



Green Inclusive Growth

rethinking public-private risk taking

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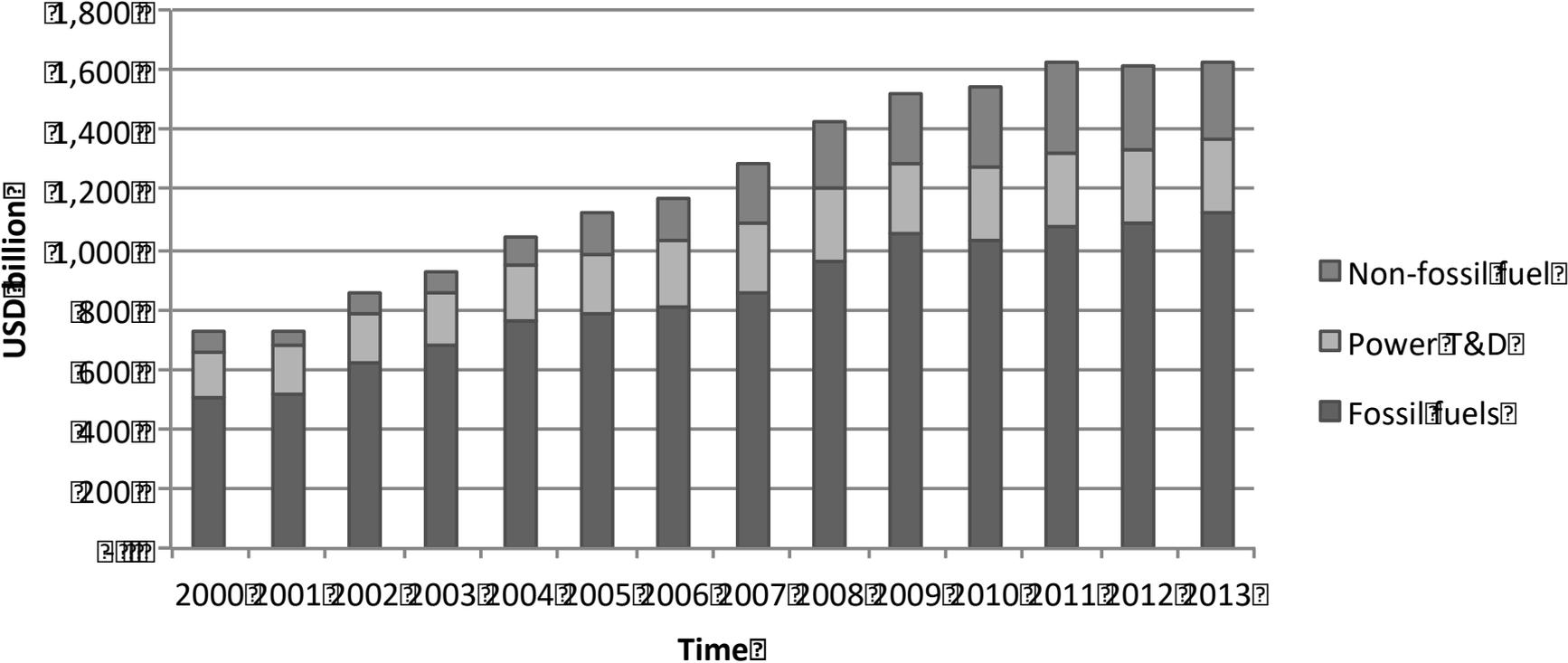


International Energy Agency estimates that an additional USD 1.1 trillion in low-carbon investments is needed every year on average until 2050, in the energy sector alone, to keep global temperature rise below 2 degrees Celsius. (CPI 2014, p. v)

This implies current investment IN GREEN ENERGY is only 20% of what it should be!

