



Global Megatrends

The 2014 Update

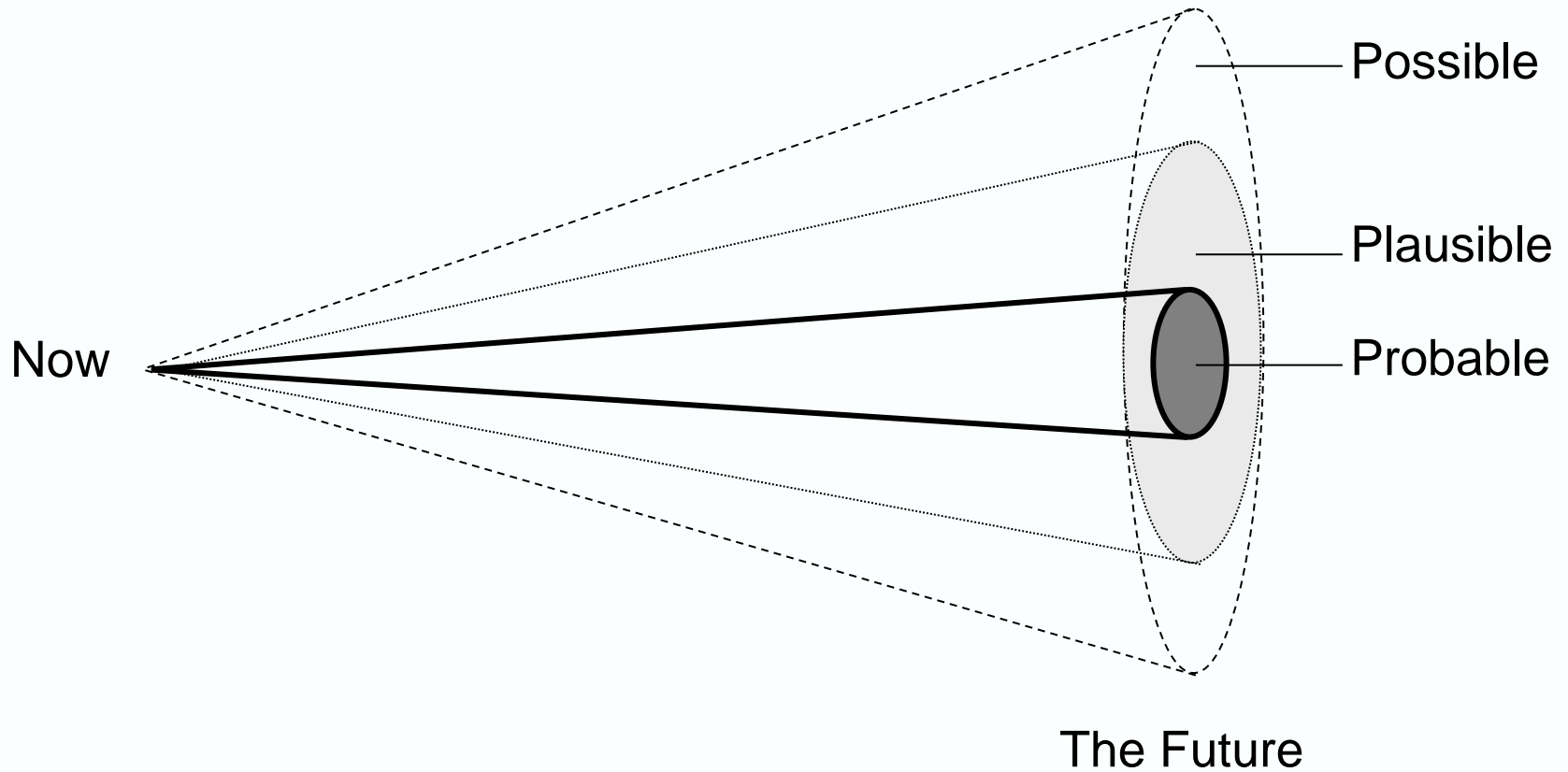
Dr Stefan Hajkowicz | Principal Scientist

www.csiro.au



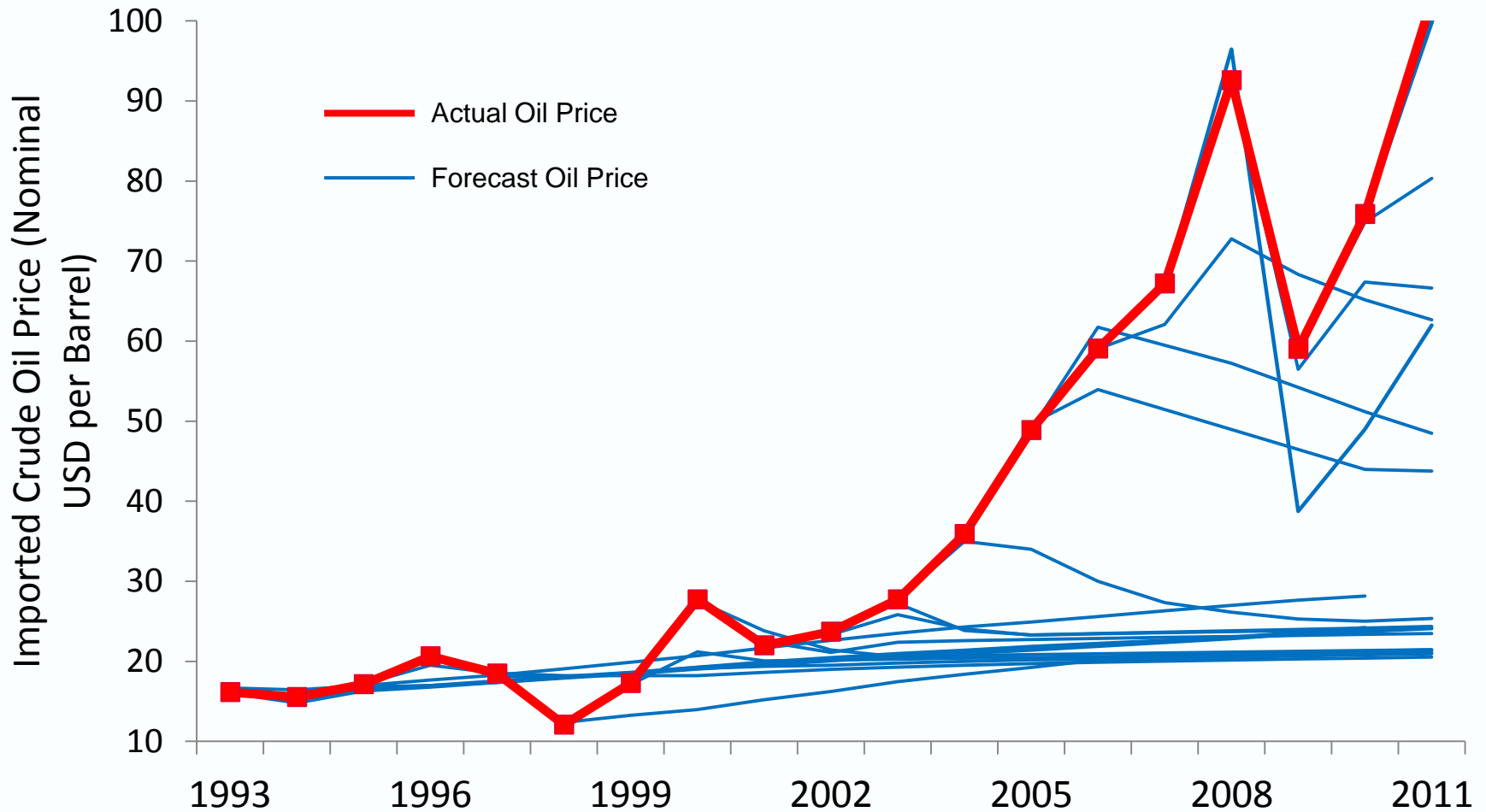
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Different Types of Futures



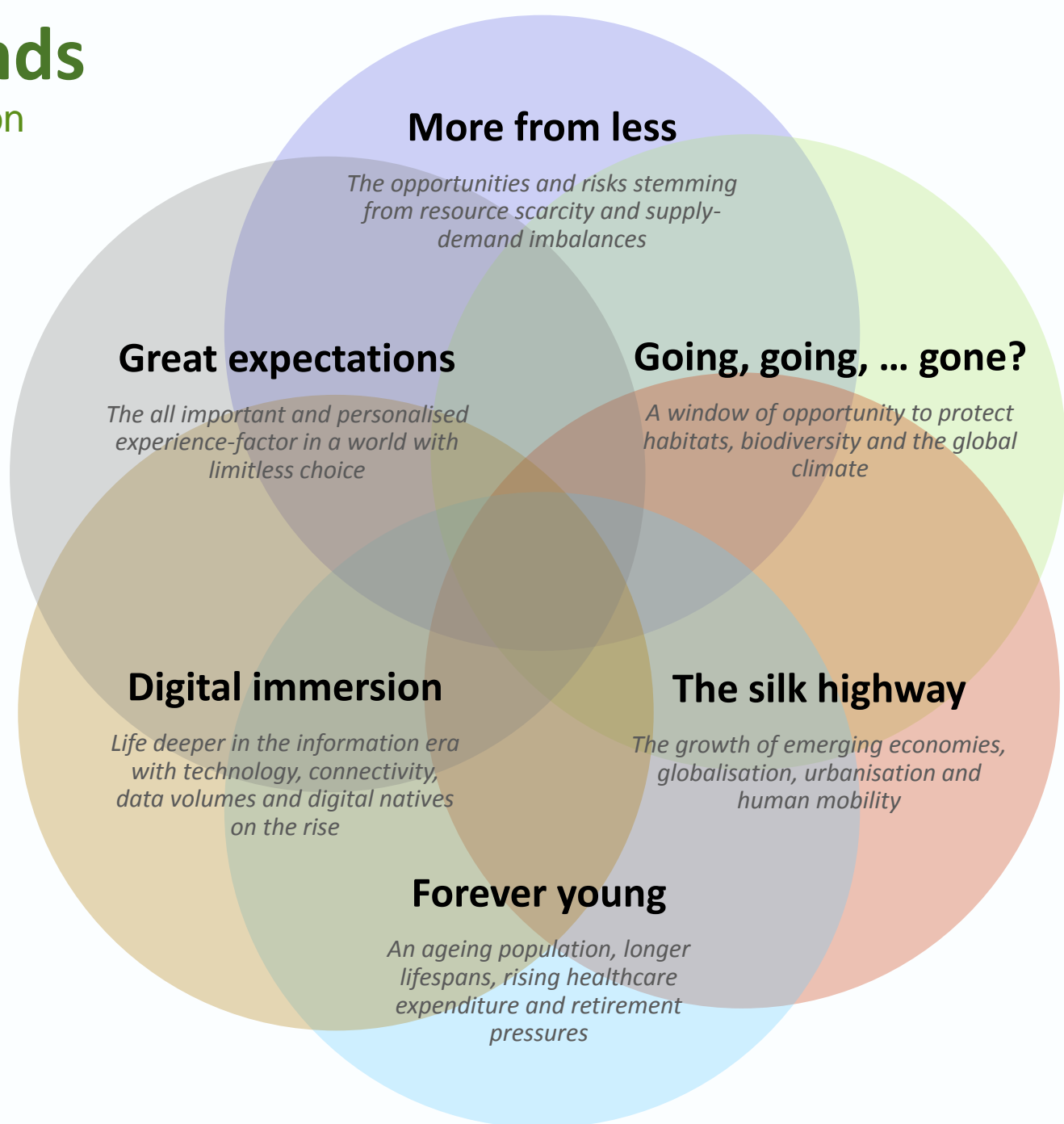
More Than Forecasting

Difference Between Actual and Forecast Oil Prices (US Govt Dept of Energy)



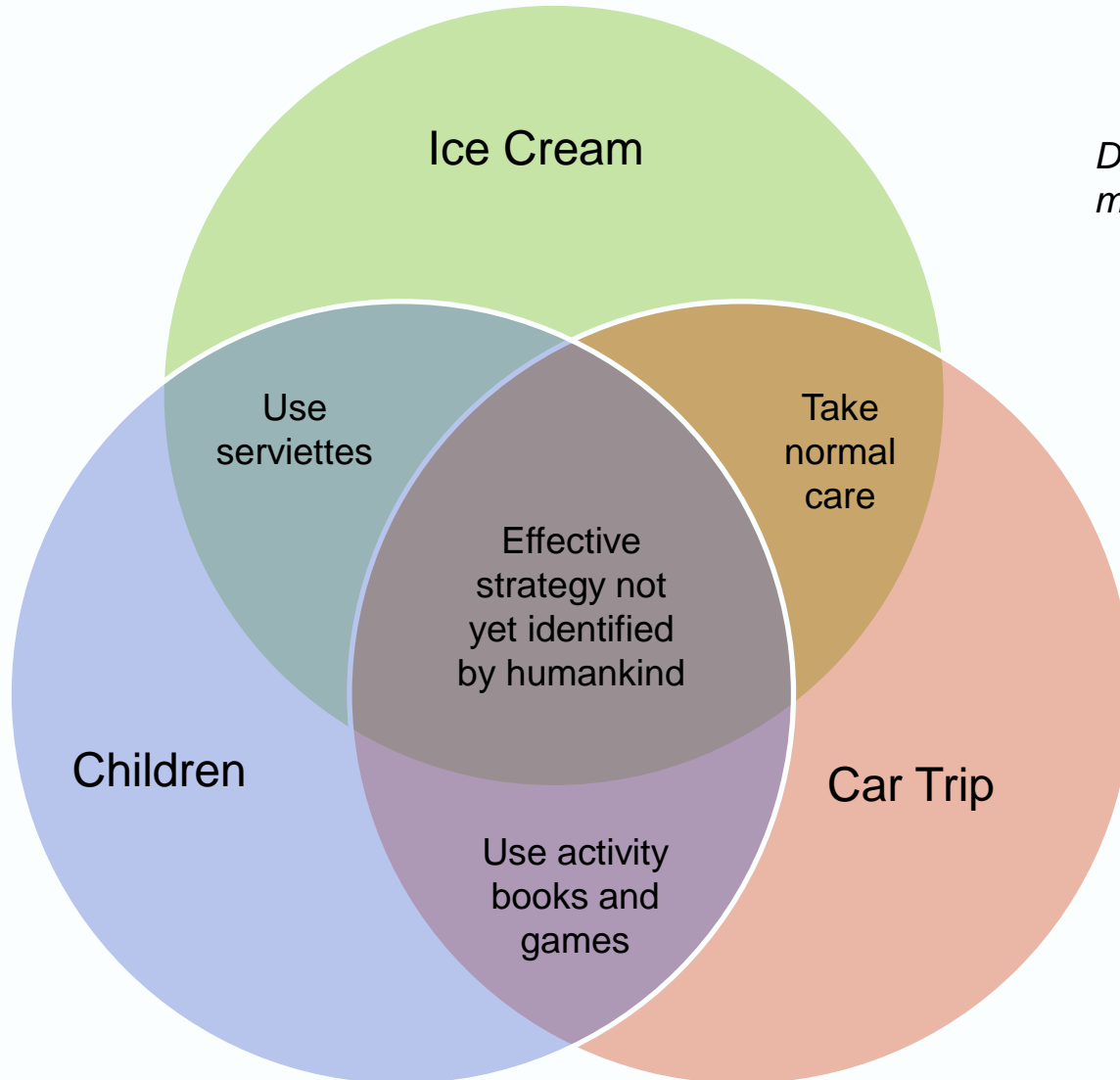
Megatrends

The 2014 Revision



Why a Venn Diagram?

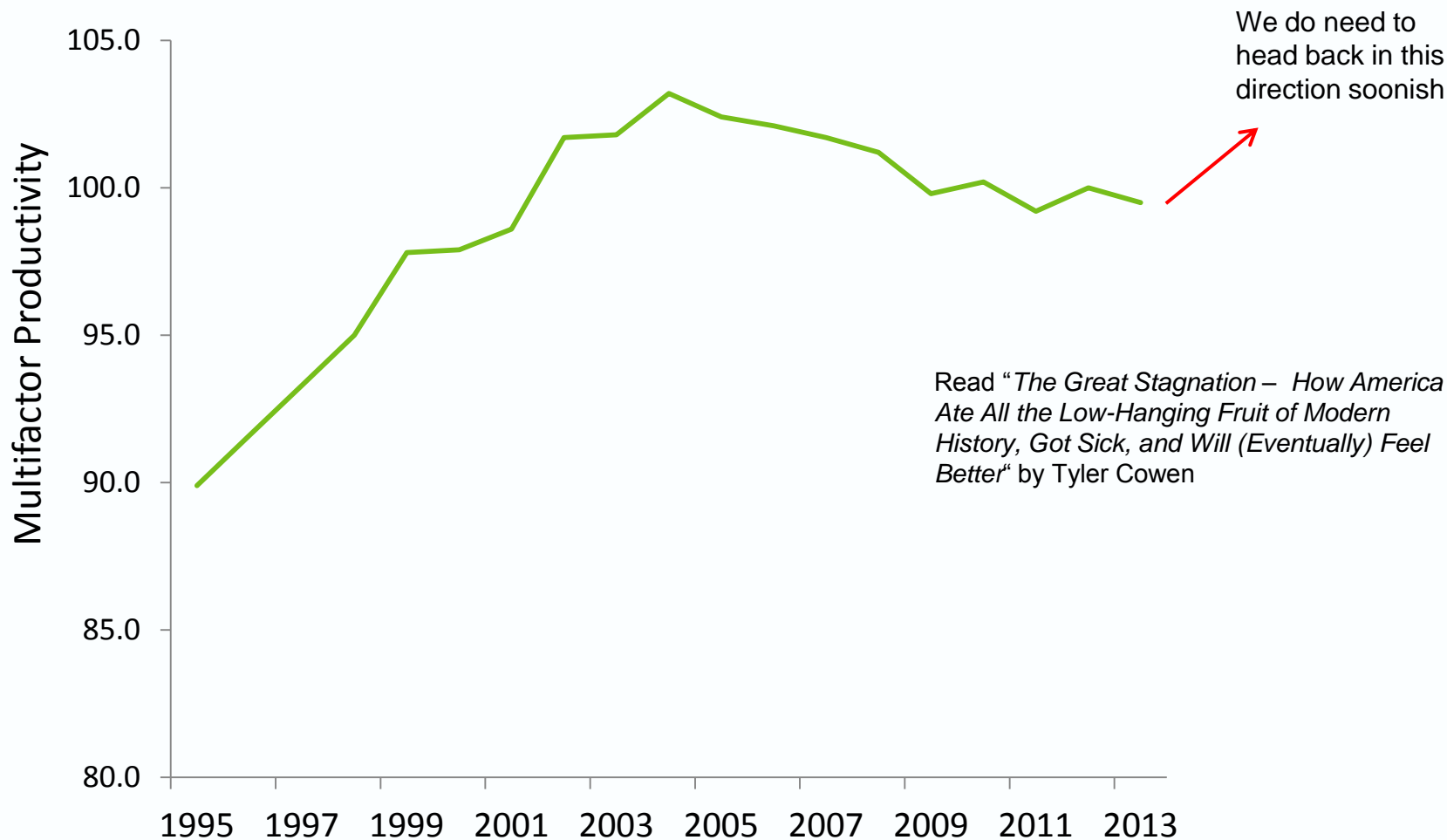
Each area of overlap tells a unique story about the future



Does the strategy perform in most/all areas of overlap?

