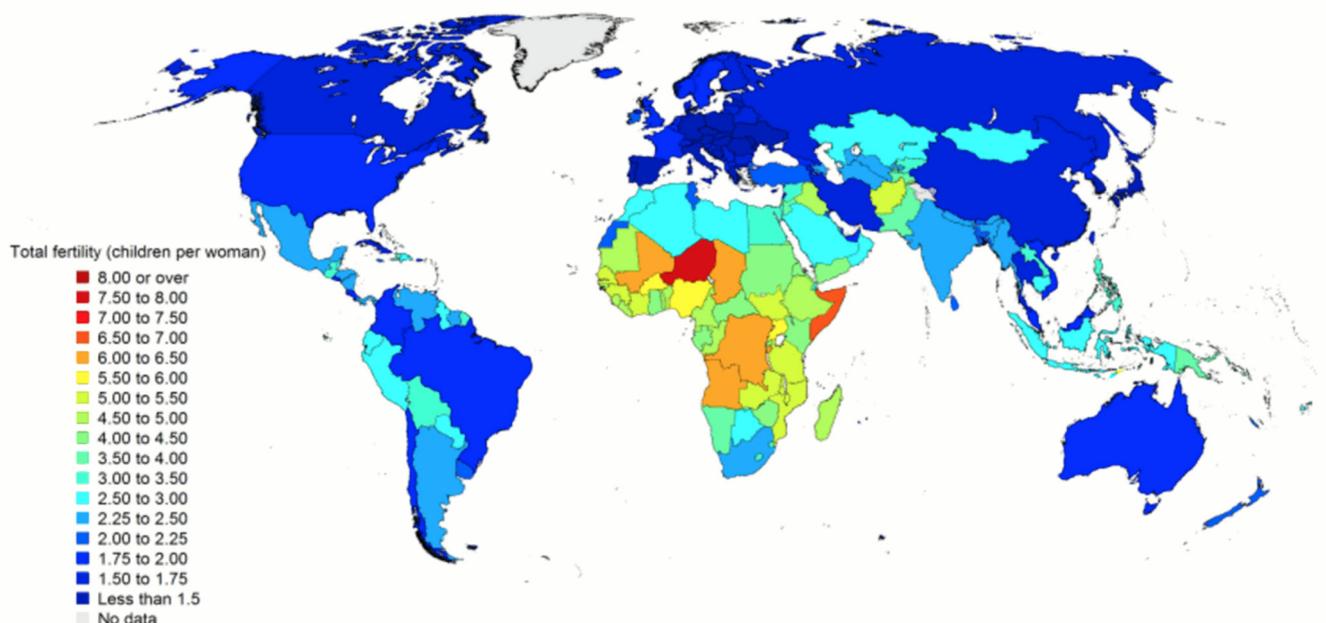
Only relatively recently in history have policies begun shifting from pro- to anti-natal. Economic and cultural shifts, described in the introduction, mean historical imperatives for higher population are weakening.

Fear of population decline, censuses to warn of it, and pronatalist and other policies to avert it are almost as old as states themselves. Rulers and states in the past and present, and stateless tribal societies, found affirmation, strength, and protection in population

growth and cause for alarm in decline as symptom and cause of failure and weakness. Where land is relatively abundant and productivity static, population numbers are the limiting factor of production, their increase to be encouraged by any means including conquest, the prohibition of emigration, and enslavement; their diminution to be avoided at all costs. Mercantilist thinking gave first place to the power and wealth of the state and regarded population as a prime component, to be increased irrespective of the effect on individual standards of living. (Coleman and Rowthorn, 2011)

Globally, population growth has slowed, with fertility declining below replacement levels in many areas (see the darker blue areas on the map at Figure 6.1). Indeed, in some high-income countries such as Japan and those of the European Union, slow growth or decline of population and an aging population present very real policy challenges.

Figure 6.1: Map of national fertility estimates, 2010-2015



Source: Wikimedia commons. Map using data from UN World Population Prospects 2015. Changes through time available at https://upload.wikimedia.org/wikipedia/en/8/86/Total_Fertility_Rate%2C_1950_-_2100%2C_World_Population_Prospect_2015%2C_United_Nations.gif

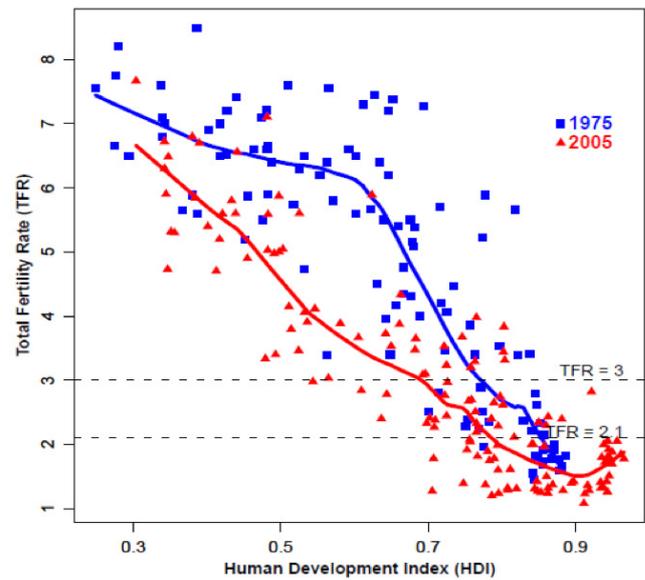
Several countries continue to have far higher than replacement levels of fertility. These countries tend to be less developed, have high dependency ratios and sometimes relatively poor reproductive health, and struggle to provide public goods and services, jobs and livelihoods for their new citizens. Kohler (2012) identifies some 58 countries as ‘high fertility’, defined as having a Net Reproductive Rate measured in daughters born per woman as above 1.5. Most (39) are in Africa, nine in Asia, six in Oceania, and four in Latin America. Around two in three of these countries are on the UN list of ‘least developed’, while most have population growth rates of 2.5% per year or higher, implying a doubling of population every 28 years (Kohler, 2012).

The link between high fertility and low-welfare is clear in the inverse relationship between national Human Development Index (HDI) measures and fertility rates, a relationship that became stronger between 1975 and 2005 (Figure 6.2).

Reducing population growth by lowering average fertility rates can help achieve human development goals, particularly in countries where average family sizes remain high. Rapid population growth has been implicated in poor health for women and children, slow economic growth, entrenched poverty, burdened public services and infrastructure, damage to the environment including depletion of natural resources, as well as potentially contributing to high unemployment and inequality leading to violence or civil strife (Kohler, 2012, citing Birdsall et al., 2001; Cincotta et al., 2003; Goldstone et al., 2012).

Two broad groups of policies can reduce fertility: **direct measures** to change preferred family sizes and close the gap between preferred and realised fertility; and **broader development** to affect, and usually improve, factors linked to fertility, including child mortality, women’s status, girls’ education and the like (Figure 6.3).

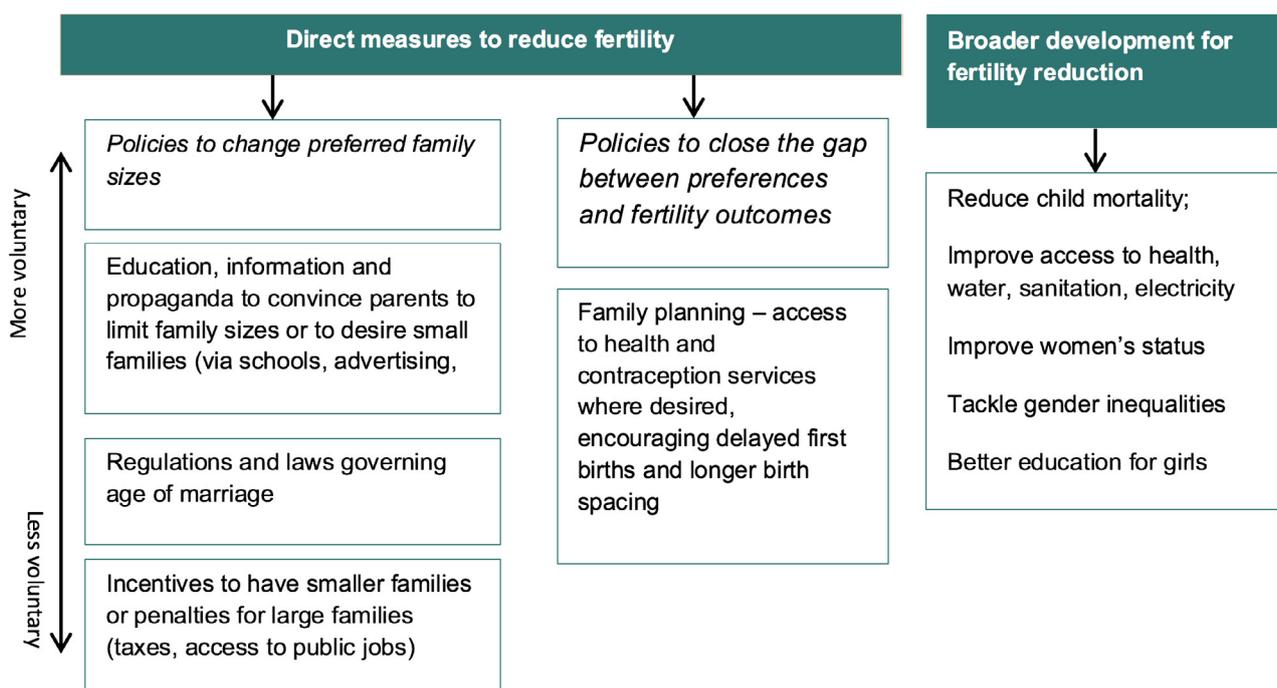
Figure 6.2: Fertility and Human Development Index, 1975 and 2005



Source: Figure 2 in Kohler (2012). Originally adapted from Myrskylä et al. (2009) and Kohler (2010)

Note: HDI is the primary index of the UNDP used to monitor and evaluate human development, combining with equal weight indicators of a country’s health conditions, living standard, and human capital. The HDI has been recalculated using a time-invariant formula to allow for comparison between 1975 and 2005.

Figure 6.3: Policies to reduce fertility



6.1.1 Direct measures

Policies to encourage preferences for small families

Although in most countries actual fertility exceeds wanted fertility, potentially large changes in fertility can be achieved by not merely closing this gap, but by decreasing wanted fertility even further. Policies to achieve this include **public campaigns** to encourage smaller families for health, economic, patriotic, or other reasons. Channels include: formal education; information and advertising through media such as radio or television, including plot lines in soap operas; direct outreach to mothers; or through messages embedded in public health services.

Part of Rwanda’s recent success in lowering fertility rates has been attributed to such messaging, including better education about the benefits of small families, as well as senior government figures championing the cause of small families.

As well as being desirable for human rights, **regulations banning child marriage** and the way they are enforced or publicised can also lower desired family sizes through shifting cultural norms.

Other, more coercive policies have been used in the past to lower desired fertility, such as fines for having too many children or incentives to undergo sterilisation (some of these were discussed in Section 3). Such policies are largely discredited not only for infringing human rights, but also for not being particularly effective. Their legacy, however, has been harmful, in that all reproductive health programmes may appear to be coercive and intrusive measures.²¹

Family planning

Family planning (FP) is largely about closing the gap between wanted and realised fertility. In some countries these gaps can be substantial. In Ethiopia, Rwanda, and Malawi, which have been credited with successful family planning programmes, the gap has ranged between one and two children per woman and has persisted even as both wanted and realised fertility have fallen (Figure 6.4); the Ethiopian gap in 2011 is notable.

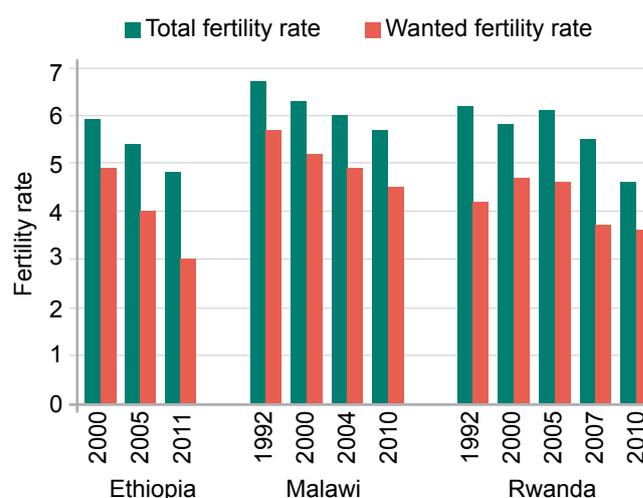
²¹ They continue to overshadow voluntary family planning programmes, and have been implicated in reducing effectiveness of other health campaigns. Attempts to eradicate polio in Pakistan, for instance, have been hampered by extremists claiming the polio vaccines are vehicles for sterilisation (see www.bbc.co.uk/news/world-asia-31507217).

Family planning has been described as ‘one of the most successful development interventions of the past 50 years’ (Bongaarts et al., 2012). Evidence that FP both works and is necessary is fairly strong:

In poor, largely illiterate countries, the record suggests that government programs are essential engines of change. No such country has experienced deep and sustained reductions in fertility rates in the absence of a strong and committed government family planning program. The experience of Kenya in the 1980s and of Rwanda in recent years demonstrates that strong government-led efforts can be as effective in Africa as they were in Asia and elsewhere three decades ago. (Bongaarts et al., 2012)

Debates over family planning persist (see Box F), with critics alleging that FP has little effect on fertility, that it is unnecessary or uneconomic, and that it tends to coerce women. Much of this can be rebutted.

Figure 6.4: Total and wanted fertility, early 1990s to 2010/11, Ethiopia, Malawi and Rwanda



Source: Adapted from Figure 3 in USAID/Africa Bureau et al. (2012). Based on DHS data

Box F: Common critiques of family planning policy and responses

Critique 1: They have little or no effect on fertility

Many consider high fertility to result from couples wanting more children to help with work and provide for them in old age, with family planning costs treated as a minor factor in parental decision making; in reality it is less simple. 137 million women in developing countries who do not want to become pregnant are without contraception, resulting in many of the 76 million unplanned pregnancies a year. A key driver of unmet contraceptive need is the cost, including materials, delivery costs, provider fees and health care, even when government subsidised. Non-economic barriers include health concerns, social/spousal disapproval, and unnecessary medical barriers such as requiring a doctor rather than nurse to prescribe contraceptives.

Success of family planning programmes in rural Matlab Bangladesh (later expanded to Bangladesh nationally), as well as national programmes in Iran, show appropriately designed FP services can help reduce unmet need for contraception and fertility, even in traditional settings.

They are especially effective when combined with other programmes such as primary education and free public healthcare.

Critique 2: Fertility declines are underway; the population problem largely solved and FP is no longer needed

Falling fertility in many countries has led to claims that the world population explosion is over, but human numbers continue to increase by more than 75 million a year. This has been the case in every year since 1970. Nearly all the future growth is to come from the developing world.

The average decline from 6 to 3 births per woman still leaves fertility substantially above the level needed to stabilise population.

Critique 3: The death toll of the AIDS epidemic makes family planning undesirable and unnecessary

The massive global effort to reduce infections via prevention programmes, and to extend the lives of infected individuals with anti-retrovirals means the HIV and AIDS epidemic has turned a corner.

After a period of rapid spread, the epidemic has stabilised in most countries, with the proportion of adults infected with HIV no longer rising, and possibly declining. Despite the substantial mortality from AIDS, UN projections for all developing regions, including Africa, predict further large population increases. The annual number of AIDS deaths (2 million) is far less than population growth.

Critique 4: Family planning is not cost-effective

Costs include contraceptive commodities, personnel and service delivery. Benefits include improvements in personal well-being, health, socioeconomic development including reduced burdens on public budgets, and reduced pressure on environmental resources. Although data to estimate all these factors are lacking, cost-effectiveness of family planning as a health investment is well established.

For instance, the World Bank's Disease Control Priorities Project estimates the cost of family planning at \$100 per life-year saved; around the same order of magnitude as other health interventions, such as basic sanitation for diarrhoeal disease, a short course of chemotherapy for tuberculosis, and condom distribution to prevent infection by HIV.

