2

The Coming Globalization

The emergence of China, India, and the former communist-bloc countries implies that the greater part of the earth's population is now engaged, at least potentially, in the global economy. There are no historical antecedents for this development.

—Ben Bernanke, August 25, 2006

The last quarter-century, a time of unprecedented integration for the global economy, has witnessed a dramatic rise in standards of living around the world. The fall in transport and communications costs and in barriers to trade paved the way for productivity increases associated with the integration of emerging economies into global markets. Add to these forces the fall of the Berlin Wall, the subsequent lifting of the Iron Curtain, and the progressive opening of the Chinese and then Indian economies—and the stage was set for a new wave of globalization of production, trade, and finance. While the associated benefits have been uneven over time and space, average living standards across the globe have risen markedly. Global income has doubled since 1980, 450 million have been lifted out of extreme poverty since 1990,[1] and life expectancy in developing countries is now 65 on average.[2]

Can one expect these trends to continue for the next 25 years, and if so, what are the key forces that will shape the world economy of tomorrow? If globalization continues, what does it mean for the allocation of production in rich and poor countries? What role will developing countries play—particularly those with large populations, such as China and India? Finally, what forces could accelerate growth and globalization—and what could derail them?

This chapter explores these questions by developing a long-term scenario to 2030. The scenario is anchored in trends already evident in recent years, and ones unlikely to be reversed in the foreseeable future. The results describe a world in which the gross domestic product (GDP) in high-income countries is slated to nearly double and that of developing countries will more than triple. The progressive expansions of China and India, the two largest developing economies and home to half the people of the developing world, are projected to drive the process. Their impact on the global economy will be increasingly felt as their exports and energy use, for example, approach the levels of the European Union and the United States.

The next 25 years will undoubtedly bring significant surprises that cause outcomes to deviate from the central scenario in this chapter. Growth in parts of the world may well be more robust than projected in this scenario; other countries or whole regions may face serious setbacks. Many imaginable and even unimaginable shocks are likely. The chapter thus includes a discussion of various shocks that could propel growth higher than the central scenario—or depress growth with

impacts devastating for poverty. Developing countries are likely to become more important in the global economy. Indeed, if anything, the likelihood that developing countries will experience higher rises in incomes seems greater than the downside risks. Although outcomes less sanguine than those in the central scenario are possible, it would take disruptive sea-changes in the structure of the global economy to produce large deviations from, much less reversals of, the strong underlying trends toward globalization.

The good performance of developing countries in recent years, combined with the still huge difference in relative incomes between developing and developed countries, points to strong potential growth across the developing world during the coming decades. The central scenario assumes a world growth rate of 2 percent per capita, slightly faster—by 0.6 points per capita—than in 1980–2005. It also assumes growth in developing countries of 3.1 percent, compared with 1.9 percent in developed countries. There are two main reasons for this. First, policy is far better on average today in developing countries than it was earlier, say in 1980. Second, technological dissemination is far faster. Indeed, in the last five years, growth in developing countries has been substantially *higher*—4.6 percent—than the assumption of 3.1 percent in the central scenario.

Whatever the scenario, challenges will abound. Growth and integration will lead to structural changes, job losses, uneven income growth, and other painful transitions. Fast growth could lead to ever-increasing competition for scarce resources and put additional strains on the environment. And some regions could continue to lag behind, owing to weak institutions, fragile states, and inadequate infrastructure. Many of these challenges will be dealt with at the national level, but some require global leadership. Perhaps one of the biggest challenges will be shaping a new global architecture that can take into account the increasing diversity of countries and interests and allow for peaceful resolution of emerging global tensions.

The evidence of globalization

Globalization has been present since the dawn of modern humans nearly 50,000 years ago in Africa (see Wade 2006). The Roman Empire stretched from Great Britain to the Middle East nearly 2,000 years ago and 500 years ago the age of discoveries led to the expansion of European outreach to the western hemisphere and East Asia. Two distinct periods in more modern times are often cited as intensified phases of globalization—the 20–30 years before World War I and the years since World War II. Both witnessed sharp increases in trade, international migration, and flows of finance, accompanied by rapid changes in technology—electricity, trains, and steamships in the first period, and planes, containers, and telecommunications in the second. While technology was a key factor, policies were also important—such as the reductions in trade and financial barriers. This section reviews some of the key evidence of the most recent period of globalization hinting at what trends can be anticipated over the next 25 years. The section will highlight trends in four broad categories that define globalization—trade in goods and services, international migration, capital flows, and technology and information.

Huge expansion of trade

World trade has exploded since the early 1960s. World exports have grown from just under $1 trillion a year (in 2000 dollars) to nearly $10 trillion a year, annualized growth of some 5.5 percent per year (figure 2.1).[3] They are clearly outpacing global output, which increased at some 3.1 percent per year over the same period. Between 1970 and 2004, the share of exports relative to global output has more than doubled and is now over 25 percent. Throughout the early part of this period the export elasticity (the rate of growth of exports relative to output) was running at about 1.5, but around 1986 the elasticity picked up substantially, peaking at more than 2.5 a decade later. This acceleration came on the heels of the collapse of the Iron Curtain

Figure 2.1 World trade has expanded dramatically…
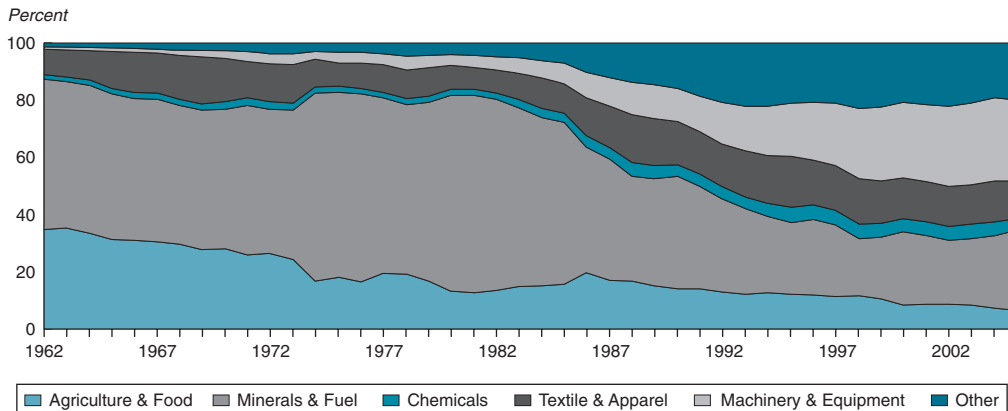
Export to GDP elasticity   *Export to GDP share (%)*
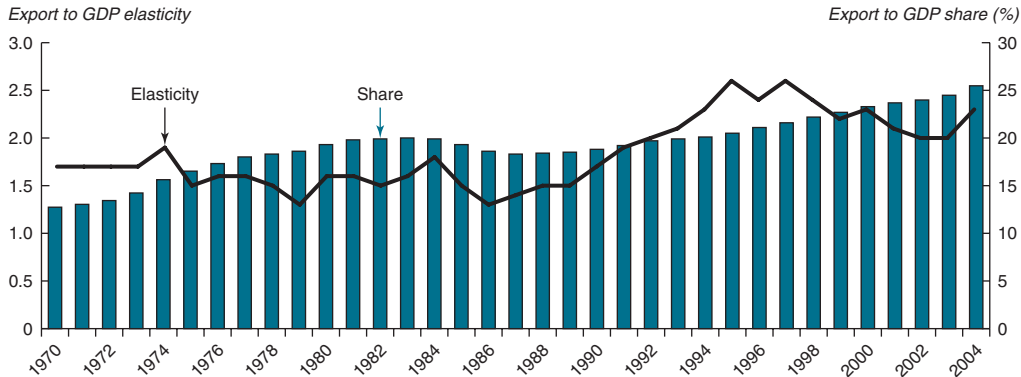
Sources: World Bank Development Data Platform (DDP) and staff calculations.
Note: Elasticity is calculated as the percent change in real exports relative to the percent change in real GDP. The export share is calculated in nominal dollar terms. Data are smoothed using five-year moving averages.

Figure 2.2 …and become more diversified…

Share of developing-country exports, by broad commodity grouping

Percent

Agriculture & Food   Minerals & Fuel   Chemicals   Textile & Apparel   Machinery & Equipment   Other
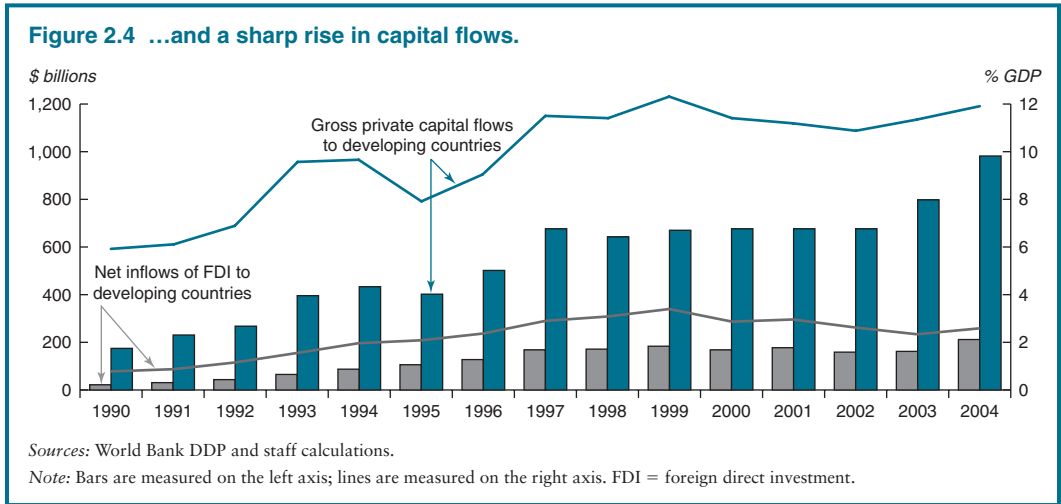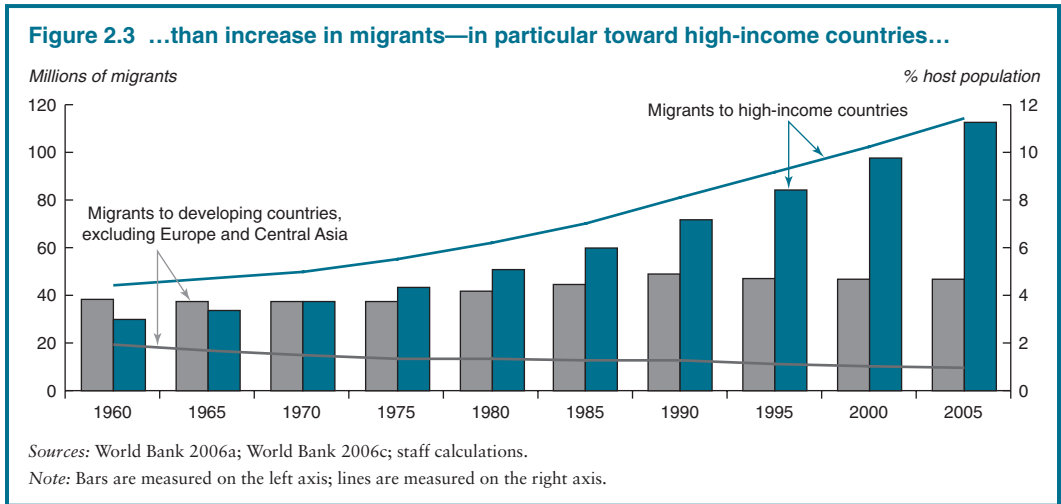
Source: World Bank World Integrated Trade Solution (WITS).

and moves by China and India to open their economies and pursue an export-led strategy. Other countries also abandoned inward-looking strategies and saw their exports jump.

A large part of the opening of domestic economies can be attributed to unilateral decisions, as in China and India, but regional and multilateral reductions were also important in promoting global trade. Multilateral negotiations under the guise of the General Agreement on Tariffs and Trade (GATT)—now the World Trade Organization (WTO)—undertook stepwise reductions in trade policies known as rounds, the latest of which, the

Figure 2.3 ...than increase in migrants—in particular toward high-income countries...

Millions of migrants   *% host population*

Migrants to high-income countries

Migrants to developing countries,
excluding Europe and Central Asia

Sources: World Bank 2006a; World Bank 2006c; staff calculations.
Note: Bars are measured on the left axis; lines are measured on the right axis.

Figure 2.4 ...and a sharp rise in capital flows.

$ billions   *% GDP*

Gross private capital flows
to developing countries

Net inflows of FDI to
developing countries

Sources: World Bank DDP and staff calculations.
Note: Bars are measured on the left axis; lines are measured on the right axis. FDI = foreign direct investment.

Doha Development Agenda is the ninth in the series. Though initially largely the realm of developed countries,[4] with the expansion of trade and WTO membership, 149 countries[5] are now involved, perhaps complicating the ability to achieve agreement given the more diverse set of objectives. Since 1990 there has also been an explosion in regional trade agreement notifications, many involving the new transition economies, but also including expansion of the European Union (EU), the North American Free Trade Agreement, and

the Southern Cone Common Market among others, with many others in the pipeline. Though most of these agreements have tended to be trade-creating, they can also divert trade from excluded countries.

Technological breakthroughs—particularly in transportation and communications—emerging business practices, capital flows, and the growth in a skilled workforce have led to an increasing proportion of developing-country exports in manufactured goods that are more traditionally the realm of developed countries

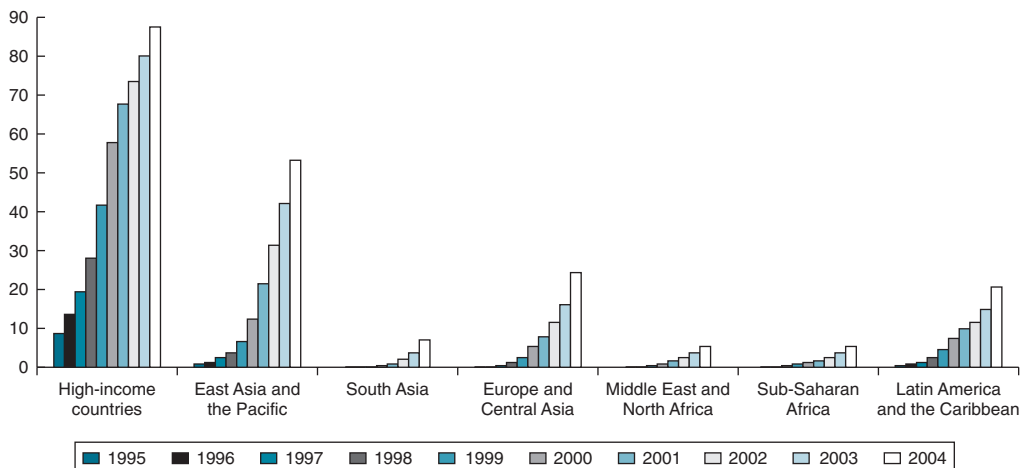**Figure 2.5 Diffusion of traditional technologies has been slow, except in high-growth regions…**

Fixed phone line subscribers per 100 persons
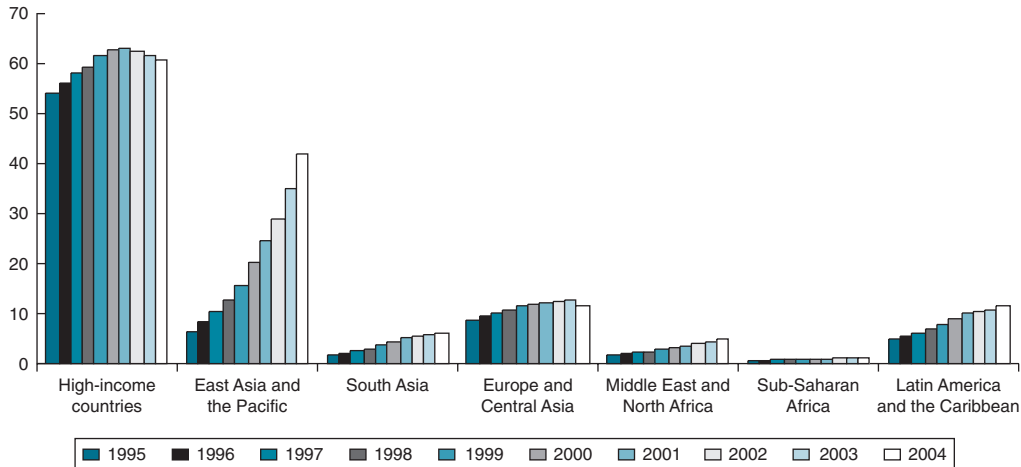
Sources: World Bank DDP and staff calculations.