Innovation, Productivity and Prosperity

We need new & bigger ideas to refuel the economy



1. More From Less

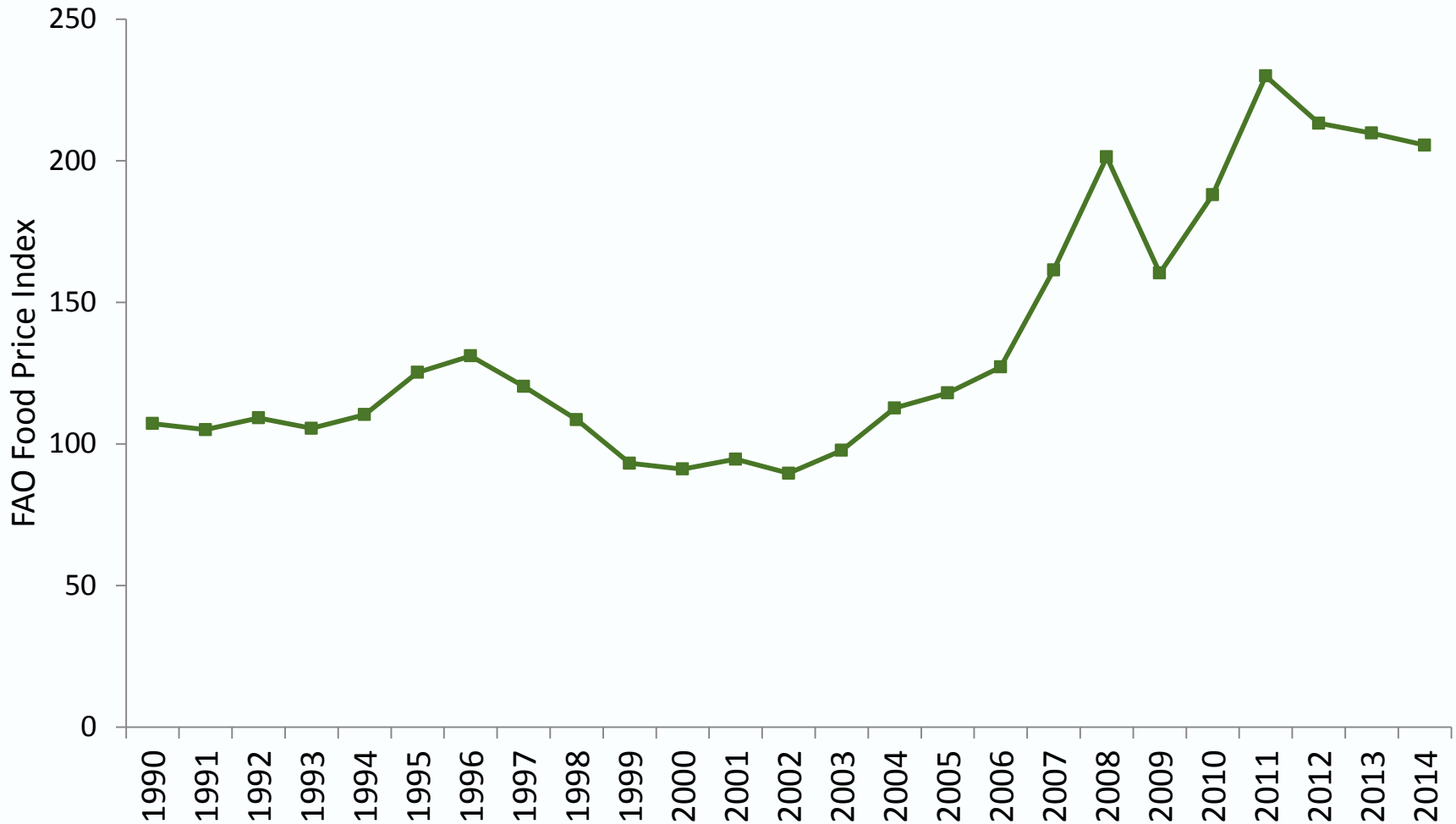


It suddenly struck me that that tiny pea, pretty and blue, was the Earth. I put up my thumb and shut one eye, and my thumb blotted out the planet Earth. I didn't feel like a giant. I felt very, very small.

- Neil Armstrong

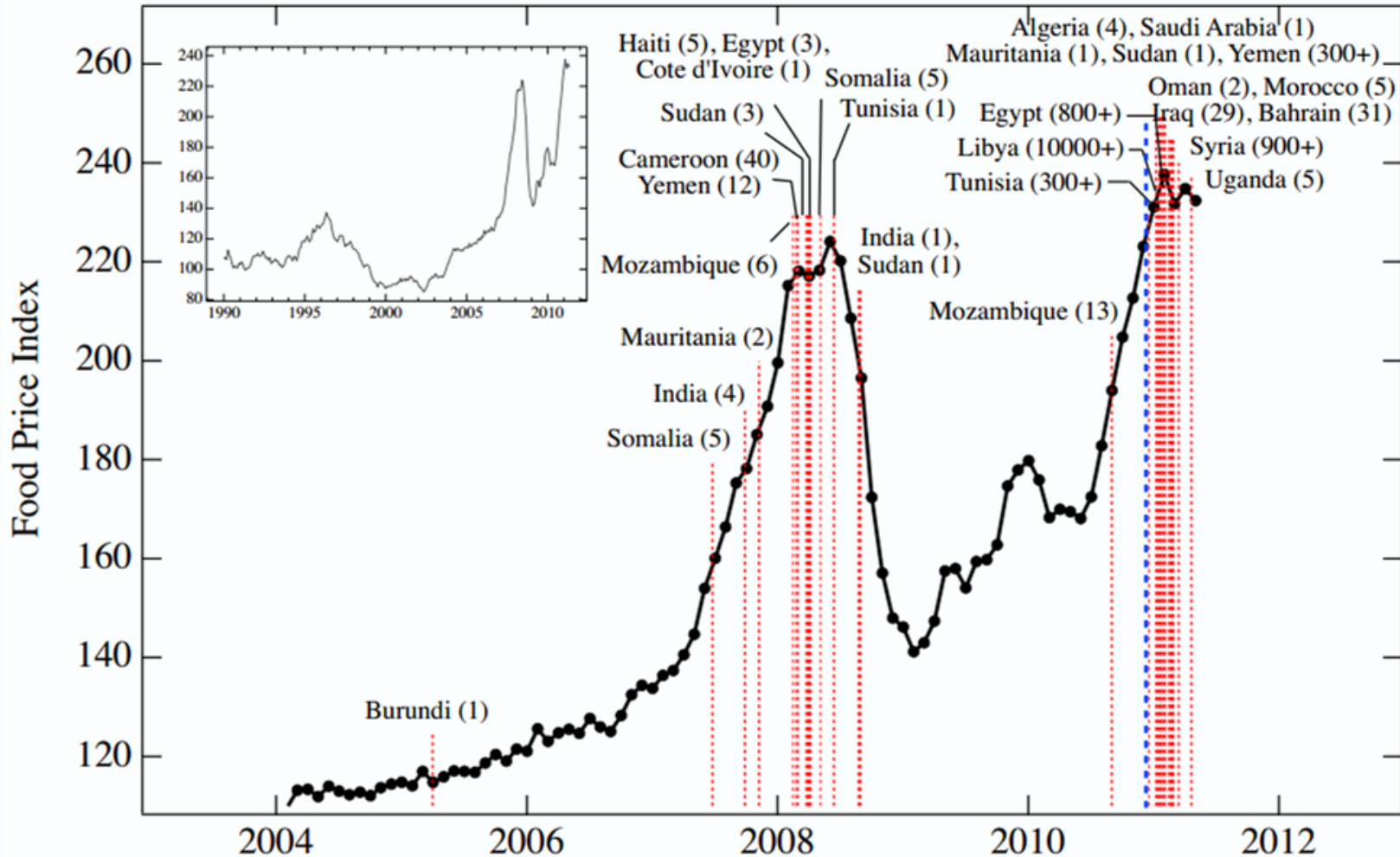
More From Less

Food demand, supply and prices



More From Less

Food Prices, Food Security and Stability



More From Less

World Energy Demand, Headline Statistics *Now to 2035*

Global energy demand ↑ one-third.

Fossil fuel share ↓ from 82% to 76%.

Low carbon sources (renewables, nuclear...) are 40% of growth

Over 50% of net-increase in electricity generation from renewables

Growth led by China this decade but shifts to India, Southeast Asia and Middle East post 2020.

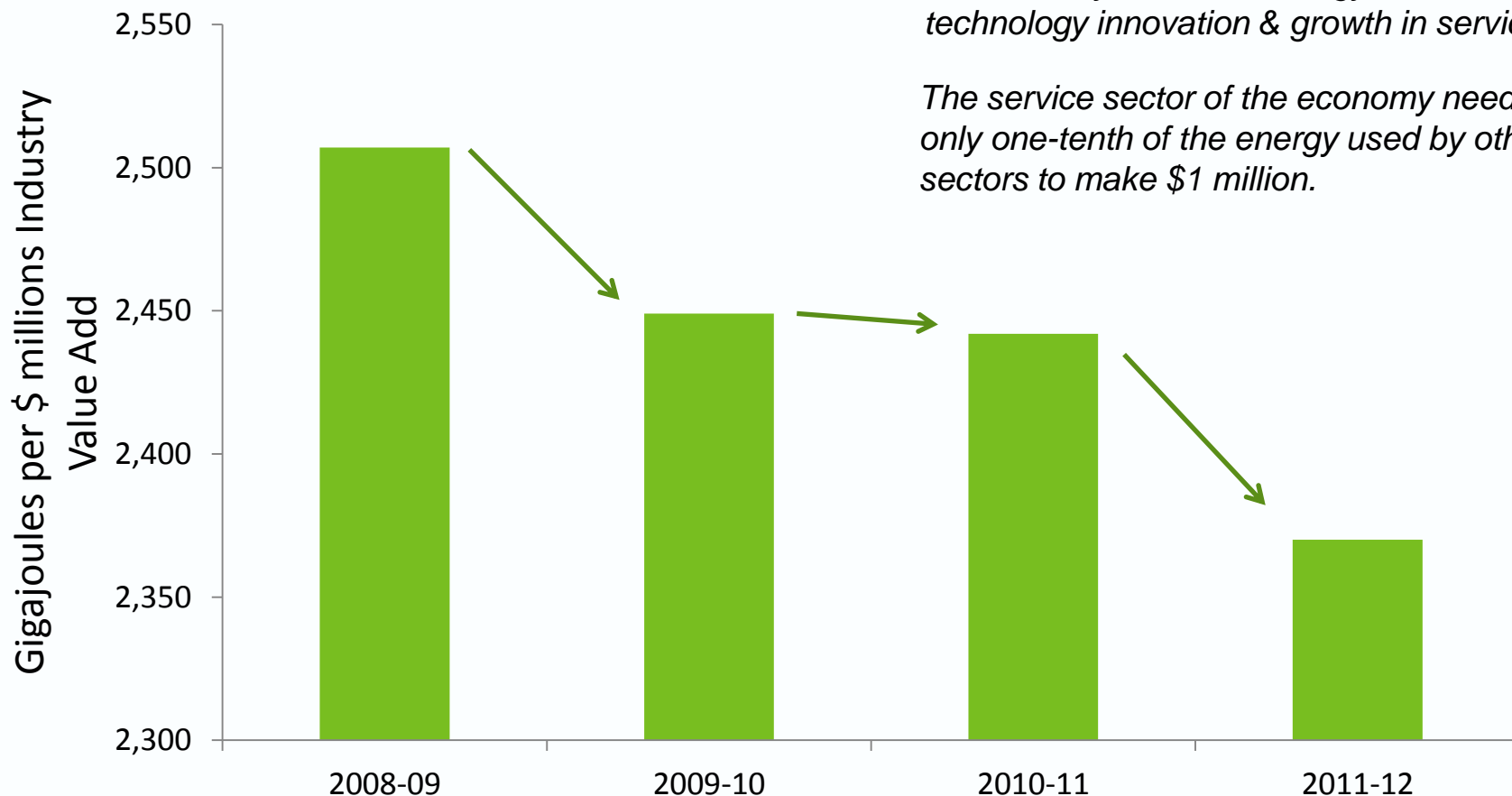
Biofuel use triples from 1.3 million barrels/day to 4.1 million barrels/day

More From Less

Declining Energy Intensity in Australia, All Industries

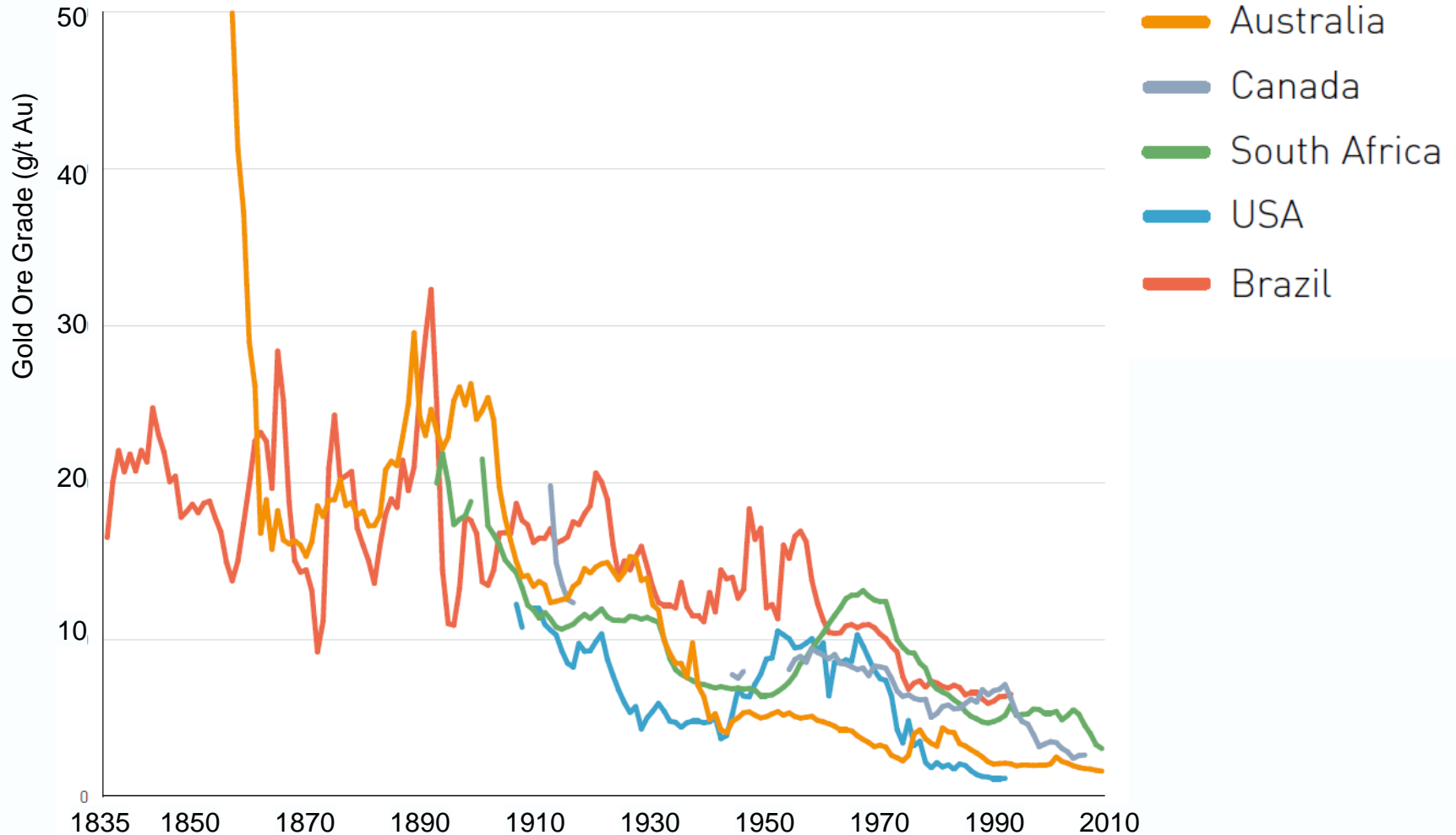
More money from less energy due to technology innovation & growth in services.

The service sector of the economy needs only one-tenth of the energy used by other sectors to make \$1 million.