From an economic perspective, family planning contributes to lowering population growth and fertility, leading to better economic growth and lower levels of poverty than would otherwise be the case, while rapid fertility declines help create a demographic dividend by increasing the size of the labour force relative to both young and old dependents and by stimulating savings.

Critique 5: Family planning has made women the instruments of population control policies and, at worst, have been coercive

In the 1960s and 1970s, although some pilot family planning programmes proved effective in some countries, sceptics claimed couples lacked motivation to adopt contraception and pointed to a lack of fertility change in other countries, including India and Pakistan, where very early and poorly designed family planning programmes had produced disappointing results.

Several national governments (particularly in Asia) went on to employ measures designed to address the perceived weak demand for smaller families, ranging from fieldworker targets and quotas for enlistment of 'new acceptors' of contraception, to incentive payments to adopt family planning, disincentives regarding large families, community pressures to use contraceptives, and outright coercion.

These policies were attacked on human rights as well as effectiveness terms, since by the 1980s overwhelming evidence against them existed. Today, nearly all programmes globally respect the right of couples to make informed reproductive choices, free from undue persuasion or coercion. Yet, say Bongaarts and Sinding (2009), 'the perception lingers that family planning programs throughout the developing world still place undue pressure on families, and particularly on women, to conform to reproductive norms imposed by governments – a perception that is no longer supported by the evidence.'

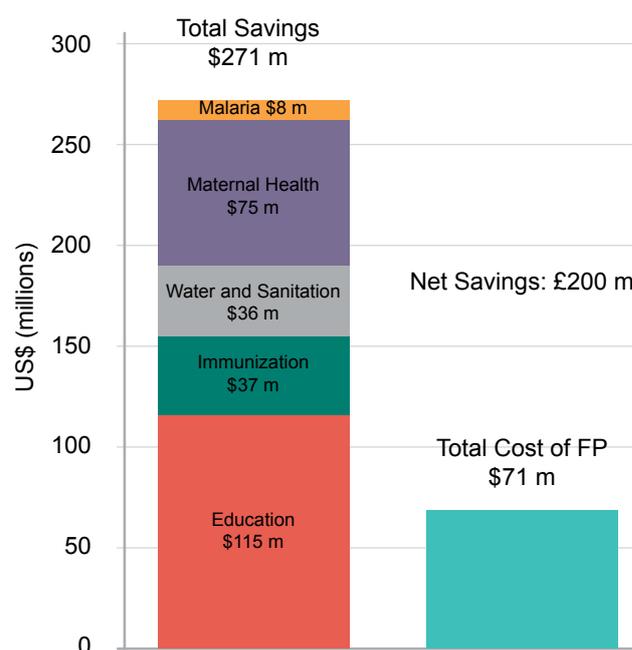
Source: Bongaarts and Sinding (2009)

Although donor funding of FP collapsed from the mid-1990s to 2010, it may be coming back into favour, with major donors such as the Bill & Melinda Gates Foundation, the World Bank, and the UK's DFID recently prioritising FP. The revival, however, has yet to result in widespread changes to government policies or national programmes (Bongaarts et al., 2012).²²

Cost-benefit ratios of family planning programmes have been very favourably evaluated, with benefits accruing in multiple areas including reduced child and maternal mortality, better schooling and gender equity, and poverty reductions (Kohler, 2012). Some examples of benefits include:

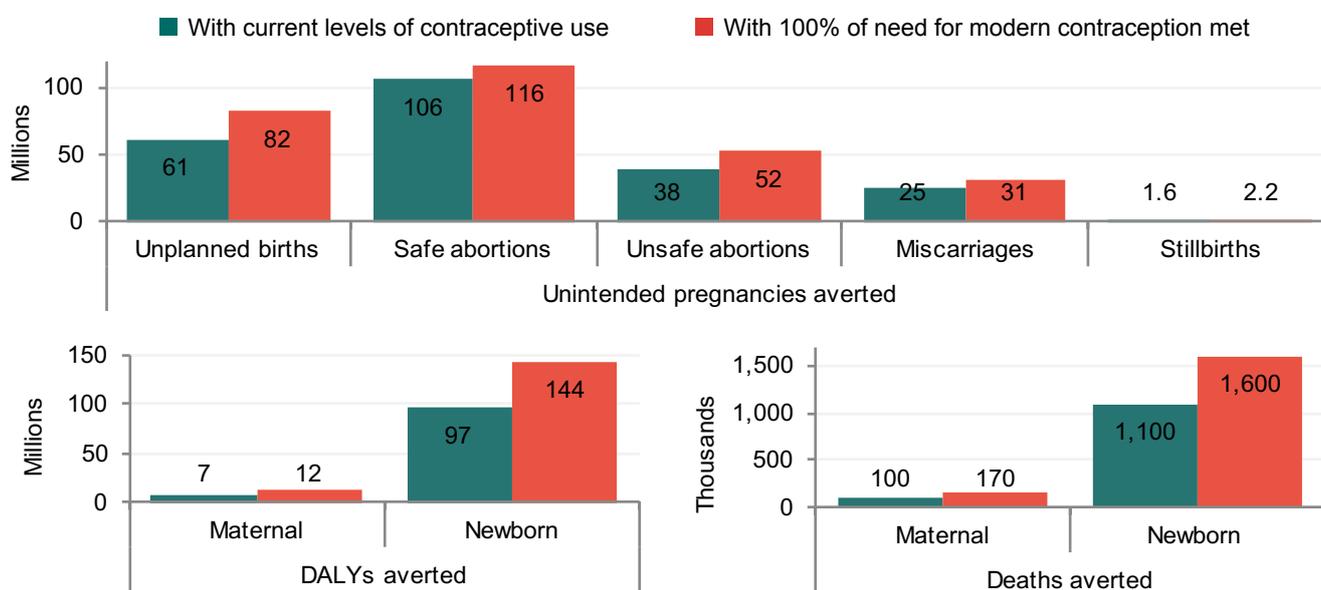
1. Reduced spending on health, schooling and other public services. Figure 6.5 provides an example from Kenya, where estimated family planning (FP) costs between 2005 and 2015 of US\$71 million are more than offset by savings in public sector spending.
2. Reduced infant and maternal mortality. Estimates of benefits resulting from women's access to modern contraceptives in 2014 were high (an estimated 652 million women wanting to avoid pregnancy were using modern contraceptives in 2014), with significant additional benefits possible from meeting unmet need for contraception (reaching an additional 225 million women) (Figure 6.6).

Figure 6.5: Cost savings and family planning costs, Kenya, 2005-2015



Source: Figure 14 in Kohler, 2012. Original source: USAID Health Policy Initiative 2009

Figure 6.6: Benefits of use of modern contraception in 2014: met and unmet needs



Source: Table x in Singh et al. (2014). Original source; Guttmacher Institute, special analyses (see Appendix, pp. 42–45 in Singh et al., 2014)
 Note: DALY = Disability Adjusted Life Years, a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.

²² Donor funding for family planning peaked at \$700 million in 2002, but by 2010 had declined to some \$400 million. Per capita, funding for family planning has fallen by more than 50% since 1995 across almost all recipient countries (Kohler, 2012).

The key lesson for family planning is to tailor programmes to the diverse demographic circumstances of LICs and MICs (Cleland et al., 2006).

Less developed countries that have implemented successful programs have made a strong political commitment to culturally sensitive, conveniently located outreach programs that offer users a wide variety of family planning methods. In particular, programs in which female family planning workers visit women in their homes bring about a tremendous increase in the use of contraception. In traditional societies, family planning programs are most successful when community leaders, those people who have a strong influence on a group's decision-making and on individual attitudes, support them. (PRB, 2015)

This lesson applies all the more strongly in rural areas where the dangers of inappropriate approaches are higher than in urban areas, since generally city-based policy-makers know less of rural settings. Thailand has had notable success with family planning since the 1970s (see Box G), in part because the programme evolved to fit with rural reality.

Family planning is probably most effective when offered as part of a comprehensive programme including efforts to promote smaller family sizes, as well as improvements to public services associated with lower desires for fertility.

Box G: Thailand's success with family planning

In the late 1960s Thailand's population was growing at 3.3% a year, with the total fertility rate at 6.3 in 1967. In 1971 it adopted a national policy for family planning to control population growth. Use of contraception that was just 14.4% of couples in 1970 had reached 79% by 2000; by 2003 the fertility rate had fallen to 1.7, below replacement, and population growth had slowed to just 0.8% a year.

Thailand achieved this through a remarkable programme that engaged with women and their families in the villages. Central to this were the efforts of an NGO, the Population and Community Development Association (PDA), headed by a determined and charismatic former senior government economist who had headed the National Economic Development Board, Mechai Viravaidya. He flamboyantly promoted condom use, with eye-catching campaigns that aimed to turn them from an embarrassment to something seen as fun.

But Mechai was more than a showman: together with health ministry officials, he trialled ways of reaching rural Thais with messages about family planning, and the means to supply them with contraceptives. The breakthrough came in 1974 when the government authorised village shopkeepers to distribute contraceptive pills: formerly this could only be done by doctors. Then came use of village nurses to administer injectable contraceptives (Depo-Provera) and carry out some forms of sterilisation. The key was to make sure that services were present in the villages, provided by local people whom women knew and could trust.

The PDA backed up its family planning with rural development, including water jars for rainwater catchment, toilets, loans of pigs, rice and buffaloes, and revolving loan funds. Participation in FP and use of contraceptives meant more access to loan funds, although the PDA claims no one was penalised for not practising FP.

The PDA became very large: today it has over 800 employees and 12,000 volunteers.

Despite Mechai becoming known as 'Mr Condom', Thais mainly use the pill, injectables, and female sterilisation: condoms rank very low on the list of methods.

Sources: Drake et al. (2014), Frazer (1992), Jitamongtree (2007), Korten (1980), Rosenfield and Min (2007), WHO (2004)

6.1.2 Indirect measures

Inclusive economic development that reduces poverty and inequality and brings improvements in welfare can also reduce fertility. This is linked to better education opportunities, particularly for girls, with more women entering the non-agricultural workforce, and to general improvements in women's status in society and empowerment that are not linked to their capacity for childbearing or raising children of any particular sex.

The strong links between improved child survival and fertility, improved women's education and fertility, as well as better economic opportunities for women, all represent pathways to reducing fertility. Much of the policy agenda here is thus about providing **public goods including health and education**, particularly in rural areas, where access often lags behind urban areas.

Programmes designed to improve the **agency of girls and women** also fit squarely into this agenda.

The status of women also affects fertility levels. Many women, especially in less developed countries, have few choices in life outside of marriage and children and tend to have large families. Investing in women, by providing education, health, and other services, helps to expand their opportunities and reduce their dependence on children for status and support. (PRB, 2015)

These efforts range from legislation and enforcement to prevent early marriage, to the promotion of women's inclusion (for instance in government employment quotas), to programmes to tackle gender-based violence, women's economic rights and empowerment, gender-responsive social protection, improved gender equality in education, working with men and boys to change social norms, engaging with broadcast media, and so forth (see World Bank 2014).

6.2 Land markets and consolidation

As the balance of national populations becomes ever more urban, rural populations eventually begin to shrink. In these circumstances, farmland can be left absent, unused or under-used. Policies to consolidate land may thus become important to drive agricultural growth and productivity.

This applies more to countries already some way through the demographic transition, and for whom agriculture remains an important part of the economy. Focusing more on Asian and Latin American countries than on those in much of Africa or the Middle East (Northern Africa and South Africa may be exceptions) is probably warranted.

Land markets may work well enough to allow land to be operated by those choosing to specialise in farming. Village studies can show remarkably active local transfers of land (Wiggins et al., 2014) under informal but locally recognised agreements. Where this applies, providing official recognition of informal rights to land, so that vulnerable people do not lose access to their land, may be all that is needed (Udry 2011). More formalised rights may help the development of land leasing, bringing benefits for both involved parties (as advocated by Lerman and Cimpoiu, 2006, for Moldova). Land transfers are not necessarily about changing ownership: more often it is rights to operate the land that move, while households that no longer farm full-time retain their property rights.

In some circumstances, specific programmes may help to consolidate fragmented land. In **China** for instance, rapid urbanisation has been said to hollow out villages (Long et al., 2012) leading to the emergence of 'empty villages', particularly in mountainous, remote, and resource-poor areas (Wu and Yao, 2010). A nationwide land consolidation programme was launched in the late 1990s, aiming not only to consolidate fragmented or underused land, but also to reclaim wasteland, land damaged by industry or natural disasters, and to develop unused land resources while guarding against desertification and soil erosion (China Daily, 2004). Farmers are the primary beneficiaries of these programmes. A total of 473,876 hectares had been consolidated by 2004, producing 171,665 hectares of new farmland.

Environmental benefits could also accrue from land consolidation policies, particularly if it prevents expansion into environmentally sensitive areas, such as forests.

6.3 Facilitating migration

Rural-to-urban migration has often and long been seen negatively, a sign of rural failure and a source of pressure on urban services,²³ rather than a step to move households out of poverty, even though most evidence sees migration as positive on balance (Lall et al., 2006 is a good summary, as is World Bank, 2009).

Nonetheless, explicit policies for migration in many developing countries have tended to focus on preventing rather than facilitating migration. In 2013, 80% of countries had policies to limit rural-urban migration,²⁴ up from 38% in 1996. This was particularly the case in least developed countries, where the percentage had risen from 53% to 88% (UN, 2013).

By and large, attempts to restrict movement have not stemmed migration, but have increased the costs and dangers to migrants. Meanwhile, policy has often indirectly encouraged migration by public spending on cities to provide services and amenities absent in the countryside (see, for example, de Ferranti et al., 2005, chapter 5, on Latin America).

Better policy would seek to facilitate rural household choices by:

Providing better information about distant opportunities to allow would-be migrants to make better choices of where and when to move, and how they may prepare for

23 Tacoli et al. (2008) rebuts this argument: 'it can be very misleading to assume that it is rural-urban migrants who are populating the expanding low-income settlements. Patterns of urbanisation closely reflect the geographical distribution of markets and their economic base... the significance of rural-urban migration to urban growth varies among countries, depending largely on their economic performance and their level of urbanization. The main component of urban growth in many countries is now natural growth rather than rural-urban migration.' Potts (2012) confirms this view for cases in Africa.

24 Policies include making it harder for people to move to cities through residence permits, deterring informal settlement in urban areas, etc.; and, on the other side of equation, using rural development programmes to make remaining in rural areas more attractive. To judge by the levels of continuing migration, these policies have not been that effective.

success by, for example, training for skills. Information may also deter unwise moves: rural Indonesians who watch television are less likely to see themselves as much poorer than their urban counterparts, have a lower estimation of the benefits of urban living than those who do not, and they hence migrate less (Farré and Fasani, 2013).

Reducing the cost of sending remittances back to households in rural areas. It costs Africa's diaspora an average of 12% commission to send \$200 back home – almost double the global average (World Bank, 2014; Watkins and Quattri, 2014). Internal remittances can be equally costly. For example, few migrants in India can use banks to send funds home since most cannot open accounts. The Post Office is an option, but money orders charge 6% commission. Most payments are therefore informal, through travelling friends and family or hawala (hundi) schemes.

Three recent developments in India may reduce costs and increase convenience: the entry of payment transfer companies using biometric smart cards to set up accounts for illiterate migrants; mobile phone payments (UNESCO, 2013); and the public initiative to set up bank accounts for all Indian households, an initiative started in September

2014 that saw 15 million new accounts set up on the first day (Gakhar and Nataraj, 2014).

Money transfers via mobile phones are now well established in Kenya with the M-Pesa scheme, which is being widely imitated by mobile providers in other African countries.

Protecting the rights of migrants as workers and in accessing services. This includes providing migrants with information on labour laws and rights and allowing unionisation. It also means giving them the same rights to public services that existing residents have, such as health, education and child care (de Haan and Rogaly, 2002; Lall et al., 2006). Indian experience shows that access to services, as well as protection from abuse by police, may be enhanced by the simple matter of proof of identity. Hence several NGO schemes now create identity cards that are recognised by city authorities. Some of these include insurance, others union membership (UNESCO, 2013).

Developing rural financial services could avert migration undertaken to accumulate capital for investment back in the village. In such cases, functioning rural credit markets would save the cost of migration and allow prompter investment.