Figure 2.6 …but the uptake of new technologies has been faster.

Mobile phone subscribers per 100 persons

Sources: World Bank DDP and staff calculations.

(figure 2.2). Goods as diverse as car parts, airplanes, semiconductors, and consumer electronics are being sourced in developing countries. For many developing countries this has reduced their dependence on volatile commodities, though in some cases the ease of moving capital has also induced economic volatility, as in apparel manufacturing.

Table 2.1 Services exports rise in line with goods exports

Regions and trade	Levels ($ billions)			Growth rate (percent)		Percentage of GDP		
	1984	1994	2004	1984–94	1994–2004	1984	1994	2004
Exports of services								
World	357.8	978.2	2,009.5	10.6	7.5	3.0	3.7	4.9
High-income countries	303.7	803.9	1,614.2	10.2	7.2	3.3	3.6	4.9
Developing countries	54.1	174.2	395.3	12.4	8.5	2.0	3.8	4.7
East Asia & Pacific	9.1	49.5	115.0	18.5	8.8	1.9	4.7	4.3
South Asia	4.7	9.9	32.3	7.7	12.5	1.8	2.3	3.7
Europe & Central Asia	7.9	47.5	124.6	19.6	10.1	—	5.1	7.0
Middle East & N. Africa	10.7	19.3	36.7	6.1	6.6	—	6.7	6.7
Sub-Saharan Africa	4.5	8.4	20.8	6.5	9.5	2.0	3.0	4.0
Latin America & Caribbean	17.2	39.6	65.8	8.7	5.2	2.5	2.5	3.3
External factor income								
World	330.4	782.4	1,578.3	9.0	7.3	2.8	2.9	3.8
High-income countries	295.2	734.5	1,476.7	9.5	7.2	3.2	3.3	4.5
Developing countries	35.2	47.9	101.5	3.1	7.8	1.3	1.0	1.2
East Asia & Pacific	5.6	15.5	33.7	10.8	8.1	1.2	1.5	1.3
South Asia	0.8	1.3	4.8	4.9	14.0	0.3	0.3	0.5
Europe & Central Asia	1.0	7.3	30.5	21.8	15.3	—	0.8	1.7
Middle East & N. Africa	15.4	7.1	8.1	−7.4	1.3	—	2.4	1.5
Sub-Saharan Africa	1.4	1.9	4.6	3.2	9.3	0.6	0.7	0.9
Latin America & Caribbean	11.1	14.8	19.9	3.0	3.0	1.6	0.9	1.0

Sources: International Financial Statistics (IFS) and staff calculations.
Note: Service exports corresponds to "services credit" from the balance of payments table in IFS (code 78ADDZF). External factor income corresponds to "income credit" from the balance of payments table in IFS (code 78AGDZF). Owing to lack of data, some countries are excluded from regional aggregations. — = not available.

Trade in services has been growing at a pace similar to trade in goods at the global level (table 2.1).[6] Rising from $358 billion in 1984 to $2,000 billion in 2004, the share of services exports in total exports of goods and services has advanced modestly from 16 percent to 17.5 percent. For developing countries in aggregate, services exports have risen from $54 billion in 1984 to nearly $400 billion in 2004, raising its share of GDP from 2 percent to 4.7 percent. The corresponding figure for exports of goods and services is an increase from 19.8 percent of GDP in 1984 to 35.1 percent in 2004 (with no smoothing in the trend). Though South Asia is often mentioned as the main source of the growth in trade in services, the largest contributors to the rise in developing-country service exports over the last two decades have been East Asia and the Pacific and Europe and Central Asia. The latter region has benefited from its opening up to the global economy, its merger with the European Union, and the rapidly rising share of services in its economies.

For developing countries the growth in factor income from abroad has been much less pronounced than the growth in the export of services—and as a share of GDP, it has declined. This is linked to the as yet relatively low level of outbound investments by developing countries. For developed countries, the expansion of foreign income has been on a par with the expansion of service exports driven by rapid investments abroad.

Rapid increase in migration toward high-income countries

A second component of the recent globalization is the rise in international migration, particularly in developed countries. The share of migrants in developed countries (from both high-income and developing countries) has nearly tripled, going from 4.4 percent in 1960 to 11.4 percent in 2005—equivalent to an estimated 112 million persons out of a total number of migrants worldwide of some 190 million (figure 2.3). It is harder to discern the impacts of policies on the level of migration. Much of

EMBARGOED: Not for publication, broadcast, or transmission until December 13, 2006, at 12:01 a.m. in Washington, DC (5:01 a.m. GMT/UTC).

THE COMING GLOBALIZATION

the South-to-North migration is predicated on the huge income differentials between the two, even taking into account differences in the cost of living. And one would expect that in the absence of (more or less) tight border controls on the movement of people, the number of migrants would increase substantially.[7] Pull factors are also in evidence in developed countries: slowing or declining labor force growth combined with aging and higher education levels is giving rise to labor shortages for certain skill levels and/or in certain sectors. Migration levels in developing countries (excluding the countries of the former Soviet Union) have more or less stayed constant over this time period at about 40–45 million and have declined as a percentage of the population.

More integrated financial and capital markets

The pace of opening of capital markets has been slower than for trade—even among the more homogeneous developed economies. Many countries still maintain restrictions on capital flows but the world has nonetheless seen a huge increase in financial flows both in gross and net terms. Foreign direct investment (FDI), which is particularly attractive for developing countries because it tends to be less volatile than other capital flows and also has other potential externalities such as embodied technology, has risen both globally and in developing countries. From a low initial level of $22 billion in 1990, FDI toward developing countries is currently running at about $200 billion a year, some 2.5 percent of developing-country GDP (figure 2.4). Developing countries currently attract about one-third of total global inward FDI, as FDI into developed countries is running at some $400 billion a year after peaking at over $1,300 billion in 2000 at the end of the dot-com boom. Total private financing of developing countries was nearly $1,000 billion in 2004, over five times the amount in 1990. The aggregate numbers fail to show the wide diversity across developing countries—both in terms of levels (or as shares of GDP) and externalities. For example,

FDI in natural resource sectors does not necessarily have the employment and technological impacts compared with FDI in the electronics sector. A more recent phenomenon has been the increase in outward FDI from developing countries from a low base of about $2.2 billion in 1990 to $41.1 billion in 2004 (World Bank 2006b).

Faster pace of technological take-up and diffusion

Technology has been advancing rapidly—particularly technologies that *shrink* the world, easing the flows of goods, capital, and technology. The improvements in telecommunications are the most striking example. The expansion of computer networking has vastly changed the way large companies organize production and has permitted the introduction of production networks that span the globe. These same networks also open up market opportunities for small firms that are no longer limited to regional markets. Mobile telephony is having the same impact. As the costs of developing mobile networks are much lower than that of traditional fixed-line networks, they have expanded rapidly even in the poorest regions of the world, opening up new market opportunities for once-isolated communities.[8] Though fixed-line telephony continues to be important, at least until wireless technologies mature, its growth has been limited by high fixed costs (figure 2.5) except in the high-growth countries. Mobile technology, by contrast, has taken off (figure 2.6)—perhaps even more sharply than shown by the data, given that the numbers probably vastly understate access since many users are non-subscribers.

Improvements in transportation technology have also been impressive. The introduction of the container in the 1950s dropped the cost of loading a ship from $5.83 per ton to 15.8 cents, and even more savings came from the vast reduction of time ships spend in port for loading and unloading (see Levinson 2006). The advent of the jumbo jet airplane in the late 1960s led to the rise of cheaper air

freight, a key component of the integrated global supply networks. It has enabled farmers in developing countries to export their time-sensitive produce—such as green beans or flowers—to high-income markets. The improvements in transportation and the advent of supply networks and global markets go hand in hand with the improvements in telecommunications and networking.

Looking forward, one would conclude that many of these forces are likely to provide the same impetus to globalization as they have in the past—some with diminishing power, and others perhaps with more. Trade policies have come a long way toward more integrated markets for goods, though tariffs remain high in many developing countries and in some sectors—such as agriculture. Other forms of protection are ever present such as unreasonable product standards or ad hoc safeguard measures. The service sectors have also been largely untouched by the GATT/WTO disciplines, and their reform would likely provide additional impetus to further trade growth. The same could be said for capital flows and the movement of people. However, the greater driver of globalization is likely to be in the technological field, because the telecommunications revolution is still in its infancy. Adoption, though rapid, has still bypassed many, and the technology is evolving—with greater speeds and the broader implementation of wireless broadband expected. And individuals and firms are still learning to adapt to the new technologies and leverage them to open new opportunities and increase productivity.

The world in 2030—the big picture

Preface: assumptions

The central scenario is built up from a number of key driving forces—notably demographic trends, savings, and investment behavior, and the role of technological change, and how these trends interact with globalization (see box 2.1). Some of these forces are, in turn, influenced by

the quality of domestic and international policies. Population is expected to add 1.5 billion people to the planet by 2030, and virtually all of the increase will be in developing countries. Moreover, today's high-income countries and China will become significantly older. Changing demographics weigh heavily on the results influencing the growth of employment, demand trends, and changes in savings and investment behavior (and even productivity).

While demographic trends are fairly predictable, assumptions about productivity growth are subject to a wider band of possibilities. There is no agreement on how to interpret recent productivity growth, let alone how to anticipate future patterns. For example, in the view of Gordon (2000), recent inventions—such as cell phones, the internet, or new drugs—are relatively normal incremental changes to productivity and are unlikely to have the same impact as the new technologies at the beginning of the 20th century—electricity, the internal combustion engine, telephones, radio, television, and indoor plumbing. Other observers, for example David (1990), suggest that it takes time for new discoveries to have their full impacts—either because initial costs are too high, or because there are network externalities, or because it takes time for organizations to change their management practices to fully benefit from the new technologies. Whether one takes a sanguine view of new technologies or not, large parts of the developing world have yet to benefit from "old" technologies.

The macro assumptions on productivity built into the forecast are largely consistent with the estimates of total factor productivity (TFP) growth from the literature (see, for example, Bosworth and Collins 2003). The world saw a period of very rapid TFP growth in the 1960s, followed by a decade of stagnation coinciding with the energy crisis of the 1970s, recovery to an estimated rate of 0.8 percent per year in the 1980s and 1990s, and an acceleration in the 2000s. There have been large variations across regions and time. The central scenario assumes a long-term rate of

Box 2.1   Inside the box—the components of scenario building

The long-term scenarios described in this chapter are based on the World Bank's Linkage model with a dynamic core that is essentially a neoclassical growth model—similar in concept to models used in other recent scenario work (see Goldman Sachs 2003 and PricewaterhouseCoopers 2006, for example). Aggregate growth is predicated on assumptions regarding the growth of the labor force, savings/investment decisions (and therefore capital accumulation), and productivity.

The Linkage model, unlike the aforementioned models, has considerably more structure—see van der Mensbrugghe (2006a) for a detailed description of the model and van der Mensbrugghe (2006b) for a summary description of the model and the assumptions underlying the baseline scenario.

First, it is multisectoral. This allows for more complex productivity dynamics including differentiating productivity growth between agriculture, manufacturing, and services and picking up the changing structure of demand (and therefore output) as growth in incomes leads to a relative shift into manufactures and services.

Second, it is linked multiregionally, allowing for the influence of openness—through trade and finance—on domestic variables such as output and wages. The model is also global, with globally clearing markets for goods and services and balanced financial flows.

Third, the Linkage model has a more diverse set of productive factors, including land and natural resources (in the fossil fuel sectors), and a labor split between unskilled and skilled.

The Linkage model has a 2001 base year and relies on the Global Trade Analysis Project (GTAP) database (release 6.1; see www.gtap.org) to calibrate initial parameters. A scenario is developed by solving for a new equilibrium in each subsequent year through 2030 with the following key assumptions:

The growth in the labor force is driven by demographics—essentially given by the growth of the working-age population. Differentiated growth of skilled versus unskilled workers is partly driven by demographics and partly driven by changes in education rates. As education levels rise (in the younger populations), they eventually drive higher relative growth of skilled workers once they enter the labor force (and older unskilled workers retire).

Savings decisions are partly driven by demographics—rising as youth dependency ratios fall and falling as elderly dependency ratios rise. Investment rates are driven by changes in growth rates (the accelerator mechanism) and differential rates of return to capital. Net foreign savings is the difference between domestic savings and investment.
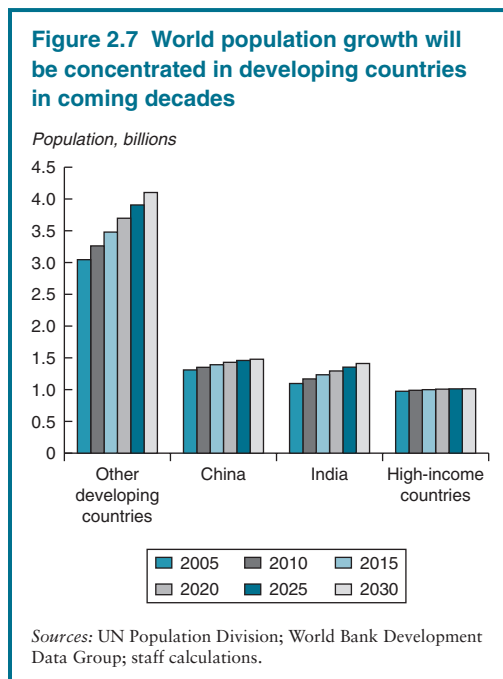
Productivity is derived by a combination of factors, but is also partially judgmental. First, agricultural productivity is assumed to be factor-neutral and exogenous and is set to estimates from empirical studies (for example Martin and Mitra 1999). Productivity in manufacturing and services is labor-augmenting and a constant wedge is imposed between productivity growth in the two broad sectors with the assumption that productivity growth is higher in manufacturing than in services.

The model assumes that energy efficiency improves autonomously by 1 percent per year in all regions and that international trade costs decline by 1 percent per year.

TFP growth in the range of 1.0–1.4 for the high-income countries, somewhat on the high end of the Bosworth and Collins estimates. The range for developing countries is somewhat wider—between 0.7 and 2.9 toward 2015 and declining slowly thereafter as the positive impacts of rural-to-urban migration fade.

The central scenario is also predicated on only modest changes in the policy environment.

Over the last 25 years, the world has seen a dramatic drop in trade barriers for goods. And although they remain high in some countries and for some sectors (for example, in agriculture), the dismantling of remaining barriers will not have the same impact as in the past. A possible exception: dismantling barriers in services that remain high could produce significant economic gains.

**Figure 2.7 World population growth will
be concentrated in developing countries
in coming decades**

Sources: UN Population Division; World Bank Development
Data Group; staff calculations.

World population will increase

As noted above, the world will add 1.5 billion persons to its population between 2005 and 2030—going from (about) 6.5 billion to 8 billion (figure 2.7).[9] Roughly 12 percent will be living in high-income countries—down sharply from the 18 percent in 1980 and 14.5 percent in 2005. All but 40 million of this growth in population will occur in developing countries. While this represents a substantial increase in the number of persons—with concomitant effects on already scarce resources—it also represents a slowing of world population growth that added 2 billion persons between 1980 and 2005. The global population growth rate, between 1.7 and 1.8 percent in the 1980s, will slow to 1 percent by 2015 and dip to 0.7 percent toward 2030.

