The Millennium Development Goals:
What’s Happened? What’s Next?

Nancy L. Stokey
University of Chicago

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At the turn of the millennium, the United Nations announced eight goals, to be achieved by 2015. They are:

1. eradicate extreme poverty and hunger;
2. achieve universal primary education;
3. promote gender equality and empower women;
4. reduce child mortality;
5. improve maternal health;
6. combat HIV/AIDS, malaria, and other diseases;
7. ensure environmental sustainability;
8. develop a global partnership for development.
Introduction

With 2015 just a few weeks away, it’s a good time to look at how much progress has been made, and to think about what should come next. Eight goals are too many to deal with, so the first part of this lecture will focus on #1, eradicating poverty.

Then we’ll look briefly the education and health goals (# 2, 4, 5, 6). The U.N.’s Open Working Group has given the General Assembly a proposal with 17 Sustainable Development Goals.

I’ll conclude with that list, and open the floor for discussion.
1. Look at income levels around the world in recent decades.
2. See where progress has been made on goal #1, and where it has not.
3. Look at evidence on the *proximate* sources of economic growth.
   Conclude that *technology* is a key factor.
4. Look at evidence on the *ultimate* sources of growth.
   Conclude that *openness* and domestic *institutions* are important.
5. Look at data on education and health: goals #2, 4, 5, 6.
6. Look the tentative list for the next goals.
Figure 31: GDP per capita by Region

![GDP per Capita by Region](image)

Figure 32: Poverty Rates and Counts by Region, Baseline

a) $1/Day Poverty Rate Across Regions: 1970-2006

![$1/Day Poverty Rate Across Regions](image)

b) $1/Day Poverty Count Across Regions: 1970-2006

![$1/Day Poverty Count Across Regions](image)


![$2/Day Poverty Rates Across Regions](image)


![$2/Day Poverty Counts Across Regions](image)
Income growth in 127 countries, relative to the U.S., 1960-2008

1960 per capita GDP relative to the U.S.
2008 per capita GDP relative to the U.S.
Income growth in 127 countries, relative to the U.S., 1960-1990

1960 per capita GDP relative to the U.S.

1990 per capita GDP relative to the U.S.

W. Europe & Offshoots
E. Europe
Latin America
E. Asia
Africa
Income growth in 127 countries, relative to the U.S., 1990-2008

1990 per capita GDP relative to the U.S.
2008 per capita GDP relative to the U.S.

- W. Europe & Offshoots
- E. Europe
- Latin America
- E. Asia
- Africa

Graph showing the relationship between 1990 and 2008 per capita GDP relative to the U.S. for various regions.
Income in Africa 1970-1990 (Penn World Tables)

- Botswana
- Swaziland
- Ivory Coast
- Angola
- Namibia

Following the 1% rate of increase, the per capita GDPs are:

- 1970: 4%
- 1990: 3%
- 1970: 2%
- 1990: 1%
- 1970: 0%
- 1990: 0%
2. Recent income growth in select countries

The share of people living in extreme poverty has fallen:
from 36% in 1990 to 15% in 2011.
The number of workers earning less than $1.25 per day has also fallen:
from 811 million in 1991 to 375 million in 2013.
This is tremendous progress on goal #1.
Where has it happened? China and India are a huge part of the success.
Where is extreme poverty still prevalent? Sub-Saharan Africa.
Figure 1: China in 1970

Figure 2: China in 2006

Figure 3: Chinese Income Distribution 1970-2006
Figure 4: India in 1970

Figure 5: India in 2006

Figure 6: India 1970–2006
Figure 19: World Distribution of Income by Region, 1970

Figure 20: World Distribution of Income by Region, 2006

Figure 21: World Distribution of Income, 1970-2006
Figure 19: World Distribution of Income by Region, 1970

Figure 20: World Distribution of Income by Region, 2006

Figure 21: World Distribution of Income, 1970-2006
Figure 22: Comparison of Normals and Kernels
3. Proximate sources of growth

What has made some countries been so successful?

What are the sources of growth?

First think about the proximate causes.

Five types of evidence point to the importance of technology:

—growth and development accounting exercises
—convergence of incomes in advanced economies
—evidence on ‘late bloomers’
—occasional growth miracles
—wages of immigrants.
3. Proximate sources of growth

Growth and development accounting

Consider a world with many economies, $j = 1, 2, \ldots, J$, over many time periods, $t = 0, 1, \ldots, T$.