More From Less

Declining Gold Ore Grade – We've dug up all the good stuff



More From Less

Mining above the ground



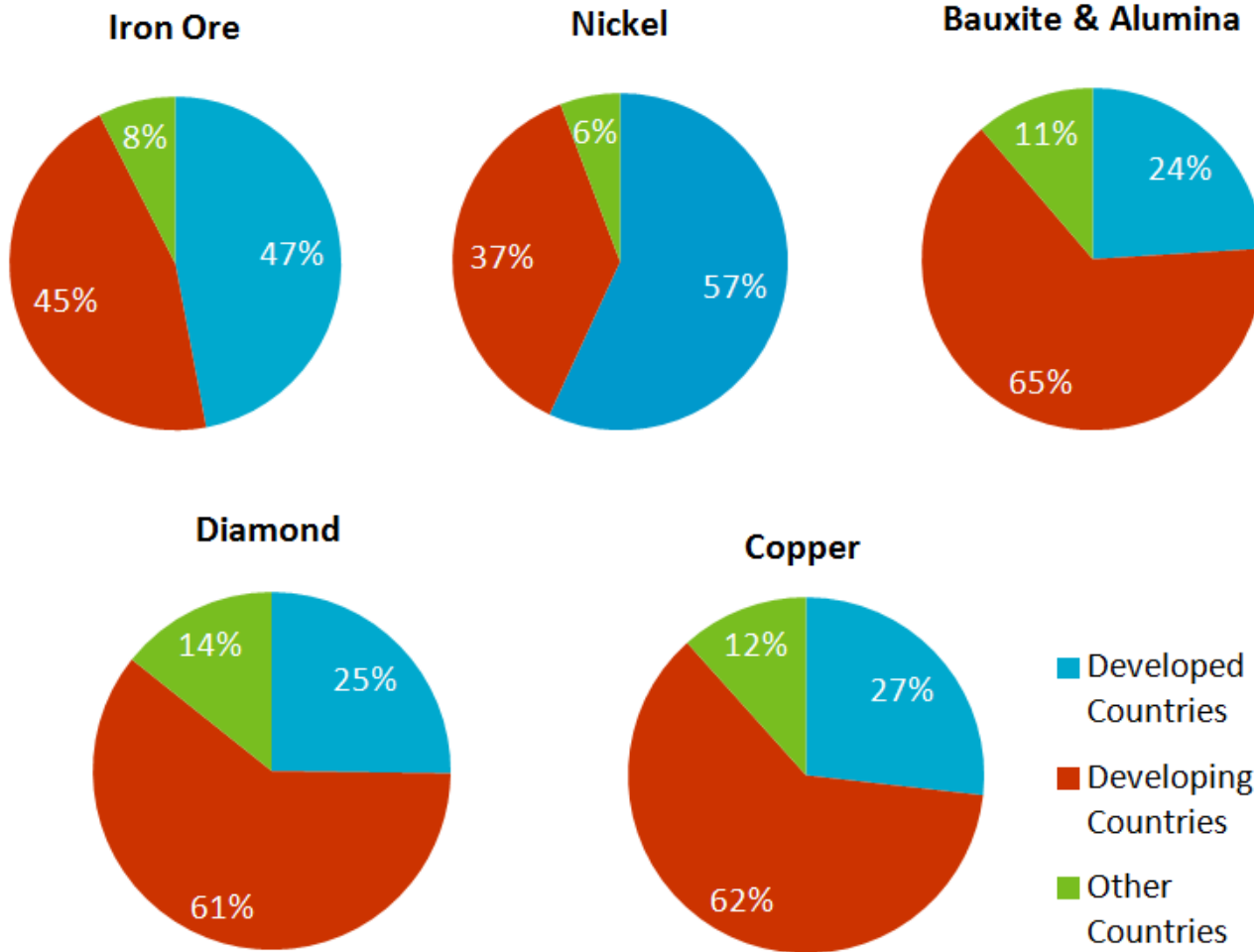
One tonne of ore body
yields 1-5 grams of gold



One tonne of old
computer circuits yields
250 grams of gold.

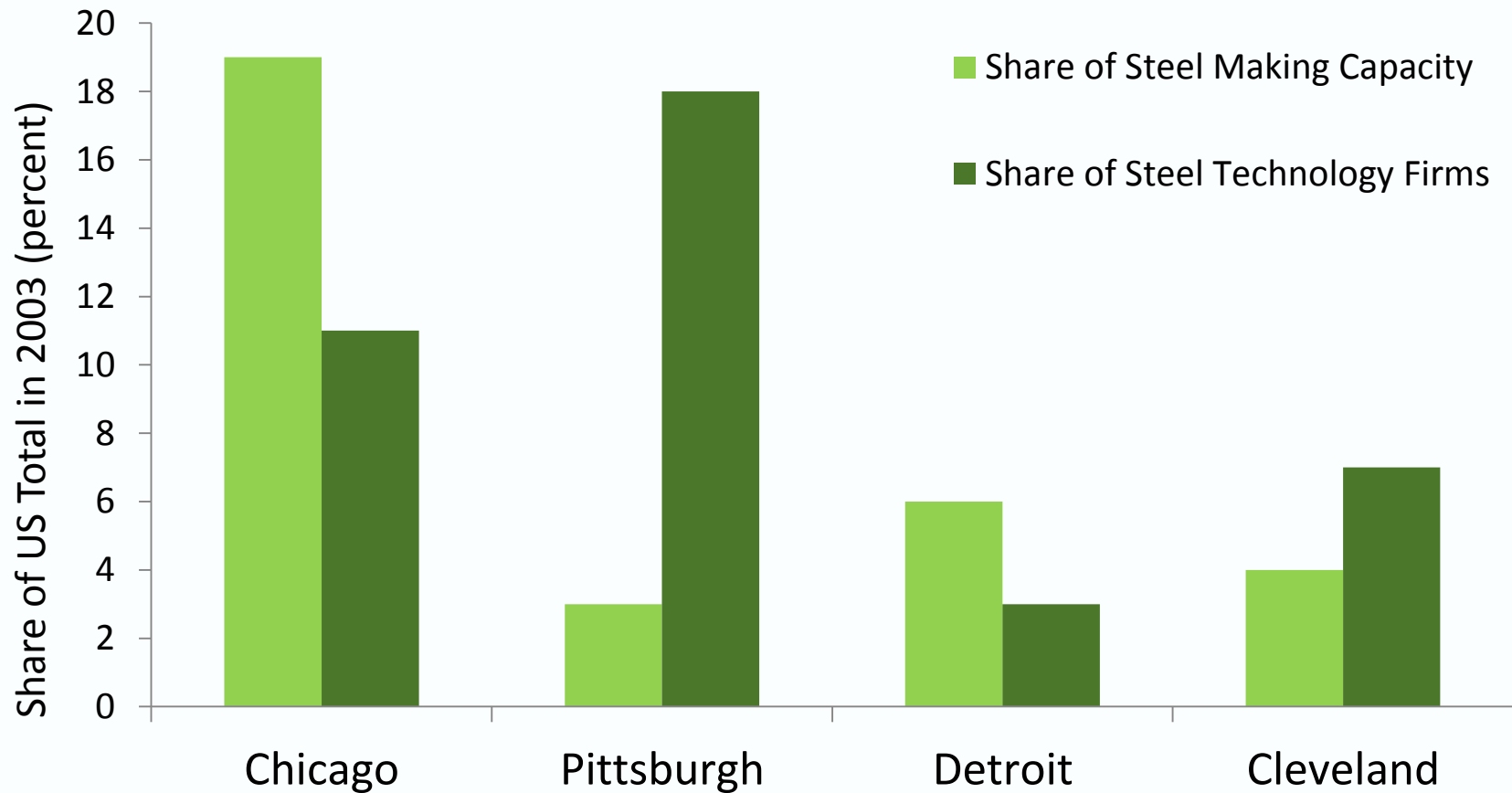
More From Less

Extent of Mineral Resources in Emerging Economies



More From Less

Transition to knowledge exports – Pittsburgh's story from selling ingots to selling ideas



2. Going, Going ... Gone?

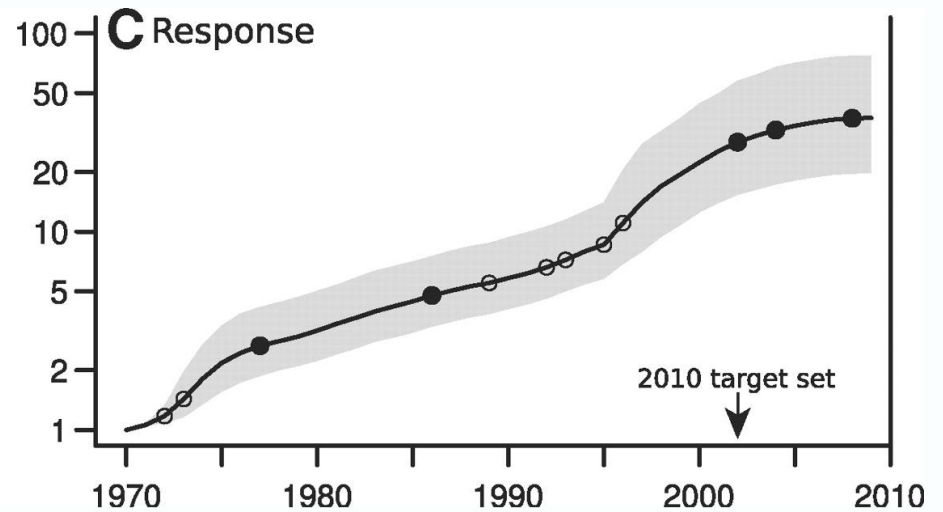
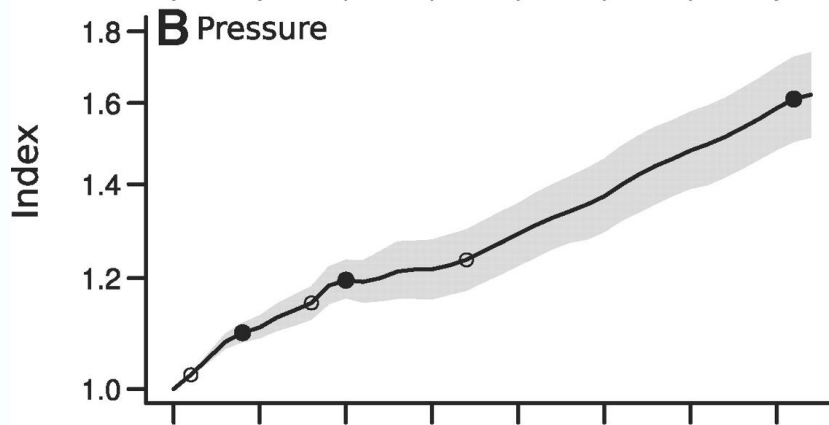
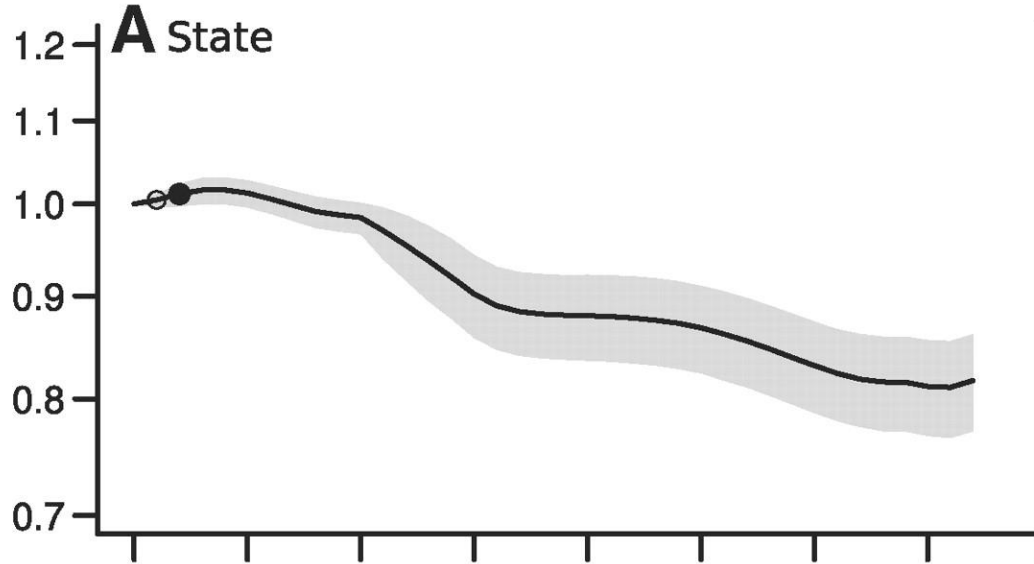


Going, Going... Gone?

The fate of biological diversity for the next 10 million years will almost certainly be determined during the next 50–100 years by the activities of a single species.

Paul Ehrlich and Robert Pringle, PNAS 2008.

Going, Going ... Gone?

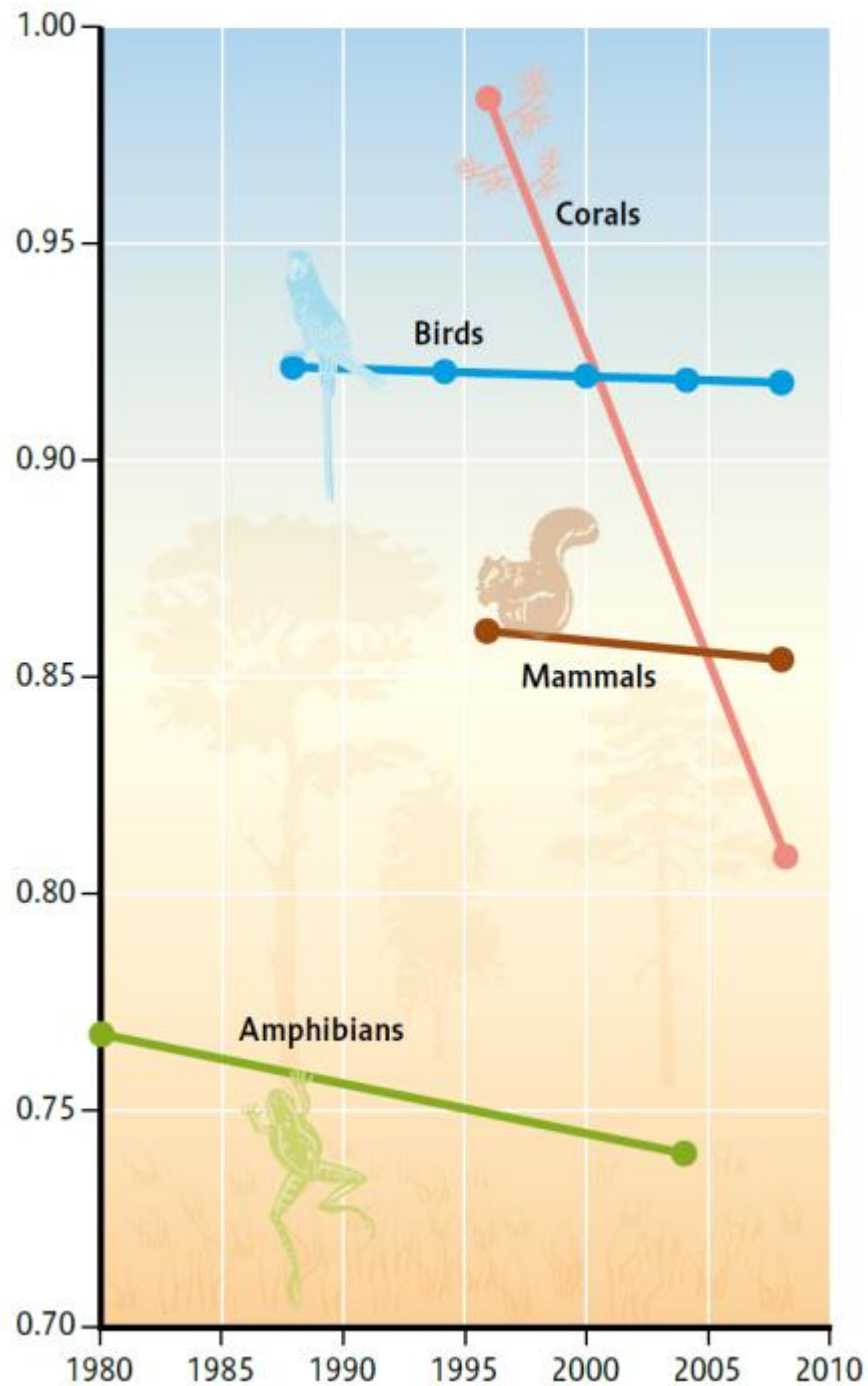


Going, Going ... Gone? The Red List

Red List Extinction
Risk Index

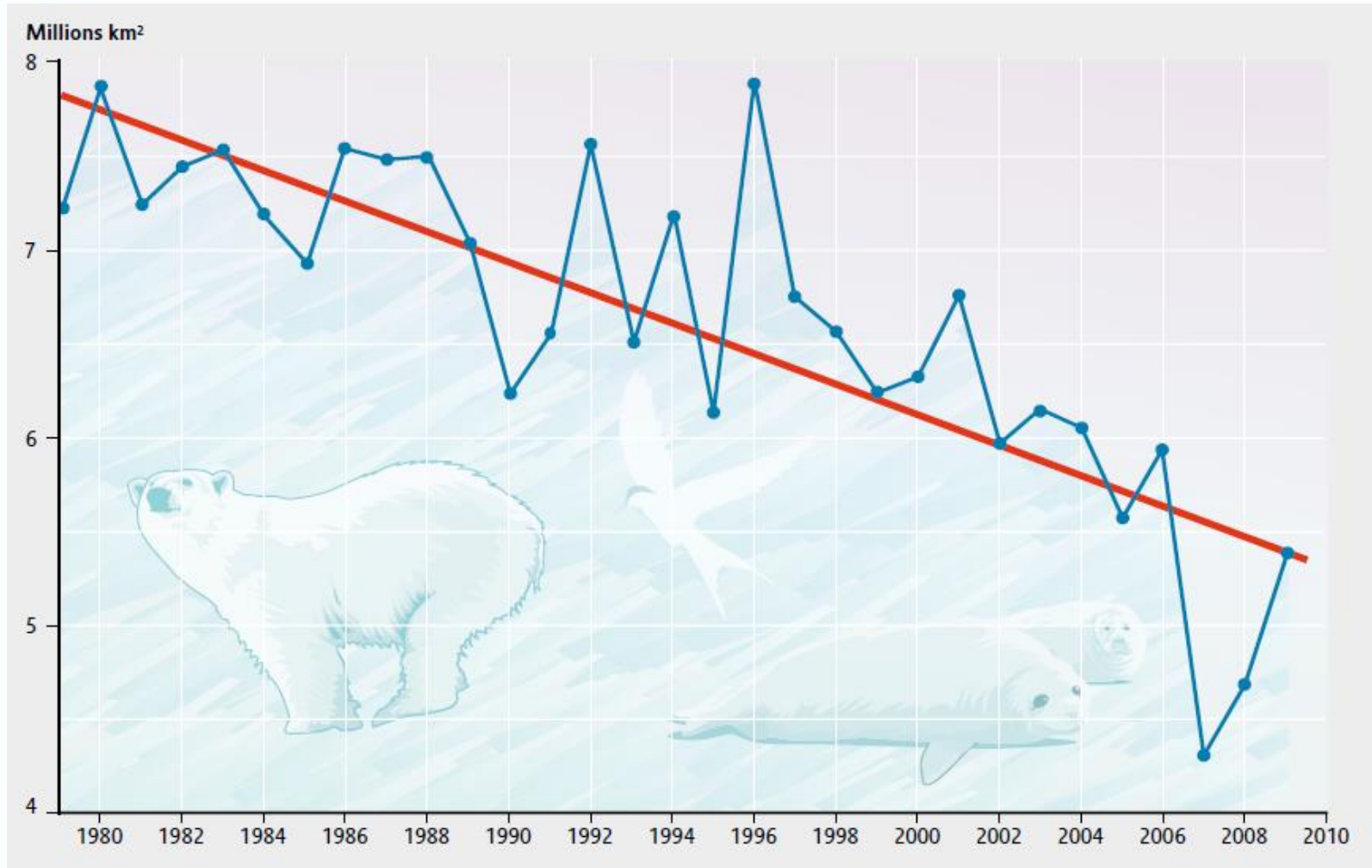
1 = No concern

0 = Extinct



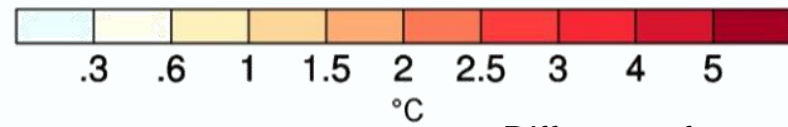
Data Source: Global Biodiversity Outlook 3,
Secretariat on the Convention on Biological
Diversity, 2010