High-income countries would start observing actual population declines—Japan by 2010 and the EU countries soon thereafter. Japan's population under current projections would fall from about 128 million in 2005 to 117 million in 2030. The EU15 would
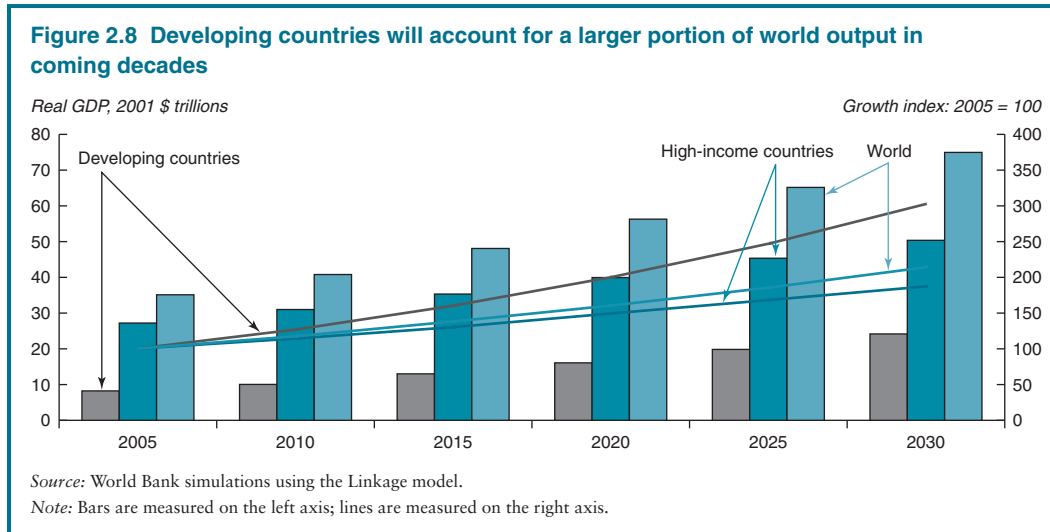
likewise lose about 10 million persons, falling from 412 million to 402 million. The United States will see a decline in the population growth rate, but fertility is still much higher in the United States than in other high-income countries—owing in part to immigrants' higher fertility. If current trends hold, the U.S. population will climb by 45 million to 345 million in 2030.

The population growth pattern is more highly varied across developing countries. Many of the countries in Europe and Central Asia are already confronted with declining populations—including the Russian Federation, which is losing population and will continue to do so unless trends are reversed—at a rate of about 0.5 percent each year. In the new EU accession countries, population declines average about 0.2–0.3 percent per year through the entire period. At the other end of the spectrum are Sub-Saharan Africa and the Middle East and North Africa, with population growth rates currently hovering at about 2 percent, declining toward 1.1–1.4 percent per year toward 2030.

The largest contribution to the nearly 1.5 billion increase in developing regions can be attributed to India, representing 320 million additional persons, and to Sub-Saharan Africa excluding Nigeria and South Africa, with a similar increment of 320 million—each contributing 20 percent to the global increase. Despite China's one-child policy and overall aging population, the momentum of the current population will generate 170 million additional Chinese by 2030, another 11 percent of the global increase.

*The global economy will more
than double*

It is important to keep in mind, turning to the economic projections, that these are a combination of reasoned quantitative analysis and informed judgment and not predicated on standard statistically based econometric models, as are the short- and medium-term forecasts described in chapter 1. They are intended to highlight certain key aspects of the

Figure 2.8 Developing countries will account for a larger portion of world output in coming decades

Real GDP, 2001 $ trillions   *Growth index: 2005 = 100*

Source: World Bank simulations using the Linkage model.
Note: Bars are measured on the left axis; lines are measured on the right axis.

baseline scenario that could be robust to a certain number of alternative assumptions—though none that imply highly nonlinear divergence from current trends.

If growth scenarios obtain, the share of output (in real terms) produced by developing countries would shift rather steadily. The global economy would grow from about $35 trillion in 2005 to $75 trillion in 2030, an overall increase of some 2.1 times (figure 2.8).[10] The developing-country share would jump from $8 trillion to $24.3 trillion—effectively tripling its output between 2005 and 2030 and increasing its global share of output from 23 percent to 33 percent.

This represents a modest acceleration of what was observed between 1980 and 2005. The global economy has increased by a factor of 2.1. For high-income countries the projection represents a slight decrease (from 2 to 1.9) but a more significant acceleration for developing countries (from 2.4 to 3.1). Part of this acceleration is due to compositional factors—higher-growth developing countries have higher weights today than back in 1980. However, it is mostly based on the chapter authors' judgment that many developing countries are on an accelerated growth path

as a consequence of the combination of improved initial conditions, better policies, and the still wide gap in productivity—relative to high-income countries. Moreover, developing countries have greater capacity and incentives to adapt new technology as communications technology continues to improve, FDI remains a force in overall development, and education and skill levels improve. If one decomposes the last 25 years in two periods—1980–2000 and 2000–2005—average growth in developing countries jumped from 3.2 percent per year in the first period to 5 percent per year in the second. This recent acceleration has not been shared by all countries—nor is it exclusively a China and India phenomenon.

Perhaps somewhat surprisingly, these differentiated growth rates will have only relatively modest impacts on the ranking of countries/regions based on the volume of output.[11] The rankings of the top six countries/regions would remain identical to those of today led by the United States, the European Union, Japan, China, the newly industrializing economies (NIEs), and Latin America (excluding Brazil and Mexico). India would jump three spots from its current 10th ranking, essentially

swapping spots with Canada. Other countries/ regions moving up include the rest of East Asia aggregate, Indonesia, and Iran. Sub-Saharan Africa, with its assumed more modest growth rates, would fall further behind with the rest of Sub-Saharan Africa aggregate losing an additional three spots by 2030.

Looking behind again, one sees that there have been some spectacular jumps in the past 25 years as well as some spectacular declines—most reflected by the fall of the Iron Curtain (table 2.2). The clear winners have been Ireland, Singapore, Sri Lanka, Costa Rica, El Salvador, Equatorial Guinea, and

Table 2.2 Country rankings—1980–2005

Country	1980	2005	Change	Country	1980	2005	Change	Country	1980	2005	Change
United States	1	1	0	Hungary	52	45	7	Jamaica	96	90	6
Japan	2	2	0	Philippines	40	46	−6	Bolivia	98	91	7
Germany	3	3	0	New Zealand	49	47	2	Azerbaijan	80	92	−12
United Kingdom	5	4	1	Algeria	34	48	−14	Ghana	89	93	−4
France	4	5	−1	Nigeria	33	49	−16	Albania	102	94	8
China	10	6	4	Peru	51	50	1	Botswana	117	95	22
Italy	6	7	−1	Romania	37	51	−14	Paraguay	84	96	−12
Canada	8	8	0	Bangladesh	56	52	4	Honduras	97	97	0
Spain	12	9	3	Ukraine	30	53	−23	Ethiopia	83	98	−15
Mexico	13	10	3	Kuwait	50	54	−4	Uganda	103	99	4
Korea, Rep. of	23	11	12	Morocco	60	55	5	Senegal	100	100	0
India	11	12	−1	Vietnam	35	56	−21	Nepal	101	101	0
Brazil	9	13	−4	Kazakhstan	54	57	−3	Gabon	90	102	−12
Australia	14	14	0	Slovak Republic	61	58	3	Mauritius	115	103	12
Netherlands	16	15	1	Croatia	57	59	−2	Madagascar	92	104	−12
Russian Federation	7	16	−9	Slovenia	64	60	4	Namibia	106	105	1
Switzerland	19	17	2	Ecuador	63	61	2	Nicaragua	99	106	−7
Taiwan, China	32	18	14	Oman	73	62	11	Burkina Faso	108	107	1
Sweden	18	19	−1	Guatemala	67	63	4	Mali	111	108	3
Austria	24	20	4	Tunisia	68	64	4	Congo, Rep. of	104	109	−5
Turkey	27	21	6	Syrian Arab Republic	58	65	−7	Georgia	82	110	−28
Saudi Arabia	15	22	−7	Bulgaria	55	66	−11	Benin	113	111	2
Indonesia	20	23	−3	Dominican Republic	69	67	2	Guinea	110	112	−2
Norway	28	24	4	Sri Lanka	86	68	18	Chad	119	113	6
Poland	26	25	1	Sudan	66	69	−3	Armenia	109	114	−5
Denmark	29	26	3	Belarus	62	70	−8	Niger	105	115	−10
Greece	36	27	9	Costa Rica	94	71	23	Kyrgyz Republic	107	116	−9
South Africa	22	28	−6	Lithuania	72	72	0	Malawi	114	117	−3
Argentina	21	29	−8	Kenya	78	73	5	Swaziland	123	118	5
Hong Kong, China	42	30	12	El Salvador	93	74	19	Togo	120	119	1
Finland	31	31	0	Uruguay	70	75	−5	Rwanda	112	120	−8
Ireland	53	32	21	Angola	81	76	5	Central African Republic	122	121	1
Iran, Islamic Rep. Of	17	33	−16	Côte d'Ivoire	71	77	−6	Sierra Leone	116	122	−6
Portugal	45	34	11	Panama	88	78	10	Lesotho	124	123	1
Thailand	38	35	3	Cameroon	76	79	−3	Mauritania	121	124	−3
Israel	48	36	12	Trinidad and Tobago	77	80	−3	Belize	126	125	1
Venezuela, R. B. de	25	37	−12	Yemen, Republic of	79	81	−2	Burundi	118	126	−8
Malaysia	43	38	5	Zimbabwe	74	82	−8	Seychelles	127	127	0
Singapore	59	39	20	Latvia	75	83	−8	Gambia, The	125	128	−3
Colombia	39	40	−1	Bahrain	91	84	7	Guinea-Bissau	128	129	−1
Czech Republic	41	41	0	Equatorial Guinea	129	85	44	Vanuatu	130	130	0
Egypt, Arab Rep. of	46	42	4	Tanzania	65	86	−21				
Pakistan	44	43	1	Iceland	95	87	8				
Chile	47	44	3	Jordan	87	88	−1				
				Estonia	85	89	−4				

Source: World Development Indicators, World Bank.
Note: Based on five-year moving average centered on 1982 and 2003, respectively. Rankings based on GDP in current dollars.

Botswana.[12] More modest, but still substantial improvements include the Republic of Korea, Taiwan (China), Hong Kong (China), Israel, Oman, Panama, Portugal, and Mauritius. There is little obvious commonality across these economies with the exception that none (save Equatorial Guinea) is an oil producer or a transition economy. China's GDP increase has been fast, but it has only moved from 10th place to 6th over the 25 years and India has lost a spot, with both Mexico and Korea jumping over India in the rankings.

Many of the countries, having lost ground in the global ranking, are concentrated among oil producers and transition countries including the Russian Federation, Saudi Arabia, Indonesia, the Islamic Republic of Iran, República Bolivariana de Venezuela, Nigeria, Romania, Bulgaria, Gabon, and Georgia. However, other countries have also fared poorly—for example Brazil, Argentina, and Uruguay in Latin America, and Ethiopia, Tanzania, and Zimbabwe in Sub-Saharan Africa—though it is generally the case that countries that have avoided conflict have managed to maintain their ranking.

Per capita income growth is what matters

Economic size and ranking have their importance, not least in terms of determining power relations, be it at the global, regional, or bilateral level. But from a welfare point of view, what really matters is income per capita, not the overall size of an economy.[13] Using the market dollar exchange rate of an economy provides a biased estimate of individual well-being because prices differ substantially across economies—particularly for nontraded goods such as personal and housing services. For this reason, it is more appropriate to use the PPP exchange rates, which take into account these differences in prices.[14] Even using PPP exchange rates, the speed of convergence between developing- and developed-country incomes would be modest under this scenario. At today's income in PPP terms, the average developing-country resident receives about 16 percent of the average income of high-income countries—$4,800 versus $29,700 (figure 2.9). This ratio would rise to 23 percent in 25 years' time, representing an average developing-country income of $12,200 versus $54,000 for high-income countries.

Figure 2.9 In some developing regions, per capita incomes will begin to converge with those in high-income countries

Index: high-income countries = 100
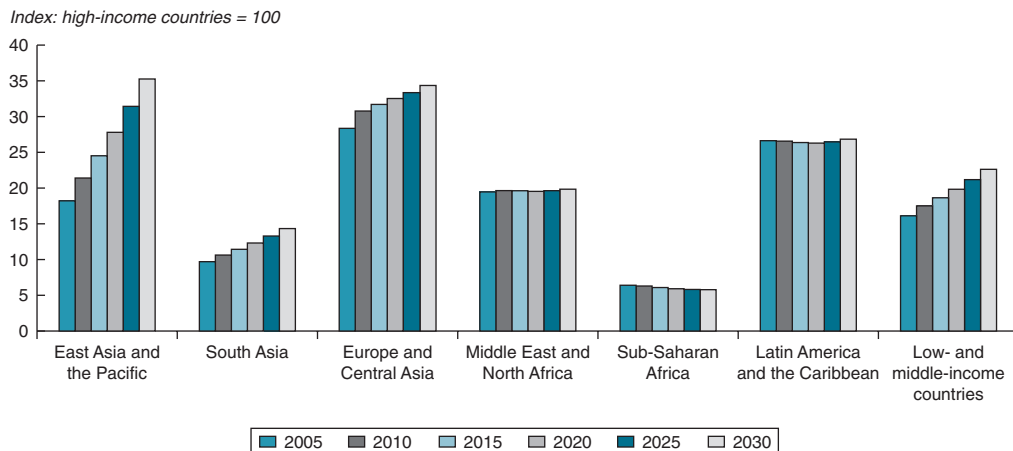
Source: World Bank simulations using the Linkage model.

Note: Ratio of PPP-adjusted per capita incomes relative to high-income average. PPP is fixed at base year (2001) level.

There is, perhaps needless to say, great variance across countries. Chinese incomes would rise from 19 percent of the average high-income level to 42 percent, a significant narrowing of the gap and would achieve an average income close to the lower range of today's poorest high-income countries. There would be a further falling behind in Sub-Saharan Africa with its modest per capita growth below the high-income average, and Latin America would see little if any convergence on average. As the previous 25 years have shown, there is plenty of scope for surprises and countries doing significantly better, even compared to countries with similar initial conditions.[15]

The rather modest level of convergence overall nevertheless obscures the fact that market opportunities for both developed and developing countries will increase dramatically as the sheer size of the population of developing countries ensures the growth of a very significant middle and upper class likely to rival the purchasing power of today's high-income consumer (see chapter 3). Thus, notwithstanding the challenge that poverty will continue to hold on the global community, the wider spread of wealth globally will also provide greater means to deal more substantively with poverty and other global concerns such as the environment and health.

The next sections delve more in depth into the underlying assumptions of this central scenario and some of the policy implications that can be derived from them and their potential alternatives.

Demographics are central to the growth scenario

Two significant demographic changes are occurring at the moment. Developed economies have seen a huge decline in fertility rates (well below replacement rate), a stable labor force that will begin to decline, and rapidly aging populations. Developing countries—some earlier than others—are now also seeing significant declines in fertility rates and a substantial reduction in the number of youths relative to those in the labor force. Labor forces are still growing rapidly in most countries owing to the large number of births over the last two decades and most are only seeing modest increases in the share of the elderly in the population because rising life expectancy largely impacts current (and larger) generations rather than past.

For developed economies, the standard economic impacts of slowing population growth and aging suggest that aggregate savings will decline, all else being equal, as aging populations tend to dis-save or consume out of existing assets. This would tend to decrease the amount of savings available for developed countries. The evidence for this dissaving is mixed and other factors—such as current levels of public and/or international indebtedness—may influence the long-term patterns of savings and investment. On the other hand, lower rates of employment growth could have mixed impacts on investment. Lower labor supply could lessen the need for investment in sectors where labor and capital are close complements.[16] But more intense investment may counteract this effect in sectors where labor and capital are substitutes and labor-saving technology is an option.[17]

Aging populations can have other consequences. Productivity growth could be higher in economies with rapid increases in the number of youth joining the labor force. They can also be associated with changes in consumer behavior with less demand for food and educational services and more demand for leisure and health services (McKibbin 2005; Bryant 2004; Helliwell 2004; Tyers and Shi 2005). There could also be fiscal implications as promises to earlier generations in terms of social welfare benefits prove hard to finance with a lower tax base. This eventually may involve a combination of lower benefits and delay of retirement age or other forms of higher labor-force participation rates by the elderly.