In each economy $j$, output per worker at date $t$ is

$$Y_j(t) = K_j(t)^{\alpha} \left[ H_j(t)^{1-\beta} A_j(t)^{\beta} \right]^{1-\alpha},$$

where $\alpha, \beta \in (0, 1)$, and

- $Y$ is output
- $K$ is physical capital
- $H$ is human capital
- $A$ is technology level (labor-augmenting)

The aggregate production function is common over time and across countries, except that $A_j(t)$ differs.
3. Proximate sources of growth

Growth and development accounting

Use this equation to get

\[
\text{growth in } Y = \frac{\alpha}{(1 - \alpha) \beta} \text{ growth in } \left( \frac{K}{Y} \right) + \frac{1 - \beta}{\beta} \text{ growth in } \left( \frac{H}{Y} \right) + \text{ growth in } A.
\]

Here growth in capital contributes to output growth only if it exceeds what is needed to offset the higher rate of return produced by technology growth.

There is no economics here: just accounting.

**Growth accounting** uses this equation to look at one country over time.

**Development accounting** uses it to look across countries at a single date.
Growth accounting exercises for the U.S. and for other countries—both developed and middle income—have (almost always) concluded that the residual contributes a large fraction.

In 1988 a worker in the U.S. was 35 times more productive than one in Niger (in 1985 int’l $).

Conclusion from development accounting: differences in TFP are more than half the story:

\[
\begin{align*}
\text{output per worker} & = 1.5 \times 3.1 \times 7.7 \\
\text{physical capital} & \quad \text{human capital} & \quad \text{TFP (residual)}
\end{align*}
\]

Similar figure for the whole world.
Income levels in the developed world have converged and then grown in parallel.
INCOME CONVERGENCE, EIGHT COUNTRIES

COUNTRIES ORDERED BY 1870 INCOME LEVELS

United Kingdom
United States
France
Germany
Canada
Italy
Spain
Japan

LOG PER CAPITA REAL GDP

1880 1900 1920 1940 1960 1980 2000
d. Evidence on ‘late bloomers’

The economic historian Alexander Gerschenkron (1965) first articulated the ‘advantage of backwardness.’

This idea was picked up by Parente and Prescott (1994, 2000), who looked at doubling times.
Doubling times for per capita GDP, 65 countries

Year reached $2000

Years to reach $4000

W. Offshoots
W. Europe
E. Europe
Latin America
E. & S. Asia
W. Asia
Africa

theoretical limit
for 2008
The appearance, occasionally, of growth miracles suggests technology transfers must be important.

Over the period 1950-2006 twelve countries

(i) had a 20-year episode where average GDPpc growth exceeded 5%,
(ii) in 2006 had GDP per capita that was at least 45% of the U.S.

  Germany, Italy, Greece, Portugal, and Spain;
  Japan, Taiwan, Hong Kong, Singapore, and Korea;
  Israel and Puerto Rico.

Human and physical capital cannot possibly grow fast enough to produce such rapid output growth.
3. Proximate sources of growth
Wages of immigrants

Adult immigrants from poorer countries to richer ones typically receive substantially higher wages after they move. Their human capital has not changed, only their environment. The size of the (average) wage increase depends on both the source country and the destination, but many are large.
3. Proximate sources of growth

Although none of these pieces of evidence is, by itself, conclusive, together they strongly suggest a key role for technological change as the proximate source of growth.

But what produces technical change?

What are the ultimate sources of growth?

The answer is different for advanced countries and developing countries.

For the advanced world, R&D (in the broadest sense) is critical.
4. Ultimate sources of growth

For developing countries, technology ‘imports’ are critical. Less advanced countries can imitate and adapt technologies that have been developed elsewhere. Because they do not have to re-invent every wheel from scratch, their technologies can advance much more quickly.

Remember the doubling times!

What facilitates technological transfers?

International trade seems to be important: openness.
INCOME LEVELS AND GROWTH RATES, 112 COUNTRIES

Annual Growth Rate, 1960-2000

1960 Per Capita Income (1990 $)
4. Ultimate sources of growth

What else is important for investments that bring technologies from abroad into developing countries? Good institutions/incentives.

In 1978 Deng Xiaoping delivered his famous “black cat - white cat” speech.

*It doesn’t matter whether a cat is black or white,*

*if it catches mice it is a good cat.*

China began allowing private agricultural plots, small businesses, and ended the government monopoly on foreign trade.

In 1991 India began reforms of the “license raj”, a system of bureaucratic government requirements that stifled entrepreneurship.

Together, China and India have 35% of the world population.
5. Education and health

Primary education: getting better.

Child mortality: reductions in under-five mortality have come through
— vaccines against childhood diseases,
— rehydration therapy for diarrheal diseases,
— malaria prevention.