Going, Going... Gone? Arctic Sea Ice

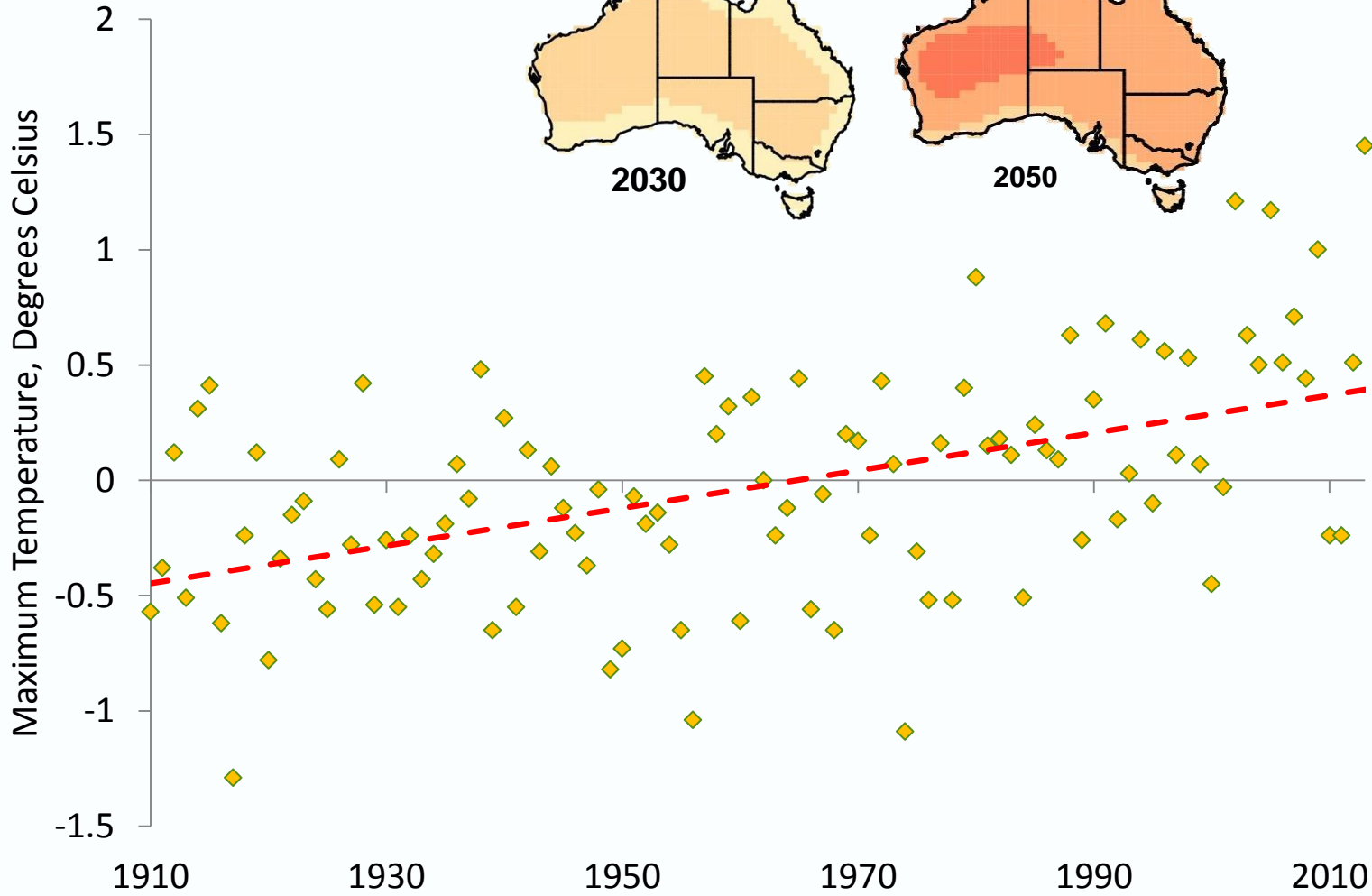


Going, Going, ... Gone?

Rising Temperatures



Difference from average maximum



Going, Going, ... Gone?

The Great Barrier Reef

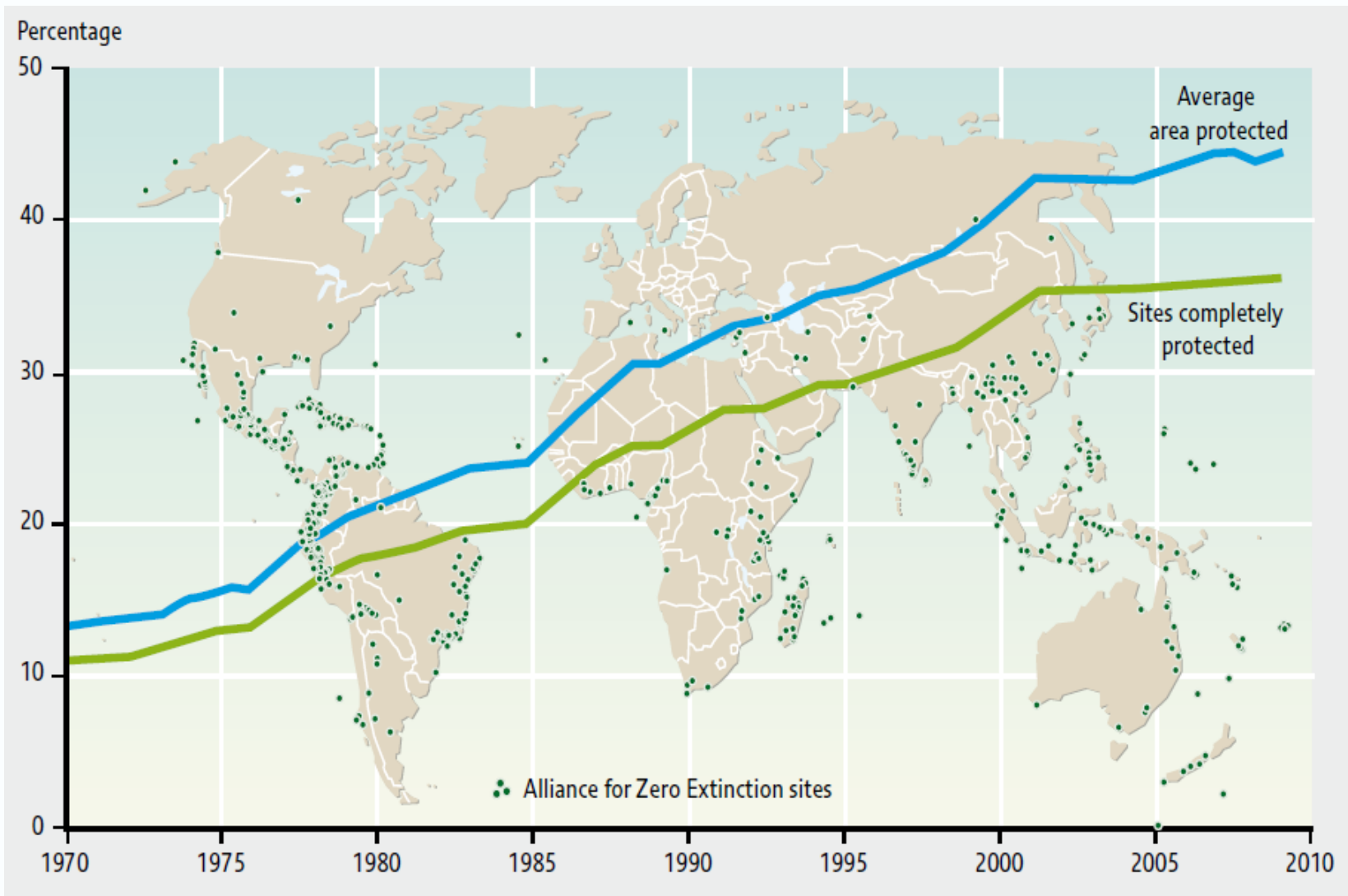
Coral area is shrinking by 0.5% per year.

Only 50% of original coral area remains today.

Culprits are tropical cyclones (48%), crown of thorns starfish (42%), coral bleaching (10%) plus other factors.

Without these 3 things it would be growing by 2.85% per year.

Going, Going ... ~~Gene?~~ Staying Put 😊

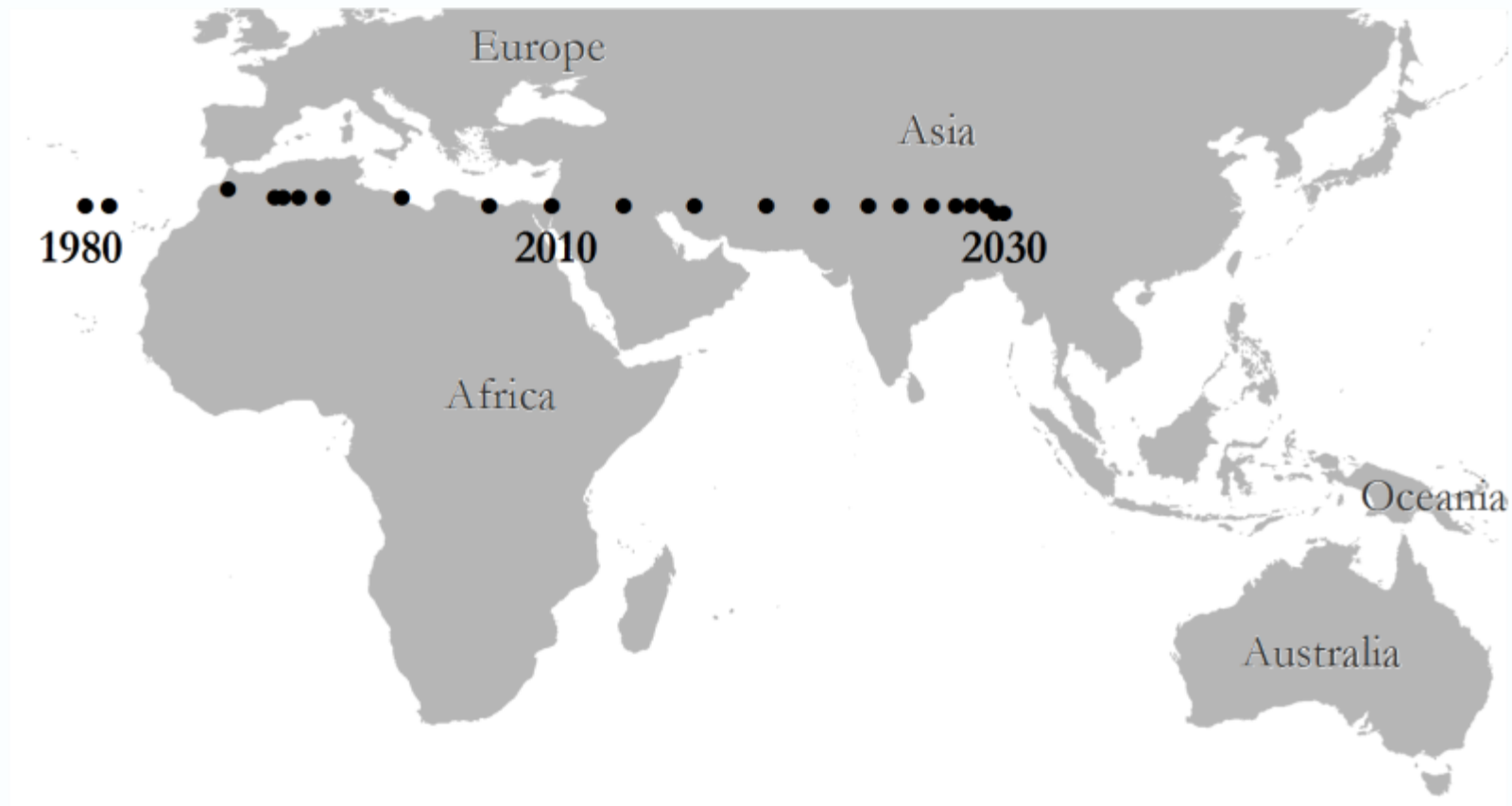




3. The Silk Highway

The Silk Highway

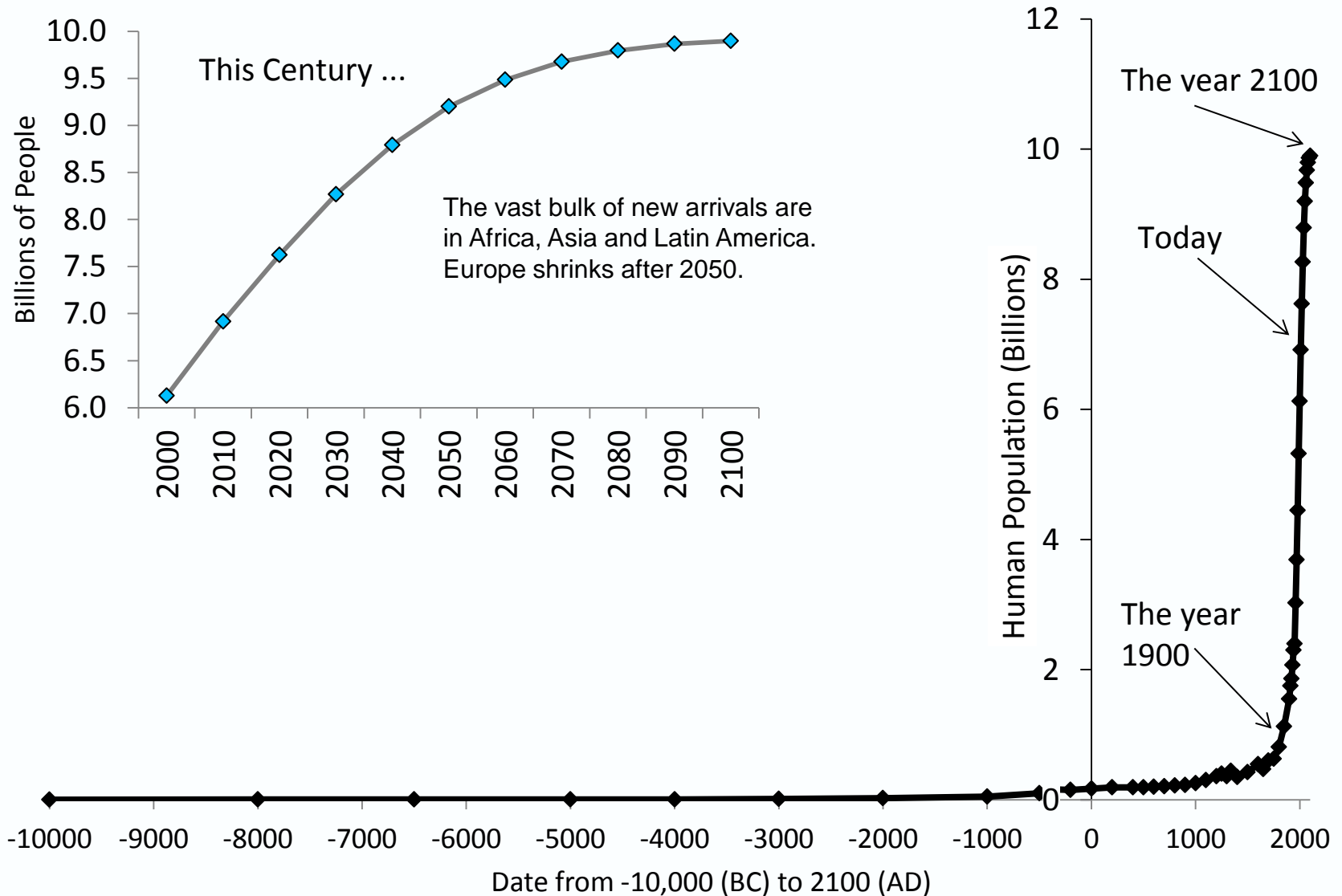
A Shifting World Economy



Source: Quah, 2011; Global Policy

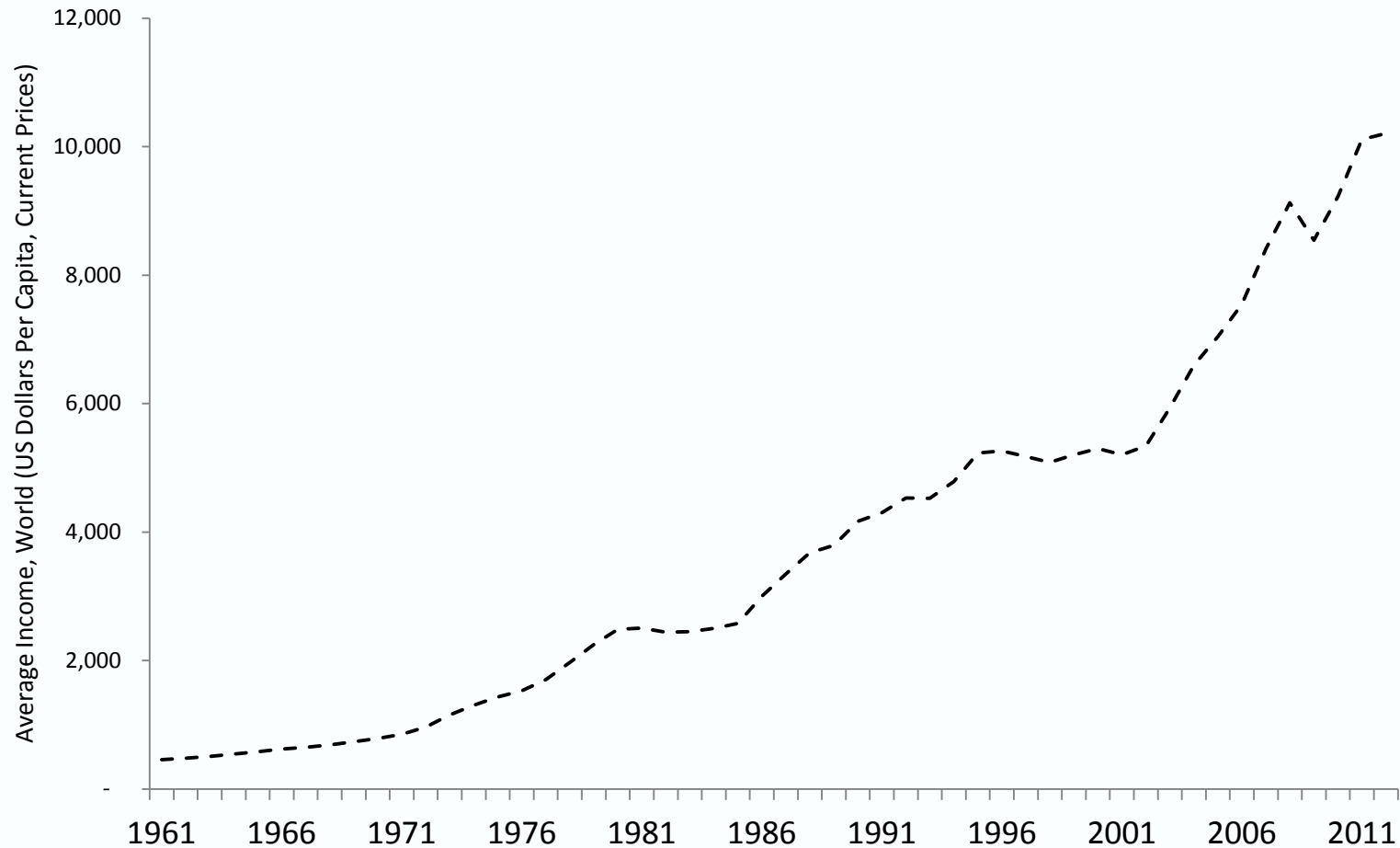
The Silk Highway

A Recent Phenomenon - The Population Explosion



Income Growth

It's not just more people, it's more people with greater buying power



The Silk Highway

Making Cities in 20 Years What Took Europe 400 Years

Shenzhen 1982



Shenzhen 2007



Image source: (c) The Chinese UPLA urban planning network, <http://www.upla.cn>

Statistic derived from analysis of the United Nations, World Urbanization Prospects, The 2007 Revision Population Database



Change in China

From the early 1990s to the late 2000s China changed its share of the world's ...