For developing countries, some of these impacts are reversed. With a lower proportion of youth to care for—including provisions for housing, education, and nourishment—more can be saved and invested, particularly because
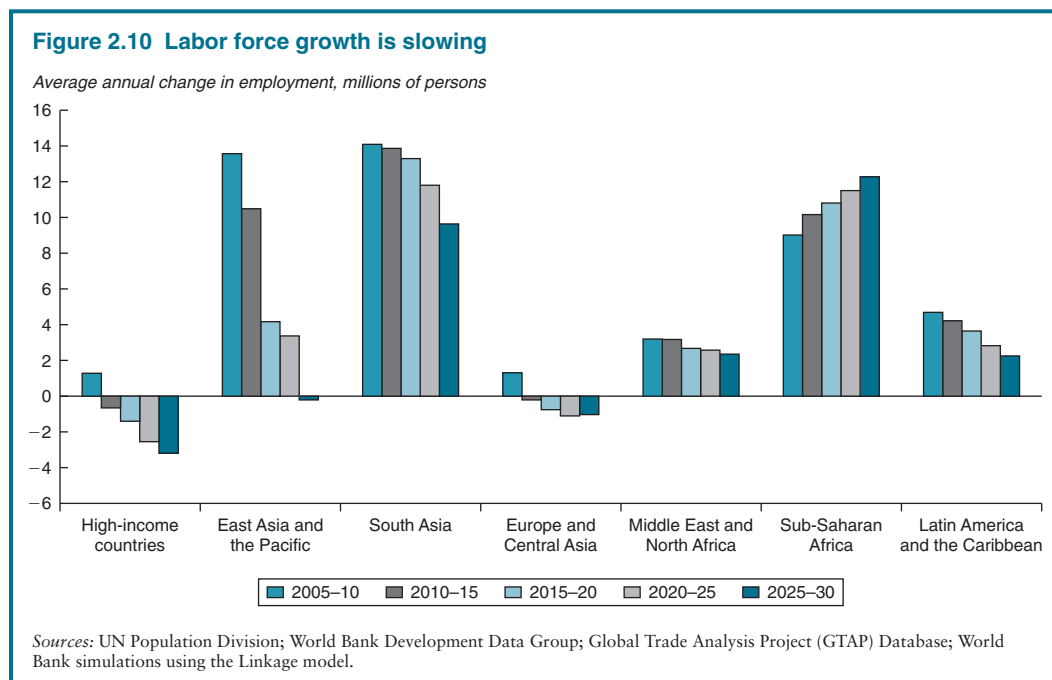
many countries still have a low proportion of elderly. To the extent that available savings from developed countries decline, the higher savings in developing countries would tend to offset the decline.

Starting with employment, developed-country employment growth, though positive through 2010 at about 1.2 million new jobs per year, becomes negative thereafter, with an average loss of about 700,000 jobs between 2010 and 2015, jumping to an annual average loss of over 3.2 million between 2025 and 2030 (figure 2.10).[18] This latter number represents a decline of about 1 percent per year. Among other things, this negative employment growth implies—through standard growth accounting—that combined capital accumulation and productivity will have to accelerate to compensate if aggregate growth of 2–3 percent per year is to be maintained. The start of the decline in the labor force varies across countries, already (potentially) observable in Japan, beginning in the European Union shortly after 2010, and delayed in the United States (and Australia and New Zealand) until sometime

between 2020 and 2025—somewhat later than even for the NIEs of East Asia.

Labor force growth is still rapid in developing countries—though on a declining trend throughout the period. Currently, developing countries need to increase employment by nearly 50 million jobs per year to keep up with working-age population growth under the proviso of no change to the labor force participation rate including females. This latter assumption may be dubious in light of the fact that fertility is declining rapidly in developing countries. The largest needs are in the largest countries, with China and India needing to create 8–10 million jobs each year. This may be easier in these rapidly growing economies. Countries in Sub-Saharan Africa also need to create close to 10 million jobs each year. With their lower economic growth rates and relatively small urban populations, the task appears to be much harder.[19]

The trends for China also show the impacts of its decades-long population policies limiting births. In a relatively near future, employment growth will decline precipitously

Figure 2.10 Labor force growth is slowing

Average annual change in employment, millions of persons

Legend: 2005–10, 2010–15, 2015–20, 2020–25, 2025–30

Categories: High-income countries; East Asia and the Pacific; South Asia; Europe and Central Asia; Middle East and North Africa; Sub-Saharan Africa; Latin America and the Caribbean

Sources: UN Population Division; World Bank Development Data Group; Global Trade Analysis Project (GTAP) Database; World Bank simulations using the Linkage model.

from over 5 million between 2010 and 2015 to under 500,000 between 2015 and 2025 and will turn negative thereafter. The only other region affected by negative employment growth is Europe and Central Asia, whose population is more similar in structure to the European Union than to the average developing country.
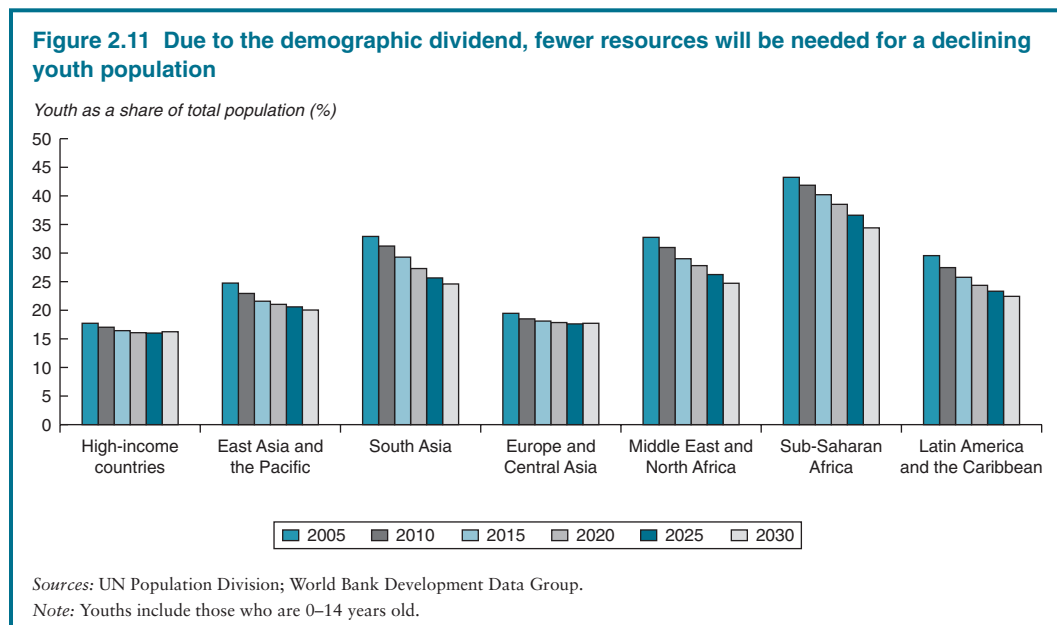
In summary, employment growth initially will provide significant stimulus to economic growth, but its share will decline rapidly in most developing regions as the current generation of youth join the workforce and leave behind a smaller pool of potential workers as fertility continues to fall.

The demographic projections for youths and the elderly are distinctly different in nature mainly because the future elderly are all alive today and thus the projection is based on changes to mortality rates that tend to be easier to gauge than changes to fertility rates. In fact, the UN population forecasts—the basis of the World Bank's forecasts—are predicated on all countries converging toward population replacement levels of fertility by 2050. This implies an *increase* in fertility in

many high-income countries, where fertility has dropped to between 1 and 1.5 births per woman.[20]

Over the longer term, the increase in developed-country fertility would lead to a slight rise in the share of the population aged 15 and below, and even an absolute rise, sometime after 2020 (figure 2.11).

The growth in the number of youths in developing countries will stay more or less constant on average over the entire time horizon—though again highly variegated across regions, with large declines in East Asia and the Pacific and Europe and Central Asia offset by positive if declining growth rates in Sub-Saharan Africa and to a lesser extent South Asia. But even in Sub-Saharan Africa, the assumption of replacement-level fertility will lead to a sharp decline in births. Between 2005 and 2030, the share of youths in Sub-Saharan Africa will drop from 44 percent to 35 percent. Despite this leveling, the pressure to educate (and provide health services) for the young in Sub-Saharan Africa will be a challenge in a region that is significantly off-track in terms of achieving the Millennium Development Goals

Figure 2.11 Due to the demographic dividend, fewer resources will be needed for a declining youth population

Youth as a share of total population (%)

Sources: UN Population Division; World Bank Development Data Group.

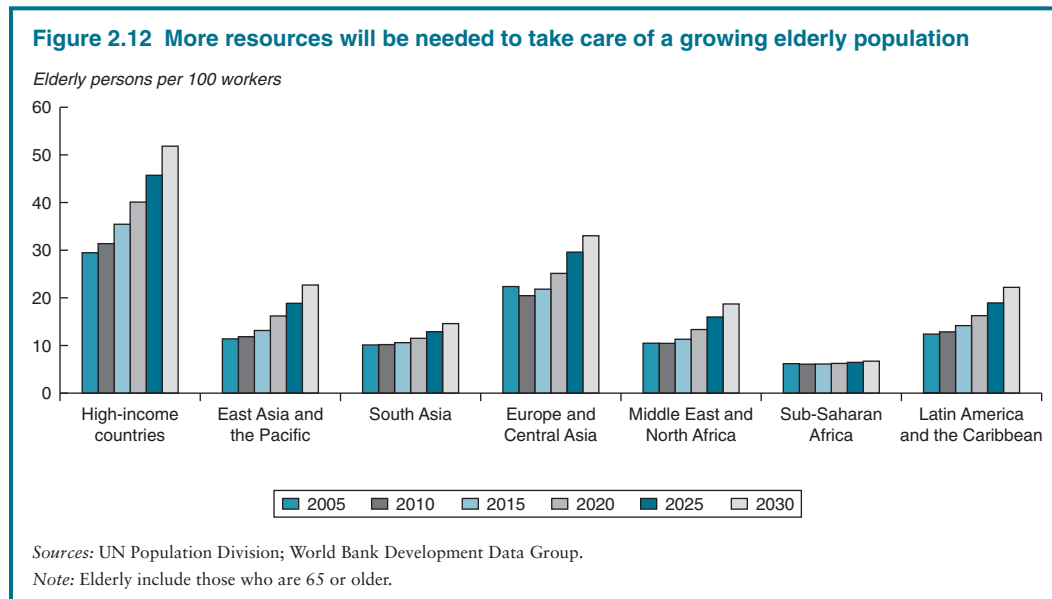*Note:* Youths include those who are 0–14 years old.

(MDGs) by 2015. The number of young people in Sub-Saharan Africa will jump by 100 million from 300 million currently, so it is not simply a question of building new classrooms and training new teachers for today's population, but also taking into account the bulge in the student-age population as one looks forward.

Potentially, the resources to take care of the youth will improve as the number of workers grows more rapidly than the number of youths in developing countries. The dependency ratio—defined as the number of youths per 100 workers—will drop pretty steadily between 2005 and 2030, starting at a level of 60 and falling to 47. Even with the sharp drop in the youth dependency ratio in developing countries, they will still have an average ratio considerably higher than the average in high-income countries centered at around 35.[21] These ratios will reach developed-country levels in East Asia and the Pacific and in Europe and Central Asia—pretty rapidly in both cases—by about 2015. Both Middle East and North Africa and Sub-Saharan Africa stand out as having particularly high youth dependency rates—85 and 93 (per 100 workers), respectively, well above the average for

developing countries. These ratios will drop, but even in 2030 will remain at 60 or above.

The number of elderly will more or less double over the next 25 years—from 464 million in 2005 to about 910 million in 2030. By and large, future population aging is a developed-country phenomenon—though only one in three elderly currently lives in developed countries and another one in three lives in China or India. The number of elderly per 100 workers in developed countries would rise from 30 to 53 between 2005 and 2030 and reach 63 in Japan and 59 in the EU (figure 2.12). Even in the United States the rate could nearly double from today's low of 23 to 44 in 2030. This will undoubtedly necessitate forceful policy changes because existing unfunded promises to future elderly would require unprecedented taxes on workers.

For developing countries, aging populations (as defined by the number of elderly per 100 workers) will rise only slowly from current levels through about 2020, but will start accelerating modestly afterwards to reach a level of nearly 19 starting from 12 in 2005. This is still well below the developed-country average of 30 today and differs widely across regions.

Figure 2.12 More resources will be needed to take care of a growing elderly population

Sources: UN Population Division; World Bank Development Data Group.
Note: Elderly include those who are 65 or older.

China will see a sharper rise in its elderly dependency rate, moving from 12 currently to 25 by 2030. This could be contrasted with India, which has a level similar to China's at 11, but rising to only 16 by 2030. As mentioned earlier, population-wise Europe and Central Asia is more similar to high-income regions and the elderly dependency ratio will hit 34 by 2030. What moderates this to some extent in Europe and Central Asia is the inclusion of Turkey with its relatively young and large population and, more unfortunately, the precipitous decline in life expectancy in some parts of Europe and Central Asia.

These demographic trends provide a significant opportunity for many developing countries[22] that will be able to devote less resources to their youth and that do not yet have to devote significant resources to their elderly—although they would be well advised to avoid making some of the choices that developed countries have made regarding long-term commitments to their elderly without adequately making provisions for them.

The four channels of globalization

What follows is a discussion of the four key channels of globalization and how they interact with the development process—trade in goods and services, movement of persons, financial flows, and technological diffusion.

Trade integration will accelerate

The trade dimension of globalization has perhaps been the most prominent, especially with the emergence of Asia and the transition economies over the last two decades. Growth in trade has outpaced growth in output by a factor of two or more and the causes behind this phenomenon are in place to sustain it over the next two decades.

Income growth, changing comparative advantage, and the push toward greater openness—the impasse in the Doha Round negotiations notwithstanding—will continue to lead to expanding global trade over the next two decades. Though import tariffs have

dropped dramatically since 1980, they still remain stubbornly high in some sectors, for example in agriculture and services, or in some countries. Protection can also take other forms, for example antidumping, questionable standards, or variable levies (as bound tariffs are typically well above applied tariffs). Progress in opening markets has stalled at the multilateral level, but countries continue to pursue liberalization either unilaterally or through bilateral and regional agreements.

While the standard theory of trade has focused on comparative advantage, new trade theory places much more emphasis on the role of specialization. Specialization is manifested in two ways. The first is consumers' desire for greater varieties of the same categories of goods. Whereas 25 years ago consumers had a relatively modest selection of automobiles or fashion, today's range of consumer goods is huge. This love of variety has provided producers from a diverse set of countries with opportunities to export. A second form of specialization is represented by production networks that allow for the breaking up of the production process across multiple firms and/or countries. The growth in production networks has been predicated on many technological advances—both physical, as in telecommunications and transport, and management processes, such as supply chain logistics. There is little evidence that these factors will subside anytime soon.

Under the central scenario, the level of exports would more than triple—from about $9 trillion in 2005 to over $27 trillion in 2030—with a concomitant rise in the world export-to-output ratio, jumping to 34 percent from 25 percent currently. For developing countries exports will increase from about $3 trillion to over $12 trillion, reflecting in part these countries' greater output growth. These baseline numbers are predicated on the assumption of no change to current trade policies.[23] Under a broad reform scenario whereby all countries reduce tariffs on merchandise goods (and domestic agricultural protection) by three-quarters, exports by developing countries would increase

by an additional $2 trillion in 2030, a jump of some 18 percent over the baseline.

The push and pull factors driving international migration will persist

International migration has risen substantially recently—though the lack of reliable data, particularly of irregular migration, makes it difficult to assess the actual number of migrants in either developed or developing countries. Current estimates are that 11.4 percent of developed countries' population are foreign-born, up from 6.2 percent in 1980. South-South migration is also an important phenomenon, but data prove even less reliable.

While developing countries on average will see improvements in living standards relative to high-income countries, the forces underlying South-to-North migration will continue to have a strong impact. First, there is the existing, considerable wage gap (even taking into consideration differences in purchasing power) that will shrink, but will still be substantial well into the future. Second, the combination of existing migrant stocks (and the push to reunite family and friends) with potential reductions in migration costs will provide ongoing impetus for South-to-North migration. Third, the slowing growth of the workforce in developed countries and the aging of populations will be a pull factor in increasing migration over the next two decades.

However, unlike the trade in goods and services, or the flow of capital, migration is subject to considerable regulation and control and is also fraught with many additional considerations. Sending countries are concerned with the social and family aspects of outward migration, or in some cases with brain drain. The receiving countries may also be concerned with the social implications of migration and the economic and fiscal consequences, particularly for those whose populations compete directly with the migrants.

Notwithstanding these legitimate concerns, in a global context, the economic impacts of increasing South-to-North migration can be highly beneficial. Any form of economic restriction on the exchange of goods and services has an economic cost and migration is no different. *Global Economic Prospects 2006* (World Bank 2006a) explored in depth the main impacts of such migration, illustrating in particular that the greatest beneficiaries are the migrants themselves, though through remittances, the sending countries could also gain substantially. The aggregate impacts for the receiving countries are also on balance positive, though they could have negative distributional consequences.