Maternal health: still high in SS Africa.

HIV/AIDS, malaria, and other diseases
Mortality rate per 1000, children under five, 43 African countries (UNICEF)

excludes S. Africa and 5 N. Afr. countries

China

US & Sweden
Life expectancy at birth in 43 African countries (World Bank)

Sweden & US

China

excludes 5 N. African countries

Rwanda
Maternal mortality rate per 100,000 live births in 43 African countries, (World Bank)

Liberia

excludes 5 N. Afr. countries
The number of people living with HIV rose from around 8 million in 1990 to 34 million by the end of 2010. The overall growth of the epidemic has stabilised in recent years. The annual number of new HIV infections has steadily declined and due to the significant increase in people receiving antiretroviral therapy (/treatment.htm), the number of AIDS-related deaths has also declined.

Since the beginning of the epidemic, nearly 30 million people have died from AIDS-related causes.1

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**Regional statistics for HIV and AIDS, end of 2010**

<table>
<thead>
<tr>
<th>Region</th>
<th>Adults &amp; children living with HIV/AIDS</th>
<th>Adults &amp; children newly infected</th>
<th>Adult prevalence*</th>
<th>AIDS-related deaths in adults &amp; children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>22.9 million</td>
<td>1.9 million</td>
<td>5.0%</td>
<td>1.2 million</td>
</tr>
<tr>
<td>North Africa &amp; Middle East</td>
<td>470,000</td>
<td>59,000</td>
<td>0.2%</td>
<td>35,000</td>
</tr>
<tr>
<td>South and South-East Asia</td>
<td>4 million</td>
<td>270,000</td>
<td>0.3%</td>
<td>250,000</td>
</tr>
<tr>
<td>East Asia</td>
<td>790,000</td>
<td>88,000</td>
<td>0.1%</td>
<td>56,000</td>
</tr>
<tr>
<td>Oceania</td>
<td>54,000</td>
<td>3,300</td>
<td>0.3%</td>
<td>1,600</td>
</tr>
<tr>
<td>Latin America</td>
<td>1.5 million</td>
<td>100,000</td>
<td>0.4%</td>
<td>67,000</td>
</tr>
<tr>
<td>Caribbean</td>
<td>200,000</td>
<td>12,000</td>
<td>0.9%</td>
<td>9,000</td>
</tr>
<tr>
<td>Eastern Europe &amp; Central Asia</td>
<td>1.5 million</td>
<td>160,000</td>
<td>0.9%</td>
<td>90,000</td>
</tr>
<tr>
<td>North America</td>
<td>1.3 million</td>
<td>58,000</td>
<td>0.6%</td>
<td>20,000</td>
</tr>
<tr>
<td>Western &amp; Central Europe</td>
<td>840,000</td>
<td>30,000</td>
<td>0.2%</td>
<td>9,900</td>
</tr>
<tr>
<td>Global Total</td>
<td>34 million</td>
<td>2.7 million</td>
<td>0.8%</td>
<td>1.8 million</td>
</tr>
</tbody>
</table>

1. [Worldwide HIV & AIDS Statistics](http://www.avert.org/worldstats.htm)
6. What’s next?

The U.N. General Assembly has before it a proposal for a new set of

**Sustainable Development Goals.**

The current proposal has 17 goals:

1. End poverty in all its forms everywhere.
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
3. Ensure healthy lives and promote well-being for all at all ages.
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. Achieve gender equality and empower all women and girls.
6. Ensure availability and sustainable management of water and sanitation for all.
6. What’s next?

7. Ensure access to affordable, reliable, sustainable and modern energy for all.

8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

10. Reduce inequality within and among countries.

11. Make cities and human settlements inclusive, safe, resilient and sustainable.

12. Ensure sustainable consumption and production patterns.

13. Take urgent action to combat climate change and its impacts.

14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
6. What’s next?

15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.
Solow (REStat 1957) first introduced this idea of growth accounting. Klenow and Rodriguez-Clare (NBER Macro Annual, 1997) and Hall and Jones (QJE 1999) extended the method to cross country evidence. Baumol (AER 1986) first looked at convergence in income levels over the 20th century. The figure here is from Lucas (2014). Alexander Gerschenkron (1965) first articulated the ‘advantage of backwardness.’ Parente and Prescott (1994, 2000), formalized that idea with figures on doubling times. The updated plot here is from Stokey (JEG 2014). Data are from Maddison, 2010]. Sachs and Warner (BPEA 19xx) developed a definition of “openness” that produce a figure like the one here. The figure here is from Lucas (AEJM 2009), who updated the numbers but kept the SW country