Champagne imports from 0.1% to 0.3%

Gross Domestic Product from 3.5% to 11.4%

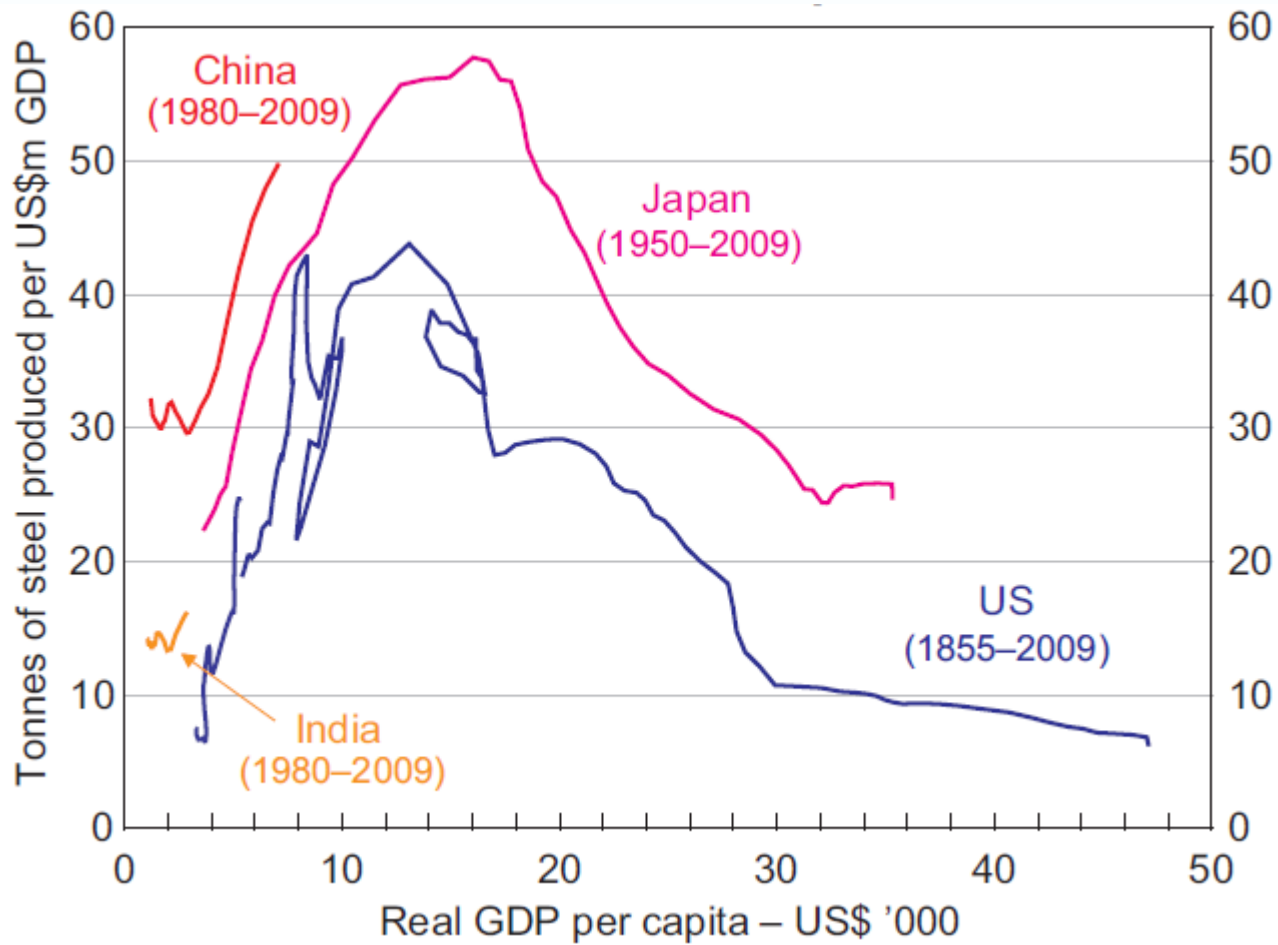
Steel production from 12.4% to 38.8%

Poor people living on less than US\$1.25 per day from 37.6% to 15.1%

Trademarks (held by residents) from 5.9% to 31.7%

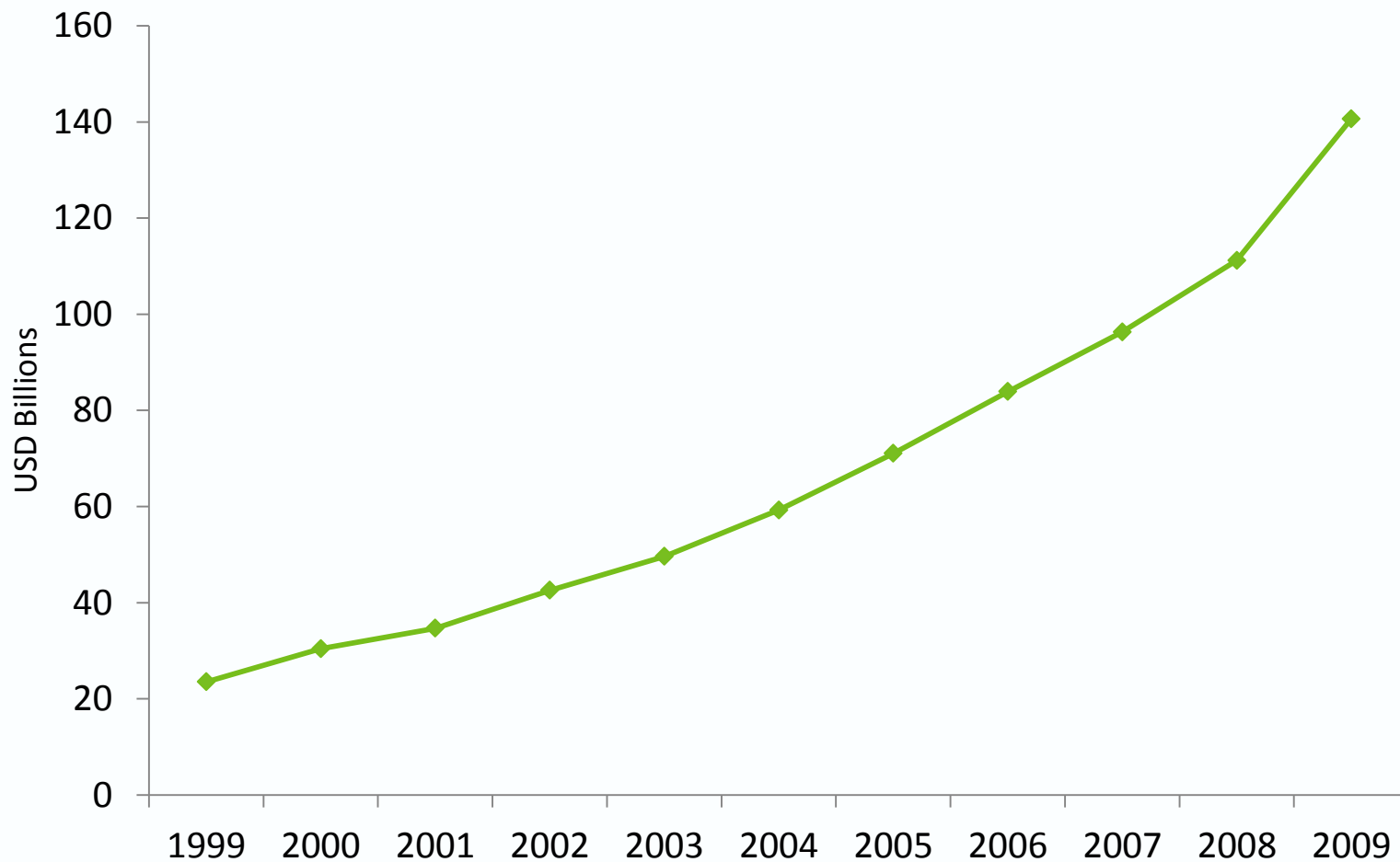
The Silk Highway

An Economy in Transition



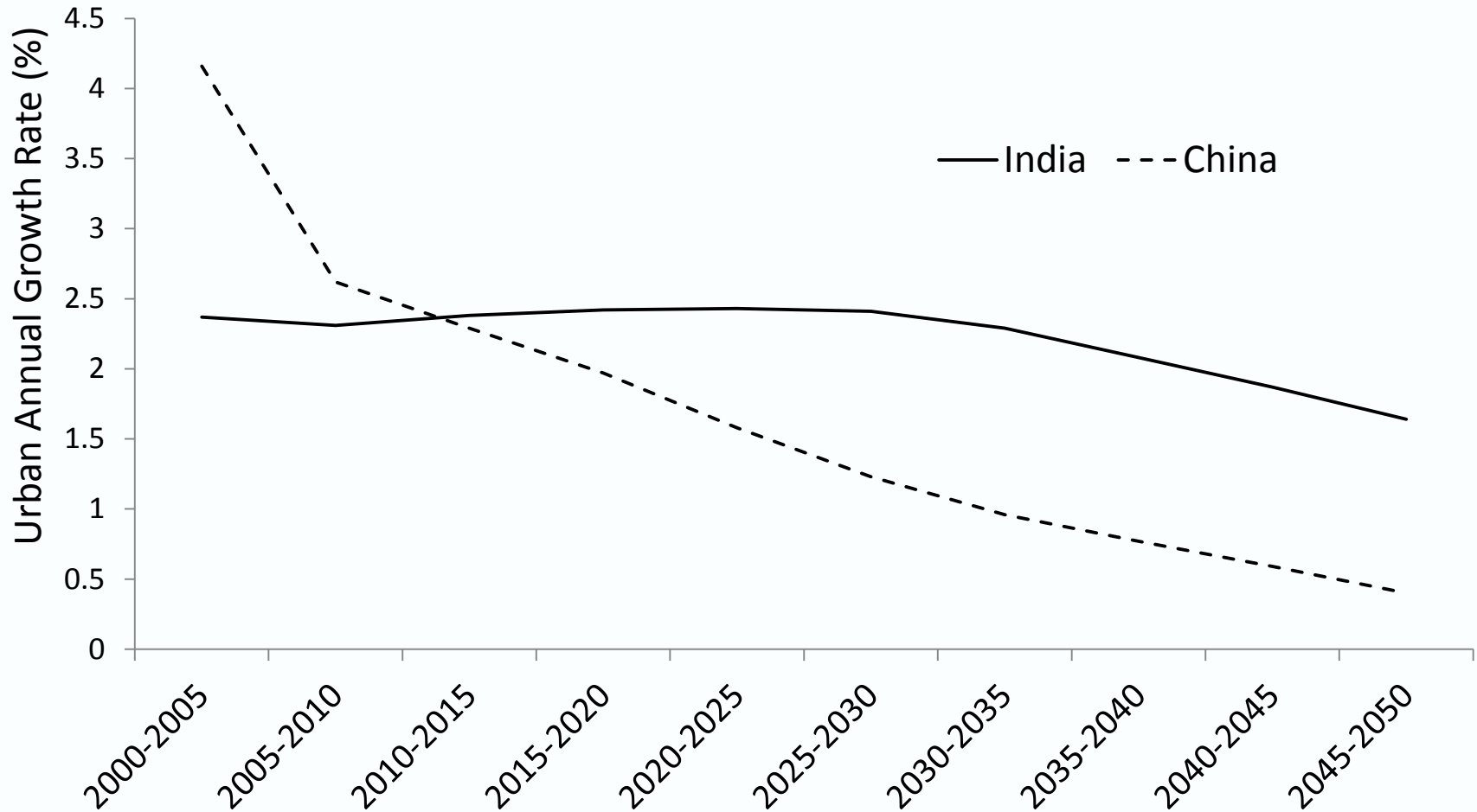
The Silk Highway

Expenditure on Research and Development in China



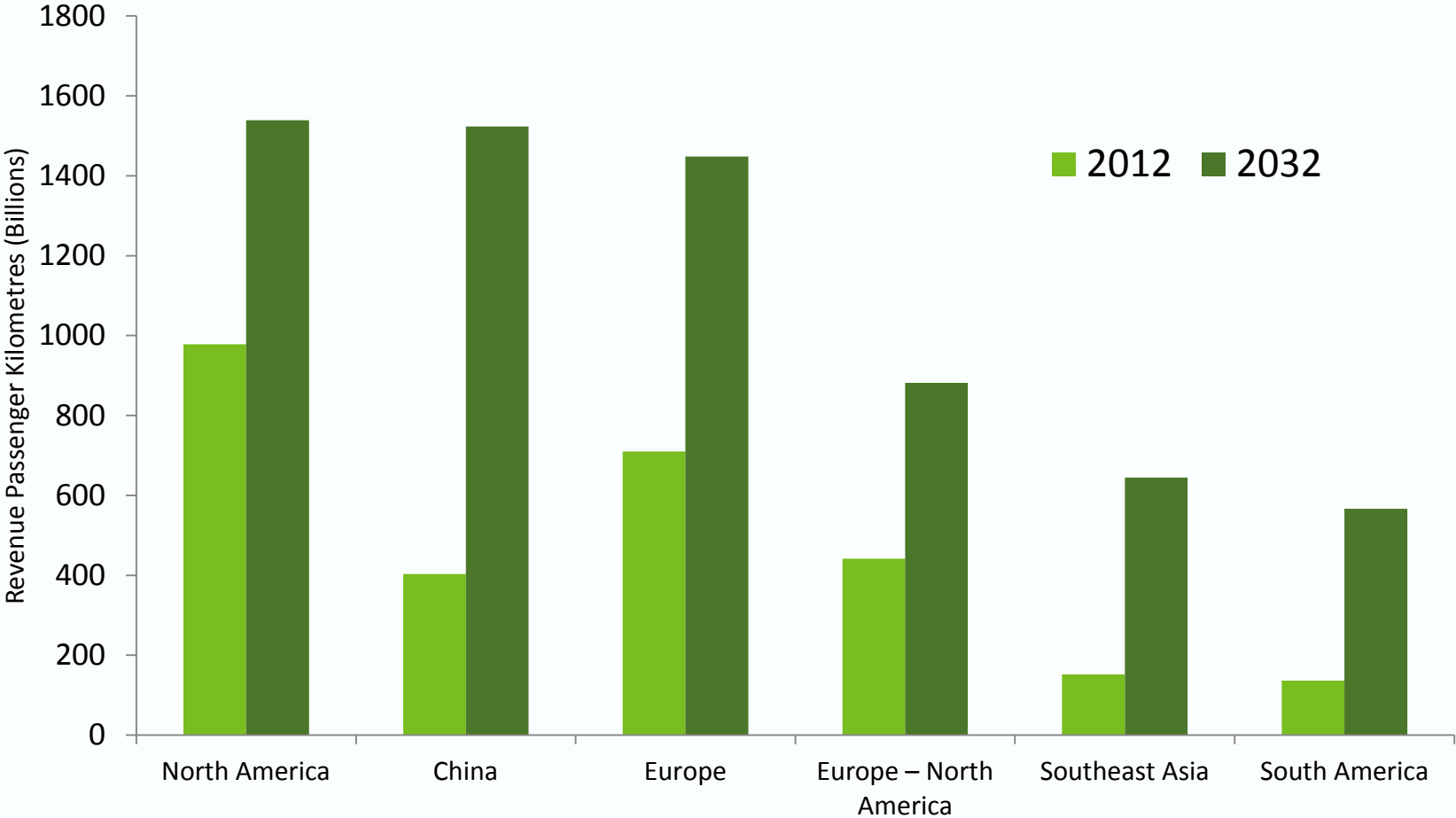
The Silk Highway

Will India pick up the slack?