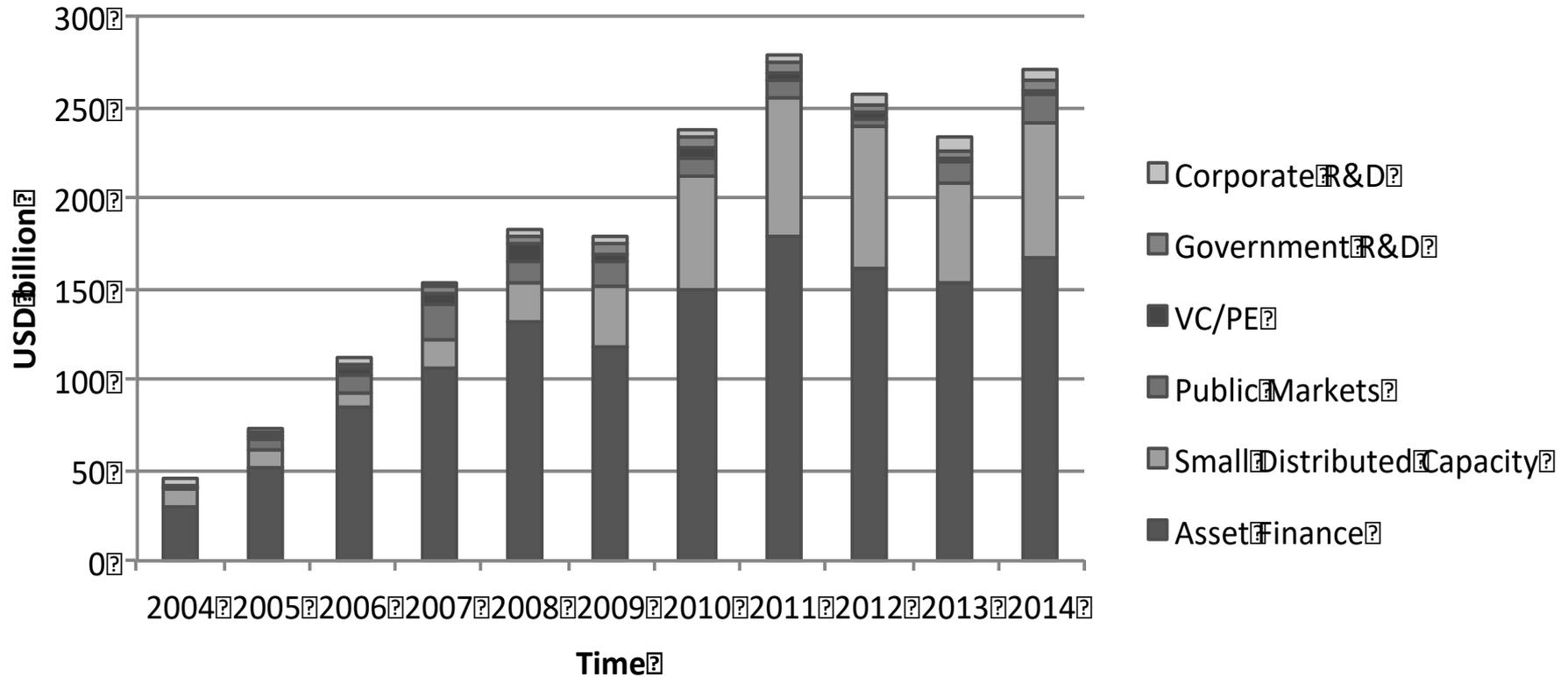
- Breakthrough Energy Coalition
- Mission Innovation Ministerial

