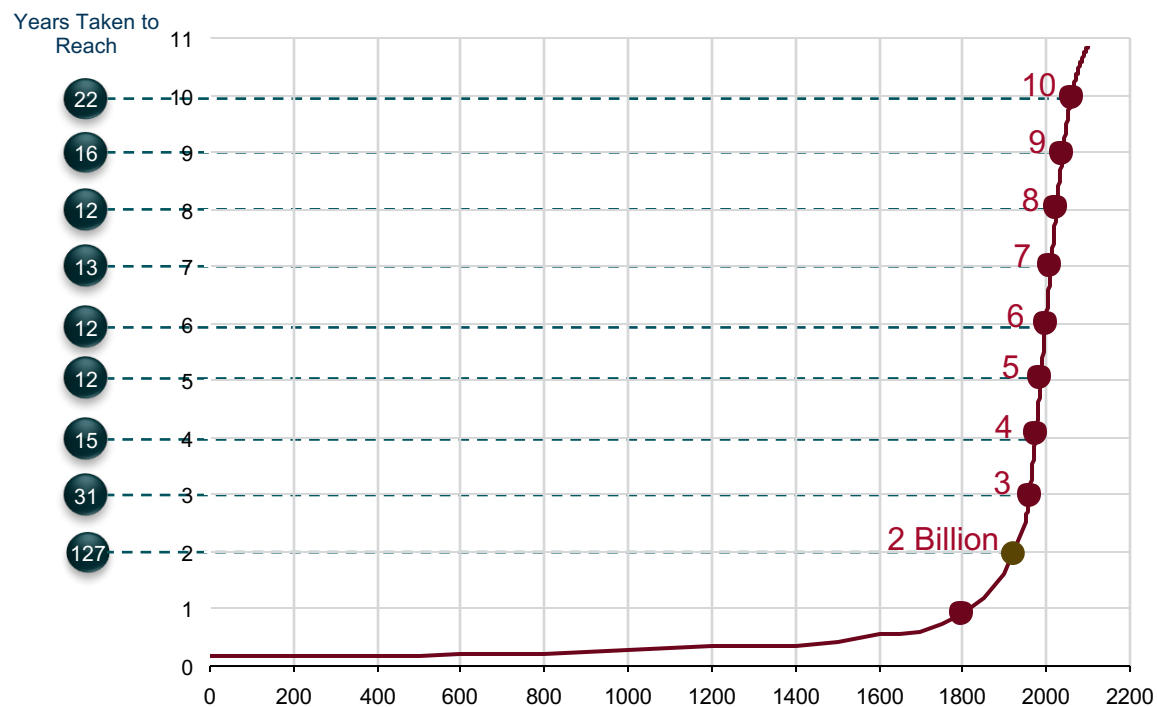# THE WORLD IS GROWING CROWDED, OLDER AND MORE URBANIZED WORLD
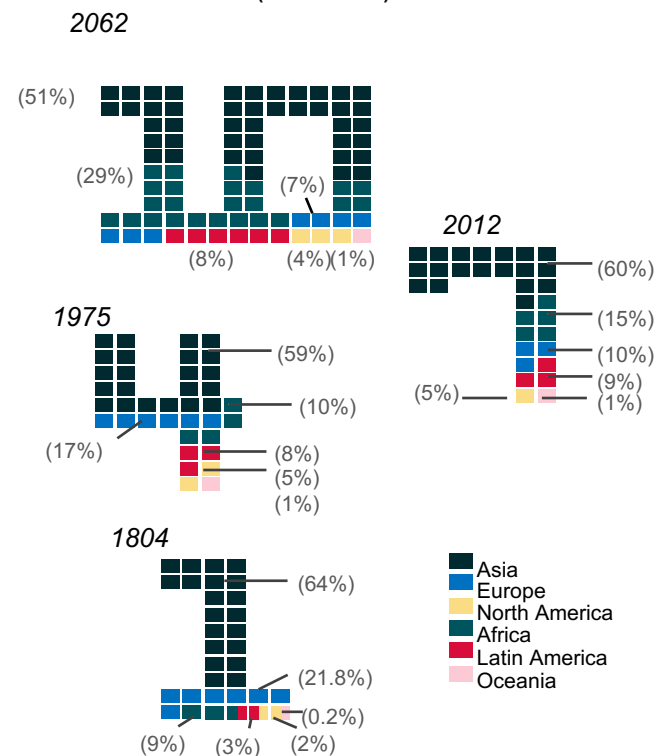
THE WORLD POPULATION WILL REACH

8 BILLION by 2024, 12 years since its last billion, but increasing at a decreasing rate

World population has reached its first billion around 1804. In the last 2 centuries, the next 6 billions have been reached and another 4 will be delivered by the end of this century. However, population growth is starting to slow down.. The annual population growth between the 3rd billion and the 7th billion was 1.7% while the expected growth from now till 2100 will be 0.5%. Population growth will be driven mainly by Asia and Africa which will represent 51% and 29% respectively by 2062 of total global population

Global Population
(In Billions, CE 1-2100)

Years Taken to Reach

22	10
16	9
12	8
13	7
12	6
12	5
15	4
31	3
127	2 Billion

Population Billions by Region
(1804 – 2062)

2062
(51%)
(29%)
(7%)
(8%)
(4%)(1%)

2012
(60%)
(15%)
(10%)
(9%)
(5%)
(1%)

1975
(59%)
(10%)
(17%)
(8%)
(5%)
(1%)

1804
(64%)
(21.8%)
(0.2%)
(9%)
(3%)
(2%)

Asia
Europe
North America
Africa
Latin America
Oceania

THE ELDERLY POPULATION WILL BE
22% of total global population by the year 2100

In the 20th century , global population was growing fast that it doubled twice. However, this growth rate has decreased since and as such another doubling is not expected till the end of this century. The number of people over 65 though doubled in 22 years from 1950 to 1972, then in 30 years and will double again in the next 75 years. These structural changes are likely to have dramatic impact on consumption, labor markets, and economic activity

World Population By Age[(1)]
(In Billion People and In %, 1950 - 2100)

Year	Total	Over 65	Younger Than 65
1950	2.5	5%	95%
2010	6.9	8%	92%
2015	7.3	8%	92%
2020	7.7	9%	91%
2025	8.1	10%	90%
2030	8.4	12%	88%
2035	8.7	13%	87%
2040	9.0	14%	86%
2045	9.3	15%	85%
2050	9.6	16%	84%
2070	10.3	18%	82%
2080	10.5	20%	80%
2090	10.7	21%	79%
2100	10.9	22%	78%

■ Population Aged Over 65   ■ Population Younger Than 65
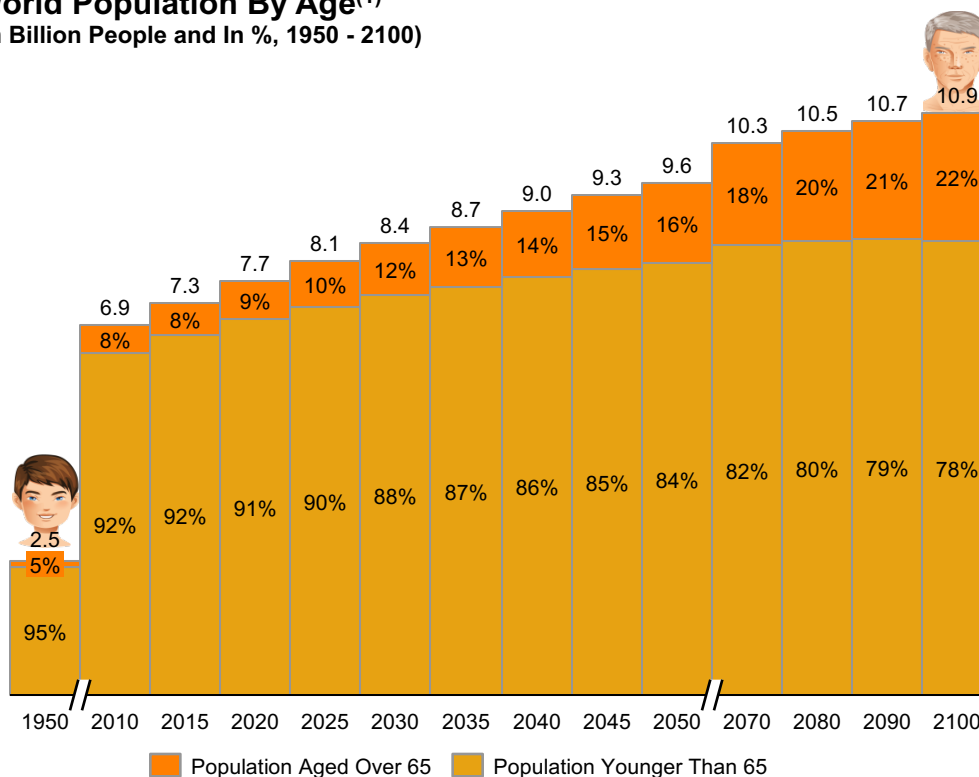
Years to Double Old Age Population
(In Actual Year of Doubling and In Number of Years to Double, 1950 - 2100)