7. Consequences of population change in rural areas

Three things may be picked out from this review. One is the way in which demographic changes promote women's empowerment in rural areas – a gentle revolution. A second is the slowing growth of rural population and its eventual decline. The third is the prospect of increasing migration out of rural areas. These are reviewed in turn, before a final section speculates on the future of the countryside in developing countries.

7.1 A gentle revolution in the lives of women and girls

For one half of society, the implications of the dramatic demographic shifts already seen, as well as those on the horizon, are potentially enormous. The lives of rural women and girls are arguably far more immediately affected by both the drivers and the implications of rural demographic change than are those of boys and men.

From a feminist perspective the question becomes whether these changes represent a big step forwards in the lives of rural women and girls in recent generations, compared to those of their grandmothers, or simply a grudging re-alignment of gender relations that does little for women's equality.

Although explicit research on the impact of demographic change on gender relations has been sparse – see quote from Malhotra, 2012, inset – there are clear pathways from demographic change to more equal gender relations.

This might come through physical changes, changing reproductive norms, economic dimensions, social aspects, or economic consequences – avenues which are often related and feed back upon each other:

- Key **physical changes** include lower infant and child mortality rates that lead parents to choose to have fewer children, as well as improved maternal health, including lower maternal mortality and morbidity. Such factors clearly improve women's experience of motherhood.
- **Changing reproductive norms** usher big changes into women's lives. Later marriage – including the decline of

The question – can fertility declines and fertility control transform gender systems and empower women – has not been coherently posed, conceptualized or tested for developing countries. It may well be one of the most important questions of our times, fundamentally affecting the lives, options, challenges, and concerns of women and men over the next several decades. ... Attention to the gender implications of declining fertility levels needs to be on the population agenda as these may signify some of the most profound and transformative shifts shaping developing societies in recent history.
(Malhotra, 2012)

child marriage, which disproportionately affects girls – allows women more opportunity to pursue education and careers, while also feeding into the physical factors discussed above. Other changes to reproductive norms include families desiring fewer children (through, for instance exposure, to norms of smaller families via the media), as well as the decoupling of female sexuality from procreation – especially with the use of modern contraception. The use of family planning not only lowers the numbers of children per woman, but also allows for longer birth spacing with physical benefits for mothers and babies.

- The **economic dimensions** of changes in fertility and changing gender relations mean women generally have access to a wider range of paid activities, while more young women are able to migrate and seek employment. In many cases, this increase in income-earning also improves women's control of incomes within households, their status and autonomy.
- **Social** aspects that contribute to these changes include increasing emphasis on girls continuing school to the end of secondary and beyond, as well as shifts in the ways women are valued.
- **Economic consequences** of changes in fertility rates include lower dependency ratios, which mean women can spend less time in child raising and domestic chores for which they shoulder a disproportionate responsibility, allowing them to live with a more equal balance between reproductive and non-reproductive goals.

Although rural women and girls in the developing world arguably still have a way to go to reach gender equality, the seismic demographic shifts taking place cannot be ignored.

Shifting norms linked to valuing girls and boys equally, that empower and enable women to choose ways of fulfilling aspirations increasingly delinked from their ability to marry, rear children, and otherwise look after the domestic sphere are more suggestive of a sea change than a marginal adjustment. The changes are significant too for men and boys, who ultimately stand only to gain from equal status with the other half of society.

A gentle revolution may be underway – one from which the daughters and granddaughters of the current generation will hopefully continue to benefit.

7.2 Slower rural population growth, eventually fewer rural people

As rural populations grow more slowly, with declining fertility as an important cause, the composition of rural populations will change. The dependency ratio, the measure of those not in active work against those who are, is likely to fall, which means that each worker will have fewer dependents to support. To some extent migration

might attenuate that since most migrants will be of working age.

So are dependency ratios falling for the 16 countries? Yes, they are and quite significantly (Figure 7.1). In Asia, the Middle East and North Africa, and Latin America dependency ratios in rural areas have been falling since the early 1990s or earlier. In most of these countries the ratio is now 0.75 dependents to workers; in some it is less than 0.55. In sub-Saharan Africa, for three countries, Ghana, Kenya and Senegal, dependency ratios have also been falling for 20 years or more, but from a high level and slowly, so that the ratios in these three countries are around 1.0. Ethiopia is the exception in that the dependency ratio rose slightly to reach 1.1 when last observed in 2007.

Slowing rural population growth is therefore delivering a 'demographic dividend' in almost all the 16 countries. This dividend manifests itself in a greater share of the population in the labour force: provided productive work is available, this should raise output. With fewer people to support, working adults will be able either to consume more or to save and invest more, thereby potentially raising future growth.

Not much has been reported in the literature that tests for this effect or estimates its strength, but some support exists. At national level, a 1% rise in the dependency ratio may reduce GDP per capita by about 1.4%, and by as much 2.5% in sub-Saharan Africa, according to cross-country regression analysis (Fayissa and Gutema, 2010). The estimated effect is powerful: Vietnam lowered its dependency ratio from 0.97 in the late 1980s to 0.53 by 2009, a 45% reduction. From the model, that might then account for a 63% rise in GDP per capita: over this time GNI per capita in Vietnam rose by 178%, so fully one-third of this increase may have come from the demographic dividend.

At a micro level, analyses in Jimma, rural Ethiopia showed that higher dependency ratios among households were closely associated with higher workloads and lower household incomes, and weakly associated with measures of body weight (Hadley et al., 2011).

Changes to the composition of the rural population and the associated dependency ratios are one effect of slowing population growth. But slower growth and eventual decline of the rural population does mean less absolute labour for either agriculture or off-farm activity. All things being equal, that would slow agricultural growth, but the composition effect would increase earnings per capita.

When rural population does enter in decline, then labour shortages are likely in agriculture, particularly at peak periods such as planting and harvest. Labour scarcity may lead to the search for labour-augmenting technical improvements such as simple machinery or the use of more external inputs such as fertiliser as a part-replacement for labour. To make such adjustments, farmers would need the capital to invest, which might come from increased

rural savings in households with fewer dependents to support. Evidence of such changes comes from China, where the rural population has been falling since the early 1990s. During the 2000s a rental market emerged for farm machinery (Zhang et al., 2015).

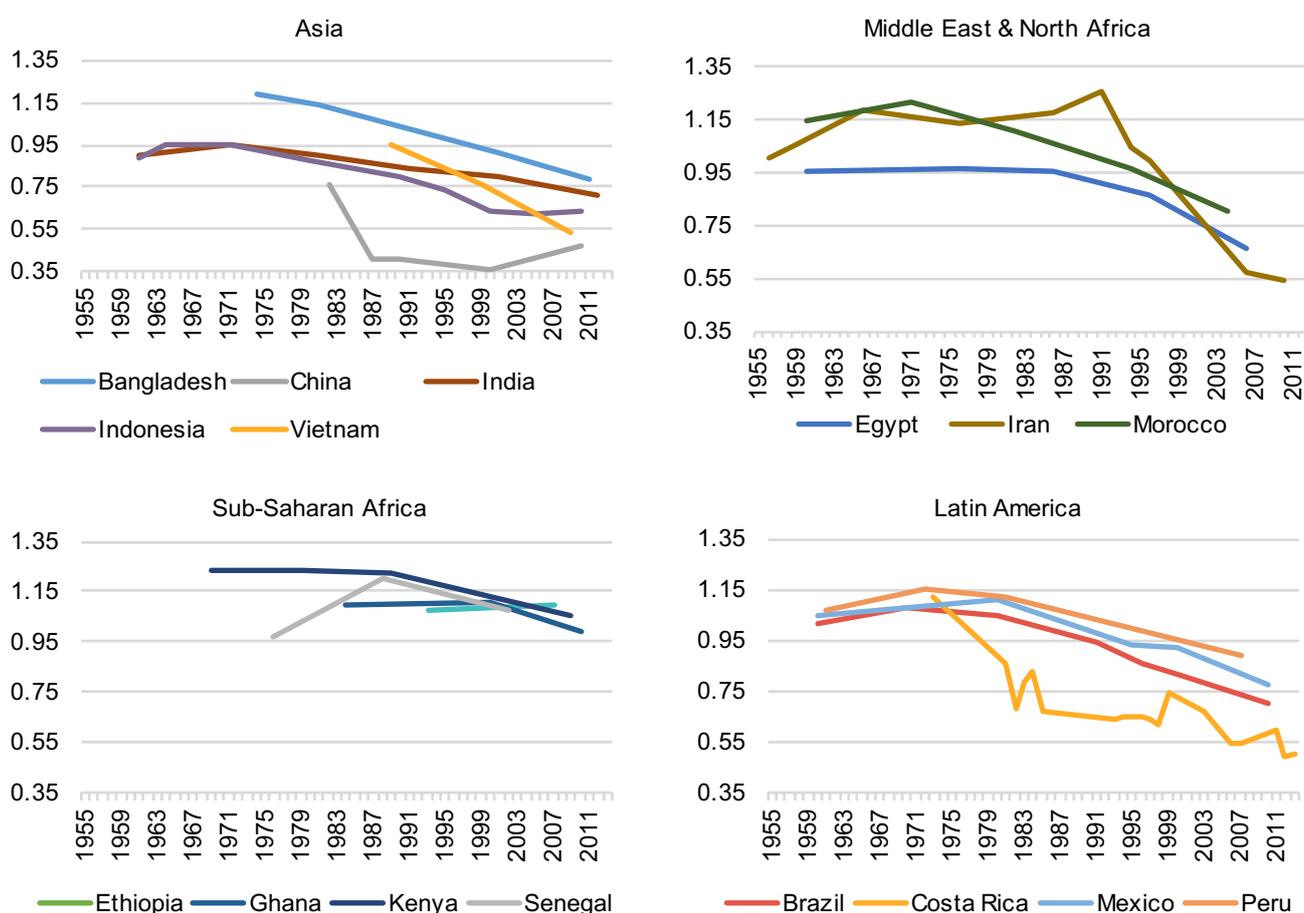
Labour shortages, however, are likely to have an even more important effect: wages for unskilled labour in rural areas will be bid up. Across many countries of Asia rural wages are rising, and in some cases with signs that the increases have accelerated since the mid-2000s. The strongest correlate of these increases is the growth of the rural population: where rural populations have contracted or grown slowly, rural wages have risen most (Wiggins and Keats, 2014).

With less labour in agriculture and more machinery, the advantage of small-scale cultivation for labour supervision will be undercut, thereby making larger-scale

farms economically viable. The stage will thus be set for land consolidation. This does not necessarily mean that the operating size of farms will become that large: if the atomised structure of farming in most high-income countries is any guide, most farms are unlikely to grow beyond the size that can be managed by a farming household.²⁵ It is generally assumed that farms do not consolidate beyond the management capacity of the household since there are still diseconomies of scale that apply when trying to coordinate and motivate a labour force that is not, unlike the household members, self-supervising.

It also does not necessarily mean that the owned size of farms may consolidate: operating sizes may rise as households specialising in agriculture rent in or share crop the land of neighbouring households who no longer farm full-time but wish to retain their ownership rights.

Figure 7.1: Dependency ratios, working age 15 to 59, in rural areas, 1955 onwards, 16 selected countries



Source: UN statistics reporting national censuses

²⁵ New Zealand has many farms that compete on world markets despite the peripheral location of the country: costs of production in dairying, for example, are some of the lowest in the world. Nevertheless, New Zealand's farms number no less than 60,000 units – a century ago the number was at most 70,000, so very little consolidation has taken place. Agriculture in high-income countries is a remarkably atomised industry: compare this to manufacturing of consumer goods where a dozen or fewer multinationals operating in multiple territories dominate the world market for cars, televisions, mobile phones, etc.

7.3 Out-migration: likely to continue and intensify

It is likely that out-migration from rural areas will continue and quite probably intensify. Migration responds, at least to some degree, to combinations of individual capacity and aspirations, allied to social networks. All these factors are likely to apply more strongly in the future. Young adults in rural areas are likely to be better educated than their parents; their aspirations may be greater since they have more access to media and internet to know of distant opportunities; and some will be more likely to have contacts with kith and kin at potential destinations owing to former migration from the village. That means more, rather than less, outflow may be expected in the future.

Households and communities experiencing out-migration potentially will see the following consequences:

- They lose the labour of the migrant.
- They may gain remittances that can be used for consumption and investment and which, by diversifying the household's sources of income, can reduce their vulnerability.

While labour loss may be a drawback, it could be advantageous if migration allows the household member to earn more than they could had they remained in the village. Remittances might be used then to hire in labour replacements, with the difference between the destination wage and those in the village resulting in a net gain for the household.

From what can be seen in the literature on the balance of these effects, most studies at district and community level report net benefits from out-migration (see the review in Wiggins and Keats, 2014). Households with migrants are usually better-off than comparable households without migrants

7.4 The future countryside of the developing world

Future trajectories in the rural areas of the developing world are thus likely to be very different to what has been typically seen in the past half century or longer, when rural populations have grown rapidly. Demographically, rural areas are likely to see:

- Loss of population as the natural rate of growth slows, or possibly even turns negative, while people migrate out of the rural areas.
- Population concentrating more in the working age cohorts and delivering a demographic dividend, at least initially. Migration would be expected, however, to remove people from working age cohorts so mitigating this effect, but from the evidence of falling dependency ratios since 1990, it seems it is not able to entirely offset this effect.

- In time, the large cohorts from times of rapid population growth will progress out of the workforce into retirement, when dependency ratios will once again rise. Where migration is strong this could lead to a countryside with relatively few of working age with many elderly persons.

Economically, these changes to population will contribute to processes in which:

- Agriculture mechanises and uses less labour.
- Land markets steadily concentrate operated holdings, although not necessarily ownership, in the hands of a minority of households in each village who specialise in farming full time. They may not operate all the land: some of the households that gain most of their income off the farm may still retain part of their owned land for part-time and hobby farming.
- Rural wages rise as labour becomes scarcer. While wages may rise, they may well still lag behind those in urban areas, since productivity typically remains lower in agriculture than most urban occupations.

These changes will take place in most cases as rural areas become better connected to urban areas, owing either to improved transport links, or to local rural centres growing to become substantial urban areas. Improved connections will likely create new opportunities for the rural economy, such as supplying the towns and cities with high-value perishable produce, providing leisure and amenity facilities for urban dwellers, and generating environmental services such as water supplies for urban areas. For rural areas sufficiently close to sizeable towns, commuting to work in urban centres may be another option. By and large more connectivity to urban areas should reinforce the processes described.

On the downside, proximity to urban areas may well mean less rural manufacturing as urban factories compete with local artisan production, and some rural services may decline when the rural population can access those in towns. Given, however, that rural manufacturing usually constitutes only small fraction of the rural non-farm economy (Haggblade et al., 2007), these drawbacks are usually outweighed by the advantages of better connections.

In sum, the economic consequences of slowing population growth in rural areas with continuing out-migration should be largely positive, and hence encouraged. The changes being seen to the lives of women and girls look equally positive. They may well have economic benefits, as the latent talents of women in production have more outlet – a possible 'gender dividend'.

A final point concerns the environment. While population has been growing in rural areas, the chief concern has been natural resources coming under pressure from cropping, grazing, extraction and settlement to the

point of being depleted and degraded, in some cases to the point of putting at risk key ecological functions. With falling rural populations, some of those pressures may ease. 'May', however, is the operative word: if demand to use natural resources for production continues to rise from urban populations, lower rural populations will make little difference. Better stewardship of rural natural resources probably depends more on increased demand for ecosystems services, correction of market failures, and deliberate policies to conserve the environment.