This chapter's central scenario uses the underlying UN methodology and projections for the growth in country population and makes no additional assumptions as regards international migration. Though migration can make a significant impact for the migrants themselves, in the context of a 25-year scenario, international migration is unlikely to have large macroeconomic impacts save perhaps for a handful of smaller economies or countries that receive high levels of remittances. The United Nations forecasts the net number of migrants to developed countries to increase by 98 million between 2005 and 2050, or about 2.2 million annually. This is expected to more or less offset the net natural population decrease in developed countries (that is, the excess of deaths over births). For developing countries, this represents only 4 percent of total incremental population between 2005 and 2050 (and thus a small fraction of the total population) (see UN 2004).

Financial integration will intensify

Savings, investment, and finance. The global financial system is likely to change dramatically over the course of the next 25 years, as technological innovations and even greater integration of markets expand the reach of global financial intermediaries. Some of these changes are impossible to anticipate. For example, it is not clear whether the future communications technologies will favor a continued concentration of financial intermediation, or encourage the growth of global banks and other financial institutions in a

wide range of markets, or lead to even greater decentralization as smaller investments are required to obtain the information necessary to carry out financial transactions. Other changes can be partially anticipated. For example, as developing countries take up a greater share of global output, it is likely that their importance in financial markets will continue to grow. Some decline is already apparent in the dominance of the dollar as a currency of lending and reserves (World Bank 2006b), but whether currencies from developing countries will play a major role in global financial markets is not yet apparent.

One major issue facing developing countries over the next quarter-century is the impact of demographic trends on the countries' access to external savings. The rise in old-age dependency ratios in industrial countries, and in some developing countries, is likely to be associated with a decline in saving, a rise in interest rates, and a fall in their current account surplus. All else being equal, the elderly tend to save less or even dis-save, as they live off of savings earned during their working years. While forecasts of saving rates are uncertain, and estimations of the relationship between aging and saving rates vary widely, the prospect of reduced global saving over the coming decades needs to be considered seriously.

The coming savings decline. The life-cycle theory of consumption argues that saving rates are low during young adulthood to provide for children, rise as individuals save for retirement, and then fall as retirees live off of their accumulated assets. This theory is subject to significant qualifications, as individuals also save to provide a bequest for their children and to maintain a stock of wealth to deal with adverse shocks. Saving rates also are influenced by a host of macroeconomic factors, including growth, interest rates, inflation, borrowing constraints, fiscal policy, pension systems, and income distribution (Loayza, Schmidt-Hebbel, and Servén 2000). Econometric estimates have provided mixed support for the view that savings behavior is governed by life-cycle

considerations.[24] On balance, some decline in savings can be expected as elderly dependency ratios increase.

This simple theory of individual behavior, in conjunction with demographic trends set off by the baby boom after World War II and the impressive increases in longevity in the developing world, has dramatic implications for the global economy. For Europe, Japan, and East Asia, which have relatively high saving rates and supply a large share of global financial flows, the rise in dependency ratios should lead to a decline in savings.[25] By contrast, the very low saving rates in Sub-Saharan Africa may be at least partially explained by the region's very high youth dependency ratios. Saving rates should rise as these young people move into the workforce, boosting investment and growth.

The decline in saving rates is not expected to follow a smooth trend over the next 25 years. In industrial countries, saving rates should rise in the near future, as the bulk of the baby boom generation remains in the workforce during peak saving years. However, over the next 20 years this generation will retire, and saving rates will go down. Russia and some of the other countries of the former Soviet Union are likely to see a decline in the labor force, and thus savings, owing to rising elderly dependency ratios shortly after the industrial countries, followed closely by China and some other parts of East Asia. Latin America and South Asia may see some effect of rising elderly dependency by the end of the forecast period. By contrast, Sub-Saharan Africa and the Middle East and North Africa have relatively young populations and should see increasing labor force participation and savings through 2030. Overall, the forecast drop in global saving is quite substantial, from 21.6 percent of income in the first half decade of this century to 19.9 percent by 2030.

Demographic influences also imply a decline in investment demand, as fewer workers are available for each unit of investment.[26] Other aspects of aging may boost investment demand. Aging may spur investments in

human capital to compensate for reduced numbers of workers (Fougère and Mérette 1997). The decline in the labor force is likely to lead to higher wages, thus increasing investments that save on labor, either in productive processes or in the supply of services at the household level. Similarly, aging may accelerate technical progress by increasing incentives to innovate. Cutler and others (1990) estimate that a decline of 1 percentage point in labor force growth in 29 countries for 1960–85 was associated with a 0.5 percentage point increase in TFP growth. On the other hand, older workers may be less innovative, reducing technical progress (Börsch-Supan 1996).

On balance, it is likely that investment will decline in regions where elderly dependency ratios are rising, but not by as much as savings, leading to a decline in these countries' current account surplus (or a rise in their deficit), along with a rise in global interest rates. This is roughly consistent with findings in Helliwell (2004), where half the impact of demographic change was matched by a corresponding change in investment, and half showed up in the current account. Estimates of reduced form relationships between demographic ratios and current account balances (Bryant 2004), cross-country time-series analysis (Lührmann 2003), and forecasting models based on estimations from historical relationships (IMF 2004; Turner and others 1998; Higgins 1998) find that countries with dependency ratios that are rising relative to other countries' tend to experience a weakening of current account balances.[27]

Implications for developing countries' access to finance. According to this chapter's simulations, the high-income countries' current account surplus is likely to deteriorate by $800 billion by 2030, or 1.7 percent of GDP. The decline in capital flows to developing countries and the rise in interest rates on developing countries' loans may be greater than anticipated by this demographic model. Developing countries are likely to

remain relatively risky investments. If risk aversion rises with age, the aging of the rich countries will imply a greater premium for risk, and thus less willingness to lend to developing countries. Higher risk premia could result either because older individuals control a greater share of investment funds, or because the share of pensions and other institutional investors in financial systems increases.[28] In the United States, the number of Americans aged 65 and over will double between 2000 and 2030, so the asset holdings of the elderly are likely to grow substantially compared with total holdings (Bellante and Green 2004).

It is likely that risk aversion does rise with age. Older individuals have less time to make up any shortfall in savings owing to the high volatility of investment returns. In the standard models of portfolio choice, the only factor that explains age-related differences in portfolio allocation is differences in risk aversion (Poterba and Samwick 1997). Bodie, Merton, and Samuelson (1992) show that older individuals will place a smaller share of their portfolio in risky assets than will younger individuals if the latter can vary their supply of labor to offset volatility in asset returns. Kimball (1993) argues that facing increasing risks in general, for example higher medical risks, should make individuals less willing to bear other risks, for example financial risks. Samuelson (1989) concludes that, assuming that one must ensure a minimum level of wealth (to ensure subsistence) at retirement, younger individuals will be more willing to take risks than older.

Despite this theoretical support, empirical estimates of the relationship between age and risk aversion are inconclusive (Ameriks and Zeldes 2004).[29] Measuring whether aging is associated with a shift to less risky assets is fraught with difficulty because it is hard to distinguish the impact on portfolio allocation of age, of the person's date of birth (different age cohorts may behave differently), and of the date of observation.[30] Moreover, the data on household allocation, even in the United

States, are incomplete and subject to measurement error.

One way that developing countries could adjust to account for increased risk aversion in financial markets is a greater use of securitization, particularly of future receivables, such as export revenues, remittance receipts, and diversified payment rights (DPRs). Securitization or structured finance techniques in developing countries are designed to enhance the credit ratings of debt issued by borrowers, typically to an investment grade status. This can allow sub–investment grade borrowers to pierce the sovereign "rating ceiling," which often constrains the access of subsovereign entities in developing countries to international capital markets (Ketkar and Ratha 2001). Securitization usually results in reduced spreads and longer maturities for emerging market debt issues, compared to conventional or unstructured debt. While traditional items such as oil and gas and mining receivables were among the first to be securitized, other assets (such as remittances and DPRs) have increasingly taken their place in recent years (figure 2.13).

Fundamentally, however, developing countries will need more than innovative financing techniques to deal with the coming decline in

savings in high-income countries. They will need to improve creditworthiness through sound fiscal and monetary policies, maintenance of an appropriate exchange rate, open trade policies, and institutional reform to improve the efficiency of investment. Relatively youthful countries in Sub-Saharan Africa and the Middle East and North Africa can benefit from the coming rise in savings in their economies, but only if an appropriate investment climate provides secure financial instruments for keeping savings, and efficiently allocates saving to productive investment. As capital becomes scarcer in the global economy, many developing countries will have the opportunity to improve financial returns and diversification through capital outflows, while low-income countries in particular could benefit from South-South flows. South-South capital flows have risen greatly over the past decade (World Bank 2006b), and demographic trends will provide a further impetus over the next quarter-century. In short, policy reform and a strengthening of the institutional environment should enable developing countries to maintain their access to the savings required for growth in the face of a decline in external finance from industrial countries and a rise in global interest rates.
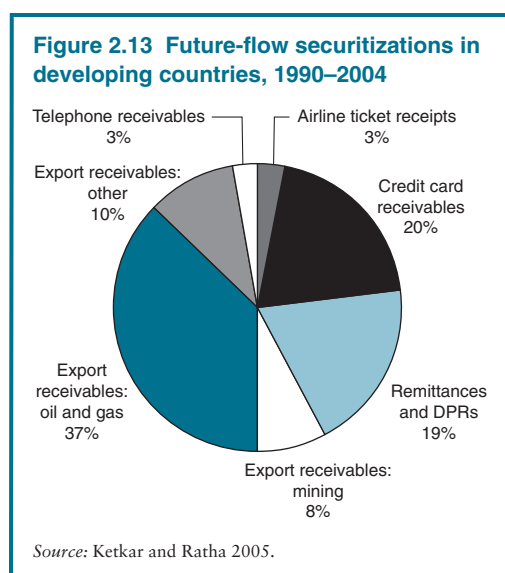
The transition to the medium term. Expectations of the decline in industrial countries' savings over the medium term may have important implications for short-term instability in financial markets. The sustainability of the U.S. current account deficit is an important vulnerability. As outlined in previous editions of *Global Economic Prospects*, there is a danger that investors will lose confidence in the ability of the United States to finance continued, large deficits, leading to a sharp decline in external finance and thus some combination of large increases in interest rates and a sharp depreciation of the dollar. Anticipated demographic trends would exacerbate the shortfall between the existing level of the U.S. current account deficit and what foreigners are willing to finance.

Figure 2.13 Future-flow securitizations in developing countries, 1990–2004

Telephone receivables 3%
Airline ticket receipts 3%
Export receivables: other 10%
Credit card receivables 20%
Export receivables: oil and gas 37%
Remittances and DPRs 19%
Export receivables: mining 8%

Source: Ketkar and Ratha 2005.

The basic issue is that the baby boom generation in the United States is now passing through what should be its period of highest saving—if baby boomers are to ensure that they have adequate financial resources to sustain themselves through retirement. While high immigration rates (relative to those in other industrial countries) should continue to support labor force growth for the next decade, the U.S. labor force is forecast to slow to 0.5 percent from 2005 to 2015 (compared with 1.3 percent from 1995 to 2005) and should actually decline beginning about 2020. At the same time, U.S. personal saving rates are at their lowest point since the government began compiling consistent statistics in 1959.[31] If saving rates do not rise in the near term, the country will be in a very poor position to face rising dependency ratios, a declining labor force, and hence an impetus for further declines in savings.

More generally, unfunded pension liabilities combined with anticipated demographic trends pose a considerable challenge to industrial-country policy makers that could imply slow growth, economic instability, or both. Industrial-country governments may impose higher taxes to cover unfunded pension costs, eroding incentives to work and invest. Alternatively, governments may accommodate the conflicting demands of pensioners and current workers through monetary expansion, leading to inflation and a more pronounced economic cycle. In any event, an inability to appropriately deal with the challenges posed by the demographic transition would have serious consequences for the global economy.

Technological diffusion: productivity, information, and knowledge

It has long been recognized in the economic literature that higher incomes are produced in the long run primarily through productivity growth rather than factor accumulation. With declining labor forces in some countries and declining labor force growth in all, productivity will play a more prominent role in maintaining economic growth over the next 25 years.

Trade, FDI, foreign travel and education, and improvements in mass communication have all played a significant role in the past 25 years to enhance productivity in many parts of the world—and a reinforcement of these trends is likely to continue.

More than ever before, all countries have access to a large share of the world's most advanced technology through improvements in communications technology and access to the World Wide Web.[32] The capacity to harness these technologies has enabled countries such as China and Thailand to quickly advance up the technology ladder and evolve from exporting natural resource– and/or low-skilled, labor-based goods toward exporting advance technology–laden goods such as microprocessors and flat panel displays. Given the greater availability of information and technology, what will differentiate countries is their ability to adopt these technologies—the skill level of their workforce, the appropriate capital and infrastructure, openness to trade and FDI, and more generally the investment climate.

Some technologies actually allow firms and even individuals to overcome these obstacles. Mobile telephony and access to the Internet have the potential to transform and raise information sharing to unprecedented levels, particularly for the poorest and most isolated in the global economy. For example, Sub-Saharan Africa has long lagged most developing countries in telecommunications infrastructure. Mobile telephony penetration has been impressive (figure 2.6)—and as noted above, the number of subscribers most likely largely understates the actual access because small-scale mobile service firms have made service available to a much broader share of the population through the selling of access to small time slices of mobile phone service.

A significant portion of productivity growth can be captured by technology embodied in imported inputs and capital, or through learning by doing or imitating. At the same time the larger and more diverse developing economies have built considerable, if yet infant capacity in research and development. But one particular

challenge for the global community will be to improve the research and development potential for underfunded regions and sectors—for example to jumpstart a green revolution in Sub-Saharan Africa or in medical research to alleviate the scourge of tropical diseases.[33]

What will happen if growth is slower—or faster—in the next 25 years?

History has shown that past trends are not immutable over time. In fact, the only thing certain about the future is that surprises will occur. However, even if growth rates turn out to be faster or slower than in the central scenario, the demographic and globalization-related strains in the global economy identified in that scenario are likely to persist—if in somewhat different form. If developing countries grow by only by 1.5–2 percent per capita over the next 25 years, a glum scenario from any point of view, globalization-related problems would remain—including the issues examined in subsequent chapters, such as income distribution, labor market adjustments, and the environment. Slower growth is likely to heighten all of these problems, as countries

would have fewer resources to tackle them and be more reluctant to compromise in undertaking multilateral action. Faster growth would likely ease distributional concerns and labor market adjustments, but increase pressures on the global environment. The bright side of faster growth for the environment is that an accelerated pace of technological changes and investments in capital stock means that abatement technologies can be adopted sooner and at lower costs than with slower growth.