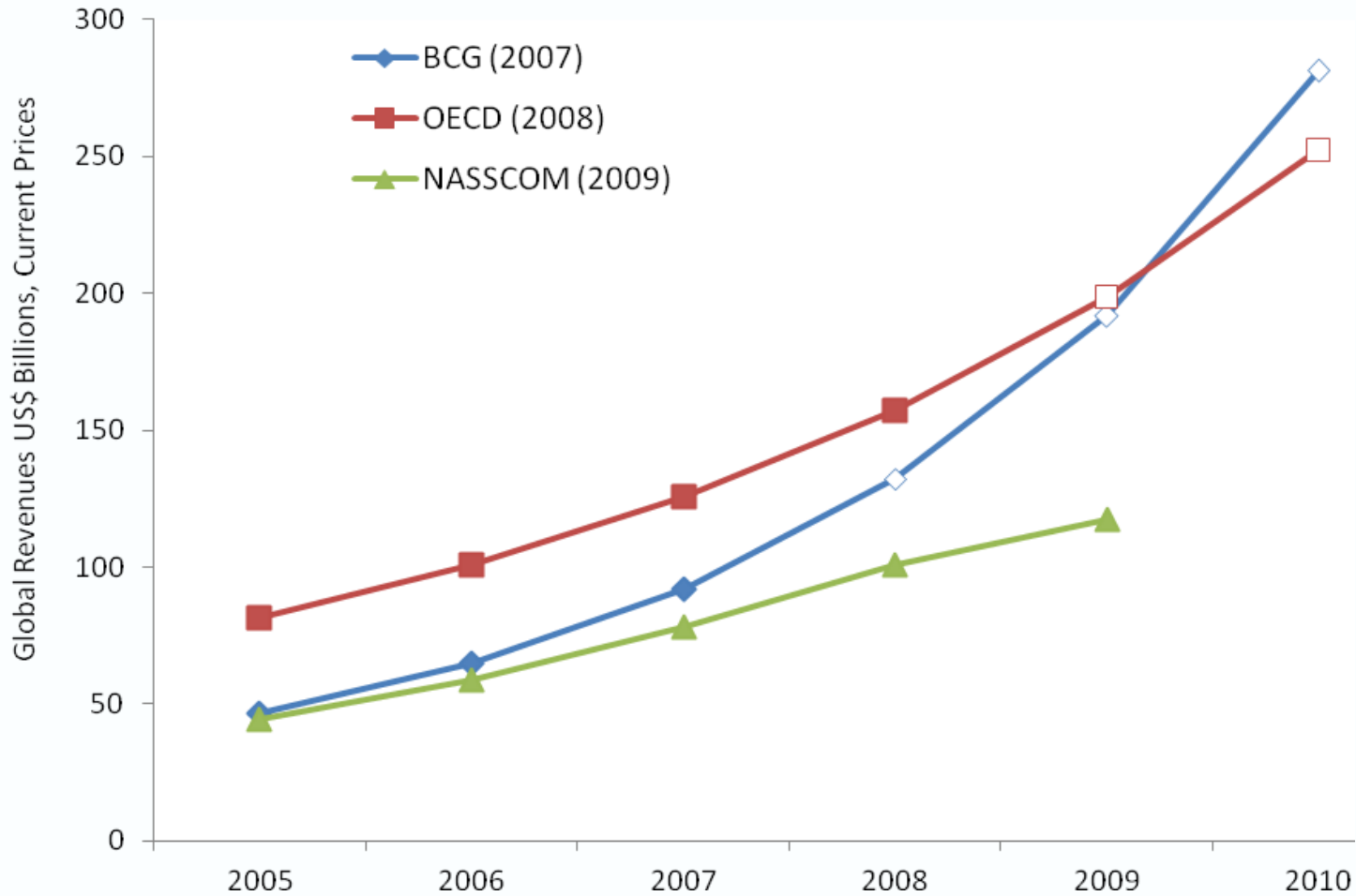
The Silk Highway

Regional Activity - Global Jet Travel



The silk Highway

The Offshoring Trend



The silk Highway

The Offshoring Trend



VIRTUAL EMPLOYEE

Outsourcing Solutions – A Better Way To Outsource

HOME

GET STARTED

TESTIMONIALS

ARTICLES

IMAGE GALLERY

FA

1 Outsourcing service

Hire an employee to work for you remotely from our office in India.

Work, manage and collaborate online.

2 Cost

Full time employee; US\$1095 - \$1995 per month

In Australia they cost \$10,000 to \$20,000 per month

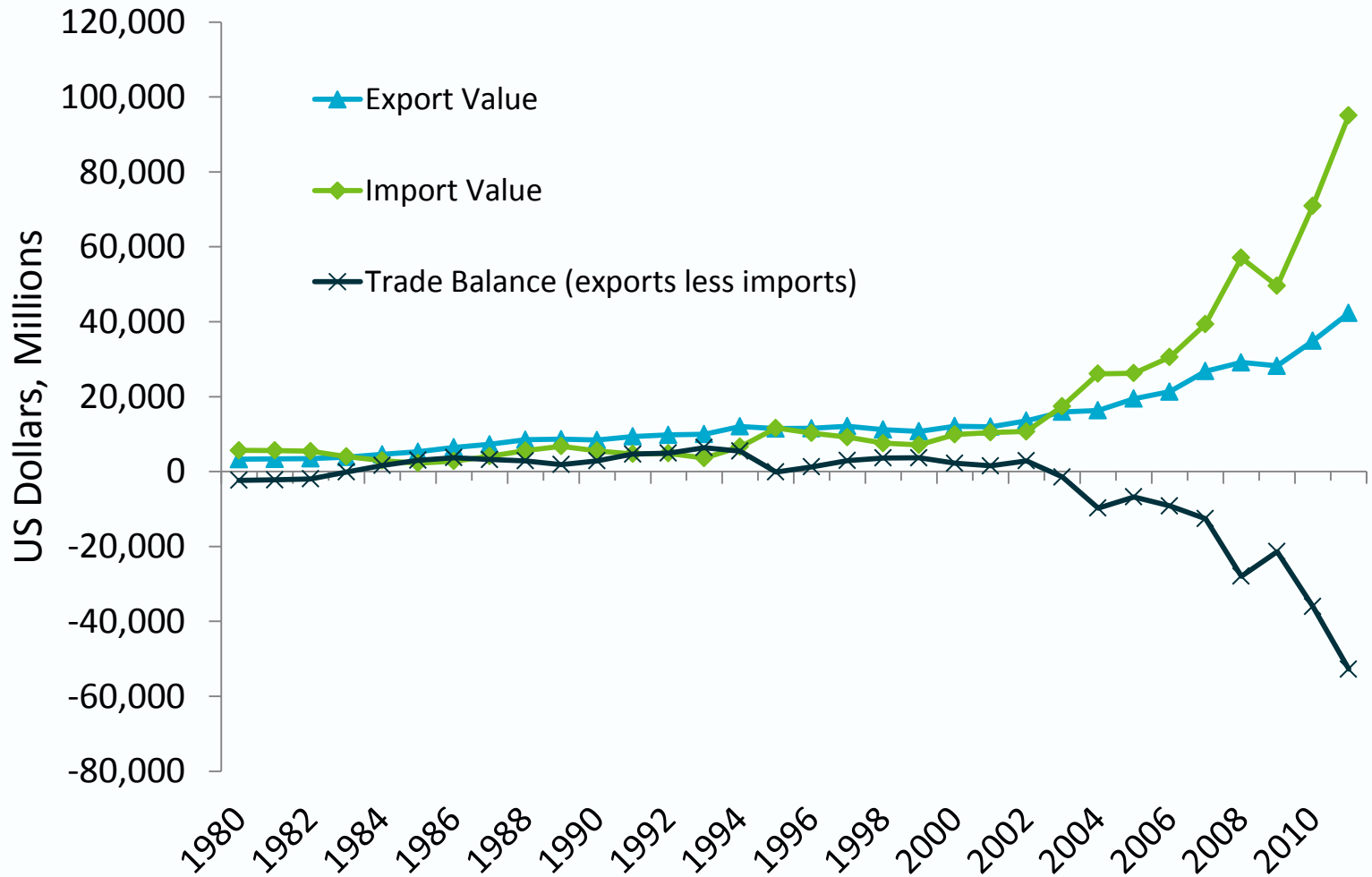
3 What type of employees can you hire

- ▶ Software Developers
- ▶ Website Designers
- ▶ Engineers
- ▶ Transcriptionists
- ▶ Accountants
- ▶ Graphics Designers
- ▶ Internet Marketers
- ▶ Lawyers
- ▶ Data Entry Executives
- ▶ And much more!

Outsource to India any office work in any field or profession

The Silk Highway

Emerging Food Markets, can't sell garlic to China but can sell fish, tropical fruit ...



4. Forever Young

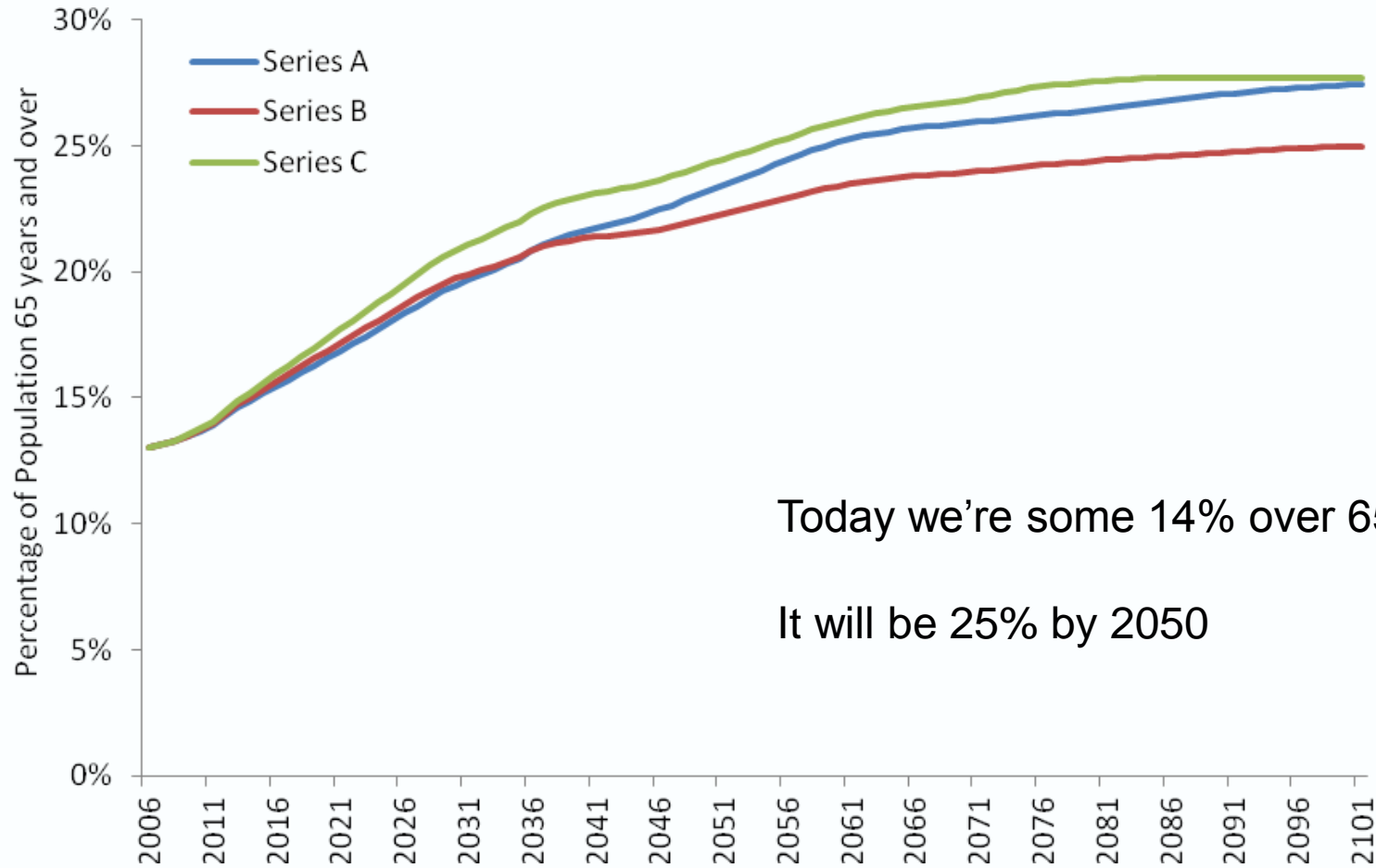
As you grow older, you will discover that you have two hands, one for helping yourself, the other for helping others.

- Audrey Hepburn



Forever Young

The Ageing Population – Australia



Today we're some 14% over 65 yrs old

It will be 25% by 2050

Forever Young

The Ageing Population in Japan

*By 2050
Japan's
population will
be 40% over
70 years old*



Forever Young

Retirement Savings Gap – Tapered Retirement



Forever Young

The Rise of Chronic Illness

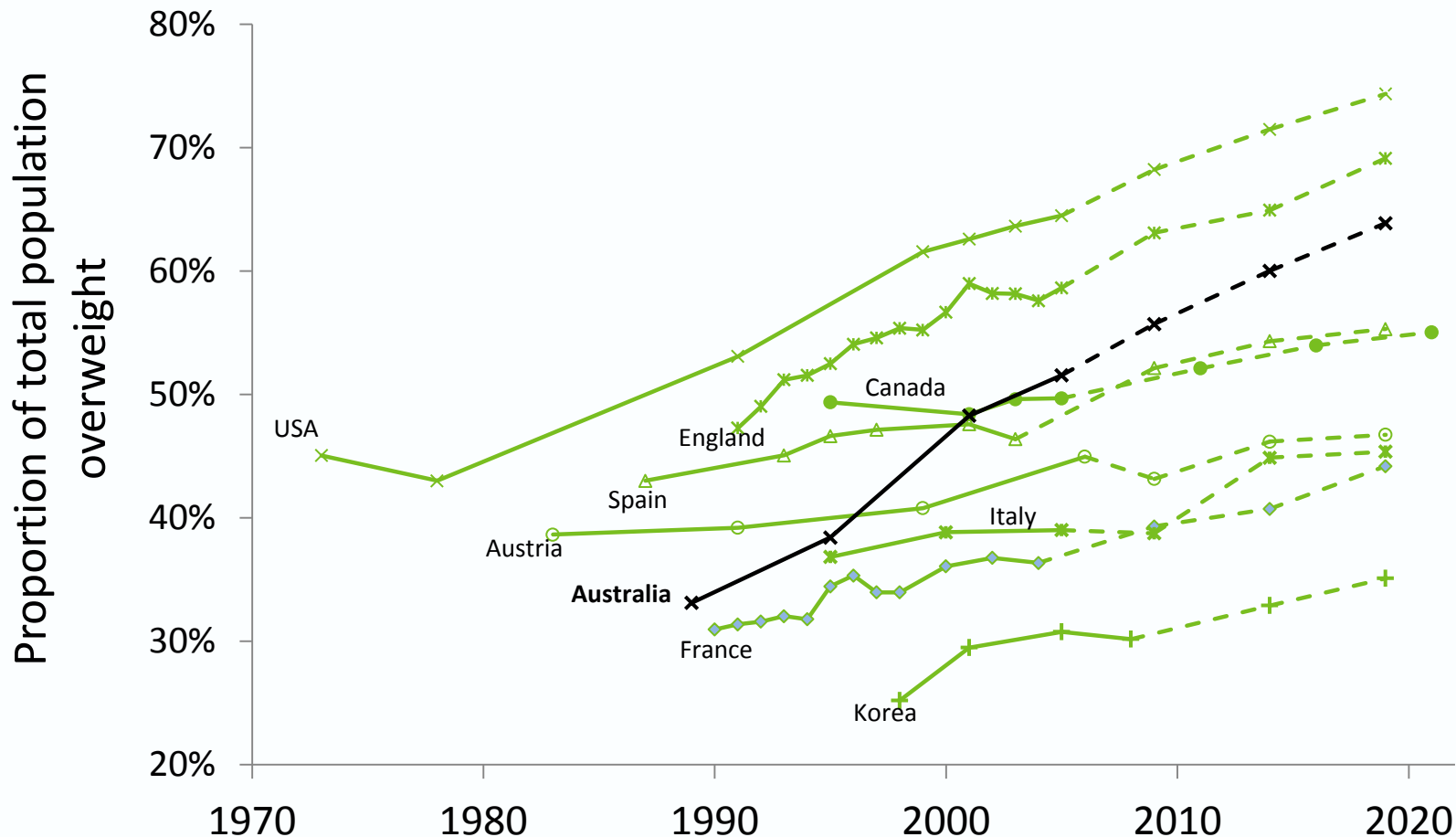
In 2002 59% of deaths worldwide were from non-communicable illness.

It will be 69% in 2030.