2077 — **75 years**
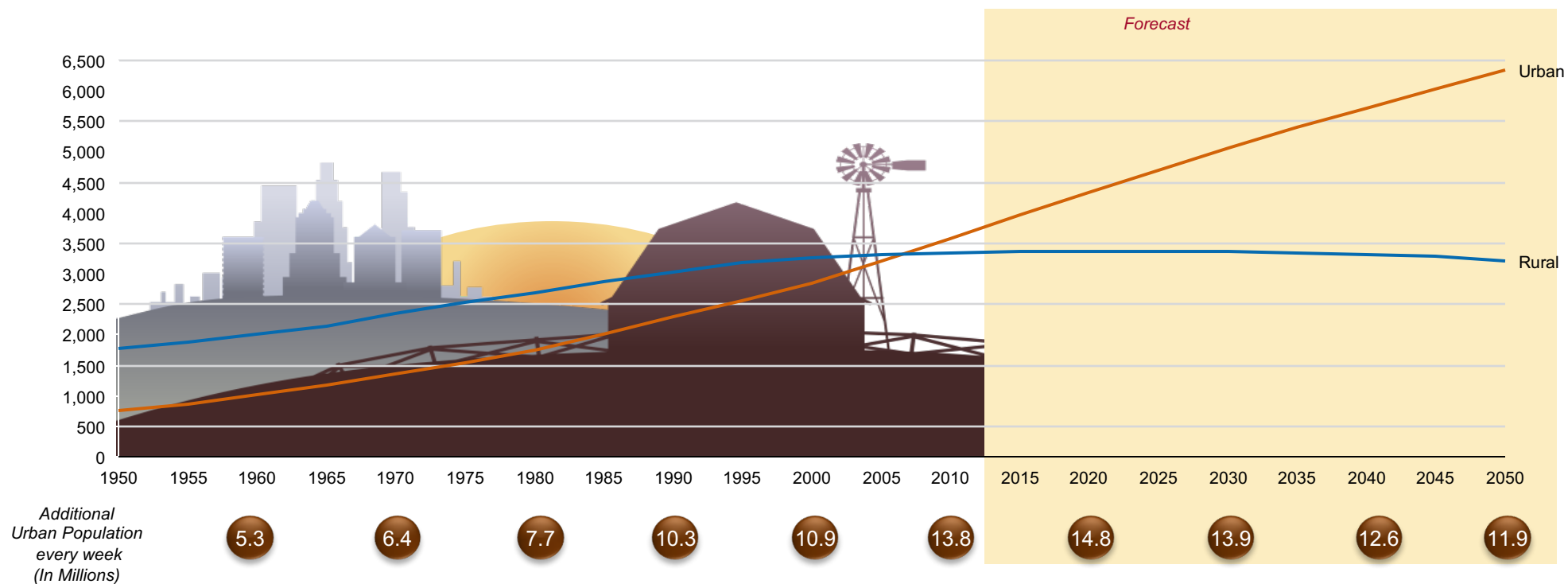2002 — **30 years**
1972 — **22 years**
1950
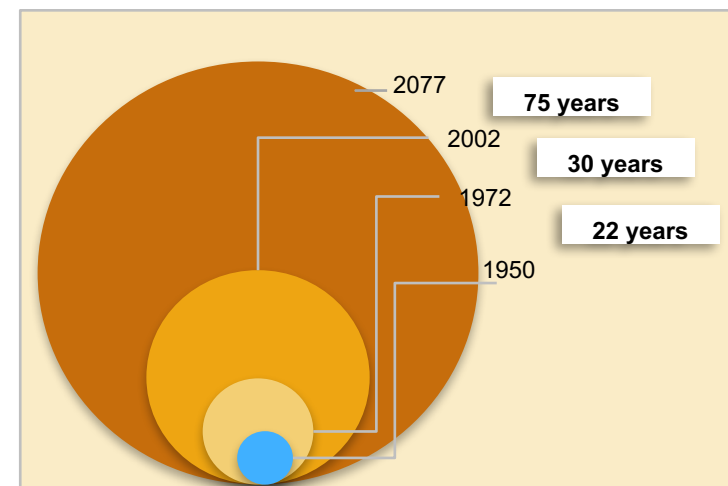
Note: (1) All projections used are based on the 'Medium Fertility' scenario. Other scenarios include: high, low, constant fertility and constant mortality
Sources- Left and Right Charts: United Nations, Department of Economic and Social Affairs, World Population Prospects, 2012; CPC Analysis

BY 2050, TWO THIRDS OF GLOBAL POPULATION WILL BE LIVING IN URBAN AREAS

The global urban population surpassed the rural one in 2009/2010. However, with this pace of growth it is likely that by 2050, the urban population will be double that of the rural and accounting for two thirds of global population

Growth in Urban vs Rural Population Globally
(In Millions, 1950-2050)

Forecast

Urban

Rural

Additional Urban Population every week (In Millions)

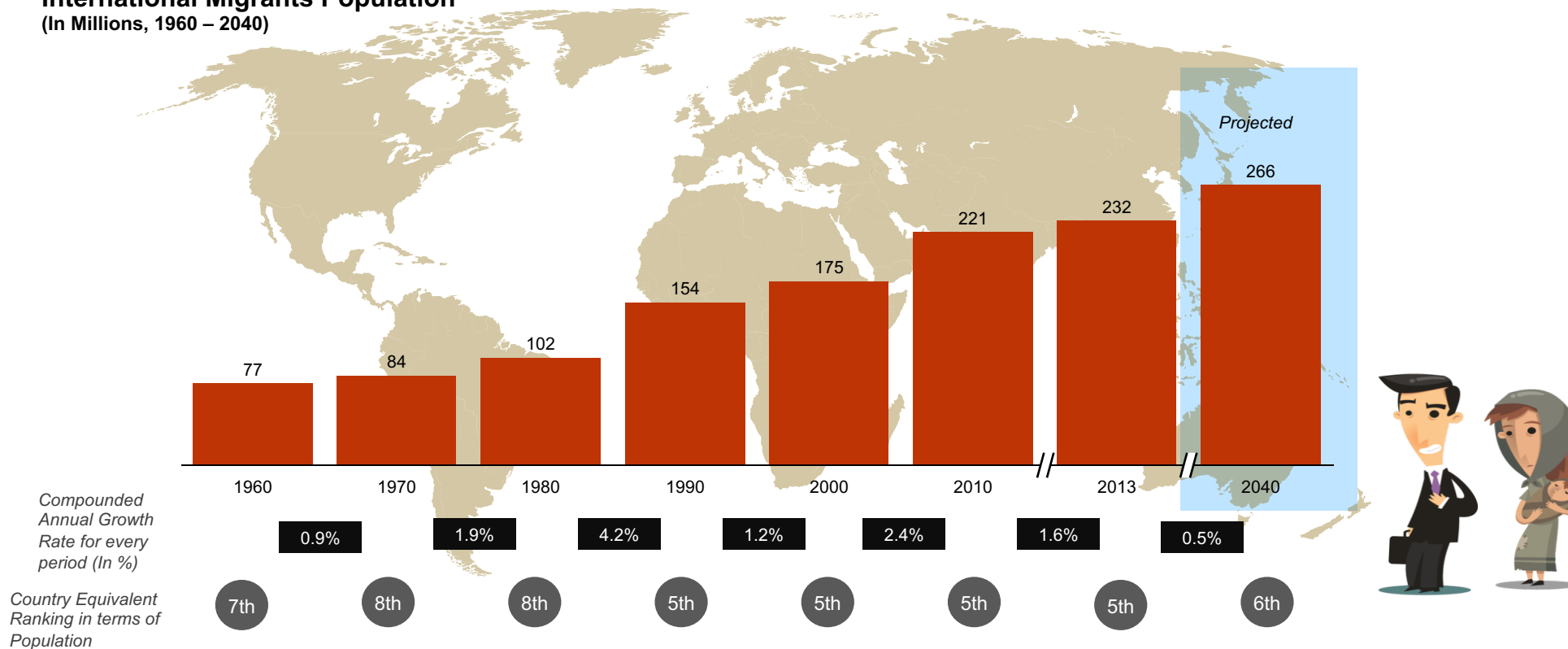5.3 6.4 7.7 10.3 10.9 13.8 14.8 13.9 12.6 11.9