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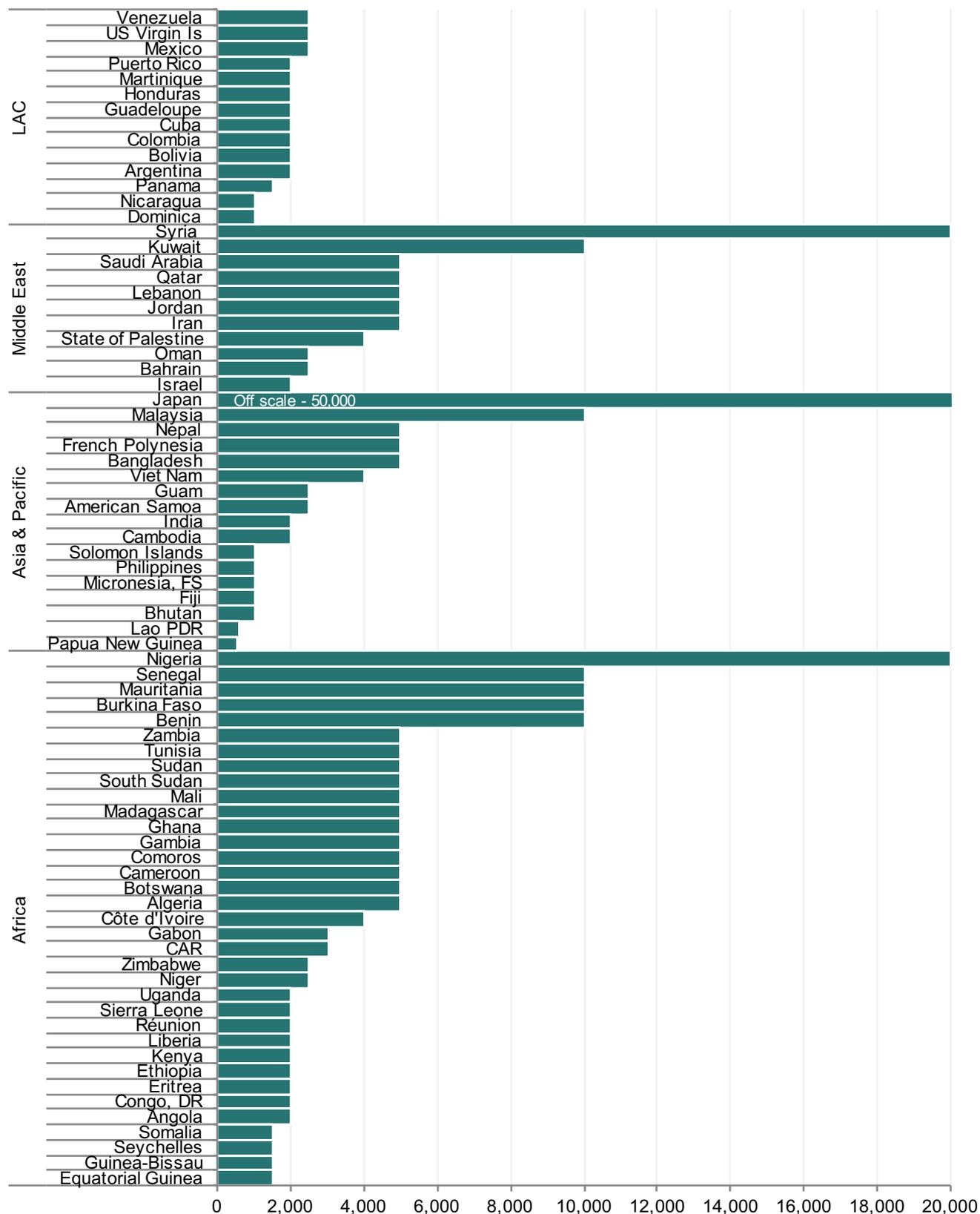
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ANNEX A: Urban thresholds

Figure A1: Thresholds used in definitions of 'urban', selected countries



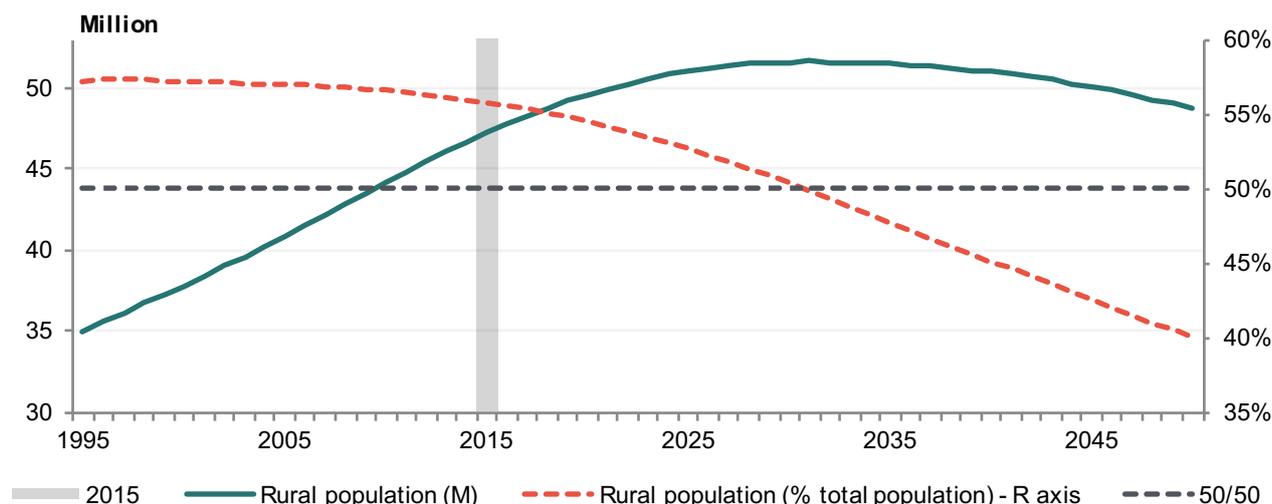
Source: UN DESA Population Division (2014)

ANNEX B Country cases additional detail

Egypt

Over the two decades to 2015, Egypt's rural population grew from around 35 million to around 47 million (a 35% increase). It is predicted to continue growing until 2031 – around the time urban and rural populations are predicted to reach equal levels.

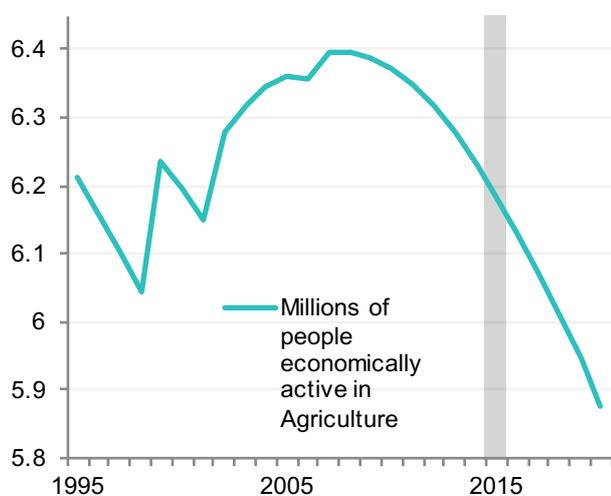
Figure B1: Rural population in Egypt, 1995 to 2050 projection



Source: Data from FAOSTAT

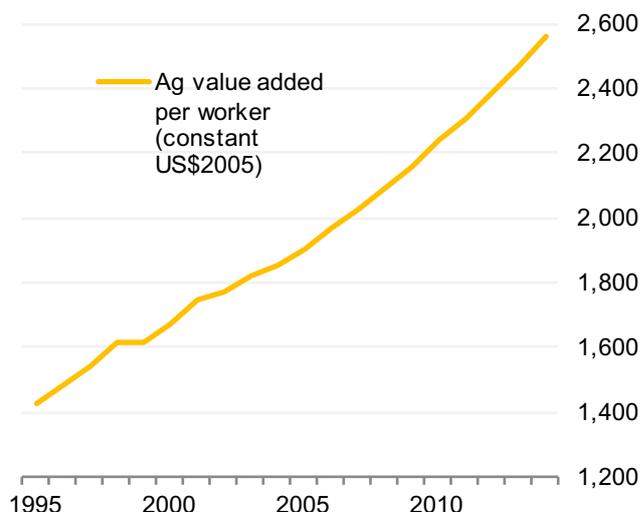
The number of people involved in agriculture is estimated to have been falling since 2007 (Figure B2a), while agricultural value added per worker has been growing (Figure B2b)

Figure B2a: Egypt, agriculturally active people 1995 to 2020 projection



Source: FAOSTAT and World Bank WDI

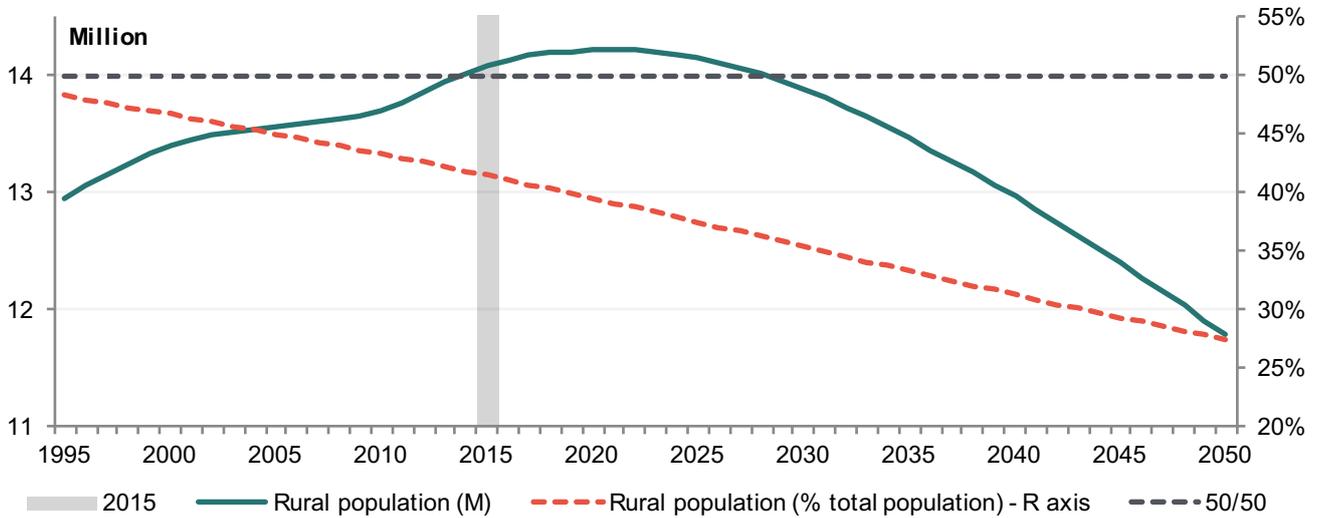
Figure B2b: Agriculture value added per worker, 1995 to 2014



Morocco

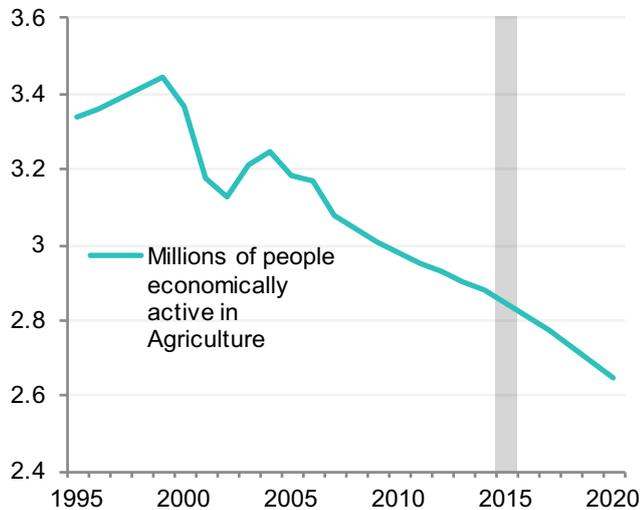
Morocco's urban population outgrew the rural before 1995, so that by 2015, just over 40% of the population was rural. Nonetheless, rural population has been growing over the last 20 years (increasing about 9% from 1995 to 2015) and is set to continue growing a little until 2022 (See Figure B3).

Figure B3: Rural population in Morocco, 1995 to 2050 projection



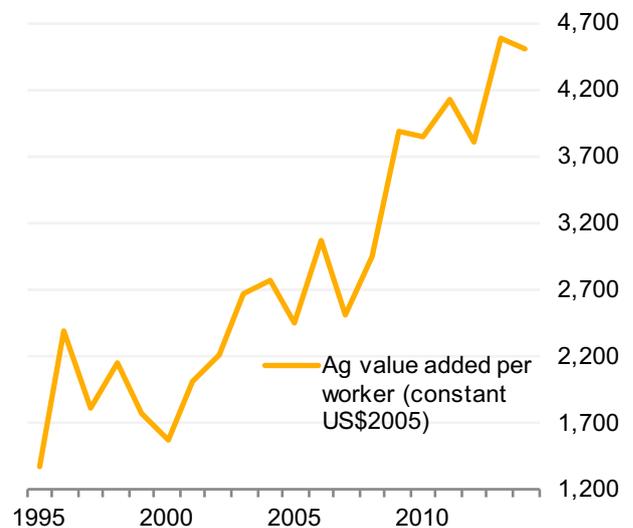
Source: Data from FAOSTAT

Figure B4a: Morocco, agriculturally active people, 1995 to 2020 projection



Source: FAOSTAT and World Bank WDI

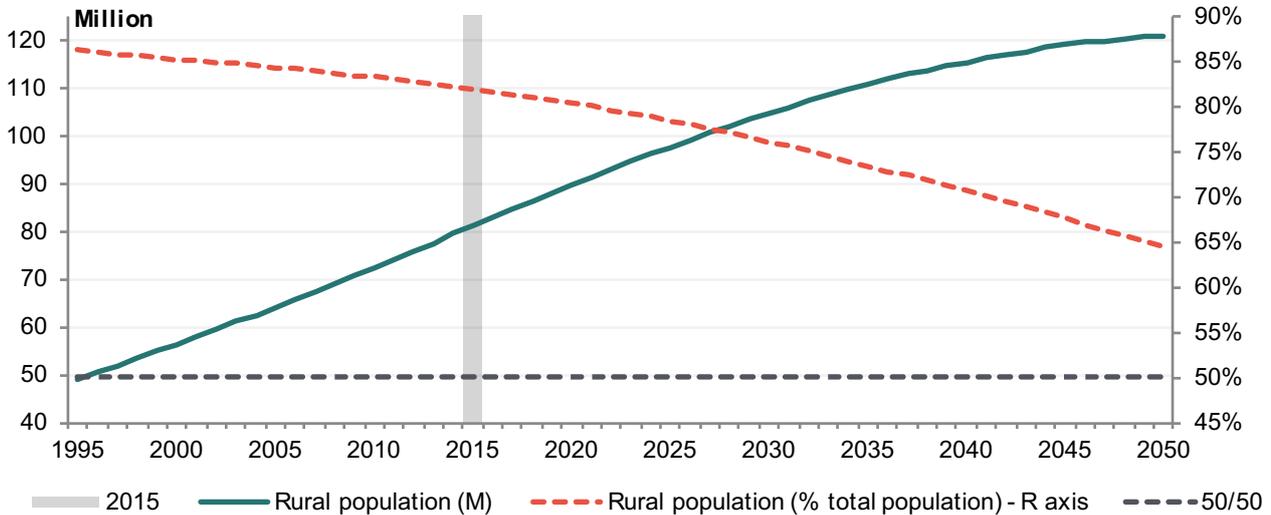
Figure B4b: Agriculture value added per worker in Morocco, 1995 to 2014



Ethiopia

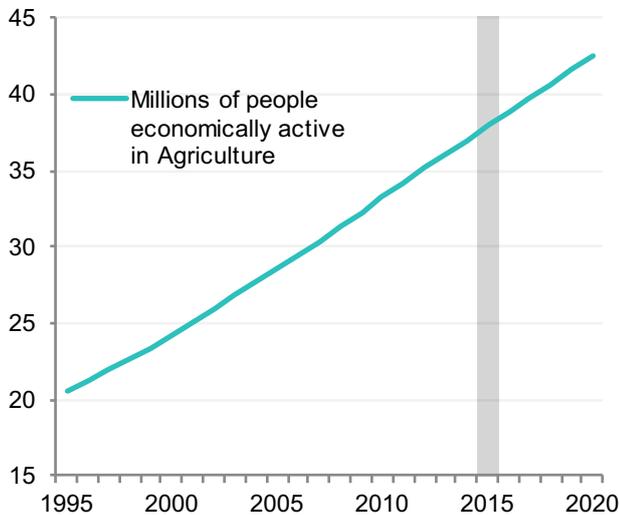
Ethiopia's rural population has grown from 1995 to 2015 – from around 49 million to around 81 million – a 65% rise. Ethiopia's population remains overwhelmingly rural – in 2015 at around 82% of the total population. Rural population is projected to continue growing at around the same rate for the next 10 to 15 years (Figure B5).