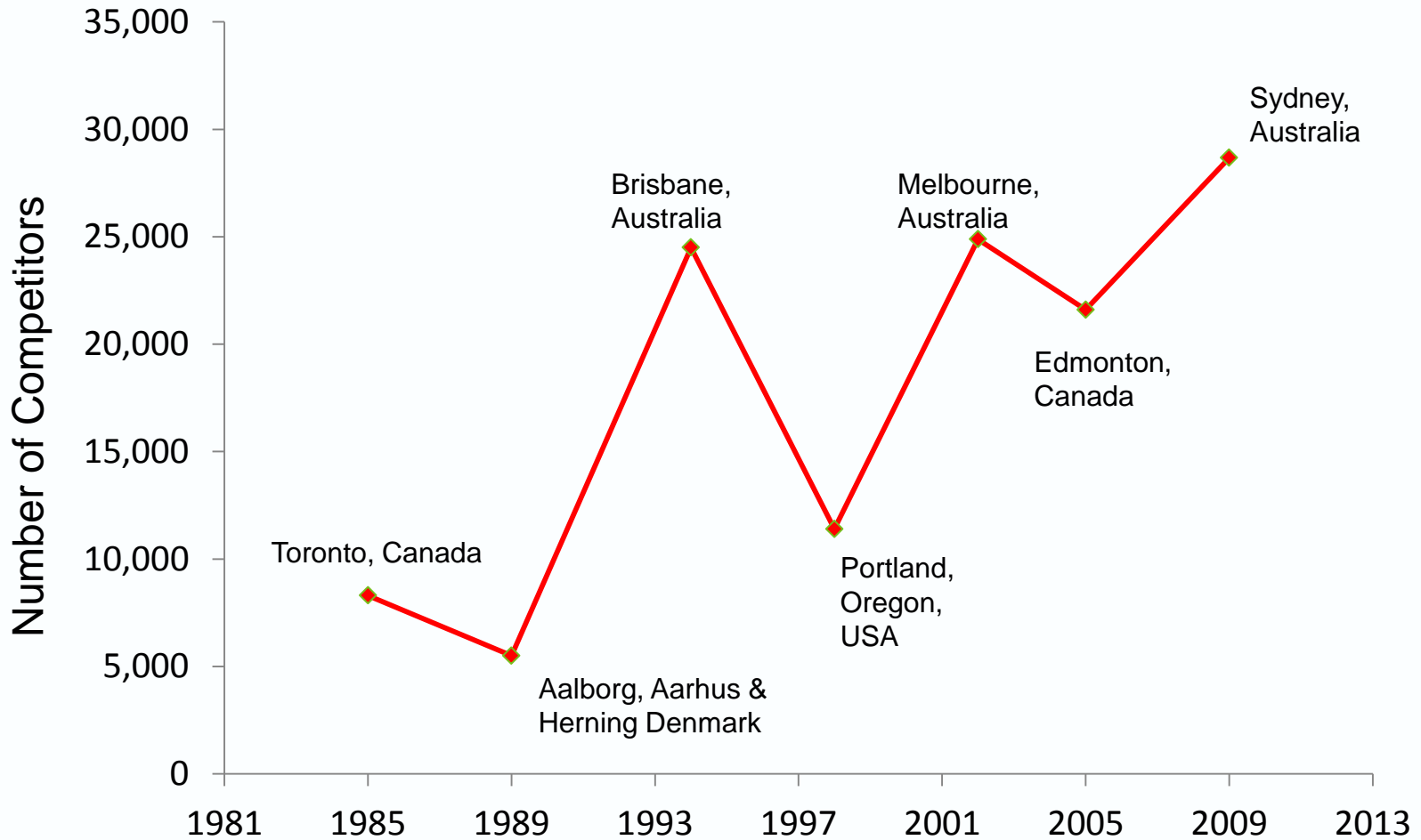
Forever Young

Diabetes and Overweight Projections



Forever Young

Wanting to Stay Active and Engaged



Forever Young

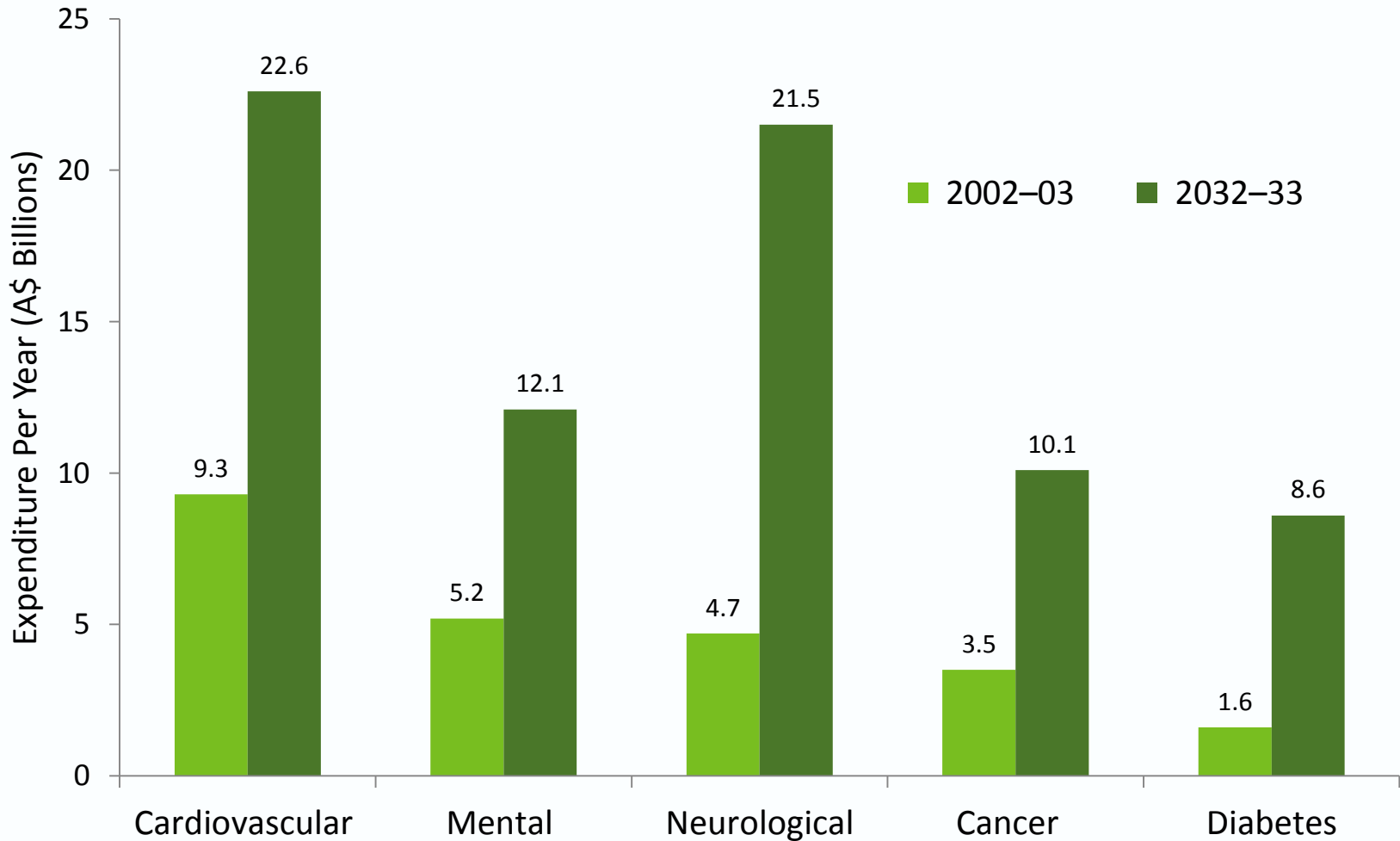
Rising Healthcare Expenditure

Today we spend 20 percent of all government taxes in Australia on healthcare.

By the year 2043 it will be 40 percent.

Forever Young

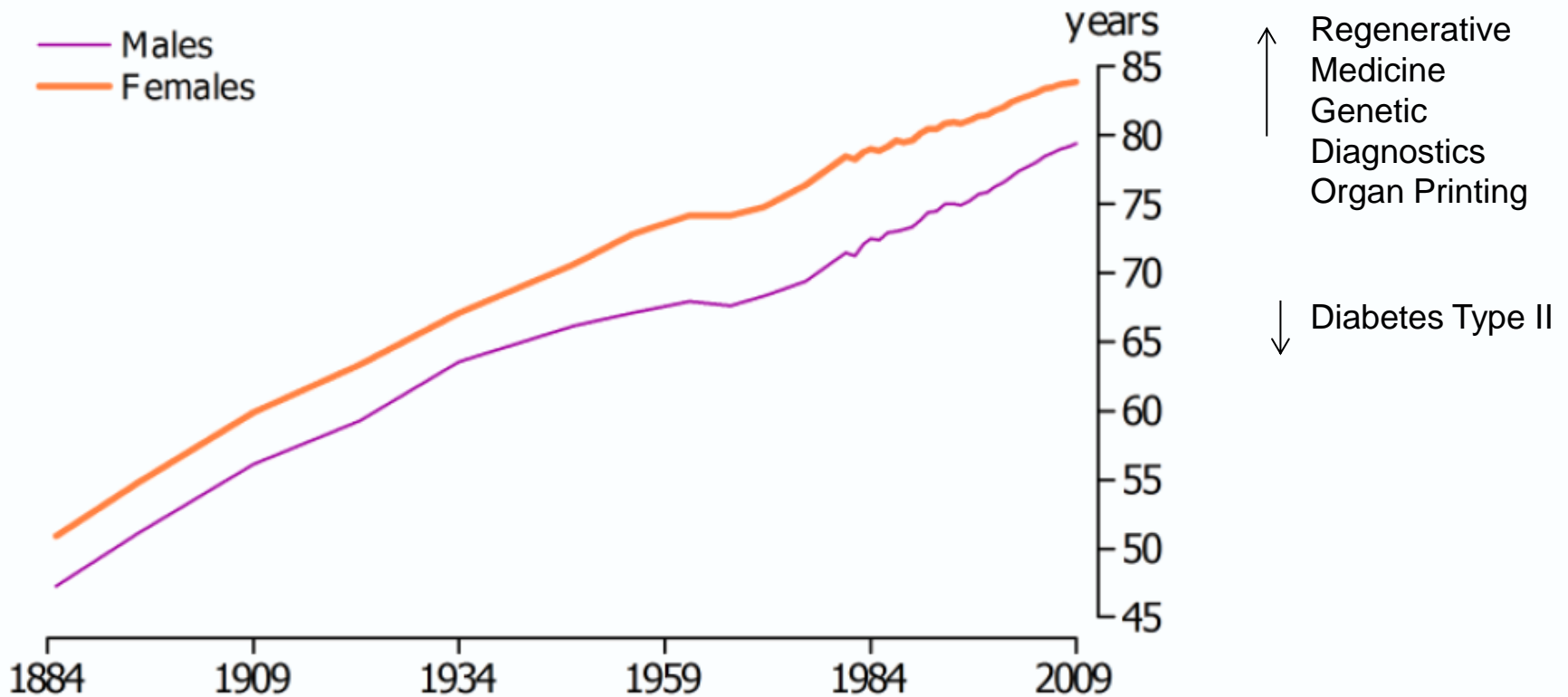
Rising Healthcare Expenditure



Forever Young

Longer Lifespans

Average today is currently 79.9 years for a boy and 84.3 years for a girl. Will exceed 100 years later this century at current linear trend.

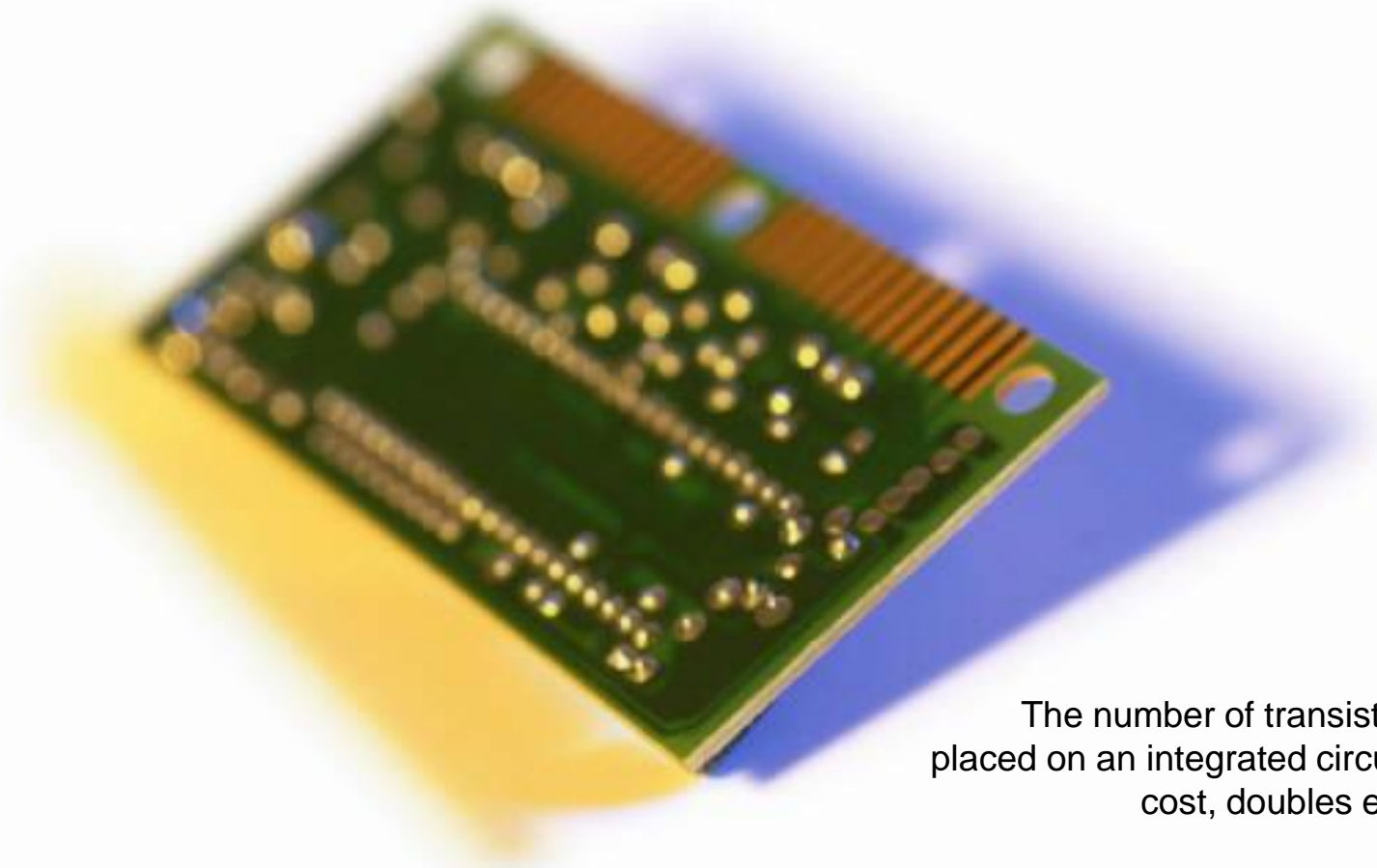




5. Digital Immersion

Digital Immersion

Moore's Law

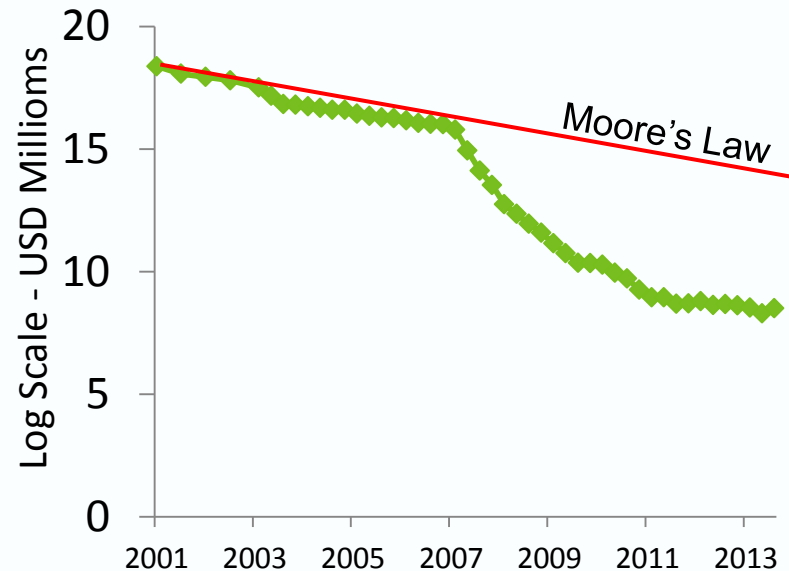
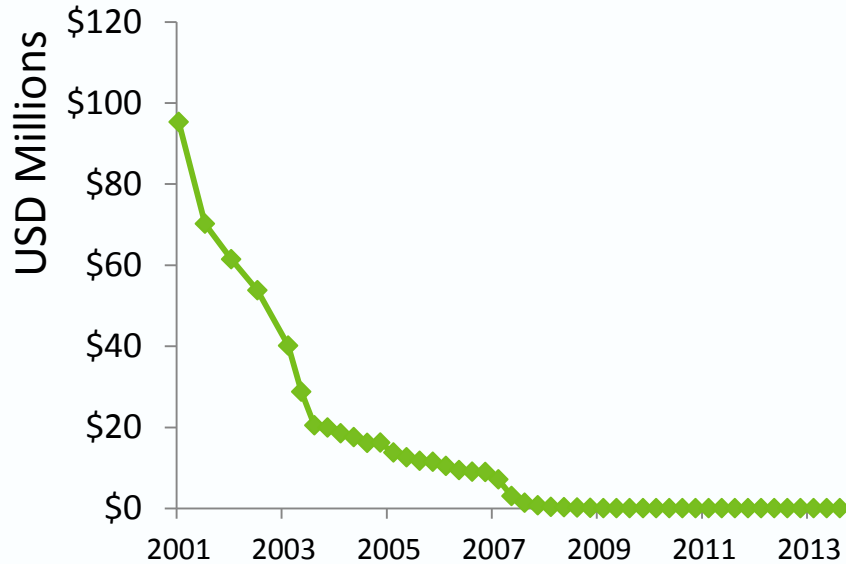


The number of transistors that can be placed on an integrated circuit, at the same cost, doubles every 1.5 years.

Data source: Moore's Law, Moore (1965) *Electronica*, Vol 38
Image source: Microsoft clipart

Digital Immersion

The falling cost of sequencing a human genome



Digital Immersion

Ray Kurzweil and *The Second Half of the Chessboard*



Creative Commons Photo by Michael Lutch. - Photo by Michael Lutch. Courtesy of Kurzweil Technologies, Incorporated.

Digital Immersion

Artificial Intelligence & Machine Learning The Story of IBM's Computer *Watson* on Jeopardy

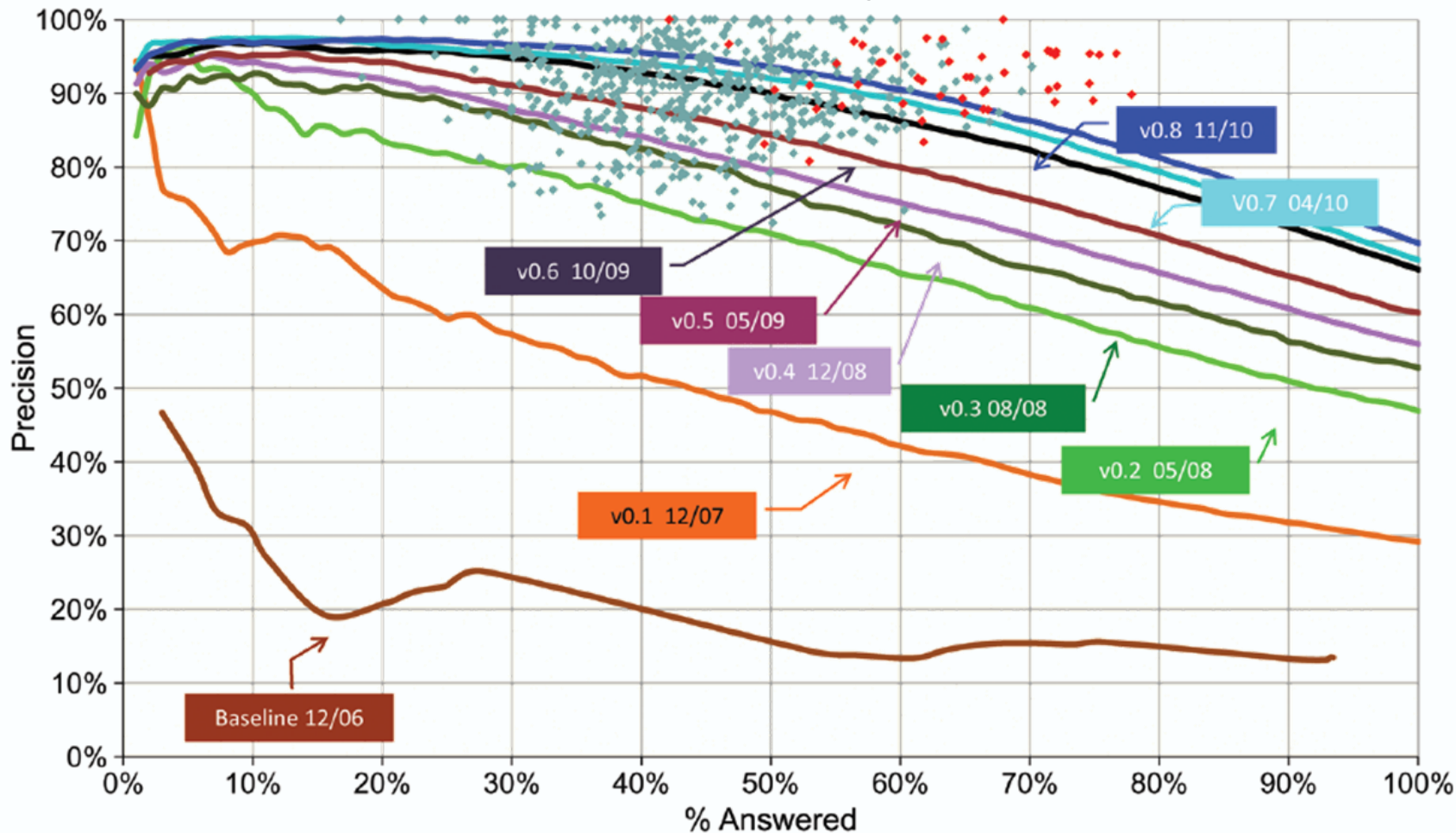
Clue (category explorers): On hearing of the discovery of George Mallory's body, he told reporters he still thinks he was first.