Source: "World Urbanization Prospects", United Nations, 2014

INTERNATIONAL MIGRANTS HAVE INCREASED BY ~60 MILLION IN THE LAST 13 YEARS constituting the world's 5th largest country

The fastest growing period of migration has been the decade between 1980 and 1990. Since then (i.e. 1990), migration has increased by 65% reaching 232 million people in 2013. Today, one in every 7 is a migrant. Migration is also expected to continue growing to reach 266 million by 2040. In general, migration numbers are underestimated because national censuses do not capture temporary migration

International Migrants Population
(In Millions, 1960 – 2040)

Year	Value
1960	77
1970	84
1980	102
1990	154
2000	175
2010	221
2013	232
2040 (Projected)	266

Compounded Annual Growth Rate for every period (In %):

Period	Rate
1960–1970	0.9%
1970–1980	1.9%
1980–1990	4.2%
1990–2000	1.2%
2000–2010	2.4%
2010–2013	1.6%
2013–2040	0.5%

Country Equivalent Ranking in terms of Population:

Year	Ranking
1960	7th
1970	8th
1980	8th
1990	5th
2000	5th
2010	5th
2013	5th
2040	6th

Source: United Nations Population Division; "Examining the Role of International Migration in Global Population Projections" , Abel, K.C, et. al., 2014
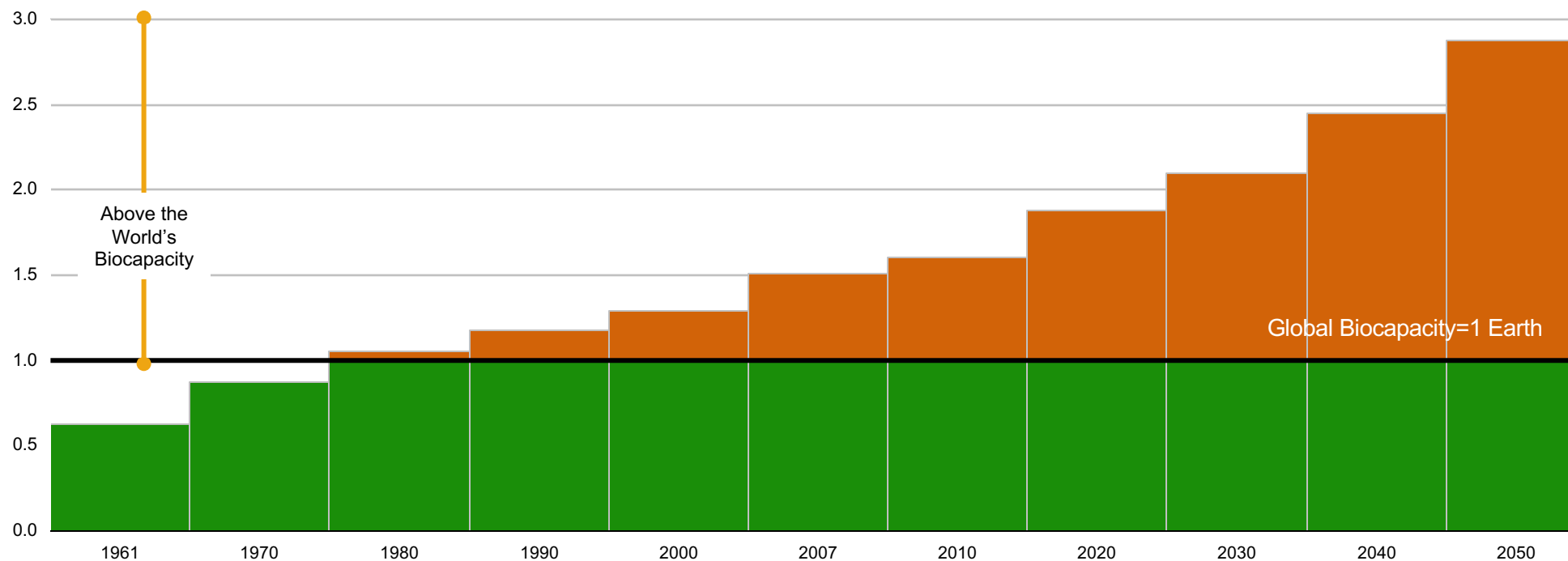
6

...PUTTING MORE DEMAND ON RESOURCES, WHICH ARE SCARCE

THE GLOBAL POPULATION USES RESOURCES BEYOND ITS MEANS
which puts further pressure on the global ecology

The threshold of what Earth can sustainably provide was reached in 1976. Currently, we are using the equivalent of over 1.5 Earths—in other words, exceeding what nature can provide by more than half. It is predicted that if the world continues on that pace that we would need almost 3 earths by 2050. Which means it will take the earth 3 years then to regenerate what has been used in one year
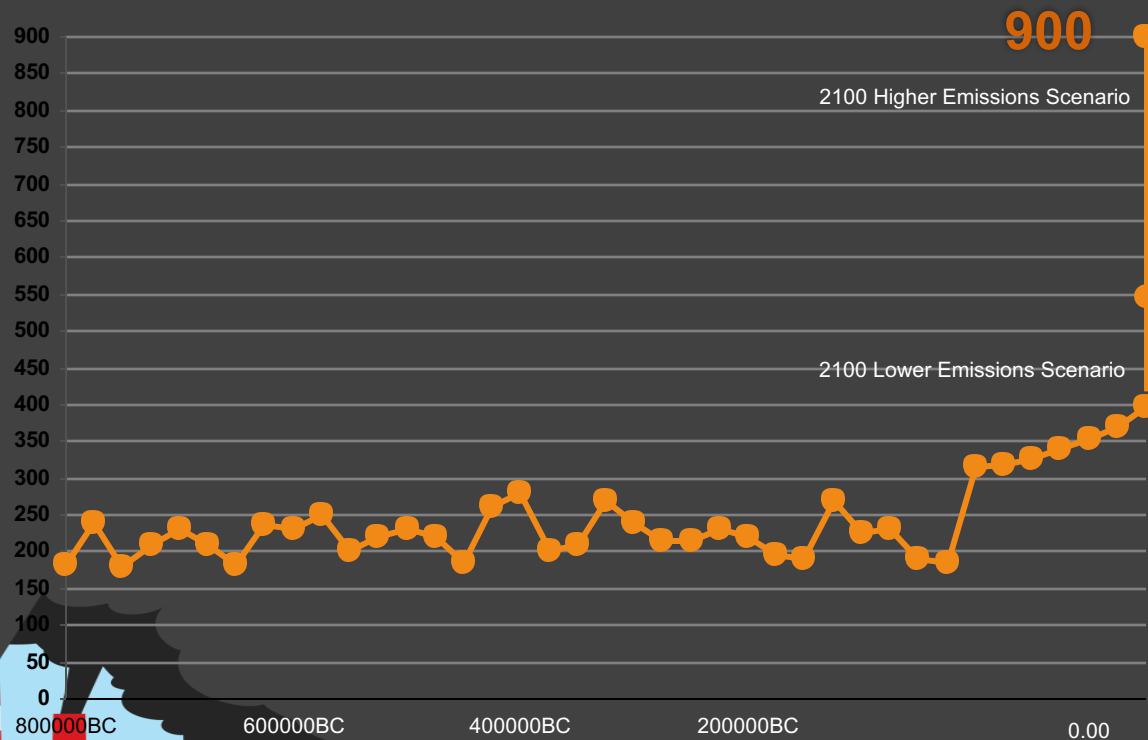
Global Ecological Footprint
(In Number of Earths Needed, 1961 - 2050)