Figure B5: Rural population in Ethiopia, 1995 to 2050 projection



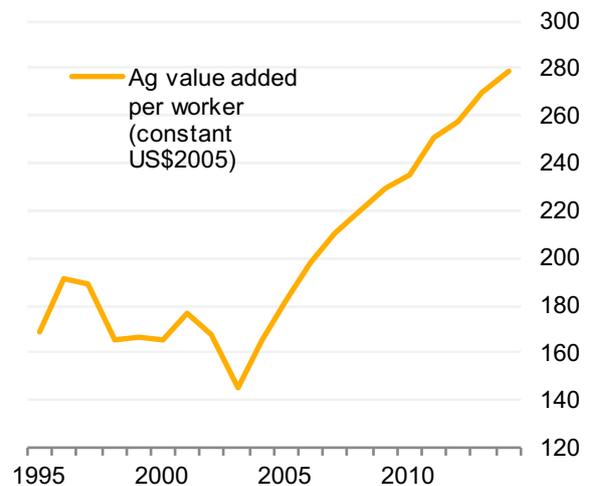
Source: Data from FAOSTAT

Figure B6a: Ethiopia, agriculturally active people, 1995 to 2020 projection



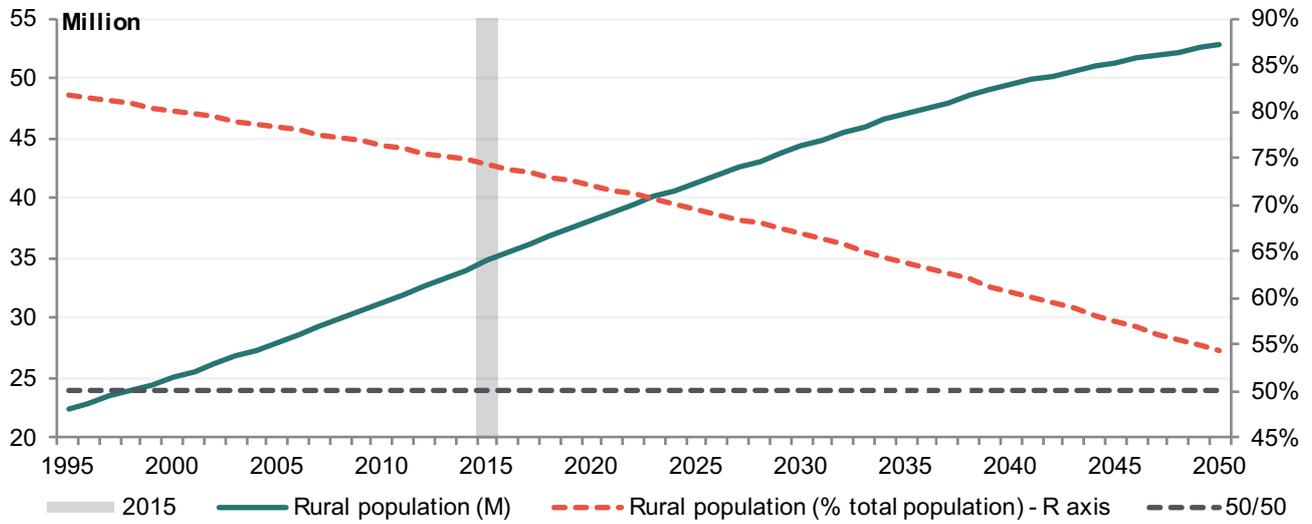
Source: FAOSTAT and World Bank WDI

Figure B6b: Agriculture value added per worker in Ethiopia, 1995 to 2014



Kenya

Figure B7: Rural population in Kenya, 1995 to 2050 projection



Source: Data from FAOSTAT

Figure B8a: Kenya, agriculturally active people, 1995 to 2020 projection

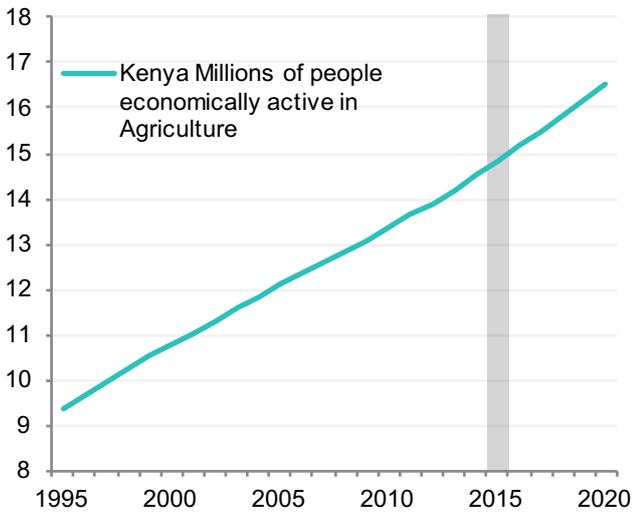
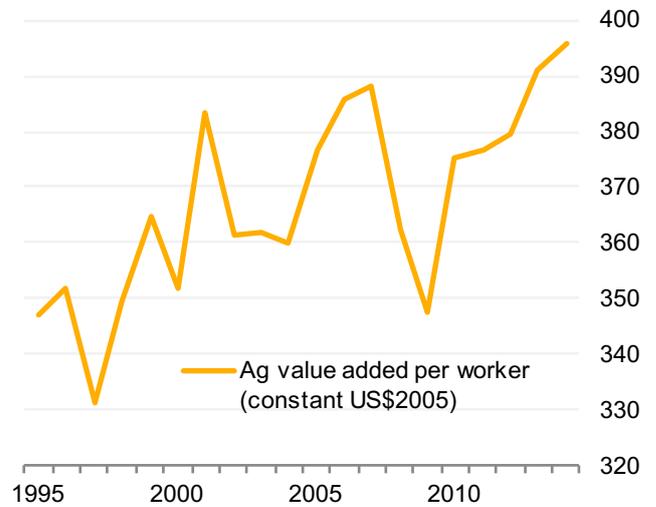


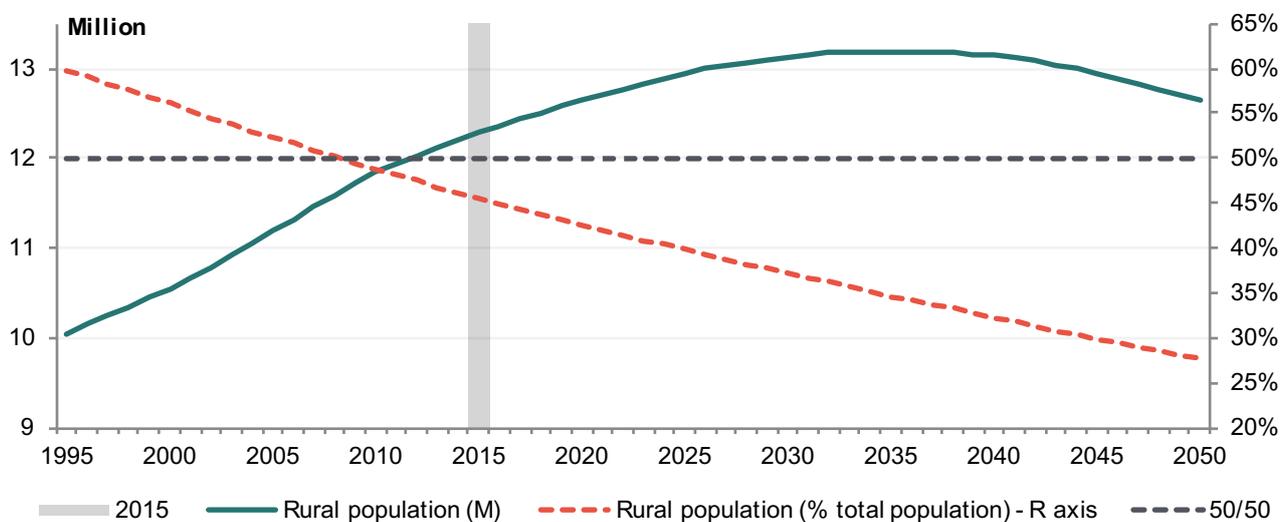
Figure B8b: Agriculture value added per worker in Kenya, 1995 to 2014



Source: FAOSTAT and World Bank WDI

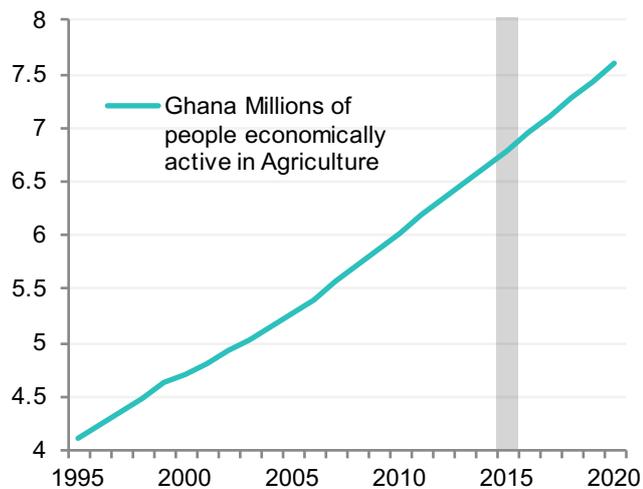
Ghana

Figure B9: Rural population in Ghana, 1995 to 2050 projection



Source: Data from FAOSTAT

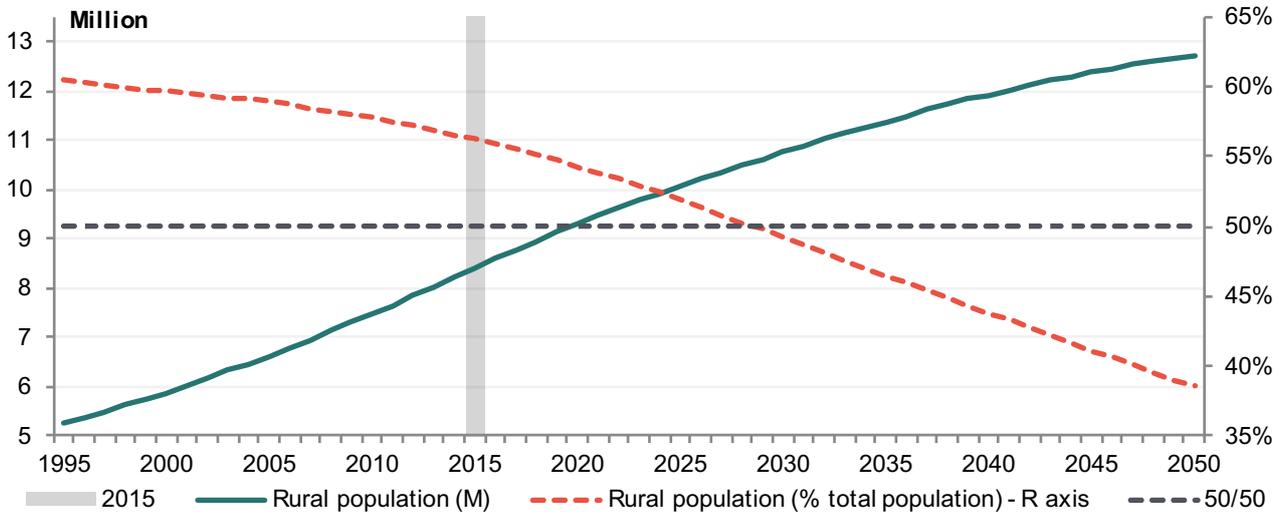
Figure B10a: Ghana, agriculturally active people, 1995 to 2020 projection



Source: FAOSTAT and World Bank WDI

Senegal

Figure B11: Rural population in Senegal, 1995 to 2050 projection



Source: Data from FAOSTAT

Figure B12a: Senegal, agriculturally active people, 1995 to 2020 projection

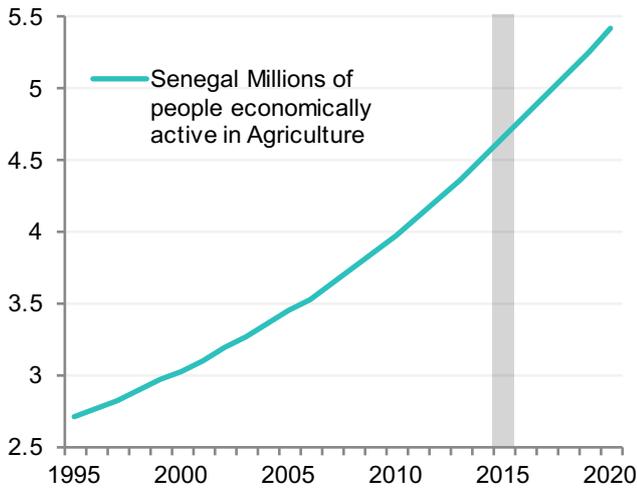
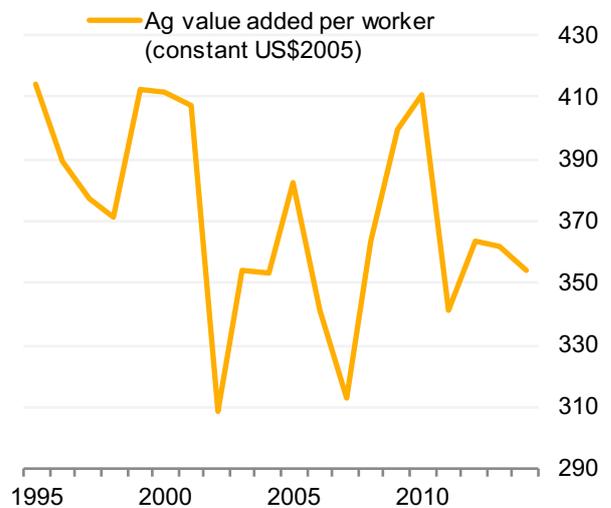


Figure B12b: Agriculture value added per worker in Senegal, 1995 to 2014

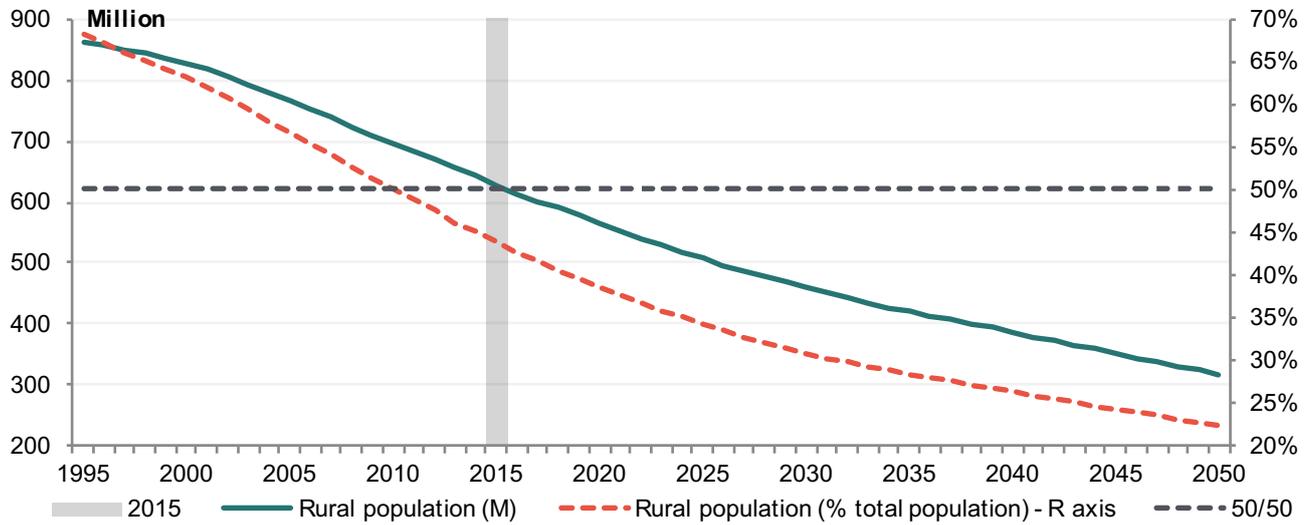


Source: FAOSTAT and World Bank WDI

China

Over the two decades to 2015, China's rural population fell from around 861 million to 628 million, a drop of 27%. The rate of decline accelerated from the earlier decade to the most recent. In 2010, rural and urban populations reached parity, and by 2015, China's rural population was only 44% of the total population – see Figure B13.