A slow-growth scenario

The last quarter-century has shown a diversity of growth trends across regions, but trends have been less volatile in the global aggregates. It is hard to identify in the global aggregates well-known systemic crises such as the Latin America debt crisis, the fall of the Berlin Wall, or the more recent Asian financial crisis and its aftermath—with the one notable exception of the energy crisis of the 1970s. Figures 2.14a–c show the evolution of long-term per capita growth rates over the period 1970–2005. The growth rates reflect the 10-year period average growth rate for each year. That is, the 1970 number reflects the average annual growth rate between 1960
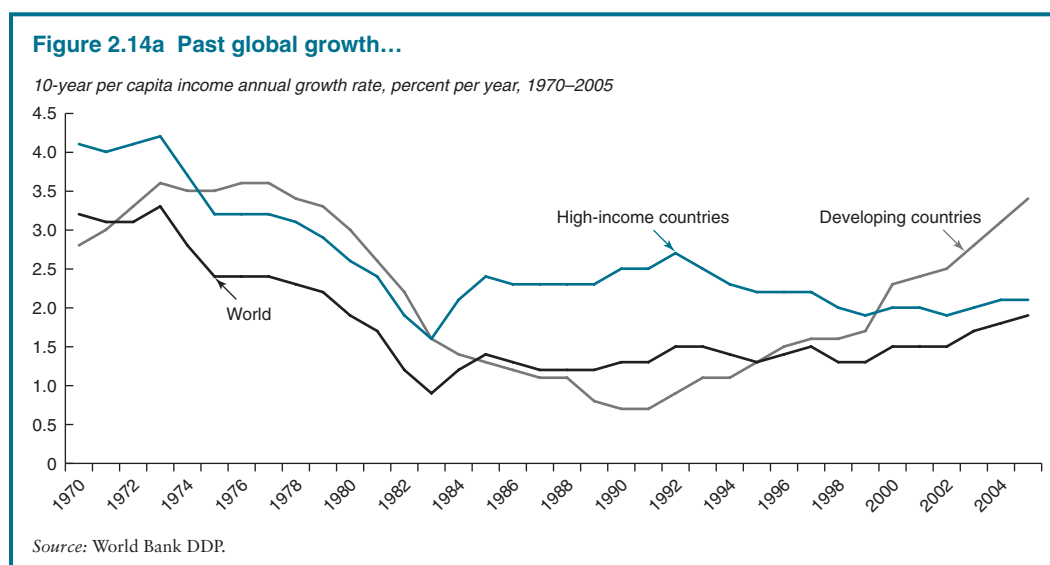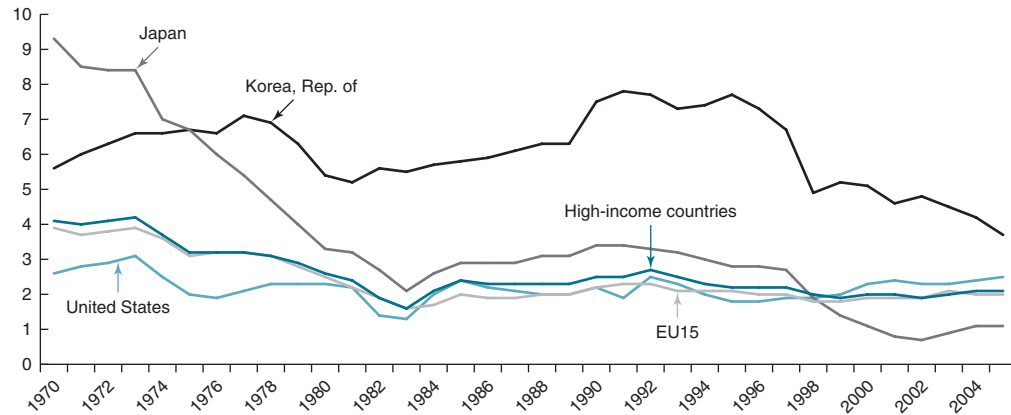

Figure 2.14a Past global growth...

10-year per capita income annual growth rate, percent per year, 1970–2005

Source: World Bank DDP.

Figure 2.14b …has been around 2 percent per capita for high-income regions…
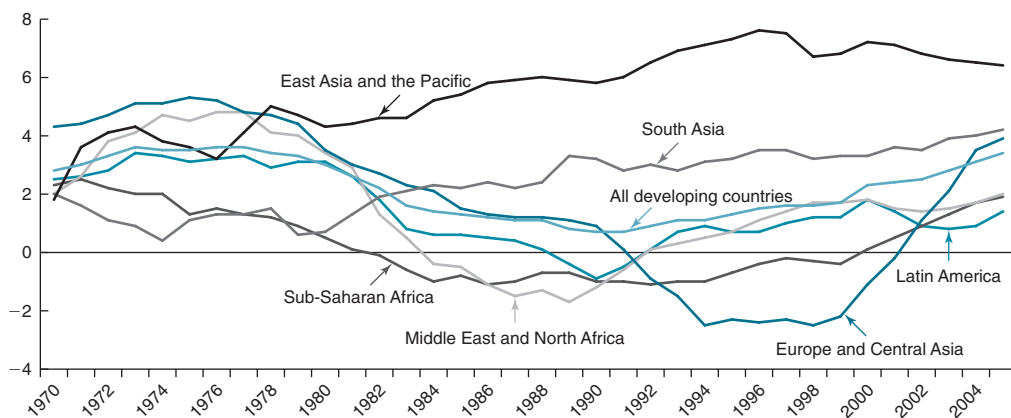
10-year per capita income growth rates, percent per year, 1970–2005

Source: World Bank DDP.

Figure 2.14c …and much more volatile in developing countries

10-year per capita income growth rates, percent per year, 1970–2005

Source: World Bank DDP.

and 1970 in per capita terms. By 2005, the growth rate for developing countries had accelerated to 3.4 percent.

If instead of the 3.1 percent growth in per capita incomes assumed for developing countries in the central scenario, developing countries were to grow at their average for the entire 25-year period of 1.9 percent (with world growth a meager 1.4 percent), their incomes

would be about 25 percent lower per capita. This translates into a reduction of GDP in 2030 by some $5.5 trillion, nearly $800 per person. This would be disappointing, and it underscores the importance of competent collective global economic management—and well-conceived domestic policies.

Still, it would take a sharp set of shocks to depress growth rates to this level. And only if

these shocks were to occur in tandem, in more than one region, and with some adverse policy feedbacks would rates likely be depressed substantially below this level. Even then, the reversal in the growth and global integration process worldwide would likely be relatively short-lived. One reason is that one sees much greater stability on average for the three major economies of the world—Japan, the European Union (EU15), and the United States (figure 2.14b). Together, they make up more than two-thirds of the global economy. The European Union, and even more so Japan, benefited after the end of World War II from catching up to the United States and rebuilding after the devastation of the war. The oil crisis of the 1970s made a dent in the long-term growth rate in the early 1980s, but after a period of adjustment, long-term growth was fairly steady throughout much of the remaining period. The exception is Japan, which had a long period of adjustment during the 1990s, perhaps in part related to its changing demographics—occurring earlier than elsewhere. Korea, which in 1980 was not yet considered a high-income country, continued to show the process of catch-up that is only now beginning to show signs of fading. The figure suggests that it would take a really major event to shove the high-income countries off their relatively steady rate of 2 percent growth. The early energy crisis was such an event for a few years, but the long-term stagnation in Japan has not had the same impact.

It is always possible that nonlinear disturbances may cause a break in trends. The downside risks are also potentially considerable. As history has shown, countries could backtrack on their commitment to openness. Failure to address the negative consequences of a more integrated global economy could generate domestic pressures to reverse the process of opening. International tensions might degenerate into tit-for-tat tariff escalation or competitive devaluations. This was certainly an important factor in driving the world into recession in the 1930s. The world is probably more integrated today than in the 1930s, with many more actors having a much greater stake in an open global economy. But in many countries, domestic pressures to reverse the trends toward greater openness are ever present and one can never be too complacent about the strength of existing international institutions.

A key downside risk for high-income countries may come from the transition from a regime of steady economic growth and relatively stable labor force to one with a declining labor force and a rising and dependent population of elderly. The long stagnation of Japan through the 1990s and early part of this decade may be an indication of the pressures high-income countries will face in the next decades. The pressures are already being felt in Europe and the United States as economic policy makers attempt to deal with the impending "transfer" crisis—the benefits promised to aging baby boomers will translate into ever-higher tax rates on ever-smaller workforces unless benefits are modified. The way out will most likely involve a package of steps, in order to minimize the overall costs, but there is no guarantee that these steps will be politically acceptable.

The history of the 20th century, if not earlier, has also shown the danger to the global well-being from the competition for ever-scarcer resources, for example energy or minerals. The overall outlook for resources, at least through 2030, suggests the ability to cope with a growing global economy. Smoothly functioning markets should be able to allocate resources and/or provide the right signals for developing and supplying alternatives. Nonetheless, interference with markets that lead to substantial market disturbances could lead to a rise in international tensions and pressures to use military force. Over the last 50 years, conflicts that have arisen have been relatively contained, but in a changing global environment where economic and political objectives do not necessarily align, the chance for miscalculations could lead to broader-based conflict with significant global implications (see box 2.2).

Box 2.2   Challenge of geopolitical shifts for long–term economic forecasts: lessons of history

The economy does not exist in a vacuum; it is affected in myriad ways by the political, historical, and social context in which economic agents act, and history shows that to ignore this geopolitical context can lead the economic forecaster awry. For example, at the beginning of the 20th century the prevailing mood in Europe and its offshoots (such as the United States) was one of optimism and confidence. Per capita growth in Europe had accelerated to an unprecedented 1.5 percent between 1896 and 1913 on the heel of 1.1 percent growth between 1820 and 1896 coming after three centuries of near-zero growth. This growth was sustained by a relatively peaceful geopolitical environment thanks to the *Pax Britannica* and a stable balance of power in Europe, rapid technological change brought about by the first (steam) and second (electricity) industrial revolutions, and policy changes that enhanced openness, such as Britain's decision to reduce protectionism. However, this rapid economic growth was accompanied by important political, social, ideological, and military changes, and by 1913 there was a growing sense that war was somehow inevitable.

Based on the historical growth of the 30 years to 1900 and using standard econometric estimates, one would have predicted a fairly optimistic GDP trend for the "G-5" (France, Germany, Japan, the United Kingdom, and the United States) for the first half of the 20th century. The box figure shows the central prediction and the upper and lower bounds. The prediction is calculated by assuming yearly shocks similar in nature to those observed between 1870 and 1899 and implicitly on the strength of economic dynamics generated by continued globalization and technological progress. With the geopolitical shocks of the early 20th century, however, economic development followed a very different path. In fact, by 1949, actual GDP (of the G-5) was almost $300 billion (in 1990 international dollars) below the *lower-bound* prediction, an amount equivalent to 13 percent of actual output, highlighting the substantial and persistent effects of adverse geopolitical events.

Predicted G5 GDP, 1990 International $ millions (ln)

Prediction using ARMA(1,1) with time trend
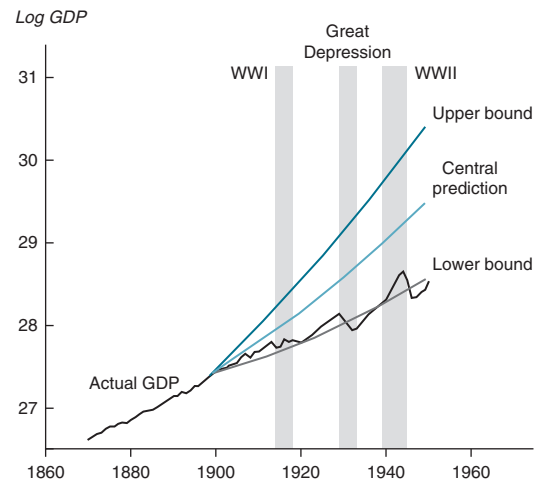
Sources: Maddison 2001; staff estimates.

By 1913 the political environment had deteriorated and led to outbreaks of conflict that ultimately escalated into World War I. In its aftermath, the Great Depression arose from a severe real economic shock that was exacerbated and propagated worldwide owing to poor economic management, an unprepared financial system, and weak institutions. In the long run, however, the forces pushing worldwide economic integration forward dominated the adverse impact of political shocks and globalization recovered powerfully after World War II. Policy was decisive in facilitating postwar resurgence: to keep "history at bay" in the words of a noted historian, domestic and international institutions were built that have allowed globalization to flourish in an environment of relative global peace.

Source: Fardoust and Goldberg 2006.

The ability of the planet to carry a growing population with rapidly growing demand for goods and services may be put to a severe test as the world moves forward. And even if catastrophes are largely avoided in the years to 2030, there is growing evidence that action needs to be taken soon, if not immediately, to avoid catastrophe in some future not far away. Rising incomes provide an opportunity—and the desire—to deal with many environmental issues, but this is no guarantee that the right decisions will be taken. Major changes in the environment, such as higher-than-predicted temperatures and/or dramatic changes in weather patterns could seriously impact regional economies, if not the global economy, with lower productivity, or worse yet, sickness and deaths.

Deviations from the central scenario are more likely to be in the form of extended periods of very rapid growth in some countries and regions and extended periods of stagnation in others, such as those witnessed over the past 25 years. A cataclysmic event that affects the entire globe for an extended period has a low probability—though from a geopolitical point of view, the world is likely in a period of transition. The end of the Cold War has shifted the world's major stress point and was, to a large extent, a conflict among the industrial countries—even if it had global spin-offs. New tensions are more likely to arise between the traditional industrial powers and developing countries—those that are rapidly rising and will ask for an increased voice in global discussions and decision making and those from failed states and/or regions. The already extensive integration of many countries in a global economy raises the stakes for all, but also provides an incentive to find a resolution through peaceful methods rather than through violence.
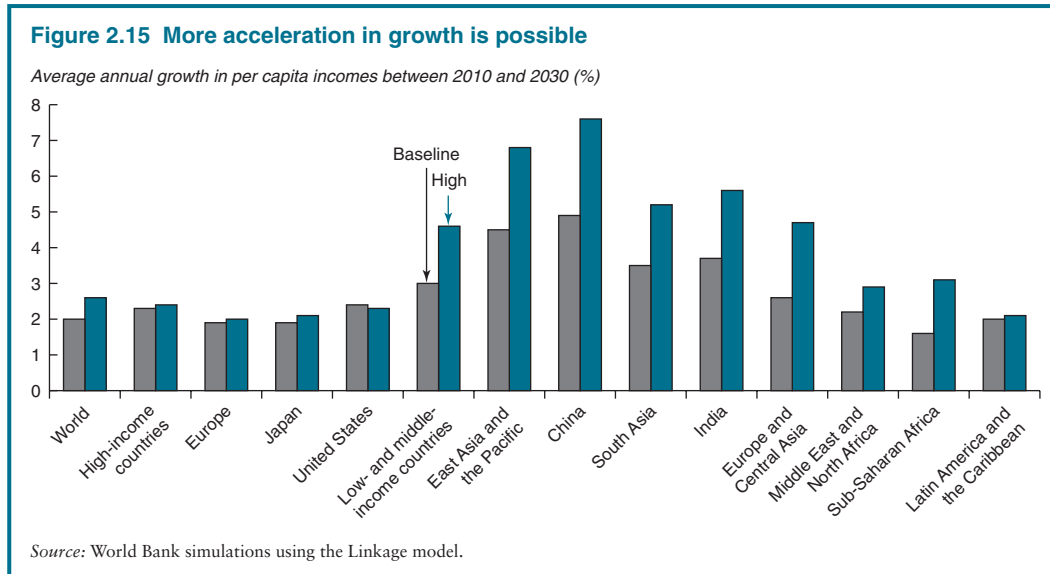
What if the world grows faster?

The global economy is benefiting from another period of sustained and broad-based growth. Among reasons are improved macroeconomic conditions (such as less inflation and inflationary expectations), more sustainable debt levels (at least for developing countries on average), more diversified economies with less reliance on volatile commodities, a much greater role for services (which tend to be less volatile), much improved production management with lower inventories (which tended to be a major factor in past business cycles), and better macroeconomic management, particularly monetary policy.

The past 25 years have had numerous setbacks afflicting growth in the developing countries. Four of the six regions have suffered from very long bouts of stagnant or even negative growth—Sub-Saharan Africa, the Middle East and North Africa, Latin America, and Europe and Central Asia. They each had specific reasons for these periods of depressed growth ranging from Latin America's debt crisis in the 1980s, the Middle East and North Africa's (and, to a lesser extent, Africa's) energy decline, and Europe and Central Asia's emergence from its transition toward market-based economies. Nonetheless, growth has been much improved overall since 1998, in almost all regions, significant crises notwithstanding, and the decade-long run to 2005 produced increases per capita of some 4.6 percent annually.

Therefore the upside potential is even higher for developing countries, not only for technological and policy reasons, but also because the current momentum in the global economy remains strong. Developing-country growth could exceed 3 percent in 2020 and be down to 2.2 percent by 2030 in the central scenario (figure 2.15).

The upside potential for the high-income countries, however, is much more muted. This scenario therefore implies greater income convergence between developing countries and developed countries. It would also imply much greater weight for developing countries in the global economy. Instead of rising to 37 percent from an initial share of 21 percent in 2001, the developing-country share in global output would be 43 percent. More remarkably, China's share would climb to 15 percent, almost on a par with Europe, from its share of 3.7 percent in 2001, whereas the share for the

Figure 2.15 More acceleration in growth is possible

Average annual growth in per capita incomes between 2010 and 2030 (%)

Source: World Bank simulations using the Linkage model.

United States would drop to less than 25 percent from an initial position of 32 percent.

At the global level, the difference in the two scenarios—the central and the high-growth scenario—translates into an additional $11 trillion in 2030, of which $10 trillion is additional income for the developing countries—that is, an overall increase of 44 percent. Thus, much is at stake. This difference in outcome is about the same as one would have calculated in 1980 using the previous 10-year growth to predict where developing countries would be in 2005.