Global energy finance



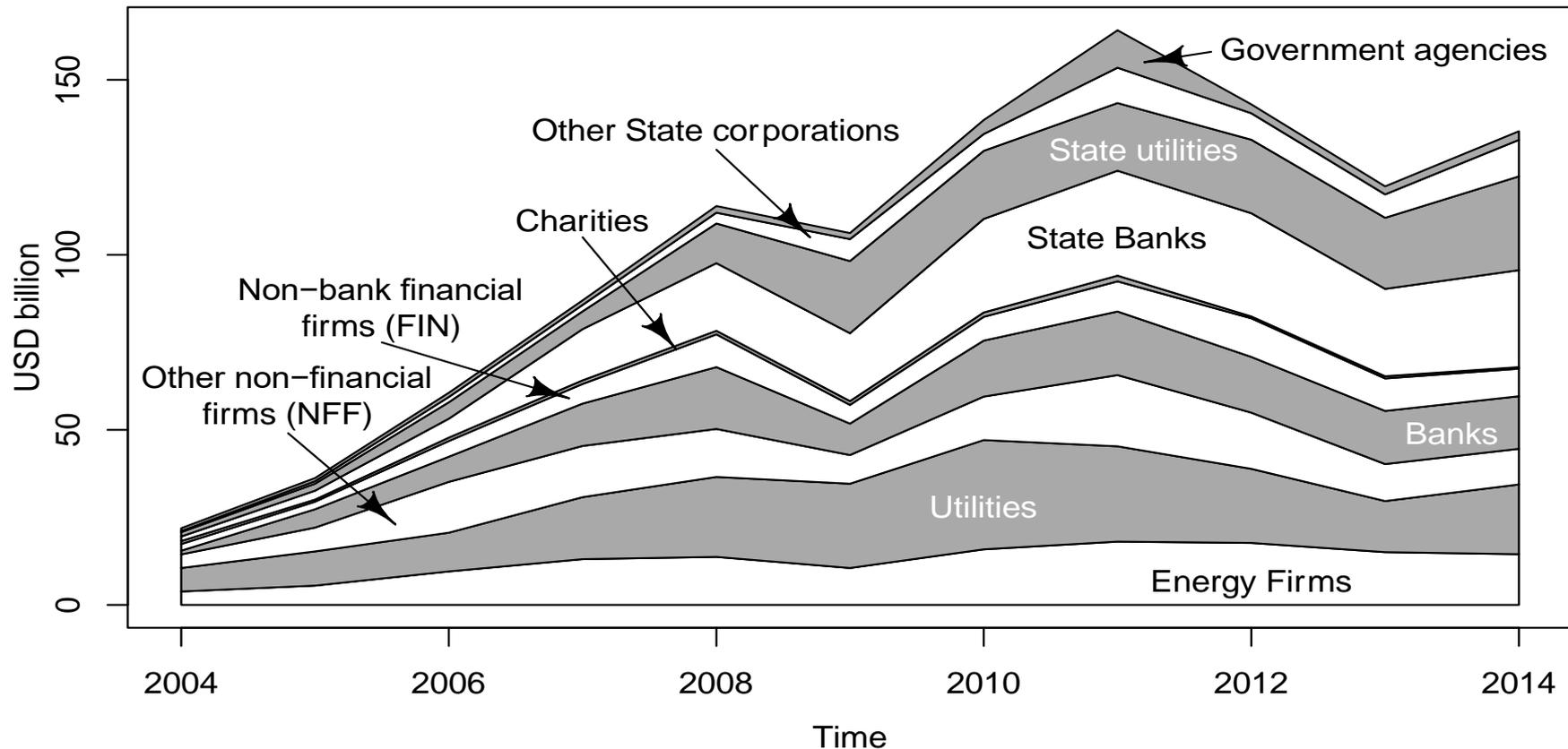
Source: International Energy Agency (2014): World Energy Investment Outlook: Special Report.

Global *renewable energy* (RE) finance



Source: UNEP & Frankfurt School (2015): Global Trends in Renewable Energy Investment 2015.

Heterogeneous actors in RE



Source: Mazzucato and Semieniuk (2016), based on data by Bloomberg New Energy Finance.

Biggest challenge: *what is State's role?*

Set 'level' playing field then *get out of the way*

De-risk (and 'facilitate') private sector

Solve market and system 'failures'

Something ... more interesting?