Figure B13: Rural population in China, 1995 to 2050 projection



Source: Data from FAOSTAT

The number of people involved in agriculture is estimated to have been falling since around 2008 (Figure B14a), and is estimated to plunge dramatically over the next five years. Agricultural value added per worker has been growing – more rapidly after 2003 (Figure 14b).

Figure B14a: China: agriculturally active people 1995 to 2020 projection

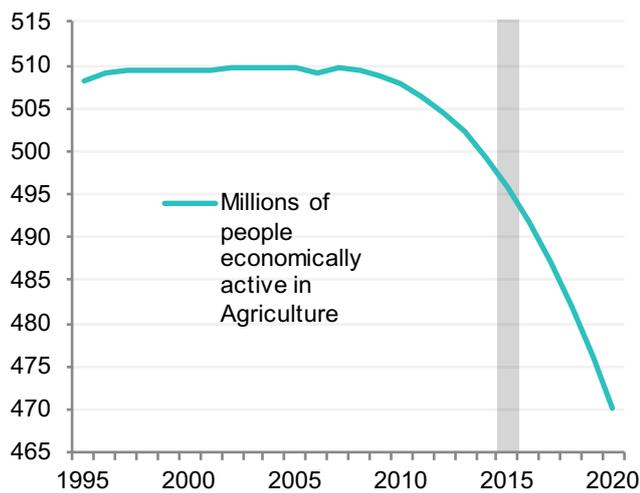
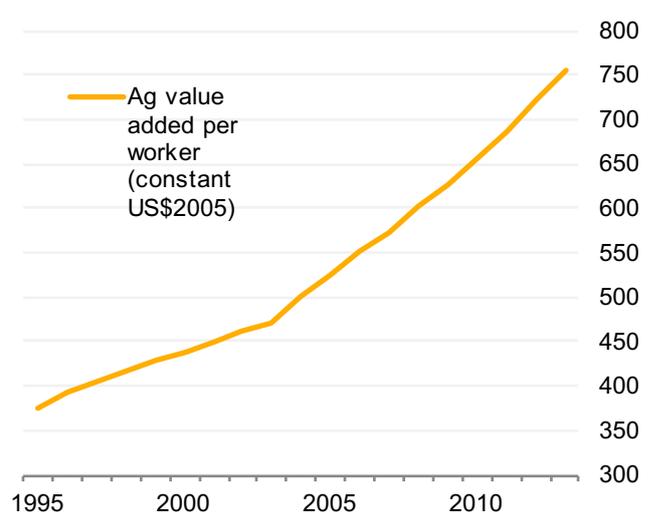


Figure B14b: Agriculture value added per worker, 1995 to 2013

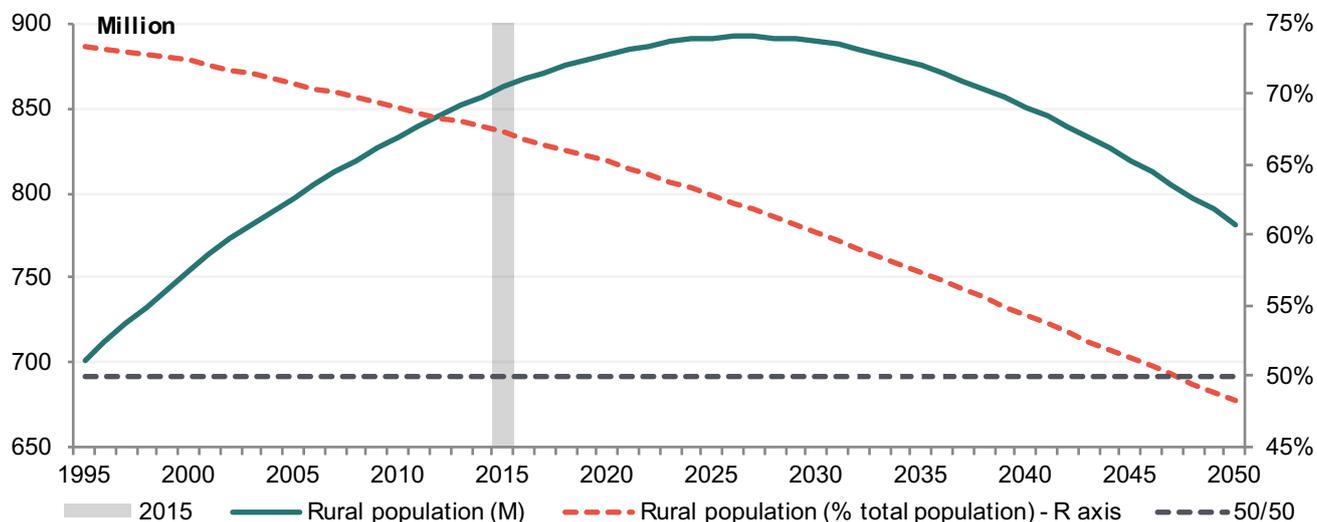


Source: FAOSTAT and World Bank WDI

India

In stark contrast to the situation in China, India's rural population has continued to grow over the last 20 years – going from around 701 million in 1995 to 862 million in 2015 – a rise of 23%. It is projected to continue growing, almost to 900 million by 2027, after which it is predicted to decline. Only by 2047 are rural and urban populations expected to reach parity (Figure B15).

Figure B15: Rural population in India, 1995 to 2050 projection



Source: Data from FAOSTAT

The number of people involved in agriculture is estimated to have been rising steadily over the last 20 years, growing by more than 50 million; and is expected to continue to do so over the medium term (Figure B16a). Agricultural value added per worker has been growing – perhaps accelerating after 2009, though this is not entirely clear (Figure B16b).

Figure B16a: India, agriculturally active people 1995 to 2020 projection

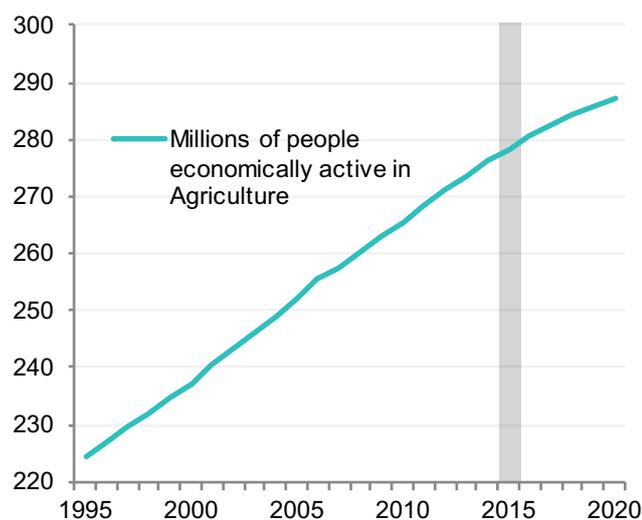
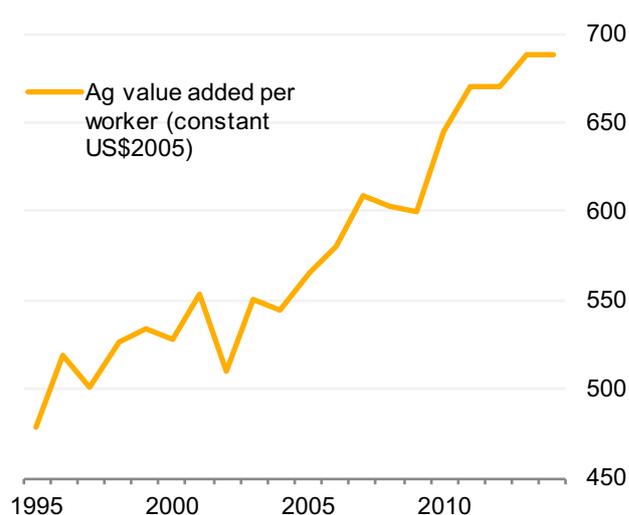


Figure B16b: Agriculture value added per worker, 1995 to 2014

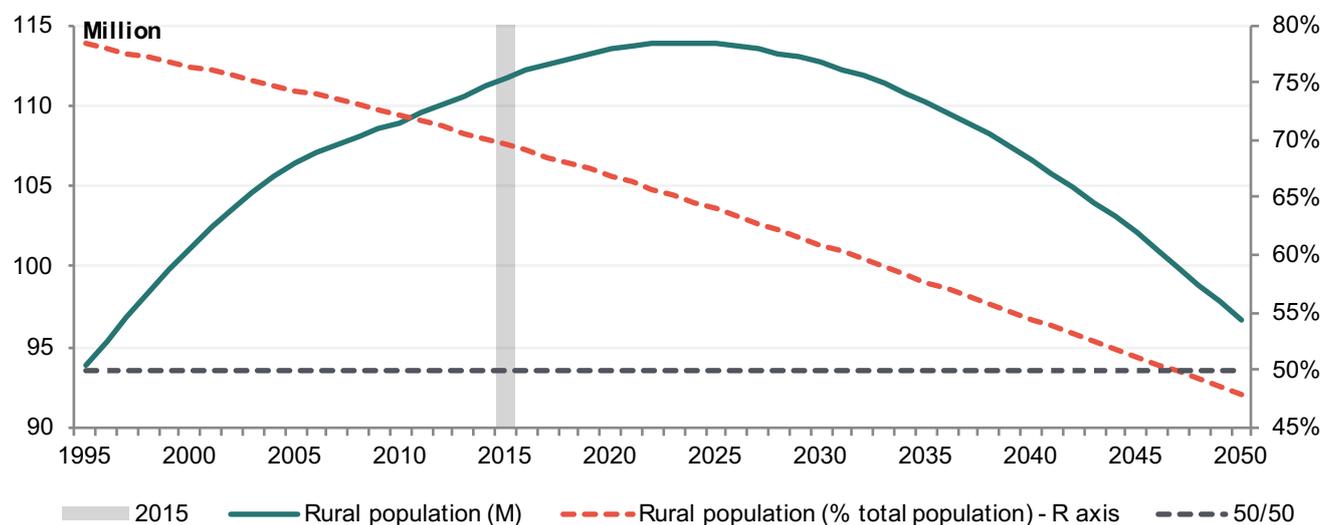


Source: FAOSTAT and World Bank WDI

Bangladesh

Bangladesh, much like India, has also seen a growing rural population over the last 20 years, though the rate of growth has become slower in the more recent decade. Rural population grew from around 94 million in 1995, to 106 million in 2005, and around 112 million by 2015. It is projected to continue growing for around the next decade, after which a relatively strong decline is predicted. Like India, rural and urban populations are only expected to even out by the late 2040s.

Figure B17: Rural population in Bangladesh: 1995 to 2050 projection



Source: Data from FAOSTAT

Unlike in India, the number of people involved in agriculture is estimated to have been falling steadily from around 2005/06. By 2015, the number of people economically active in agriculture was similar to the levels in the mid-1990s – and is predicted to continue falling over the next 5 years (Figure B15). Agricultural value added per worker has been growing fairly steadily, doubling over the last few decades.

Figure B18a: Bangladesh, agriculturally active people 1995 to 2020 projection

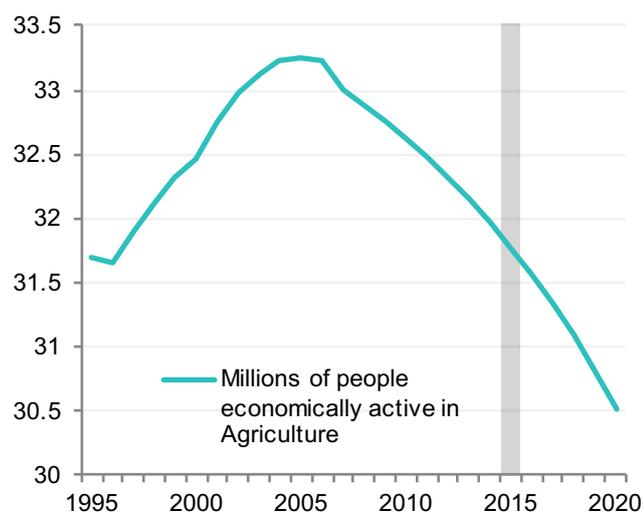
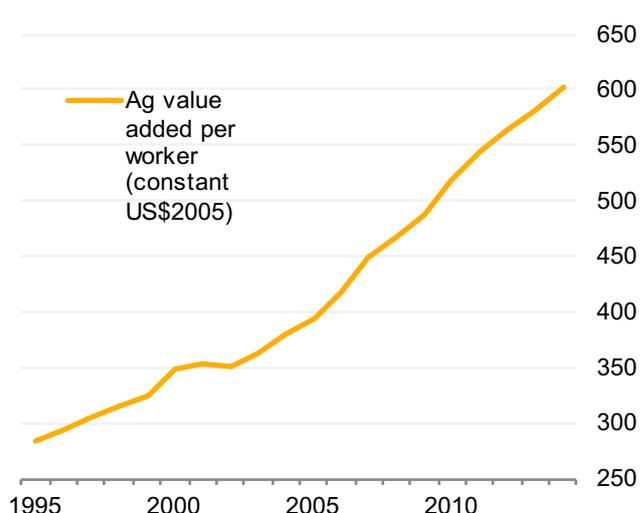


Figure B18b: Agriculture value added per worker, 1995 to 2014

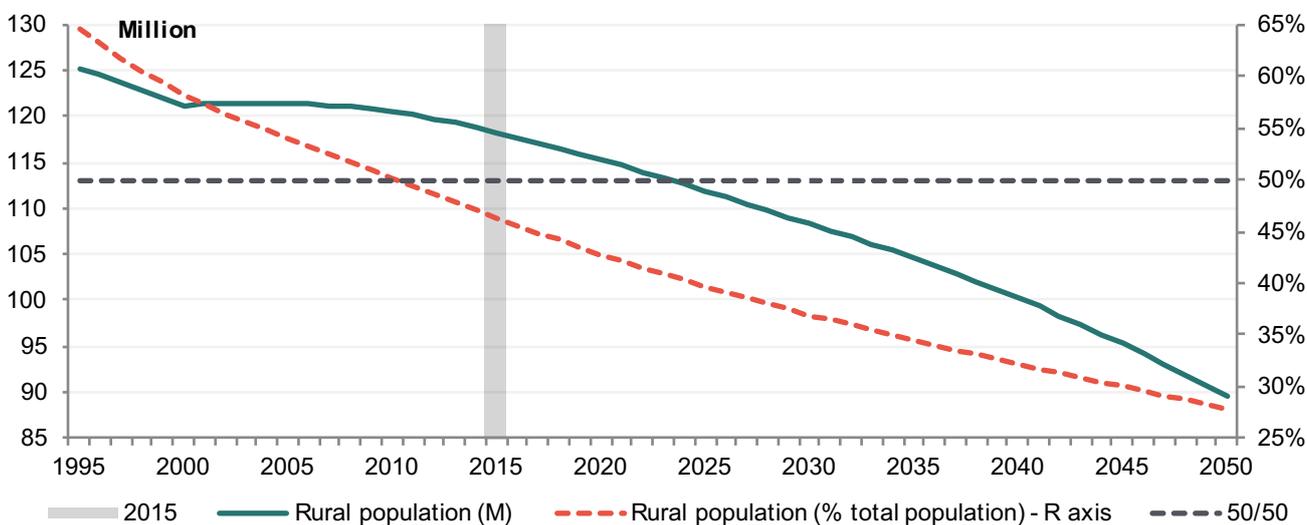


Source: FAOSTAT and World Bank WDI

Indonesia

Rural population in Indonesia fell over the late 1990s, before flattening out over the first half of the 2000s. It fell again, though at a slower pace, from around 2007 to 2015, and is projected to continue to decline in coming decades (Figure B19). The falls over the last 20 years were relatively small – with population falling 5% from 1995 to 2005: however, urban and rural populations reached equal levels in 2010.

Figure B19: Rural population in Indonesia, 1995 to 2050 projection



Source: Data from FAOSTAT

The number of people involved in agriculture is estimated to have risen over much of the last 20 years – from around 1995 to 2013 – after which it has begun to fall (Figure B20a). At the same time, agricultural value-added per workers has been rising from the late 1990s to 2014 (Figure B20b).