Above the World's Biocapacity

Global Biocapacity=1 Earth

3.0

2.5

2.0

1.5

1.0

0.5

0.0

| 1961 | 1970 | 1980 | 1990 | 2000 | 2007 | 2010 | 2020 | 2030 | 2040 | 2050 |

Source- Global Footprint Network

# CO₂ EMISSIONS - THE MAIN SOURCE OF GLOBAL WARMING - HAVE REACHED UNPRECEDENTED LEVELS

Global carbon emissions from fossil fuels have significantly increased since 1900. Emissions increased by over 16 times between 1900 and 2008 and by about 1.5 times between 1990 and 2008. Current levels are at an unprecedented high reaching 400ppm for the first time in 2013. This hints to the start of a new geological era

CO₂ Emissions
(In Parts per Million, -500,000 - 2010)

900

2100 Higher Emissions Scenario

2100 Lower Emissions Scenario

900	
850	
800	
750	
700	
650	
600	
550	
500	
450	
400	
350	
300	
250	
200	
150	
100	
50	
0	

800000BC   600000BC   400000BC   200000BC   0.00

CO2 emissions in Recent History
(In ppm 1955-2015)

399

1950   1965   1980   1995   2015

Source- National Oceanic & Atmospheric Administration (NOAA)
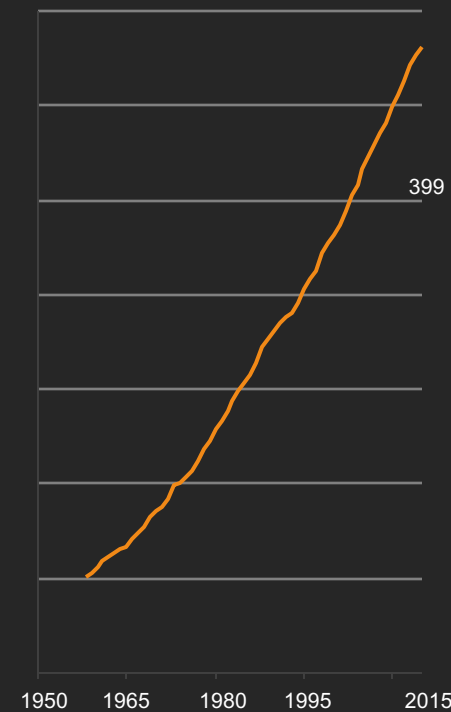
SOCIAL WELLBEING: HOW HAVE WE FAIRED SO FAR?

GLOBAL EMPLOYMENT CREATION HAS BEEN ALMOST STAGNANT growing slower than any pre-crisis year and with a projected 80 million jobs needed by 2018 to close the crisis-related jobs gap

Employment is not expanding fast enough to keep up with the growing labor force. If current trends continue, global unemployment is set to worsen further, gradually reaching around 212 million jobseekers by 2019. In 2014, the ILO predicted that around 40 million net new jobs would be created every year, which is less than the 42.6 million people expected to enter the labor market every year. The bulk of the increase in global unemployment is in the East Asia and South Asia regions, which together represent more than 45 per cent of additional jobseekers, followed by Sub-Saharan Africa and Europe

Current and Pre-Crisis Employment Trend
(In Millions, 2001-2019)