A number of discrete policy changes can have significant impacts on long-term growth even if they do not individually imply large deviations from baseline growth rates—particularly as seen from a regional or global level. The aforementioned trade liberalization scenario that is limited to merchandise goods only would raise the average developing-country growth rate by 0.2 percentage points and as high as 0.5 percentage points for some regions. Cumulatively over a 25-year period, this additional growth would end up as significantly higher incomes for many. This illustrates the importance of making progress in the current round of multilateral negotiations known as the Doha Development Agenda—without even describing the considerable distributional impacts of removing protection in the most distorted sectors, such as agriculture, could have in many developing countries.[34]

There are many other choices facing policy makers—most going well beyond the ability of this chapter's analytical framework to capture, such as improving institutions and the investment climate, deepening infrastructure, and implementing policies to achieve or surpass the MDGs and make for a healthier and more productive labor force. Cumulatively, making the right policy choices could dramatically change the growth prospects for a large number of countries. There are a number of countries that have demonstrated the ability to achieve very high growth rates for very long periods even with very different initial conditions in terms of endowments—human and natural—and institutions. In the same vein, getting "everything" right may not necessarily lead to the kind of high growth rates that many countries in East Asia have been able to generate.

The potential nonlinearities could also surprise on the upside. This chapter may be seriously underestimating the potential for further

technological change because the world is still at the dawn of the information age, the biotechnology revolution, and other innovations. The chapter also assumes a rather benign policy environment even though barriers to trade in some instances, for example agriculture and services, are still prohibitively high, and many countries can still make vast improvements in domestic policies that could improve the investment climate and lead to capital deepening. Cumulatively some of these changes could have the same impact as that witnessed in East Asian economies starting with Japan in the 1950s and 1960s, followed by the newly industrializing economies, and now more recently by China.

Challenges of the coming globalization

The discussion suggests that an abrupt reversal in current trends—particularly toward a global economic collapse—has a very low probability. The central scenario—and any reasonable upward or downward deviation around it—will generate mostly positive consequences, but not exclusively. Globalization and growth will have uneven impacts leading to structural change, job losses in some sectors and regions, and the risk of some being left behind. And virtually any growth scenario will put stress on natural resources in the absence of corrective action.

Income distribution and jobs

As mentioned, incomes rise rapidly in developing countries—increasing an average 3.6 percent per capita across all regions, with the fastest growth in East and South Asia.[35] This is some 1 to 1.2 points more than income growth in developed countries, so there is some overall convergence in incomes—with some important exceptions, for example Sub-Saharan Africa and Latin America.

The distributional gains across households will largely reflect household endowments—of capital, land, and skills—and changes to the underlying returns to these endowments. The

returns to endowments could also be influenced by sectoral changes such that a migrant moving from rural to urban areas and from a low-wage country to high-wage country may benefit from higher wages even given the same intrinsic endowment (that is, skill level), albeit perhaps with a correction in welfare due to changes in prices.

The central scenario includes labor market segmentation between agricultural and nonagricultural sectors (for unskilled labor alone). The segmentation is only partial because agricultural workers seek higher-paying jobs in urban areas. All else equal, this would tend to raise wages in rural areas and cap wage rises in urban areas (compared with a no-migration scenario). The scenario suggests that the rural exodus could be a significant factor in the years ahead with the share of agricultural workers dropping from about 51 percent currently to less than 35 percent in 2030. Owing to population increase, this leads to only a small decrease in the agricultural labor force, but to an increase of over 1 billion in urban workers. The outward movement of agricultural workers is highest in East Asia and the Pacific and leads to a decline in the urban wage premium.

Another critical dimension in determining distributional outcomes is the change in the so-called skill premium, that is, the ratio of skilled wages relative to unskilled wages. According to the estimates (and definitions) of the authors of this study, the share of skilled workers is approximately 32 percent in developed countries and less than 10 percent in developing countries. The scenario assumes an acceleration of skilled workers relative to unskilled workers. Despite the acceleration in numbers, the skill premium tends to increase in most regions under this scenario. This reflects the assumption that skilled labor is a complement to capital, so demand for it increases more rapidly than supply. The skill premium increases most rapidly in those countries with a high investment rate. A second factor is the relative glut of unskilled workers as the rural exodus—largely an unskilled phenomenon—continues. A third factor is the relatively higher concentration of

EMBARGOED: Not for publication, broadcast, or transmission until December 13, 2006, at 12:01 a.m. in Washington, DC (5:01 a.m. GMT/UTC).

THE COMING GLOBALIZATION

skilled workers in high-income elastic sectors, notably services.

In summary, the increase in value added for all developing countries can be decomposed into volume and price effects and further differentiated by factor of production. The average annual increase is 4.0 percent over the entire period. There is a rotation in value added toward skilled workers, their total share increasing from 11 percent to 17 percent, largely taken from capital's share that declines to 47 percent from 59 percent in 2005. Thirty percent of the increase is determined by the increase in unskilled wages and 15 percent by the increase in skilled wages (figure 2.16). The former is more important because of the relative weight of unskilled workers in total value added. Combined, wage increases account for 44 percent of the total increase in value added. The next-largest segment is the increase in the capital stock, representing 44 percent of the growth in value added (with changes in the return to capital not a factor). The results suggest a modest improvement for workers in developing countries over 25 years relative to owners of capital, but with a somewhat better outcome for skilled workers.

Under the baseline scenario, the poverty MDG is reached in 2015 at the global level, with the headcount index falling to 11.8 percent

in 2015 from 20.2 percent in 2003 (table 2.3). The MDG target is just under 14 percent.[36] The poverty MDG is met broadly in all regions with the glaring exception of Sub-Saharan Africa, which will miss by a wide margin. By 2030, the percent of poor living on $1 a day or less will be near 8 percent of the developing-country population, or roughly 550 million persons.[37] Even with the longer term horizon, it is unlikely that the 2015 poverty MDG will be met in Sub-Saharan Africa without an acceleration in growth and more targeted interventions.

The global environment will come under increasing stress

While incomes, inequality, and poverty are at the heart of the debate on globalization and its impacts, energy and more specifically environmental impacts are lurking not far behind. Though the energy issue had been somewhat relegated to a less prominent position during most of the 1990s and early 2000s, the recent run-up in fossil fuel prices and the more alarming evidence of global warming have returned energy and environment to the front pages.

With world growth in the central scenario running at about 3 percent per year on average, primary energy demand (coal, oil, and natural gas) runs at about 2 percent per year. Under standard assumptions, this would not generate any significant tension on energy markets, with prices rising at about 1.4 percent per year in real terms from base year levels. Demand for natural gas would tend to outpace demand for oil and coal as policies and technology tend to favor this relatively cleaner fuel. Renewable and nuclear energy would tend to see somewhat higher growth rates (see chapter 5), but from a low base and therefore making only a modest impact. To accelerate their adaptation requires a more significant push from policies to increase investment in these technologies and taxes on conventional fuels to induce greater substitution.

Stagnant or declining production in high-income countries and high growth in some developing countries would lead to some (perhaps dramatic) changes in net trade in fossil
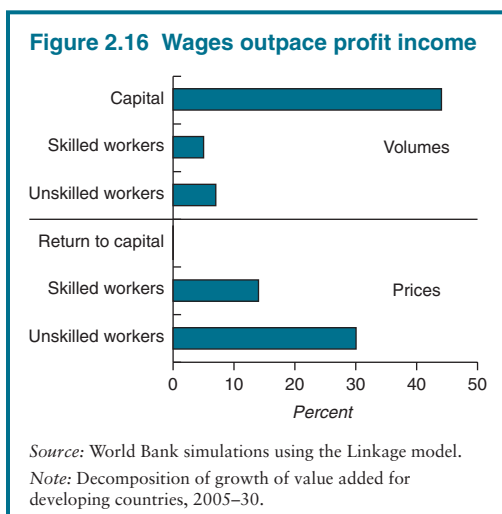

Figure 2.16 Wages outpace profit income

Source: World Bank simulations using the Linkage model.
Note: Decomposition of growth of value added for developing countries, 2005–30.

Table 2.3 Regional breakdown of poverty in developing countries

	Millions of persons living on							
	less than $1 per day				less than $2 per day			
Region	1990	2003	2015	2030	1990	2003	2015	2030
East Asia and the Pacific	472	213	57	18	1,116	745	317	148
China	375	179	50	16	825	531	229	108
Rest of East Asia and the Pacific	97	34	7	2	292	213	88	40
Europe and Central Asia	2	9	5	3	23	71	40	26
Latin America and the Caribbean	49	49	38	30	125	134	118	103
Middle East and North Africa	6	5	3	1	51	62	45	31
South Asia	462	472	273	159	958	1,131	1,017	902
Sub-Saharan Africa	227	320	345	337	382	530	613	653
Low- and middle-income countries	1218	1,068	721	547	2,654	2,671	2,150	1,863
Excluding China	844	889	671	531	1,829	2,140	1,921	1,755

	Percent of the population living on							
	less than $1 per day				less than $2 per day			
Region	1990	2003	2015	2030	1990	2003	2015	2030
East Asia and the Pacific	29.6	11.5	2.8	0.8	69.9	40.2	15.5	6.7
China	33.0	13.9	3.6	1.1	72.6	41.2	16.5	7.3
Rest of East Asia and the Pacific	21.1	6.0	1.1	0.2	63.2	37.7	13.5	5.4
Europe and Central Asia	0.5	1.9	1.0	0.6	4.9	15.0	8.4	5.5
Latin America and the Caribbean	11.3	9.1	6.1	4.1	28.4	24.9	18.8	14.2
Middle East and North Africa	2.3	1.7	0.7	0.2	21.4	21.0	12.3	6.5
South Asia	41.3	33.2	16.2	8.1	85.5	79.5	60.2	46.0
Sub-Saharan Africa	44.6	45.0	37.4	29.9	75.0	74.5	66.5	58.0
Low- and middle-income countries	27.9	20.2	11.8	7.8	60.8	50.5	35.1	26.7
Excluding China	26.1	22.2	14.2	9.7	56.6	53.5	40.6	31.9

Source: World Bank.

fuels. The high-income countries may be subject to an increase in their energy imbalance amounting to some $400 billion in 2030 (in 2001 dollars), more than a doubling from $175 billion in 2001. China's small deficit could balloon to over $100 billion and India's to $50 billion. The positive counterparts on a regional basis would be the Middle East and North Africa, Sub-Saharan Africa, Russia, and Latin America. Dutch-disease-type effects combined with the political economy of natural resource–rich countries may make it difficult for some to diversify their economies and prepare for a post-energy future.

Relatively benign economic impacts as regards energy do not imply that the negative externalities associated with continued dependence on carbon-based fossil fuels will not lead to severe environmental consequences—if not immediately, at some point in the future. There is mounting evidence that the impacts of rising greenhouse gas concentrations are accelerating—at least in some parts of the world, notably at the two poles. Even accelerated penetration of clean energy is likely to leave the world largely fossil fuel dependent—at least over the next two decades—thus technologies need to be developed that limit the damage from burning conventional fuels, such as carbon sequestration. Such technologies combined with policies to accelerate the use of renewable fuels and improve energy efficiency would form the basis of a package to deal more forcefully with greenhouse gas emissions. These are developed further in chapter 5.

These three problems will require policy responses

The purpose of this chapter has been to outline a plausible evolution of the global economy and to highlight some of the key findings

from the forward-looking exercise. Irrespective of whether growth rates exceed or fall short of the central scenario, it has exposed several problems that require further analysis and policy response. Three of the most important problems—income distribution, tensions in labor markets, and environmental risks that require multilateral response—are the subjects of the next three chapters.

Notes

1. Measured as the difference in the number of poor in 2002 using the 1990 poverty incidence (headcount) and the actual number of poor (at the $1/day poverty line).

2. *World Development Indicators 2006*, table 2.19.

3. Unless otherwise stated, historical growth rates are calculated using a log-linear regression growth model.

4. The first five rounds, concluding with the Dillon Round in 1961, involved 13–38 countries at most.

5. As of December 11, 2005 (www.wto.org).

6. The comparisons with goods trade are not necessarily straightforward. First, there are no price indexes for trade in services, so they are measured only in current dollar terms. Second, it is more difficult to evaluate trade in services, so their level is likely to be underestimated.

7. There is recent evidence that migration from the new EU member countries is higher than analysts had anticipated. See John Kay, "How the Migration Estimates Turned Out So Wrong," *Financial Times,* September 5, 2006.

8. Anecdotal evidence is provided in Sharon LaFraniere, "Cellphones Catapult Rural Africa to 21st Century," *New York Times,* August 25, 2005; Rodrique Ngowi, "Africa's Cellphone Explosion Changes Economics, Society," *Associated Press,* October 16, 2005; and Kevin Sullivan, "For India's Traditional Fisherman, Cellphones Deliver a Sea Change," *Washington Post,* October 15, 2006.

9. To avoid repetition, unless stated otherwise, all incremental values represent changes between 2005 and 2030—either absolute levels or average annual compound rate changes.

10. All prices are at 2001 levels—the base year of the scenario. Volume growth will therefore reflect 2001 weights. Prices and values reflect changes with respect to the model numéraire, which is a price index of manufactured exports from the high-income countries—similar in concept to the World Bank's manufactured

unit value (MUV) index. This index is set to 1 in the base and all subsequent years. Thus future values, for example of GDP, do not integrate the normal secular increase in prices that are generated by changes in money supply. Technically the price of manufactured exports of high-income countries is fixed and only changes in relative prices matter. Say for example that world GDP is 100 in 2001 and 200 in 2030 in real terms, that is, the volume of output has doubled. Say that relative to the numéraire, the price of GDP is unchanged so that the value is also 200. If instead there were a steady increase in nominal inflation, say prices would have increased by an average of 2.5 percent per year, the price of GDP would have more or less doubled between 2001 and 2030 and nominal GDP would be 400, not 200. There would of course be no change in volume growth, and assuming super-neutrality, all relative prices would also be identical to assuming zero nominal inflation.

11. The rankings refer to the model-based aggregation, not at the actual country level.

12. To attenuate the problems with exchange rate movements, the rankings are based on a five-year moving average of dollar-based GDP centered on 1982 and 2003.

13. Here welfare is equated with income per capita, but of course the authors recognize that there are many other variables that affect individual well-being—such as health, family and friends, and so on.

14. One such commonly used index is the so-called Big Mac index popularized by the *Economist.* This index compares the cost of purchasing a Big Mac in a variety of cities across the world. While McDonald's prides itself on selling a well-recognized and largely homogeneous product across the world, the raw inputs in a Big Mac—perhaps priced the same everywhere if one assumes that they are perfectly traded on world markets—only represent a small portion of the cost of the final product. A large portion of the Big Mac will be composed of the wages paid to local workers and managers and the rent on land and buildings. These are likely to be much lower in many developing countries and hence represent an approximation of the PPP exchange rate. Thus if a Big Mac sells for an average of $4 in the United States but $1 in China, the PPP exchange rate would be 4. When this calculation is scaled up, if China's GDP is evaluated at 8 trillion renminbi and converted to U.S. dollars at a rate of 8 renminbi per $1, its GDP in dollar terms (at the market exchange rate) is $1 trillion. Using a PPP exchange rate of 4, the Chinese economy would then evaluate to $4 trillion. However, this chapter argues that this conversion is largely valid to make intercountry welfare comparisons and not for making judgments about the relative size of the respective economies.

15. There is recent theoretical and empirical work on what makes countries grow that could provide more practical implications for policy makers than the widely discussed cross-country panel regressions. Both of these strands rely on complementarities across policies and other development-related necessities such as infrastructure needs. In the theoretical literature this has been referred to as the O-ring theory of growth and comes from the analogy with the U.S. space shuttle disaster. In that disaster, it was a simple and cheap O-ring that failed. So despite the billions of parts and scientific know-how that goes into putting the shuttle in space, the failure of any part, no matter how simple or inexpensive, is enough to bring it down. In growth theory, the same can be applied. A country can have, say, 9 out of 10 growth-related necessities absolutely perfect, but if the 10th is a failure, there will be no take-off because of the complementarities across these necessities. Recent empirical work by Hausman, Rodrik, and Velasco (2004) has used so-called growth diagnostic tools to assist in finding the bottlenecks to growth and providing a road map for the appropriate sequencing of policies to overcome the bottlenecks.