The
Economist

APRIL 23RD–27TH 2012

Economist.com

Romneyomics explained

The euro crisis: back after its siesta

Argentina's oil grab

The science of guerrilla warfare

America's bagel king

The third industrial revolution

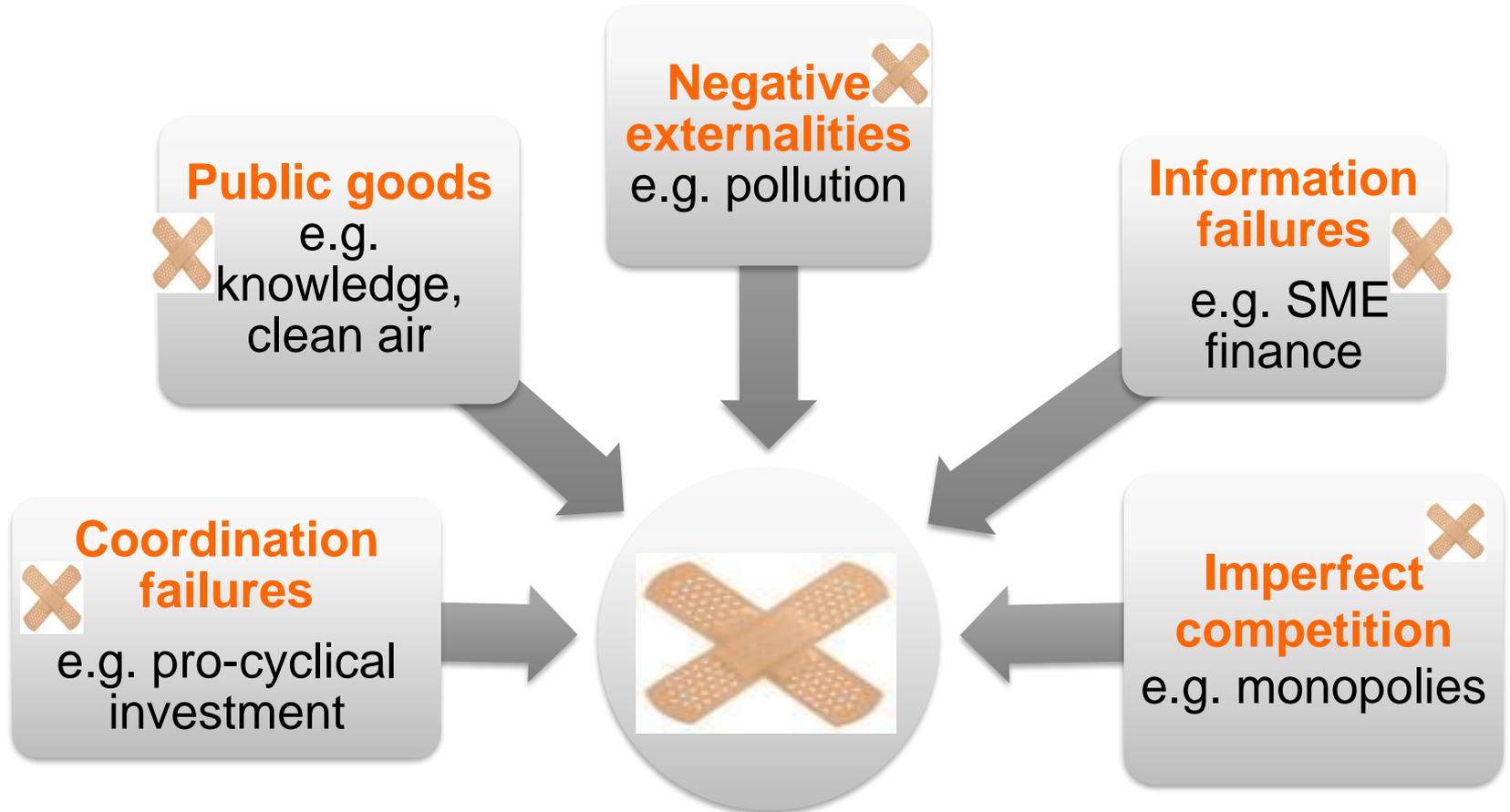
A 14-PAGE SPECIAL REPORT



"**Governments** have always been lousy at picking winners... As the revolution rages, **governments should stick to the basics**: better schools for a skilled workforce, clear rules and a level playing field for enterprises of all kinds... **Leave the rest to the revolutionaries.**"

(‘The Third Industrial Revolution’, *The Economist*, April 21, 2012).