Pre-crisis trend

Post-crisis trend

Forecast

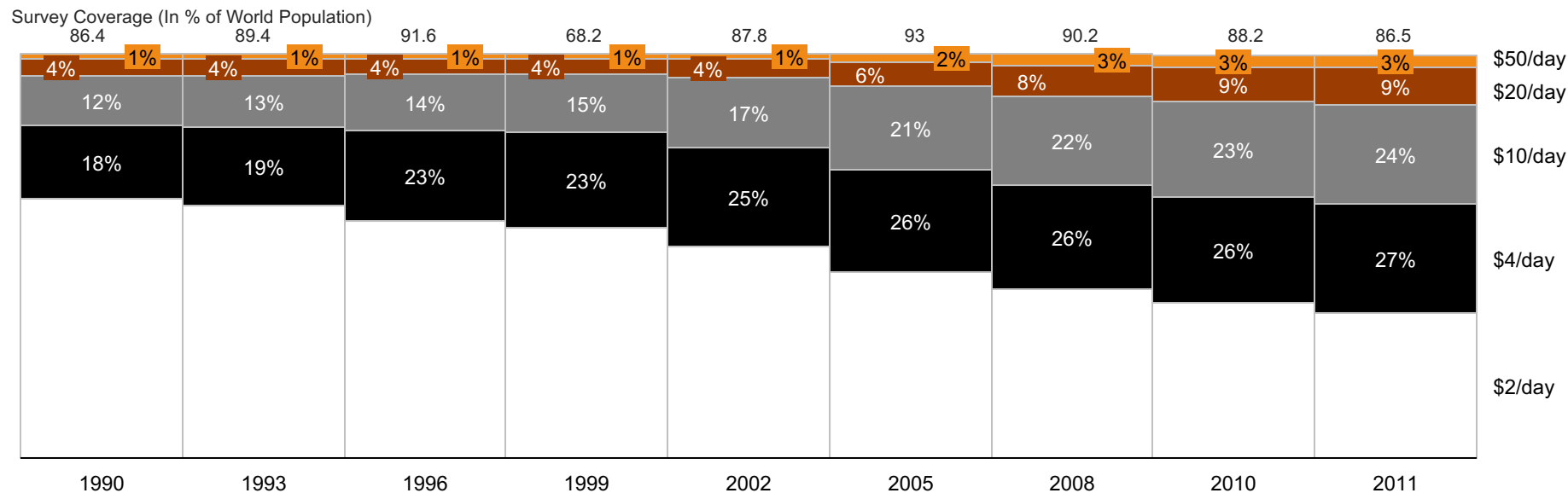Job Gaps: 61 Million

Job Gaps: 80 Million
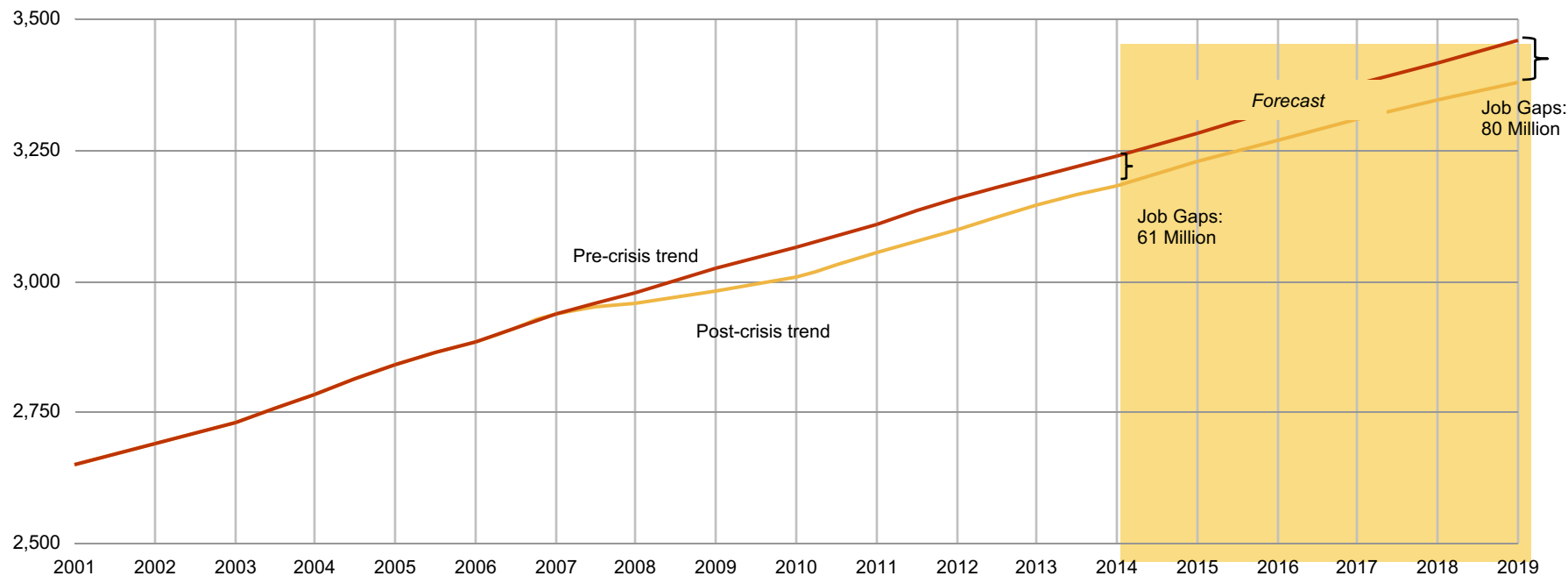
Source: "World Employment Social Outlook Trends 2015", ILO, 2015

THE GLOBAL MIDDLE CLASS IS GROWING ALTHOUGH NEARLY 50% OF IT REMAINS "FLOATING" (susceptible to going back to poverty), with variation in social and economic profiles within the different strata

The global middle class is projected by the OECD to reach 4.9 billion people by 2030. The majority of this growth will come from Asia, which will account for over 65% of the global middle class by 2030 compared to 28% in 2009. However, much of the emerging middle class remains vulnerable; in 2011 over 1.6 billion people lived within the "floating class" $2-4/day, at risk of falling back below poverty lines. Younger populations, lower education rates, and dependence on low-paying industrial and agrarian jobs set emerging middle class countries apart from their developed counterparts

Population of the Global Middle Class[1] over Time
(In % of Total Population and In Millions of People, 1990-2011)

Survey Coverage (In % of World Population)

	1990	1993	1996	1999	2002	2005	2008	2010	2011
Coverage	86.4	89.4	91.6	68.2	87.8	93	90.2	88.2	86.5
$50/day	1%	1%	1%	1%	1%	2%	3%	3%	3%
$20/day	4%	4%	4%	4%	4%	6%	8%	9%	9%
$10/day	12%	13%	14%	15%	17%	21%	22%	23%	24%
$4/day	18%	19%	23%	23%	25%	26%	26%	26%	27%

Total Population Living on $2-50/day (In Billions)[2]

1.6	1.8	2.0	2.2	2.7	3.0	3.3	3.6	3.8

Notes (1): Middle Class is defined as population living on between $2-50/day, PPP or $60-15,00/month, PPP
(2): Only includes population within survey sample
Source – Upper Chart: World Bank POVCAL Dataset.
Source – Lower Chart: World Bank Databank

DESPITE ITS LONG-TERM RISE, GLOBAL INEQUALITY HAS TAPERED IN THE PAST 3 DECADES

While our world has grown richer, it has also grown more unequal, both within and among countries. The world GINI coefficient, a measure of global inequality, grew by 20% between 1820 and 2008, from 0.5 to over 0.6. While data from 1980 to 2008 indicate that inequality may have slightly declined, more recent analysis of growing dispersion in economies affected by the 2008 economic crisis forecast that inequality is likely to remain stagnant or again rise in the near to intermediate future.

Global Inequality[1] over Time
(In GINI coefficient, 1820-2008)
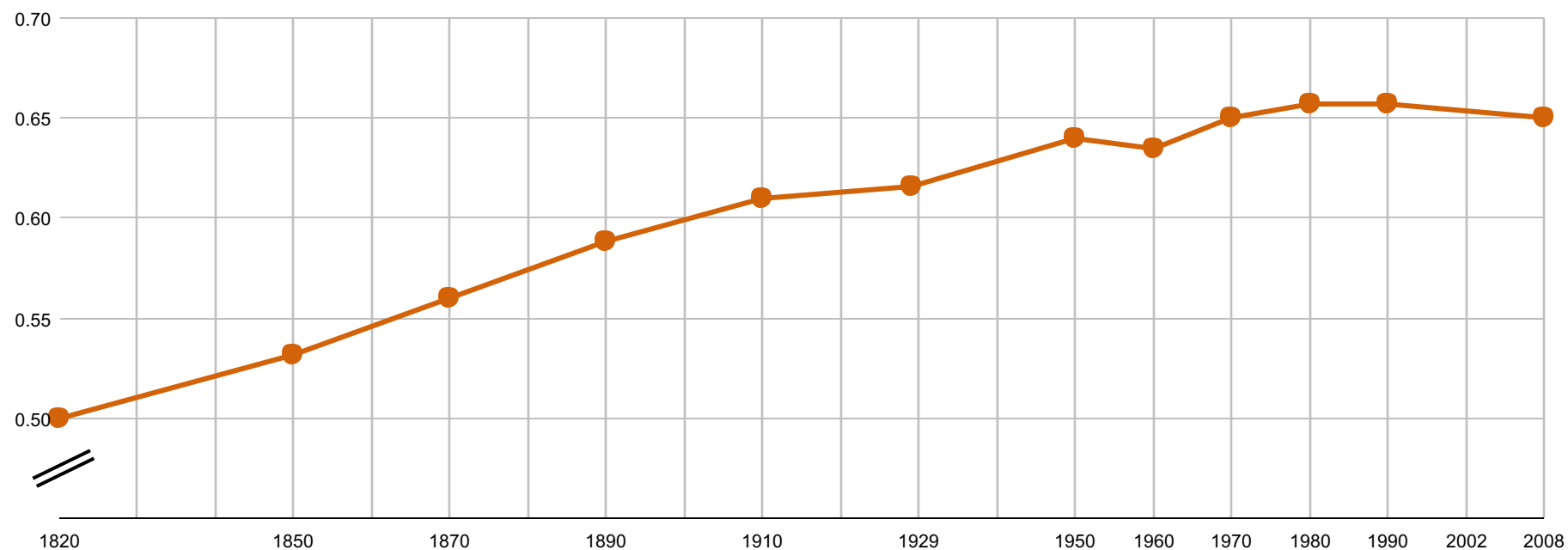
Note: (1) Based on the paper "Globalization, Poverty, and Inequality since 1980" by David Dollar
Sources: "For Richer, For Poorer," The Economist, 2012; "A Short History of Global Inequality: The Past Two Centuries," Branko Milanovic, 2011

DRAMATIC SHIFTS: ARE THEIR OPPORTUNITIES THAT WILL ALLOW US TO STEER THE SHIP?

INFORMATION MANAGEMENT HAS BEEN FACILITATED BY BETTER PROCESSING POWER OF TRANSISTORS, which became much faster over time

With processing powers increasing over time such that the trend analysis of the time required to match the human brain decreased to around year 2020. As such, Moore's law that predicts the doubling of transistors on integrated circuits every two years has been met. In fact some argue we have reached "More Moore" with transistor size and cost decreasing

Computer Power Milestones
(In Floating Point Operations per Second, 1960-2019)

Floating Point Operations per Second (FLOP)
Equivalent computing power

10^{18} — Human Brain

2019: exaFLOP Barrier to be Reached?