16. For example, fewer office workers could reduce the need for office space, computers, furniture, and the like.

17. Car manufacturing in Japan is much less labor intensive than in other countries owing to the scarcity (and hence the price of) labor. Agriculture in the United States could become more mechanized in the absence of abundant cheap labor ("The Worker Next Door" by Barry Chiswick, *New York Times,* June 3, 2006).

18. These numbers are based purely on the growth rate of the working-age population, defined as the population aged between 15 and 65. In effect it currently assumes that labor force participation rates are zero for the rest of the population and that the participation rates for the 15–65 group are fixed. Further, it makes no explicit assumption regarding migration, though one could infer that the proportion of migrants as a share of the population remains constant.

19. Much of the recent turnaround in Sub-Saharan Africa is also largely based on increased global demand for natural resources—whose labor intensity in most cases is relatively low, save for agriculture.

20. The standard replacement rate, that is, the rate of fertility that would keep population at a steady-state level is 2.1 births per female, to take into account average mortality rates and other factors.

21. Of course, this represents a relatively narrow definition of dependency because an increasing number of youths pursue education well beyond high school and often with parental support.

22. Several additional points are worth highlighting regarding the demographic scenario. Though most of the macroeconomic literature refers to the youth and elderly dependency ratios, it could also be true that there are macroeconomic dimensions to the gross dependency ratio, that is, the ratio of all nonworkers to workers. Countries that have had high births in the recent past and that have relatively low labor force participation rates will tend to have higher total dependency ratios, all else being equal. Sub-Saharan Africa, for example, has relatively greater declines in the total dependency ratio than the Middle East and North Africa despite its more rapid population growth because the labor force participation rate is higher. In fact, on this score, Sub-Saharan Africa has a lower dependency ratio than Latin America, which has lower workforce participation and a more rapidly aging population. Altering assumptions on labor force participation—for example a rise in female and/or elderly participation—could affect these total dependency ratios.

23. The baseline does track changes in policies between the base year of 2001 and 2005, notably China's commitments following its accession to the WTO, EU expansion, and the removal of the textile and apparel quotas.

24. The literature on empirical studies of the life-cycle theory is voluminous. Studies of macroeconomic data in industrial countries have found significant relationships between dependency ratios and saving rates (see for example Masson and Tryon 1990; Meredith 1995; IMF 2004; Higgins 1998; Masson, Bayoumi, and Samiei 1998; Lee and Kim 2005). By contrast, household survey evidence typically finds only weak, or even positive effects, of dependency ratios on savings (Turner and others 1998). The difference is likely due to weaknesses in the survey data (for example, the surveys often do not include pension data), the failure to adequately assess the disproportionate impact of the wealthy on aggregate savings, differences in age cohort behavior, and the failure to consider interactions among households, firms, and government.

25. This would reverse the trend of past decades. Bloom and Canning (2004) estimate that one-third of the East Asian economic miracle may be accounted for by a demographically induced rise in savings and investment. Higgins and Williamson (1996) find that much of the rise in Asian saving rates since the 1960s is due to a decline in youth dependency ratios.

26. On the other hand, Börsch-Supan, Ludwig, and Winter (2001) claim that the elasticity of substitution between capital and labor is close to one in industrial countries, meaning that production processes can be modified easily to substitute labor for capital, which would limit the impact of demographic change on investment.

27. OECD (2005) notes that the model-based simulations typically assume that labor is immobile, that capital is perfectly mobile, and that investors have

perfect foresight. Allowing for immigration, capital account restrictions, and risk aversion would reduce the magnitude of capital flow shifts in response to aging.

28. The share of institutions, defined as pension funds, insurance corporations, and mutual funds in household portfolios in OECD countries has risen from 17 percent in 1970 to 38 percent in 2003 (OECD 2005). World Bank (1997) shows that regulations also limit the share of investments by institutional investors in foreign assets.

29. Morin and Suarez (1983) and Bakshi and Chen (1994) find evidence that risk aversion rises with age; Riley and Chow (1992) and Halek and Eisenhauer (2001) find that risk aversion declines with age until 65, but then increases; while Bellante and Saba (1986) and Jianakoplos and Bernasek (1998) find that risk aversion falls with age. Bellante and Green (2004) find that risk aversion tends to increase with age, for any given level of wealth.

30. For example, Poterba and Samwick (1997) find significant differences in asset ownership of different birth cohorts. Older households today are more likely to hold relatively risky stock, and less likely to hold tax-exempt bonds, than younger households. But this says nothing about how the current, older-generation attitudes will change as they age.

31. Considerable controversy exists concerning the appropriate measure of personal savings in the United States, the determinants of the steady decline in saving rates, and the extent to which low saving represents household dependence on the rise in housing assets or reliance on pensions. Whatever the actual level of saving, there is little doubt that appropriately measured, it has fallen significantly over the past two decades.

32. Not all technologies are freely available, of course. Patents and other forms of intellectual property protection imply that still significant portions of technological transfers will come through joint ventures with firms holding the rights to those technologies.

33. The philanthropic efforts of the Bill and Melinda Gates Foundation and others provide some reason for optimism that progress can be made in some of these areas.

34. Significantly more detail on the potential impacts of various Doha scenarios is available in Anderson and Martin (2006).

35. Per capita growth is somewhat higher when measured at PPP exchange rates owing to different weights—notably for China.

36. The 2015 forecast represents some changes from last year's poverty forecast published in *Global Economic Prospects 2006*. The first notable difference is the change in the base year for the forecast—now 2003 instead of 2002. Despite the more recent year, both the number and percentage of poor (at the $1-a-day level) is higher in the base year, respectively 1,068 and 20.2 percent compared with 1,011 and 19.3 percent. (A printing error appeared in last year's report regarding the 2002 numbers for the $1-a-day poverty indicator.) Principally this is due to three factors. (1) Population figures have been revised. (2) The new estimates for the base year incorporate 38 new surveys covering the 2003/04 period. Many of the new surveys include large countries such as Argentina, Brazil, Mexico, and the República Bolivariana de Venezuela in Latin America; Pakistan in South Asia; and Nigeria in Sub-Saharan Africa. (3) Adjustments to a common base year incorporate the latest information on price inflation and growth in private consumption. These same factors also impact the forecast to 2015, since the new surveys will be associated with new estimates of the poverty-to-growth elasticity and the revised population forecasts will impact the estimate of the absolute number of poor. One additional factor has been a revision to the Chinese estimate of the poverty elasticity with respect to changes in the income distribution (as measured by the Gini coefficient). The estimate of this elasticity has been revised upward so that more poverty is associated with a rise in inequality. While for most countries, the 2015 forecast assumes distribution neutrality, in the case of China, both the rural and urban Gini coefficient is assumed to deteriorate by 10 percent. Thus, a rise in this elasticity leads to a worsening of poverty, all else remaining constant, though counteracted, nonetheless, by relatively high income growth.

37. The 2030 poverty forecast does not use the same methodology as the poverty forecast for 2015 and instead is based on a straight poverty and growth elasticity approach. The 2015 forecast uses all of the available household information at the country level combined with a country-specific forecast of per capita consumption growth. The 2030 forecast uses the elasticity approach at the regional level. It combines the implicit growth elasticities from the 2003/2015 poverty forecast with the regional per capita growth rate between 2015 and 2030 as anticipated in the central scenario. The projection is meant to be broadly indicative of potential improvements and to highlight regional differences.

References

Ameriks, John, and Stephen P. Zeldes. 2004. "How Do Household Portfolio Shares Vary with Age." Working Paper, Columbia Business School, New York, NY.

Anderson, Kym, and Will Martin, eds. 2006. *Agricultural Trade Reform and the Doha Development Agenda*. Washington, DC: Palgrave Macmillan and the World Bank.

Bakshi, Gurdip, and Zhiwu Chen. 1994. "Baby Boom, Population Aging and Capital Markets." *Journal of Business* 67 (2): 165–202.

Bellante, Don, and Carole A. Green. 2004. "Relative Risk Aversion among the Elderly." *Review of Financial Economics* 13: 269–81.

Bellante, Don, and Richard P. Saba. 1986. "Human Capital and Life-Cycle Effects on Risk Aversion." *Journal of Financial Research* 9 (1): 41–51.

Bernanke, Ben S. 2006. Remarks made at the Federal Reserve Bank of Kansas City's Thirtieth Annual Economic Symposium, Jackson Hole, WY, August 25.

Bloom, David E., and David Canning. 2004. "Global Demographic Change: Dimensions and Economic Significance." In *Global Demographic Change: Economic Impacts and Policy Challenges,* proceedings of a symposium, pp. 9–56, sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 26–28, 2004.

Bodie, Zvi, Robert C. Merton, and William F. Samuelson. 1992. "Labor Supply Flexibility and Portfolio Choice in a Life Cycle Model." *Journal of Economic Dynamics and Control* 16: 427–49.

Börsch-Supan, Axel. 1996. "The Impact of Population Ageing on Savings, Investment and Growth in OECD Area." In *Future Global Capital Shortages: Real Threat or Pure Fiction?* Paris: Organisation for Economic Co-operation and Development.

Börsch-Supan, Axel, Alexander Ludwig, and Joachim Winter. 2001. "Aging and International Capital Flows." NBER Working Paper No. 8553, National Bureau of Economic Research, Cambridge, MA.

Bosworth, Barry P., and Susan M. Collins. 2003. "The Empirics of Growth: An Update." *Brookings Paper on Economic Activity* 2: 113–206.

Bryant, Ralph C. 2004. "Cross-Border Macroeconomic Implications of Demographic Change." In *Global Demographic Change: Economic Impacts and Policy Challenges*, proceedings of a symposium pp. 9–56, sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 26–28, 2004.

Cutler, David M., James M. Poterba, Louise M. Sheiner, Lawrence H. Summers, and George A. Akerlof. 1990. "An Aging Society: Opportunity or Challenge?" *Brookings Papers on Economic Activity* 1: 1–73.

David, Paul A. 1990. "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox." *The American Economic Review* 80 (2) (May): 355–62.

Fardoust, Shahrokh, and Jonathan E. Goldberg. 2006. "Predicting the Future, Looking into the 'Rearview Mirror.'" World Bank, Washington, DC, August.

Fougère, Maxine, and Marcel Mérette. 1997. "Population Aging and Economic Growth in Seven OECD Countries." *Economic Modeling* 16: 411–27.

Goldman Sachs. 2003. "Dreaming with BRICs: The Path to 2050." *Global Economics Paper* 99 (October).

Gordon, Robert J. 2000. "Does the 'New Economy' Measure Up to the Great Inventions of the Past?" *Journal of Economic Perspectives* 14 (4) (Fall): 49–74.

Halek, Martin, and Joseph G. Eisenhauer. 2001. "Demography of Risk Aversion." *Journal of Risk and Insurance* 68 (1): 1–24.

Hausman, Ricardo, Dani Rodrik, and Andrés Velasco. 2004. "Growth Diagnostics." Kennedy School of Government, Harvard University, Cambridge, MA.

Helliwell, John F. 2004. "Demographic Changes and International Factor Mobility." NBER Working Paper No. 10945, National Bureau of Economic Research, Cambridge, MA.

Higgins, Matthew. 1998. "Demography, National Savings, and International Capital Flows." *International Economic Review* 39 (2): 343–69.

Higgins, Matthew, and Jeffrey G. Williamson. 1996. "Asian Demography and Foreign Capital Dependence." NBER Working Paper No. 5560, National Bureau of Economic Research, Cambridge, MA.

IMF. 2004. *World Economic Outlook.* Washington, DC: International Monetary Fund.

Jianakoplos, Nancy Ammon, and Alexandra Bernasek. 1998. "Are Women More Risk-Averse?" *Economic Inquiry* 36: 620–30.

Ketkar, Suhas, and Dilip Ratha. 2001. "Development Financing during a Crisis: Securitization of Future Receivables." Policy Research Working Paper No. 2582, World Bank, Washington, DC.

———. 2005. "Recent Advances in Future-Flow Securitization." *The Financier* 11/12: 1–14.

Kimball, Miles S. 1993. "Standard Risk Aversion." *Econometrica* 61 (May): 589–611.

Lee, Jong–Wha, and Soyoung Kim. 2005. "Global Implications of Demographic Changes." Korea University. Paper prepared for the keynote speech at the International Symposium on Aging Problems in Northeast Asia, August 25–26, Fudan University, China.

Levinson, Marc. 2006. *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger*. Princeton, NJ: Princeton University Press.

Loayza, Norman, Klaus Schmidt-Hebbel, and Luis Servén. 2000. "Saving in Developing Countries:

An Overview." *The World Bank Economic Review* 14 (3): 391–414.

Lührmann, Melanie. 2003. "Demographic Change, Foresight and International Capital Flows." *MEA Discussion Paper* 38-03, Mannheim Research Institute for the Economics of Aging (MEA), Universität Mannheim, Germany.

Maddison, Angus. 2001. *The World Economy: A Millennial Perspective*. Paris: Development Centre Studies, OECD.

Martin, Will, and Devashish Mitra. 1999. "Productivity Growth and Convergence in Agriculture and Manufacturing." World Bank Policy Research Working Paper No. 2171, Washington, DC. August.

Masson, Paul, Tamim Bayoumi, and Hossein Samiei. 1998. "International Evidence on the Determinants of Private Saving." *World Bank Economic Review* 12 (3): 483–501.

Masson, Paul, and Ralph W. Tryon. 1990. "Macroeconomic Effects of Projected Population Aging in Industrial Countries." *IMF Staff Papers* 37 (September): 453–85.

McKibbin, Warwick J. 2005. "The Global Macroeconomic Consequences of a Demographic Transition." Centre for Applied Macroeconomic Analysis, Australian National University, August.

Meredith, Guy. 1995. "Demographic Change and Household Saving in Japan." In "Saving Behavior and the Asset Price Bubble in Japan," IMF Occasional Paper No. 124, International Monetary Fund, Washington, DC.

Morin, Roger A., and Antonio Fernandez Suarez. 1983. "Risk Aversion Revisited." *The Journal of Finance* 38 (4): 1201–16.

OECD. 2005. *Financial Market Trends: Ageing and Pension System Reform, Implications for Financial Markets and Economic Policies,* Vol. 2005, Supplement 1. Paris: Organisation for Economic Co-operation and Development.

Poterba, James M., and Andrew A. Samwick. 1997. "Household Portfolio Allocation over the Life Cycle." NBER Working Paper 6185, National Bureau of Economic Research, Cambridge, MA.

PricewaterhouseCoopers. 2006. "The World in 2050: How Big Will the Emerging Economies Get and How Can the OECD Compete?" March.

Riley, William B., and K. Victor Chow. 1992. "Asset Allocation and Individual Risk Aversion." *Financial Analysis Journal* 48 (6): 32–37.

Samuelson, Paul A. 1989. "A Case At Last for Age-Phased Reduction in Equity." *Proceedings of the National Academy of Sciences* (November): 9048–51.

Turner, David, Claude Giorno, Alain De Serres, Ann Vourc'h, and Pete Richardson. 1998. "The Macroeconomic Implications of Ageing in a Global Context." Economic Department Working Papers No. 193, Organisation for Economic Co-operation and Development, Paris.

Tyers, Rod, and Qun Shi. 2005. "Global Demographic Change, Labour Force Growth and Economic Performance." Faculty of Economics and Commerce, Australian National University, June.

UN (United Nations). 2004. *World Population Prospects: The 2004 Revision*. New York: Department of Economic and Social Affairs, Population Division. Available at www.un. org/esa/population/publications/WPP2004/ 2004EnglishES.pdf.

van der Mensbrugghe, Dominique. 2006a. "Linkage Technical Reference Document: Version 6.0." World Bank, Washington, DC.

———. 2006b. "Scenario Building through 2030 with the Linkage Model." World Bank, Washington, DC.

Wade, Nicholas. 2006. *Before the Dawn: Recovering the Lost History of Our Ancestors*. New York: Penguin.

World Bank. 1997. *Private Capital Flows to Developing Countries: The Road to Financial Integration*. New York: Oxford University Press.

———. 2006a. *Global Economic Prospects: Economic Implications of Remittances and Migration*. Washington, DC: World Bank.

———. 2006b. *Global Development Finance*. Washington, DC: World Bank.

———. 2006c. "South-South Migration and Remittances." World Bank, Washington, DC.