Answer: Who is "Sir Edmund Hillary"

Digital Immersion

Watson on Jeopardy

Ken Jennings: "I for one welcome our new computer overlords"



Automation Outside the Factory

500,000 kms accident free
Laws in Nevada, Florida,
California, and Michigan

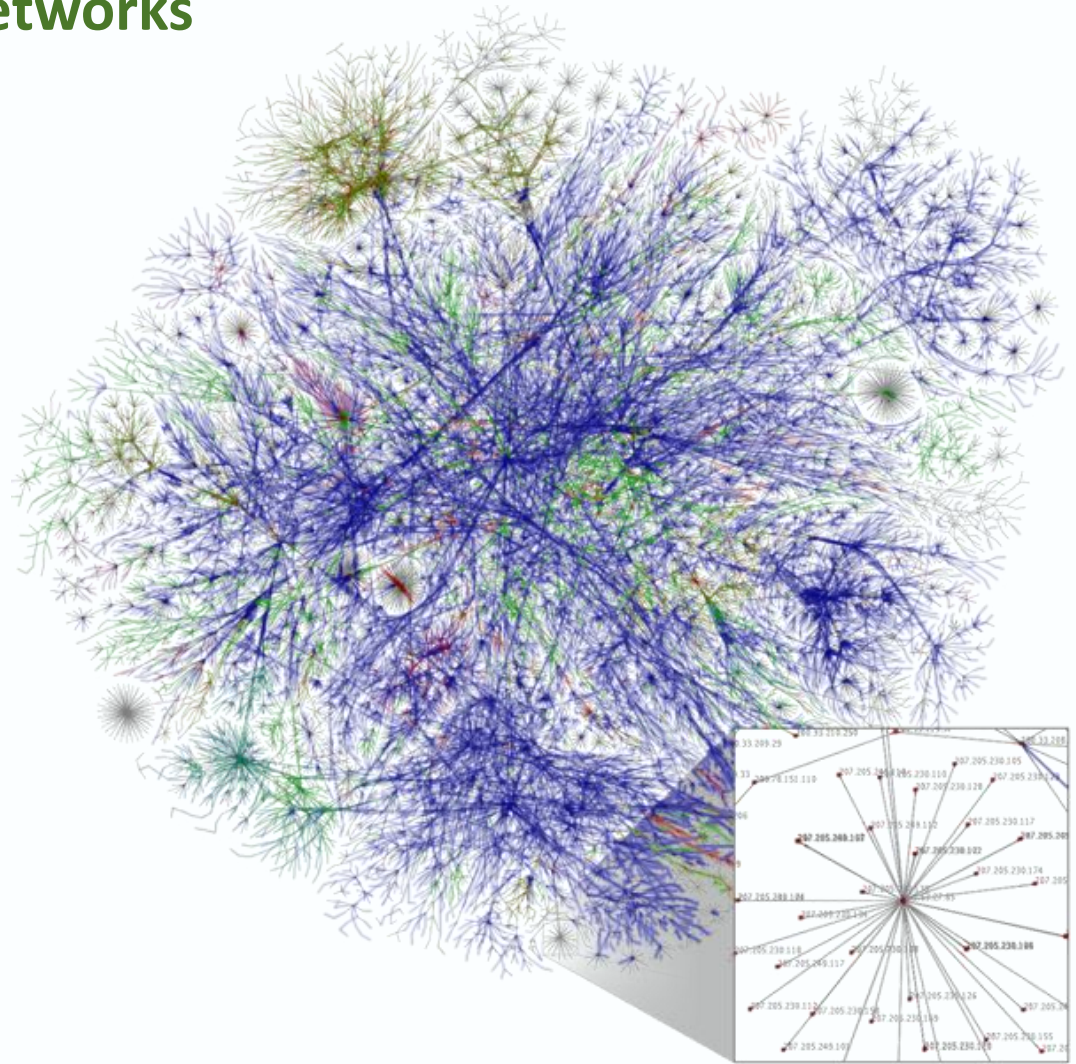


Digital Immersion

Emergent Properties of Networks

The number of *devices* connected to the Internet exceeded the number of people on Earth in 2010.

By 2020, this ratio is predicted to increase to almost 7:1.



From 6 to 3 Degrees of Separation

The New World of Connectivity



Every day 2.5 quintillion bytes of data are created; 90% of the data available today was created in the last two years (IBM).



Mobile Phones in Kerala, India between 1997 - 2001

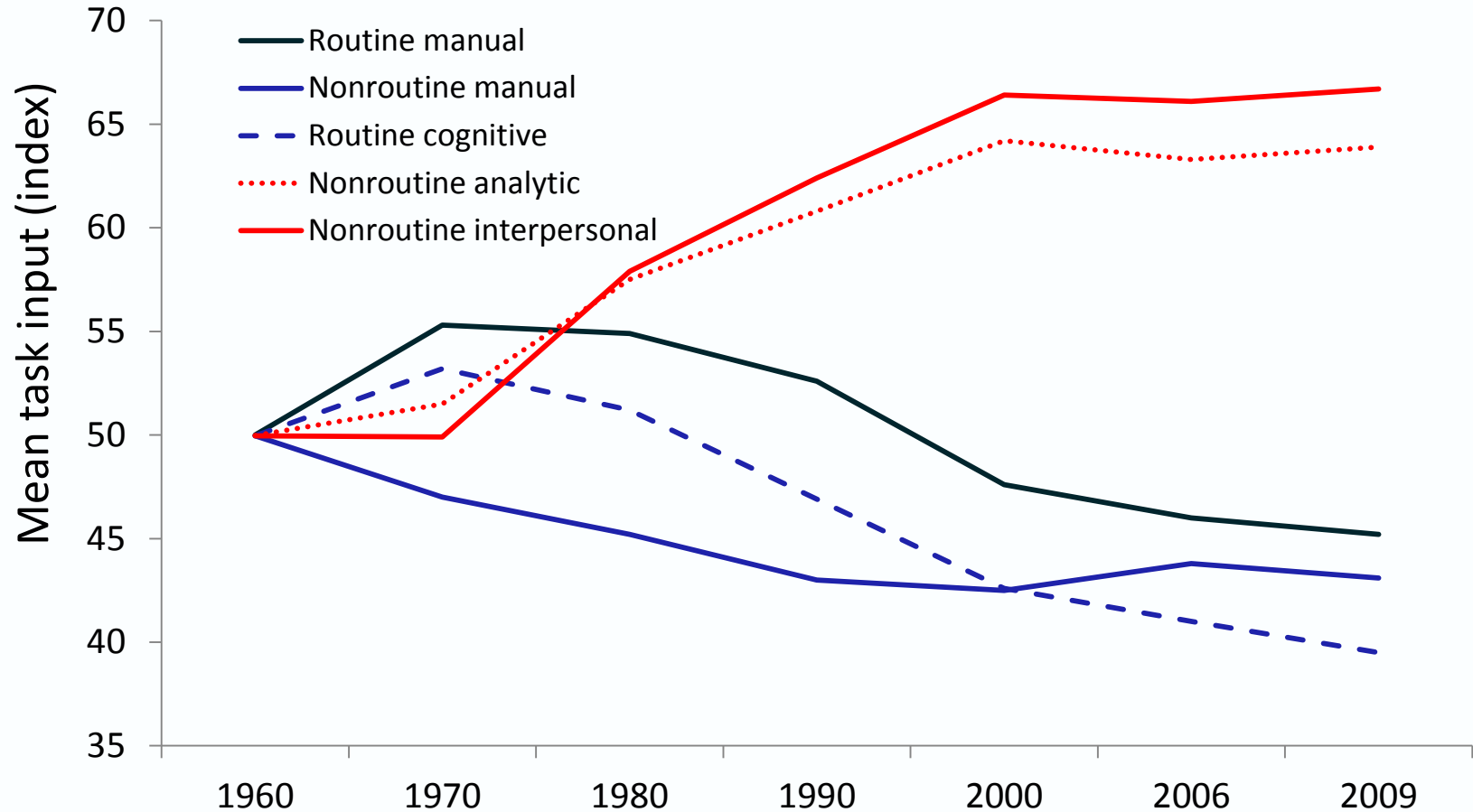
Robert Jensen, Quarterly Journal of Economics



- Reduction in price dispersion
- Elimination of waste
- Consumer and producer welfare improved

The Changing Job Market

Insights from the United States of America



Percentile of the 1960s level

6. Great Expectations

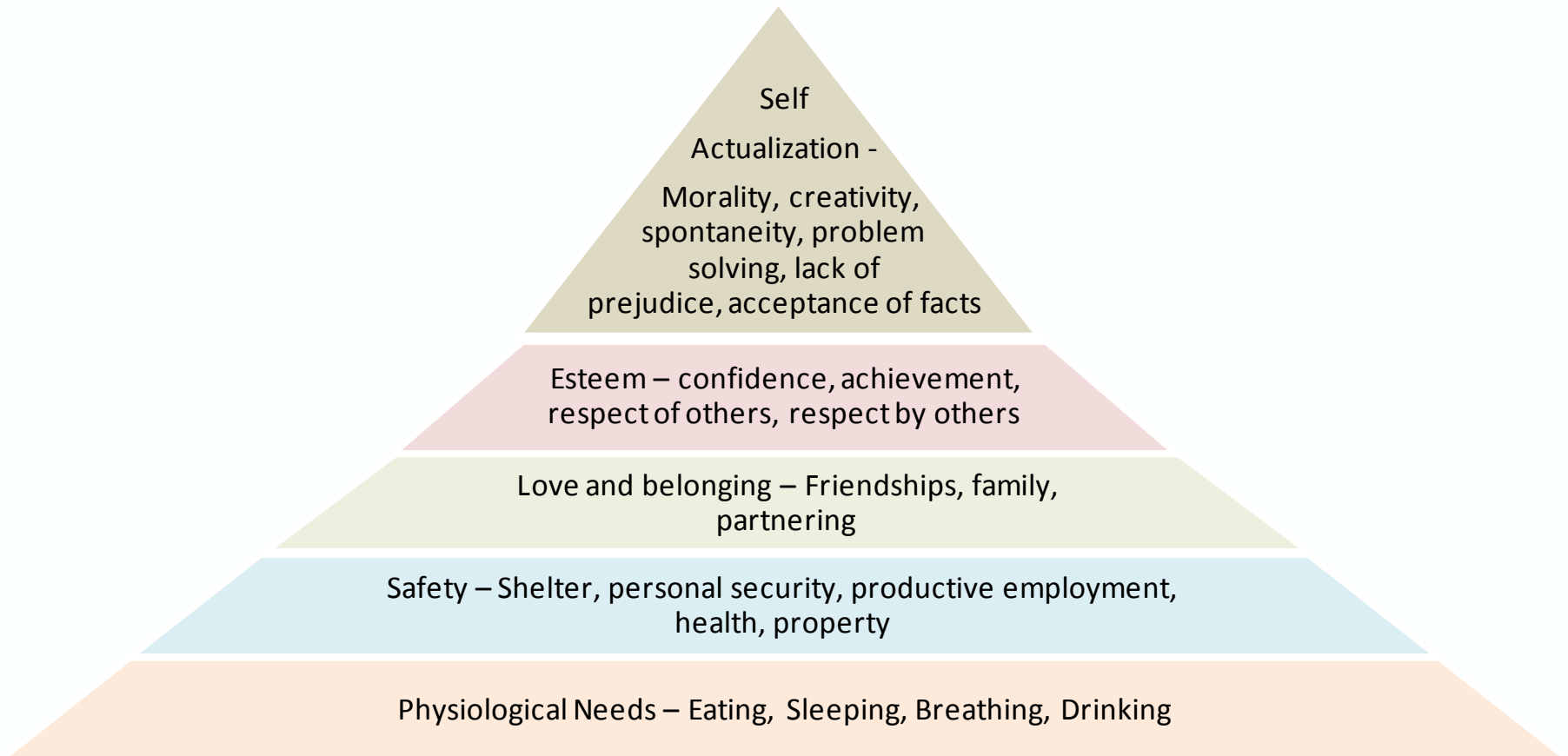
*Now, I return to this young fellow.
And the communication I have got to
make is, that he has great
expectations.*

- Charles Dickens



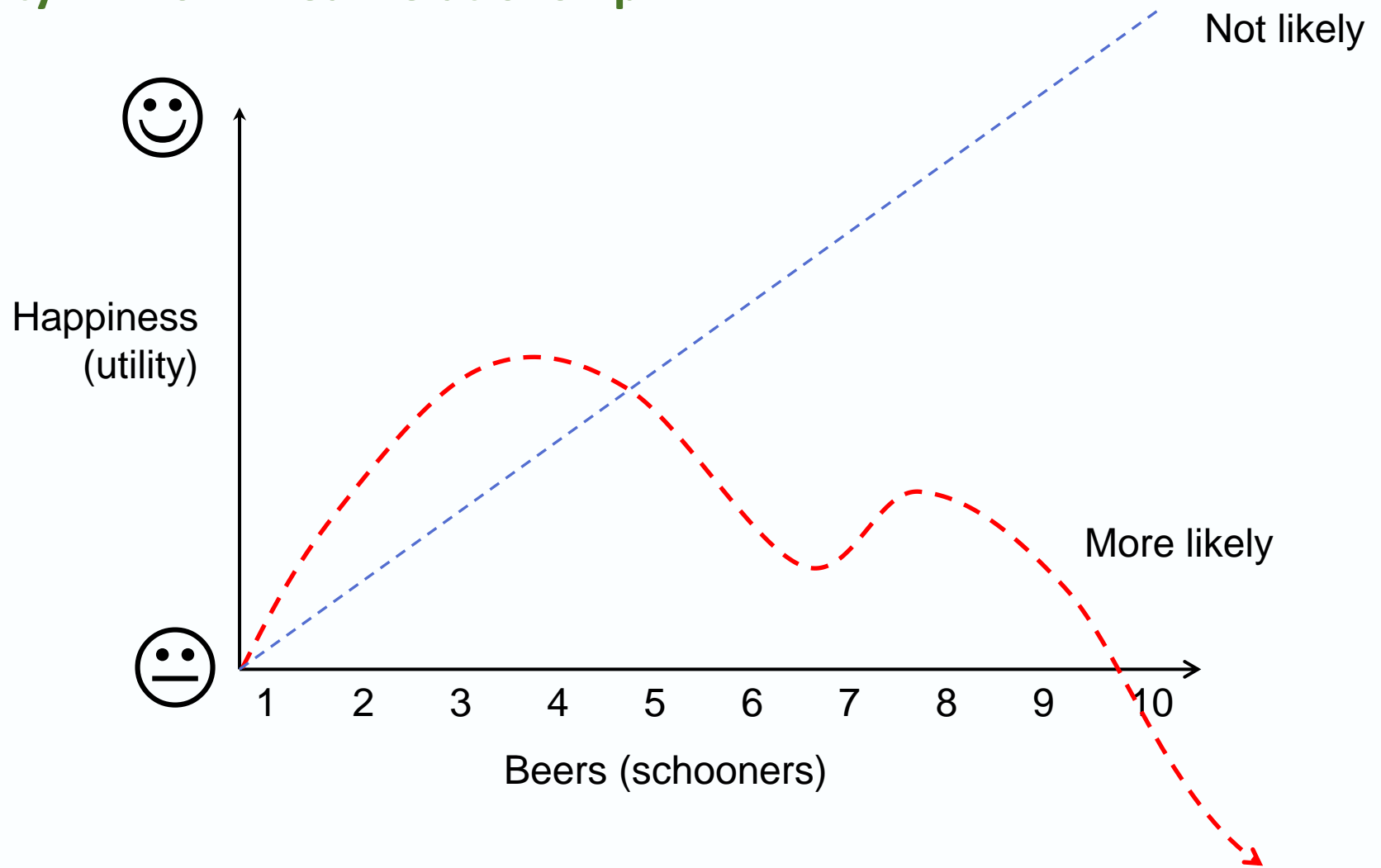
Great Expectations

Maslow's Hierarchy



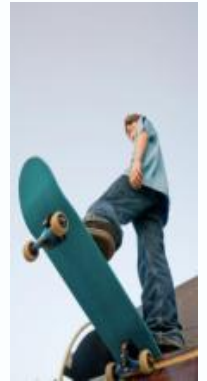
Great Expectations

Utility - A non-linear relationship



Great Expectations

The rise (and continued rise) of the experience economy



Basic Expectations



24% < US\$1.25/day (47% in 1990)

33% of people in urban slums

15.5 percent of the world's population (1 billion) hungry

[United Nations, 2012](#)



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*Or have coffee with me at the
Ecosciences Precinct in Brissy*

Thank you

Dr Stefan Hajkowicz

Principal Scientist

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