2009: Cray XT5-HE Goes Live
2009: First World-class GPU-powered Supercomputer

10^{15} — Mouse Brain

2008: PetaFLOP Barrier Broken

2005: Millennium Run Simulation
2003: Human Genome Mapped

10^{12}

1999: ASCI Blue Pacific Goes Live

1993: CM-5/1024 Supercomputer

1984: M-13 Supercomputer

10^9 — Insect Brain

1976: Cray 1 Goes Live

10^6

1960: Univac LARC Goes Live

10^3

1960   1970   1980   1990   2000   2010   2020

Source: Advanced Micro Devices

ADVANCEMENTS IN SCIENCE AND MEDICINE ARE LIKELY TO YIELD GAINS IN TERMS OF BETTER LIFESTYLES in the future especially with the drop in cost of genomic sequencing

As medical technology improves, so does human life expectancy. In addition to new breakthroughs in stem cells, organ printing, dead heart transplant and DNA tailored treatments coming into the market, the cost of the technologies is also decreasing drastically. The cost of DNA sequencing for example has dropped to under one 20,000th its cost in 2001. There is a technological race with nations and companies aiming at gaining the advantages of the newer technologies

Cost of Sequencing a Human Genome Over Time
(In US$ Million, Sep. 2001 - Apr. 2014)
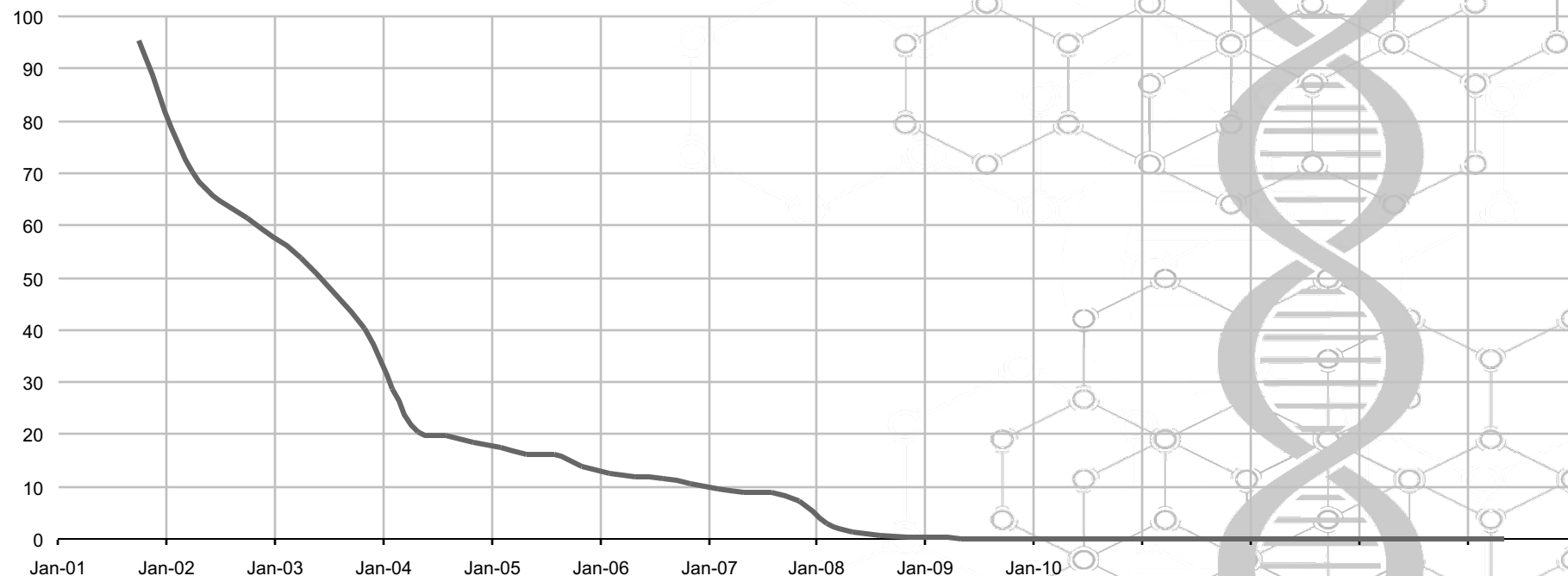
Source- Upper Chart: National Institute of Health, Human Genome Project, 2014
Source- Lower Chart: Stem Cell Research in China, CKGSB Knowledge, 2014 (based on Paul Knoepfler's 2013 study)

PARTIALLY AUTONOMOUS CARS ARE ALREADY IN THE MARKET driven by assisted driving technologies with the potential of a fully automated car by 2020

Although full automation of cars is not expected yet in all cars, gradual automation has already been happening. The technology is already used in instalments as carmakers have been introducing "assisted driving" features as options, even on mass-market models. Driverless cars will be relying on a large number of sensors
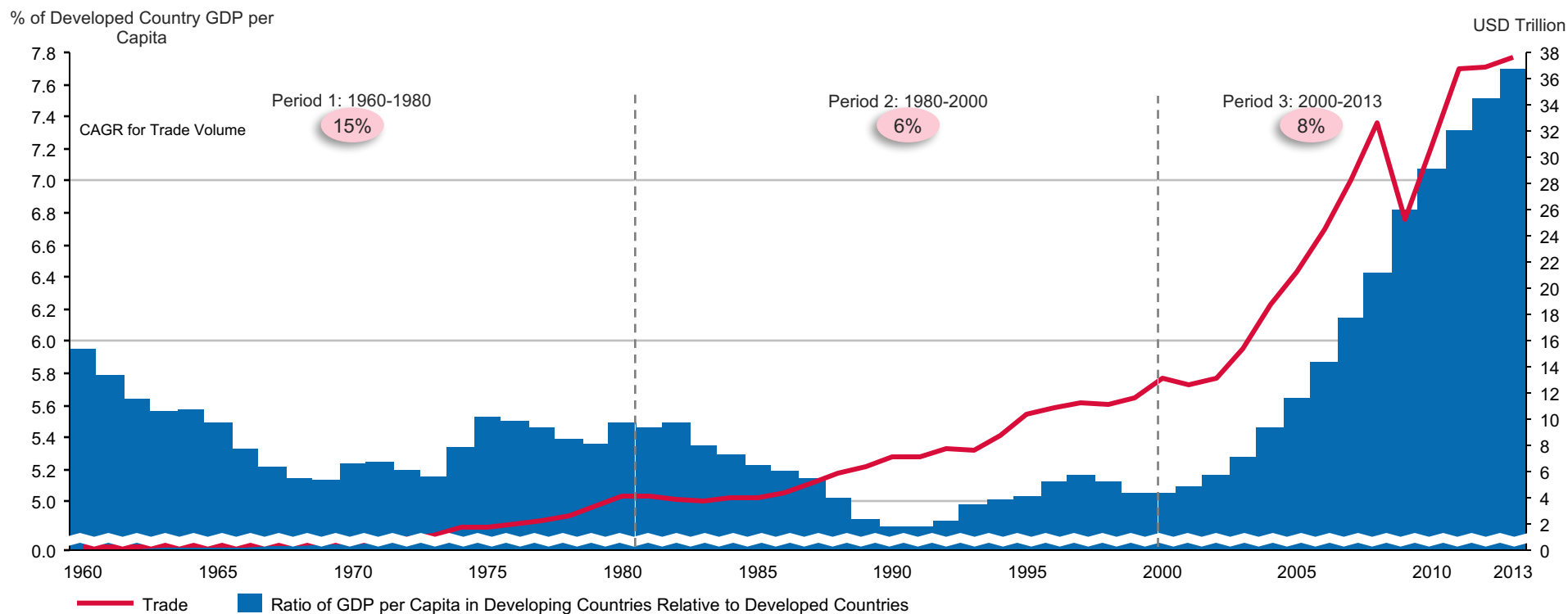
Driverless Car Components

GPS (Global Positioning System)
Provide more accurate positioning

Lidar (light detection and ranging)
Identify lane markings and the edges of roads