Figure B20a: Indonesia, agriculturally active people 1995 to 2020 projection

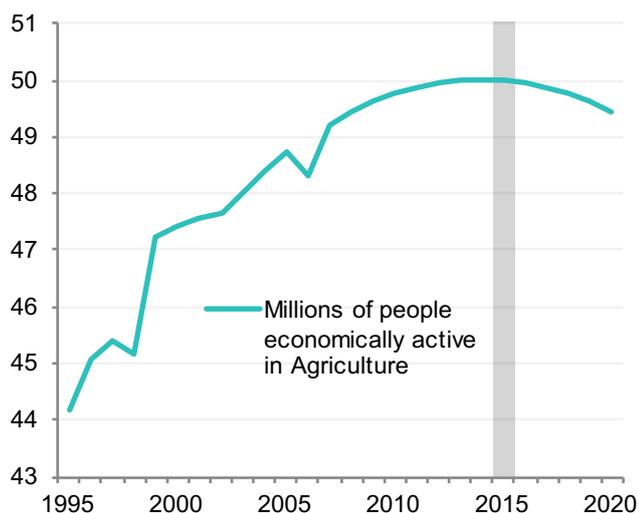
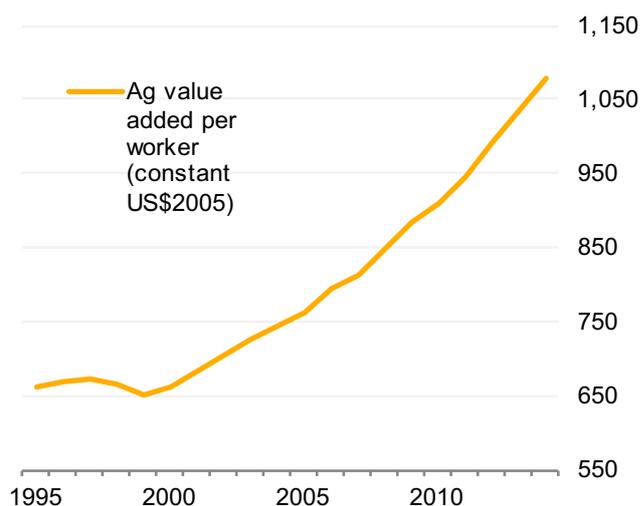


Figure B20b: Agriculture value added per worker, 1995 to 2014

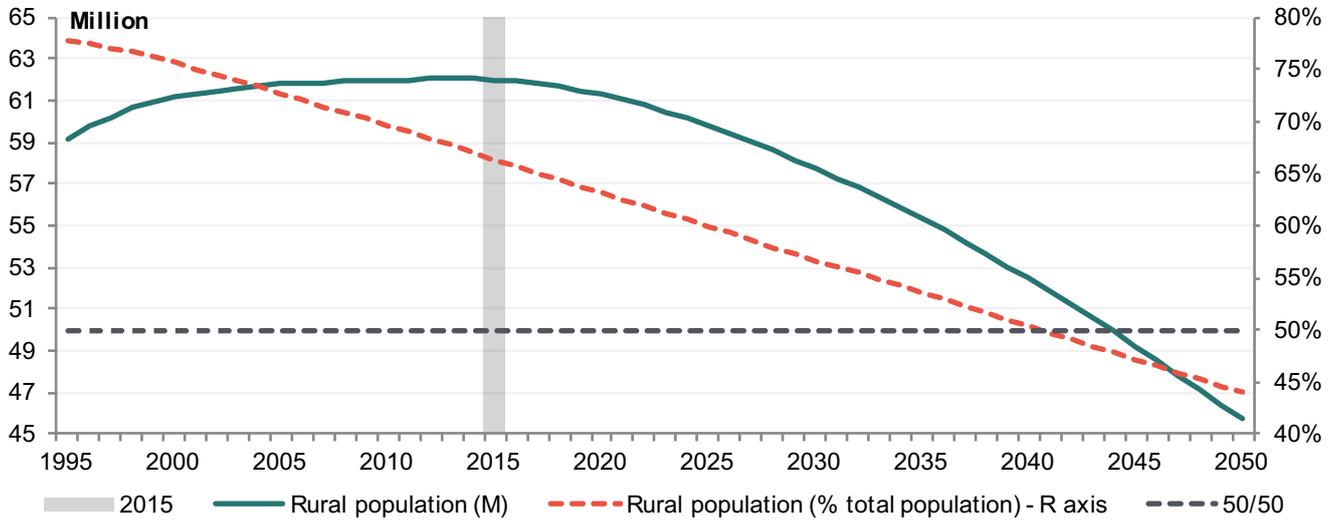


Source: FAOSTAT and World Bank WDI

Vietnam

Rural population in Vietnam rose over the late 1990s, and continued to rise through much of the last 15 years, though at a reduced pace. By 2015 the rural population in Vietnam had started a slight decline (Figure B21). Nonetheless, rural and urban populations are only projected to reach equal levels by around 2040.

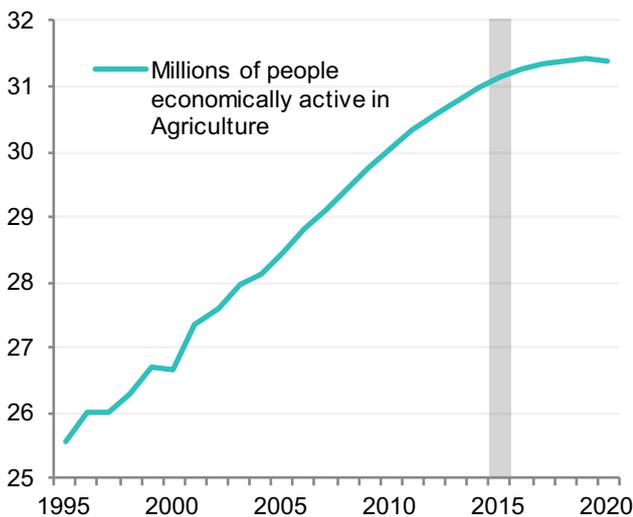
Figure B21: Rural population in Vietnam, 1995 to 2050 projection



Source: Data from FAOSTAT

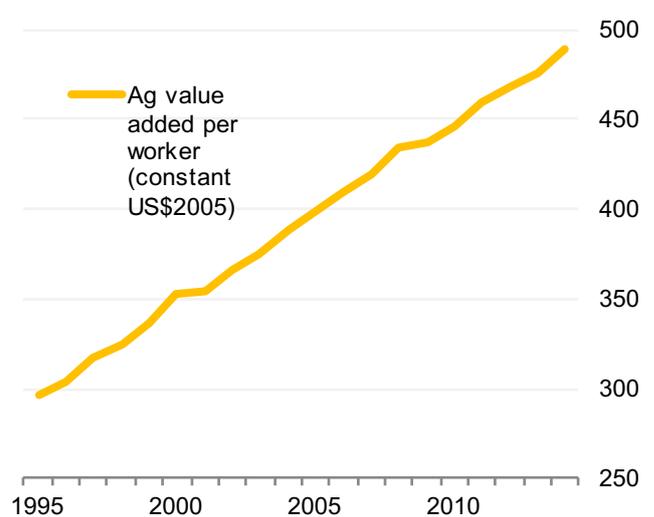
The number of people involved in agriculture is estimated to have risen steadily over the last 20 years, though it appears to be set to reach a peak in the next five years (Figure B22a). At the same time, agricultural value-added per worker has been rising from the late 1990s to 2014 (Figure B22b).

Figure B22a: Vietnam, agriculturally active people 1995 to 2020 projection



Source: FAOSTAT and World Bank WDI

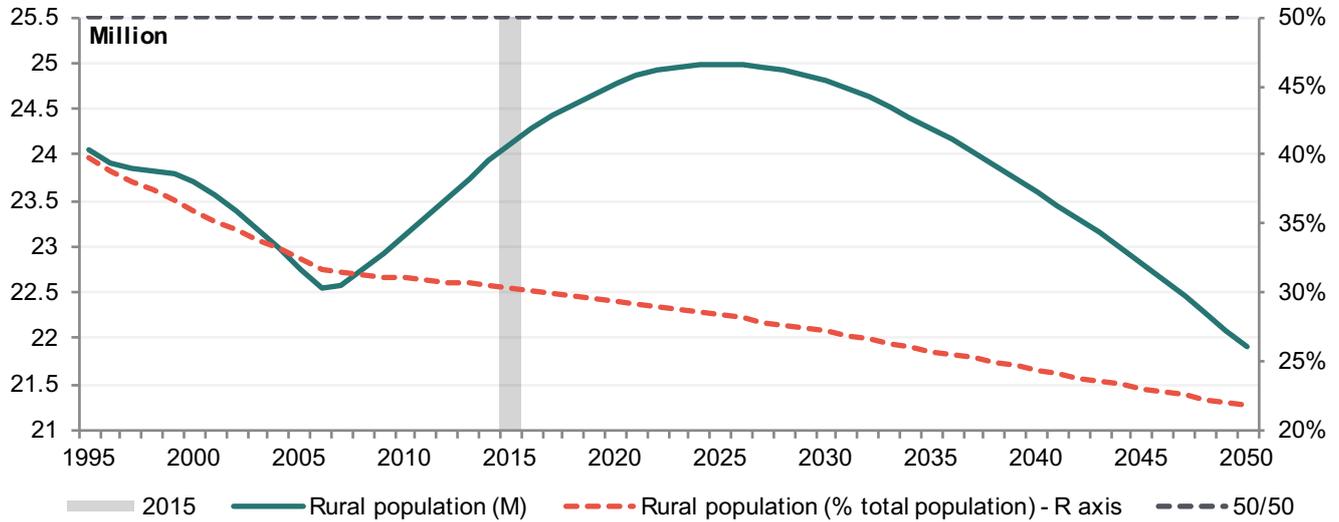
Figure B22b: Agriculture value added per worker, 1995 to 2014



Iran

Iran's rural population followed an unusual pattern over the last 20 years. Between 1995 and 2006 it fell by around 1.5 million; after which it rose by about 1.5 million. It is projected to continue rising to about 2025, after which another decline is predicted (Figure B23). Nonetheless, over the full time period, the proportion of population which is rural is expected to continue to decline – from around 40% in 1995 to 30% in 2015, and around 22% by 2050.

Figure B23: Rural population in Iran, 1995 to 2050 projection



Source: Data from FAOSTAT

The number of people involved in agriculture is estimated to have risen from 1995 to around 2012, after which numbers began to fall (Figure B24a). Agricultural value-added per worker fell on average over 1995 to 2001, after which it grew quite sharply between 2001 and 2007 (later data not available) (Figure B24b).

Figure B24a: Iran, agriculturally active people 1995 to 2020 projection

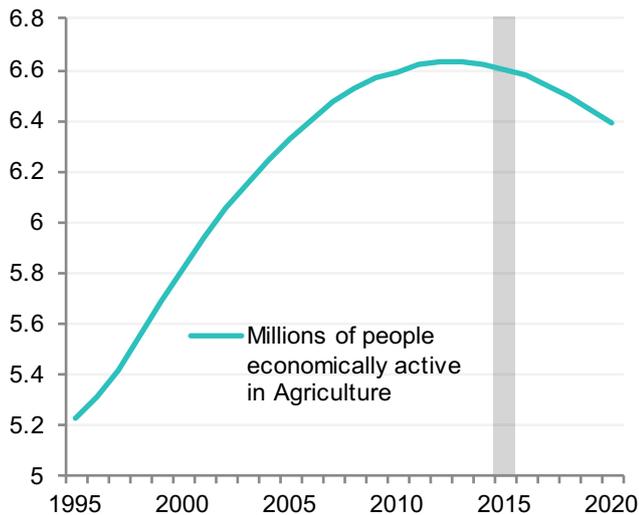
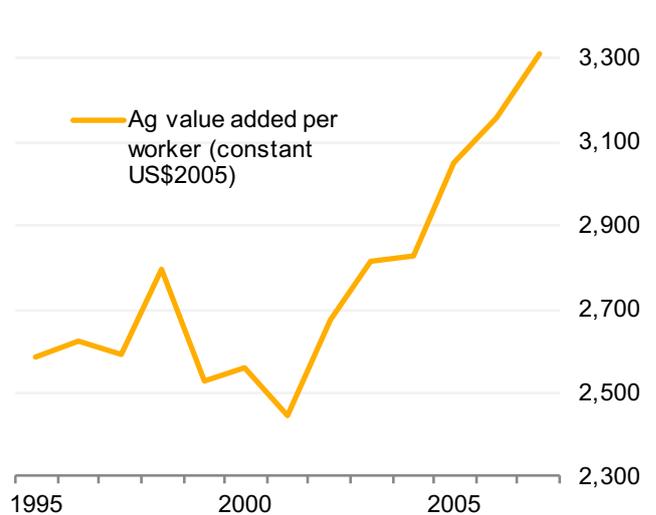


Figure B24b: Agriculture value added per worker, 1995 to 2007

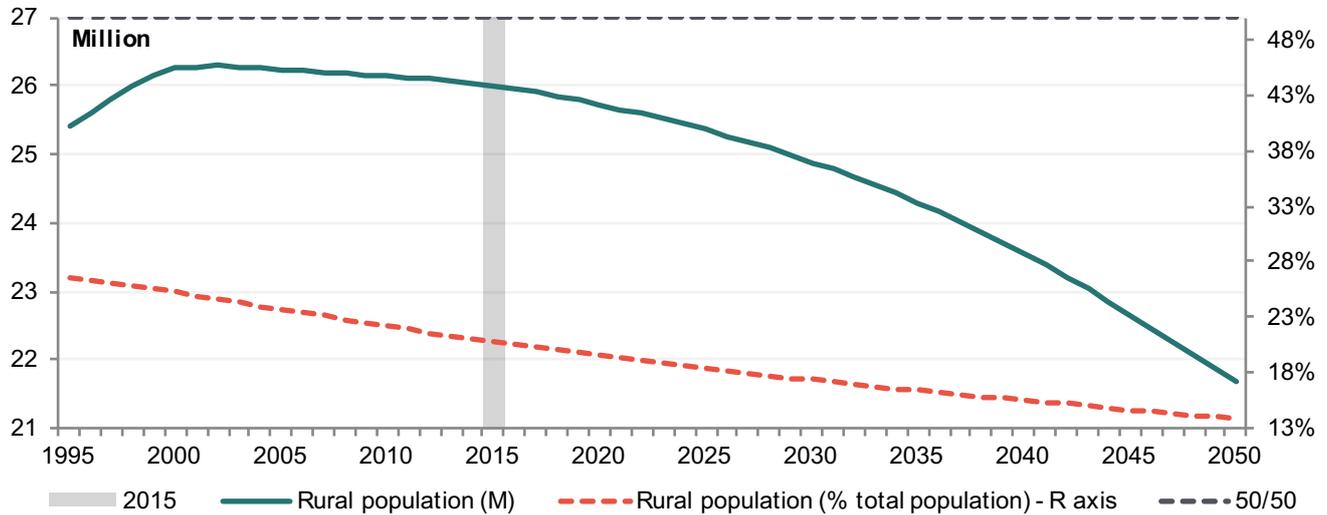


Source: FAOSTAT and World Bank WDI (Data on Agriculture value added per worker only to 2007 in that database)

Mexico

Mexico's rural population grew over the late 1990s, before turning a corner in the early 2000s and beginning to fall. Overall rural population was still larger in 2015 than in 1995, but only by about 2%. By 20 years ago, Mexico was already overwhelmingly urban, with just over a quarter of the population living in rural areas – down to around a fifth by 2015.