Radar Sensor

Video Cameras
Detect traffic lights, read road signs, keep track of the position of other vehicles and look out for pedestrians and obstacles on the road

Ultrasonic Sensors
Measure the position of objects very close to the vehicle, such as curbs and other vehicles when parking

Central Computer
Understand rules of the road and manipulates the steering, accelerator and brakes accordingly

Radar Sensor
Monitor the position of other vehicles nearby

Source:" How does a self-driving car work?", The Economist, 2013

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VALUE OF GLOBAL TRADE HAS GONE UP OVER 180% SINCE 2000, but only in the last decade has it started being correlated with gains in developing countries' standards of living

Global trade has increased dramatically over the past half century, expanding by over 800% between 1980 and 2013. Yet growth has slowed substantially in the wake of the 2008 financial crisis. While rising demand for imports and cost-saving technologies in transport and logistics will continue to drive the flow of goods, ongoing economic weakness will counter these effects. Despite the rise in trade and globalization, it is clear that only in the past decade or so has this openness started translating into reduction in standards of living gaps between developing and developed countries

Aggregate Value of World Imports and Exports over Time and Ratio of GDP per Capita in Developing Countries Relative to Developed Countries
(In US$ Trillion at Current Prices and Current Exchange Rates and % of Developed Country GDP per Capita, 1960-2013)

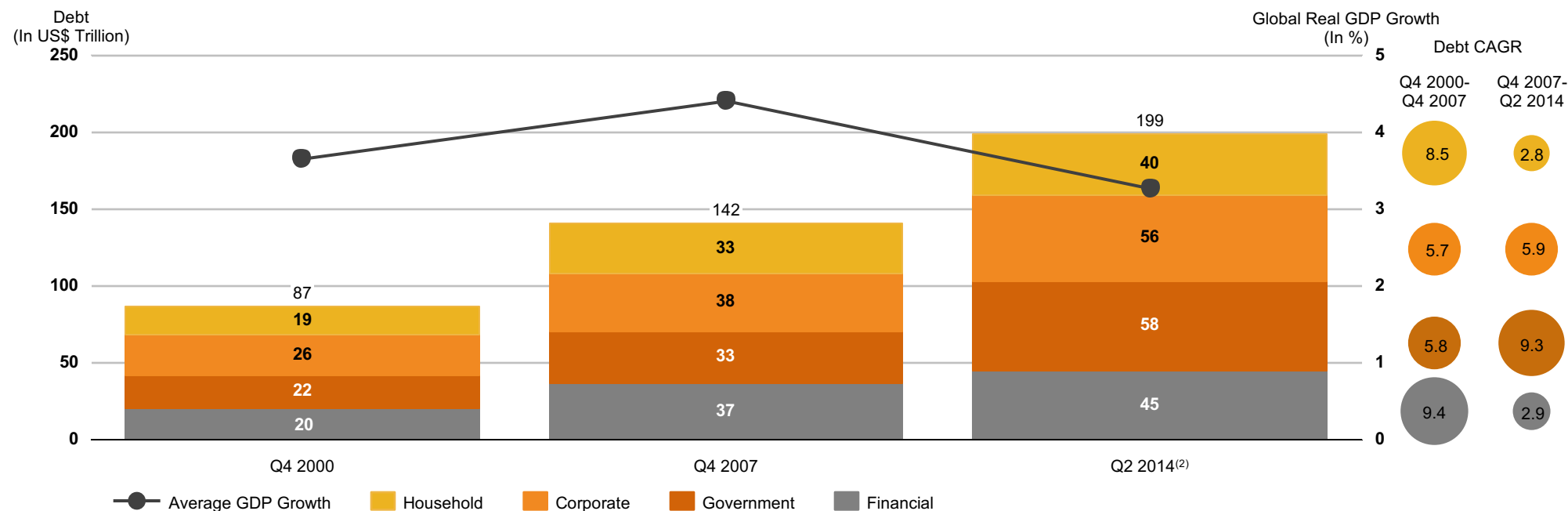Sources: UNCTAD; World Bank Development Indicators

ECONOMIC STRUCTURAL CONSTRAINTS

GLOBAL DEBT IS GROWING FASTER
THAN REAL GDP with public debt growing fastest after the financial crisis

According to MGI, the total world debt increased by US$ 57 trillion between 2007 and 2014, growing an average of 5.3% per year. At the same time, average growth in world GDP has slowed from its pre-crisis peak down to an average of 3.3% per year, creating a world that is increasingly leveraged. While household and financial sector debt were the primary drivers behind world debt expansion from 2000-2007, since the recession government and corporate have taken the lead, growing at 9.3% and 5.9% per year respectively

Global Debt and Real GDP Growth[1] over Time
(In US$ Trillion at 2013 Prices and Average % Annual Change, Q4 2000, Q4 2007, and Q2 2014)

Debt
(In US$ Trillion)

Global Real GDP Growth
(In %)

Debt CAGR

	Q4 2000-Q4 2007	Q4 2007-Q2 2014
Household	8.5	2.8
Corporate	5.7	5.9
Government	5.8	9.3
Financial	9.4	2.9

Q4 2000 — 87
- Household: 19
- Corporate: 26
- Government: 22
- Financial: 20

Q4 2007 — 142
- Household: 33
- Corporate: 38
- Government: 33
- Financial: 37

Q2 2014[2] — 199
- Household: 40
- Corporate: 56
- Government: 58
- Financial: 45

Legend: ● Average GDP Growth ▮ Household ▮ Corporate ▮ Government ▮ Financial

Notes: (1) Average real GDP growth represents average of 7 years prior to year listed (Example: 2000 represents average annual growth from 1993-2000)
   (2) Q2 2014 data for advanced economies and China
Sources: McKinsey Global Institute; IMF

THE GLOBAL ECONOMY IS GOING INTO A PERIOD OF LOW POTENTIAL GROWTH

with the risk of secular stagnation driven by ageing population and slowing innovation affecting standards of living

Both developed and emerging markets have witnessed a decline in potential growth after the crisis. In developed economies much of this slowdown is attributed to low capital growth and potential employment driven by ageing population. As for emerging markets, low factor productivity is the major driver of low potential growth. This has led many economists including those at the IMF to raise the risk of "secular stagnation" as a result of this low growth. This implies that economies might be growing slower going forward making it hard to raise standards of living

Potential Growth of Advanced Economies
(In %, 2004 - 2020)
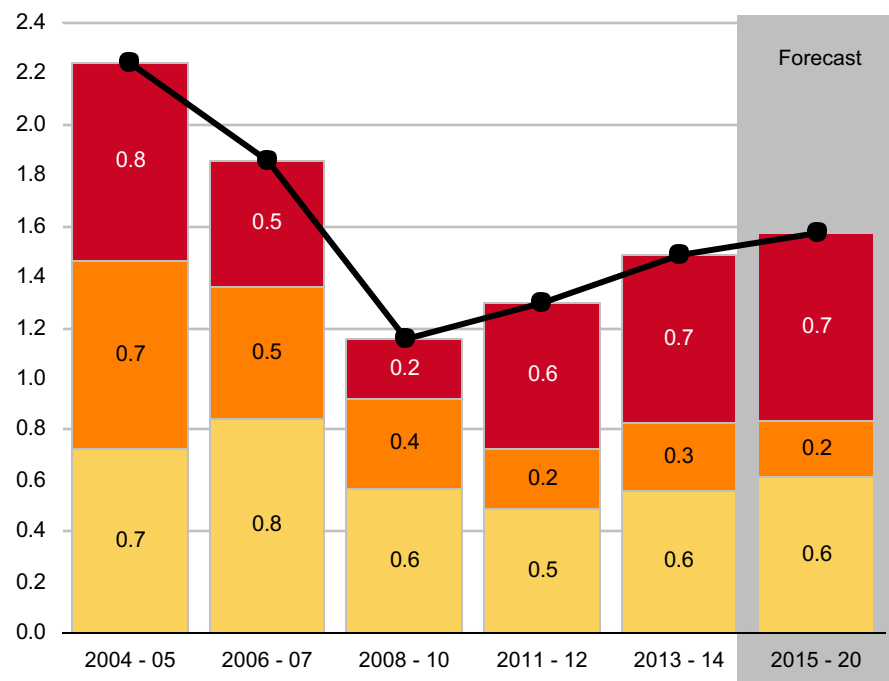
Potential Growth of Emerging Economies
(In %, 2004 - 2020)
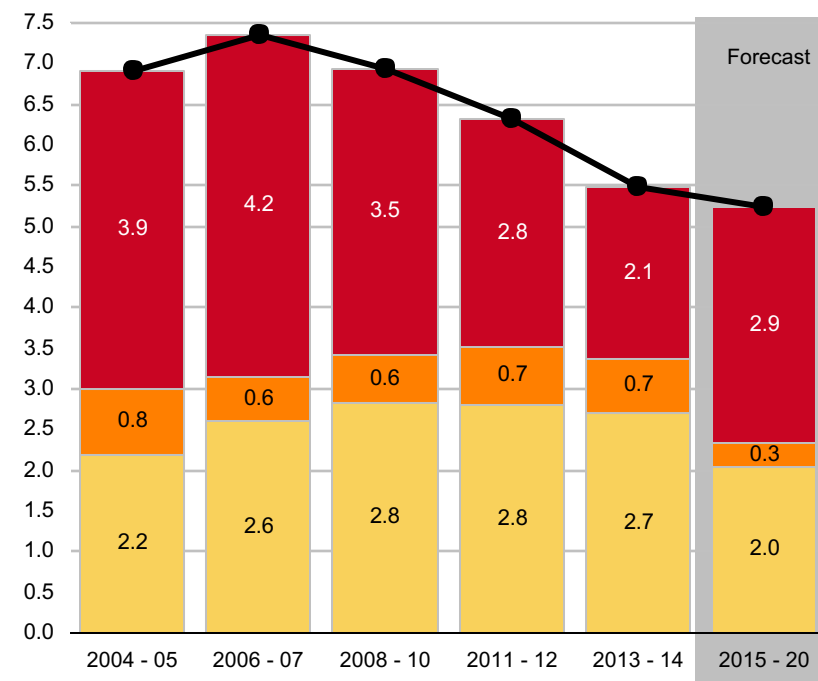
Legend: ● Potential Output Growth   ■ Total Factor Productivity Growth   ■ Potential Employment Growth   ■ Capital Growth

THE SUASTAINABLE DEVELOPMENT GOALS WILL BUILD UPON THE MILLENNIUM DEVELOPMENT GOALS
which reach their end by 2015 and the majority of which were not met

The 17 Sustainable Development Goals ' (SDG) objectives and their expected169 targets build upon the existing Millennium Development Goals (MDGs) which will reach their end in 2015. Some SDG goals are a continuation of what has already been achieved and those are in relation to heath and education. Poverty remains a major focus of SDGs. New focus areas are also ben pushed forward such as food security, peace, and marine life sustainability among others

MIGRANTS' REMITTANCES TO DEVELOPING COUNTRIES WILL REACH ~600 MILLION IN 2015

Global remittances in 2014 were more than double the level of official development assistance . Least Developed Countries receive more remittances than FDI. The cost of sending remittances is declining across all regions but remain costly when sent to Africa. In a special analysis, the World Bank estimates that as much as US$100 billion in migrant savings could be raised annually by developing countries by reducing remittance costs

Remittances, FDI to Developing Countries and Net ODA
(In US$ Billion, 1990 - 2017)
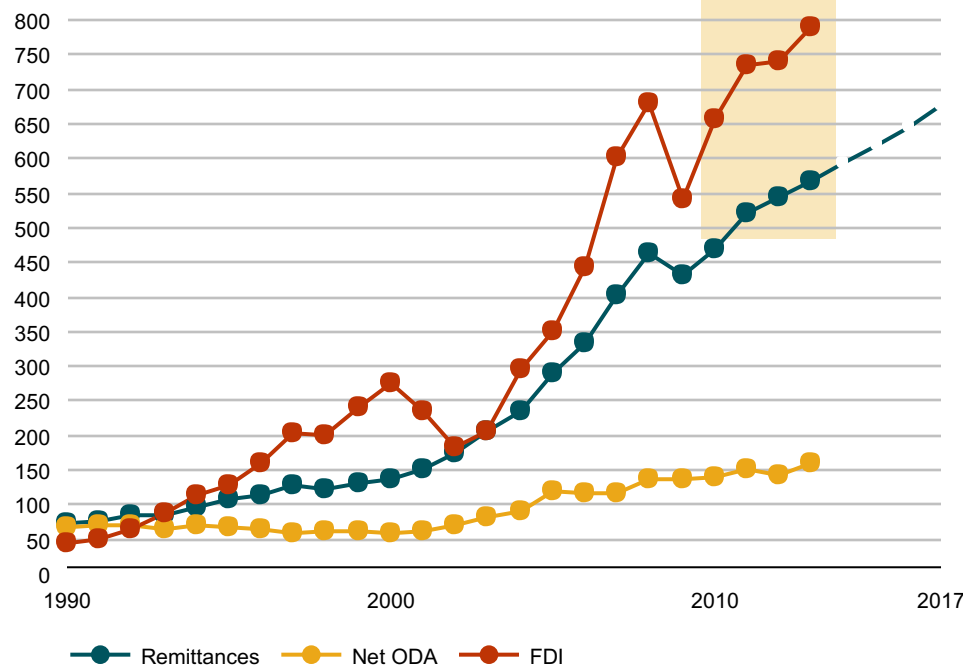
Remittances, FDI and Net ODA to Least Developed Countries
(In US$ Billion, 1990 - 2014)

Legend: Remittances — Net ODA — FDI
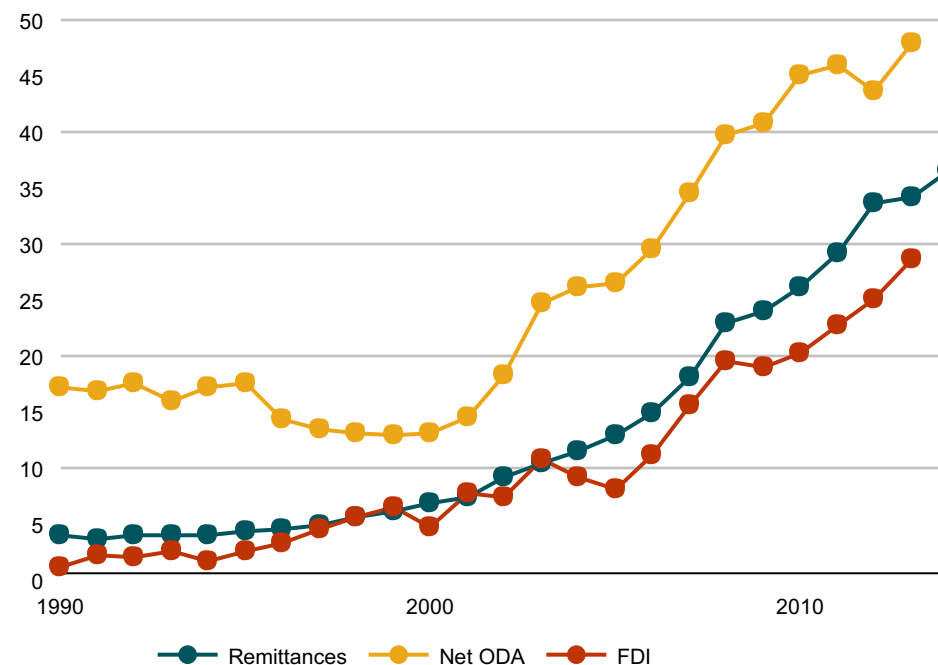
Note: (1) The migrant population in this graph includes those from the regions on the left graph only
Sources- Left and Middle Chart: World Development Indicators; World Bank Development Prospects Group
Source- Right Chart: "Remittance Prices Worldwide", World Bank, March 2015; United Nations Population Division