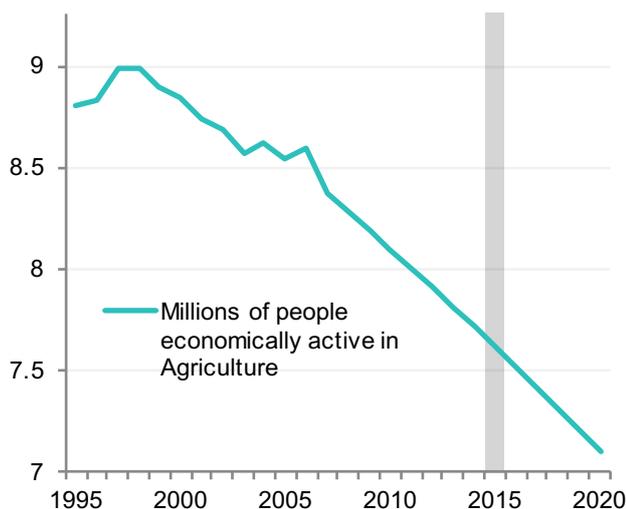
Figure B25: Rural population in Mexico, 1995 to 2050 projection



Source: Data from FAOSTAT

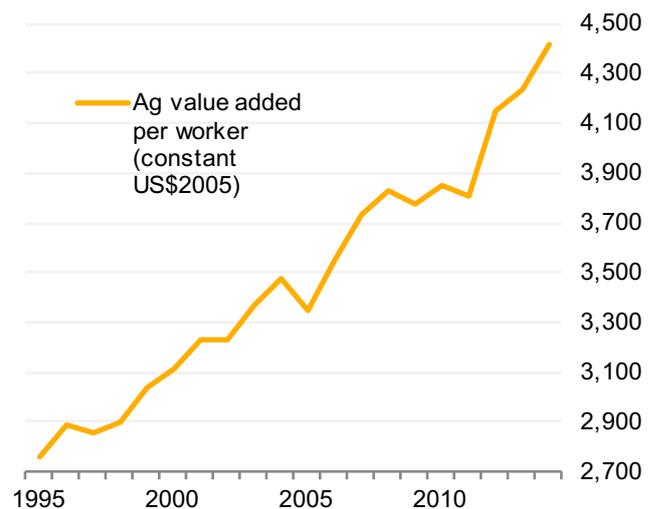
The number of people involved in agriculture fell overall over the last 20 years, and is projected to continue falling at around the same rate to 2020 (Figure B26a). Over the same time, agricultural value added per worker has been growing – perhaps even accelerating after 2011 (Figure B26b).

Figure B26a: Mexico, agriculturally active people 1995 to 2020 projection



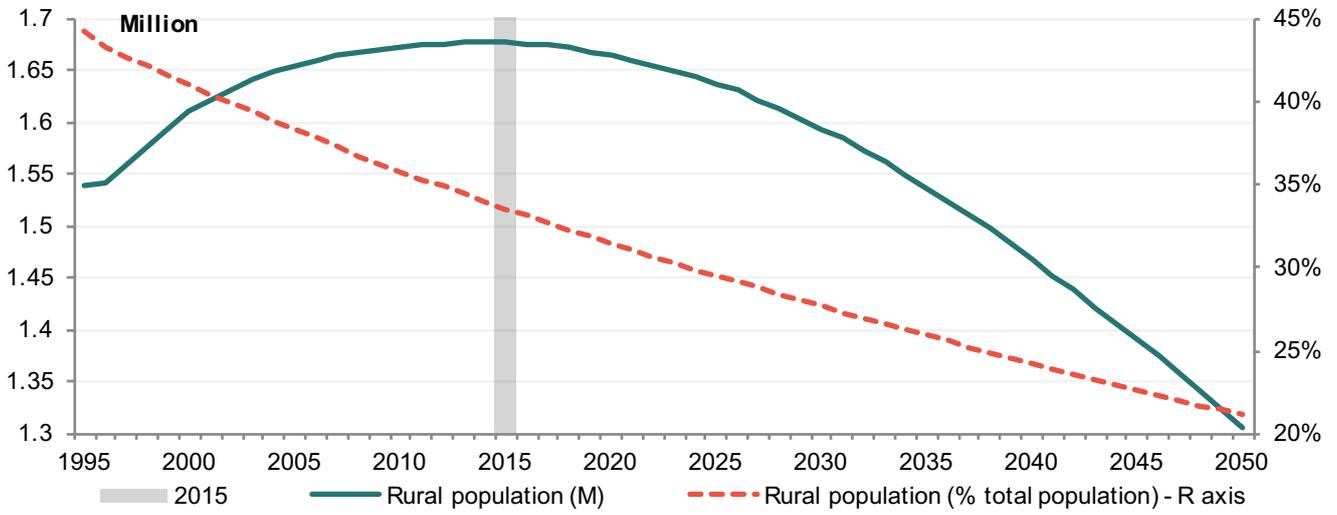
Source: FAOSTAT and World Bank WDI

Figure B26b: Agriculture value added per worker, 1995 to 2014



Costa Rica

Figure B27: Rural population in Costa Rica, 1995 to 2050 projection



Source: Data from FAOSTAT

Figure B28a: Costa Rica, agriculturally active people 1995 to 2020 projection

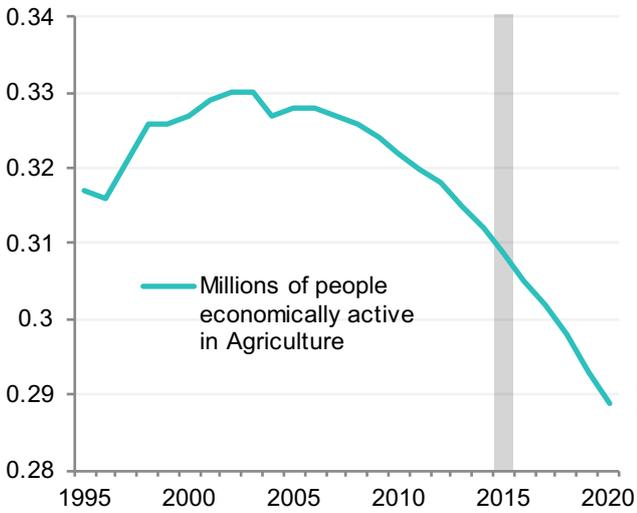
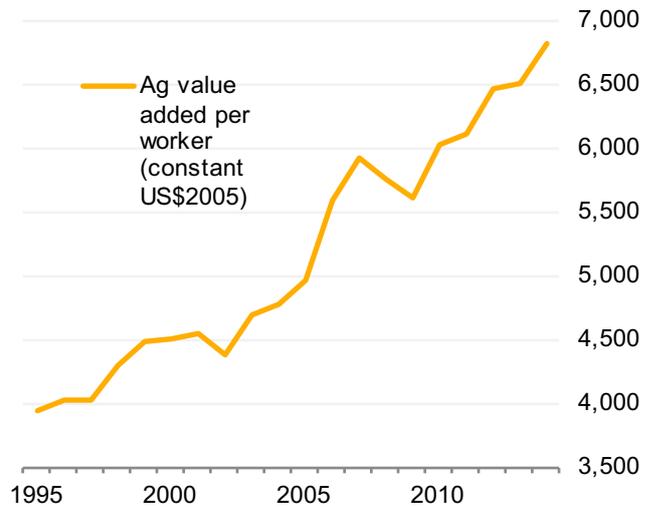


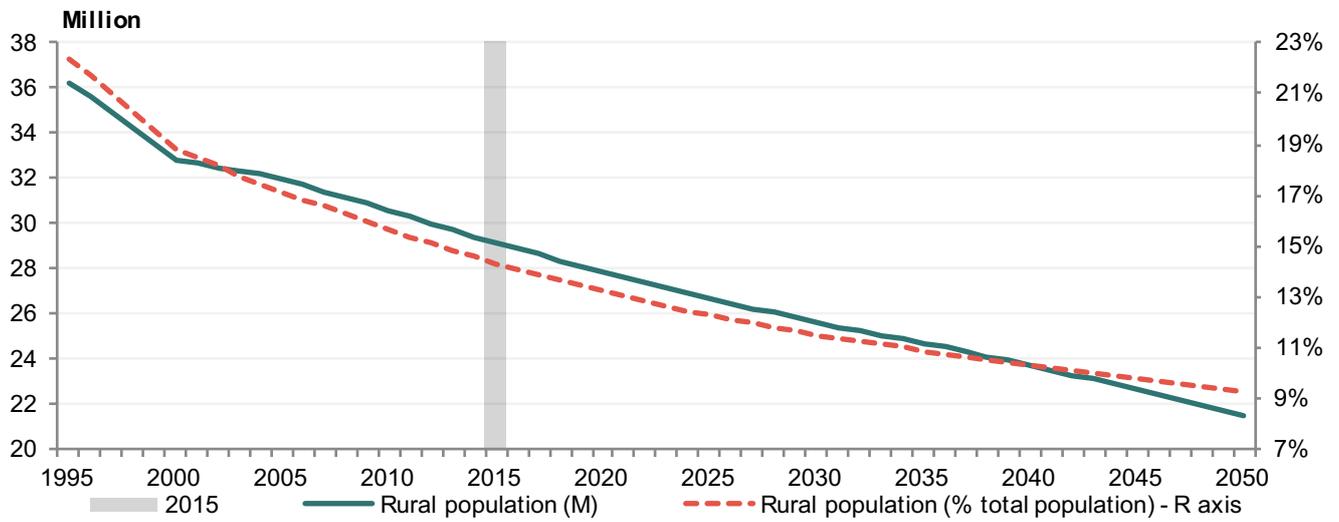
Figure B28b: Agriculture value added per worker, 1995 to 2014



Source: FAOSTAT and World Bank WDI

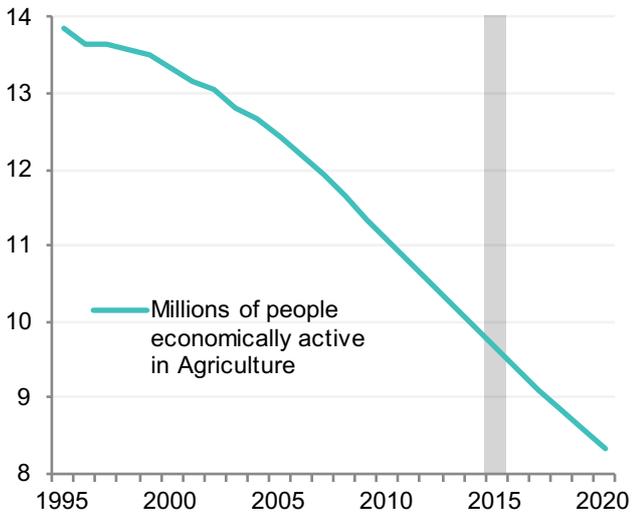
Brazil

Figure B29: Rural population in Brazil, 1995 to 2050 projection



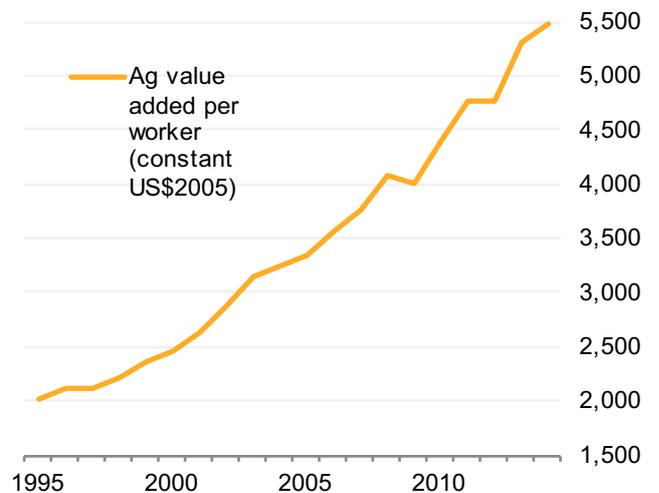
Source: Data from FAOSTAT

Figure B30a: Brazil agriculturally active people 1995 to 2020 projection



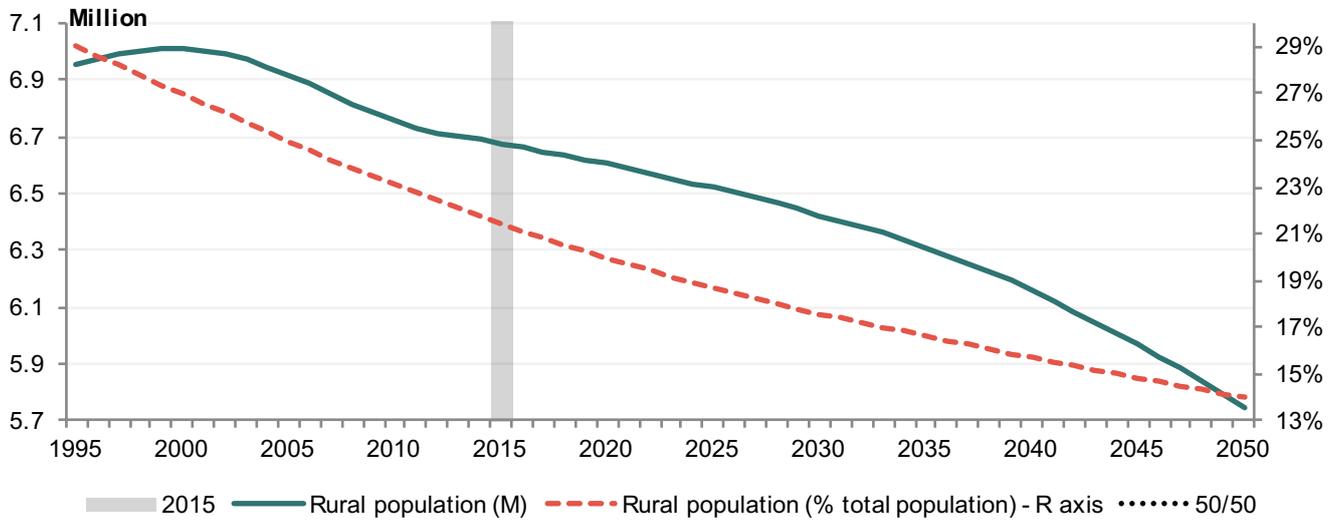
Source: FAOSTAT and World Bank WDI

Figure B30b: Agriculture value added per worker, 1995 to 2014



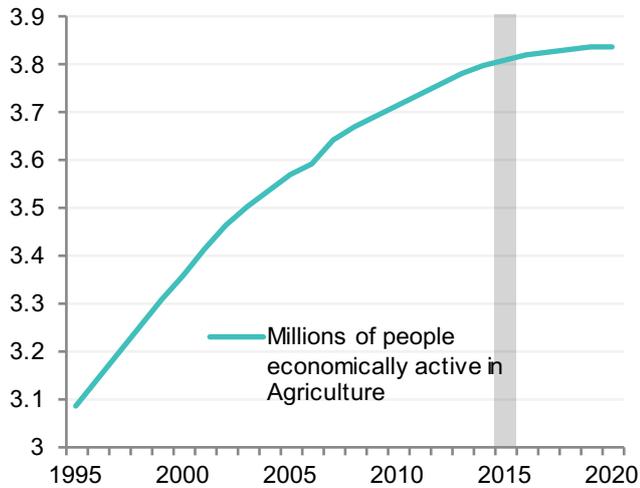
Peru

Figure B31: Rural population in Peru, 1995 to 2050 projection



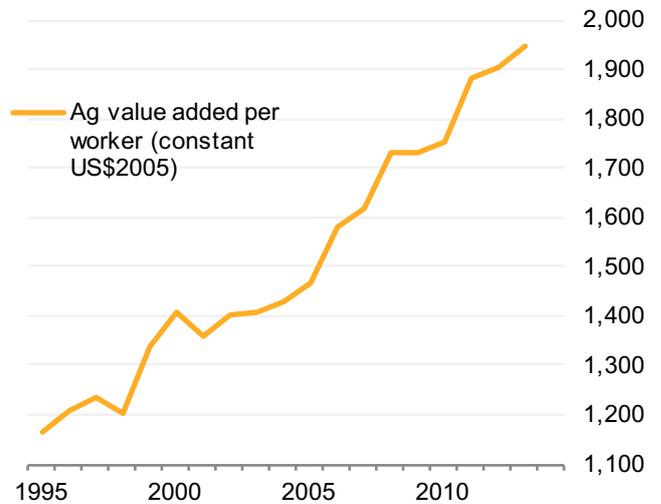
Source: Data from FAOSTAT

Figure B32a: Peru, agriculturally active people 1995 to 2020 projection



Source: FAOSTAT and World Bank WDI

Figure B32b: Agriculture value added per worker, 1995 to 2014





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