Fixing failures



the assumption

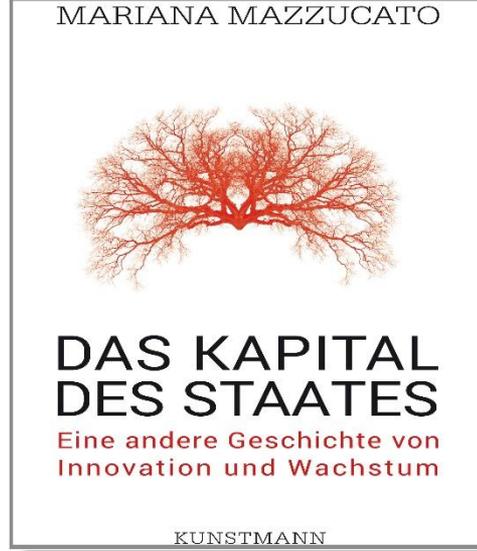
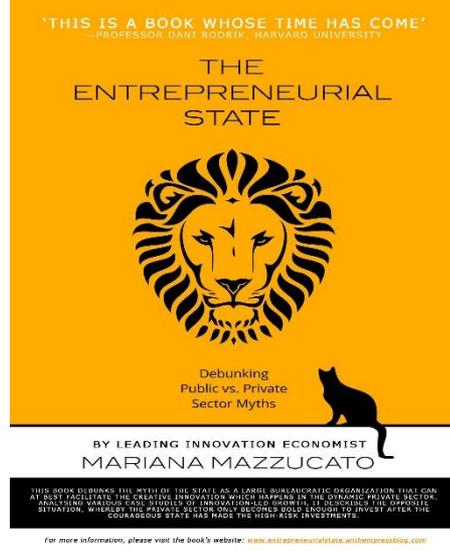


private sector

where are the european goals?
vs.



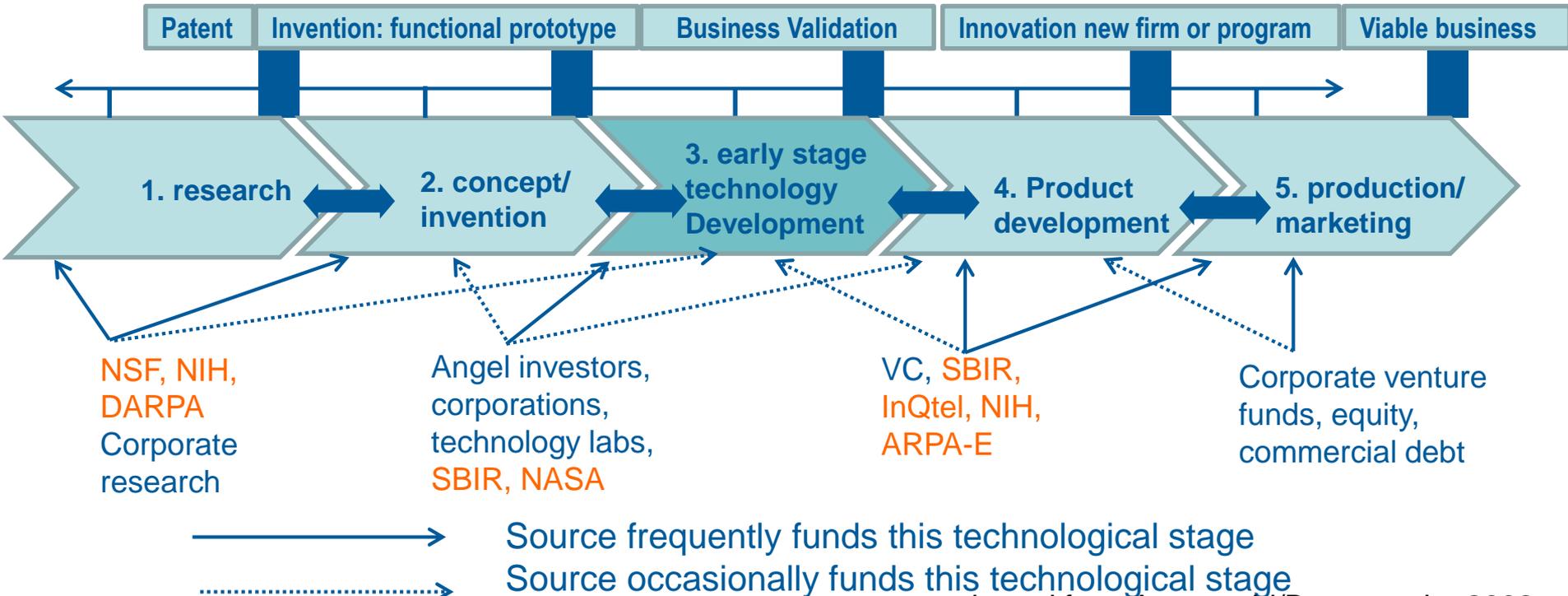
public sector



Market failure policies don't explain *General Purpose Technologies*

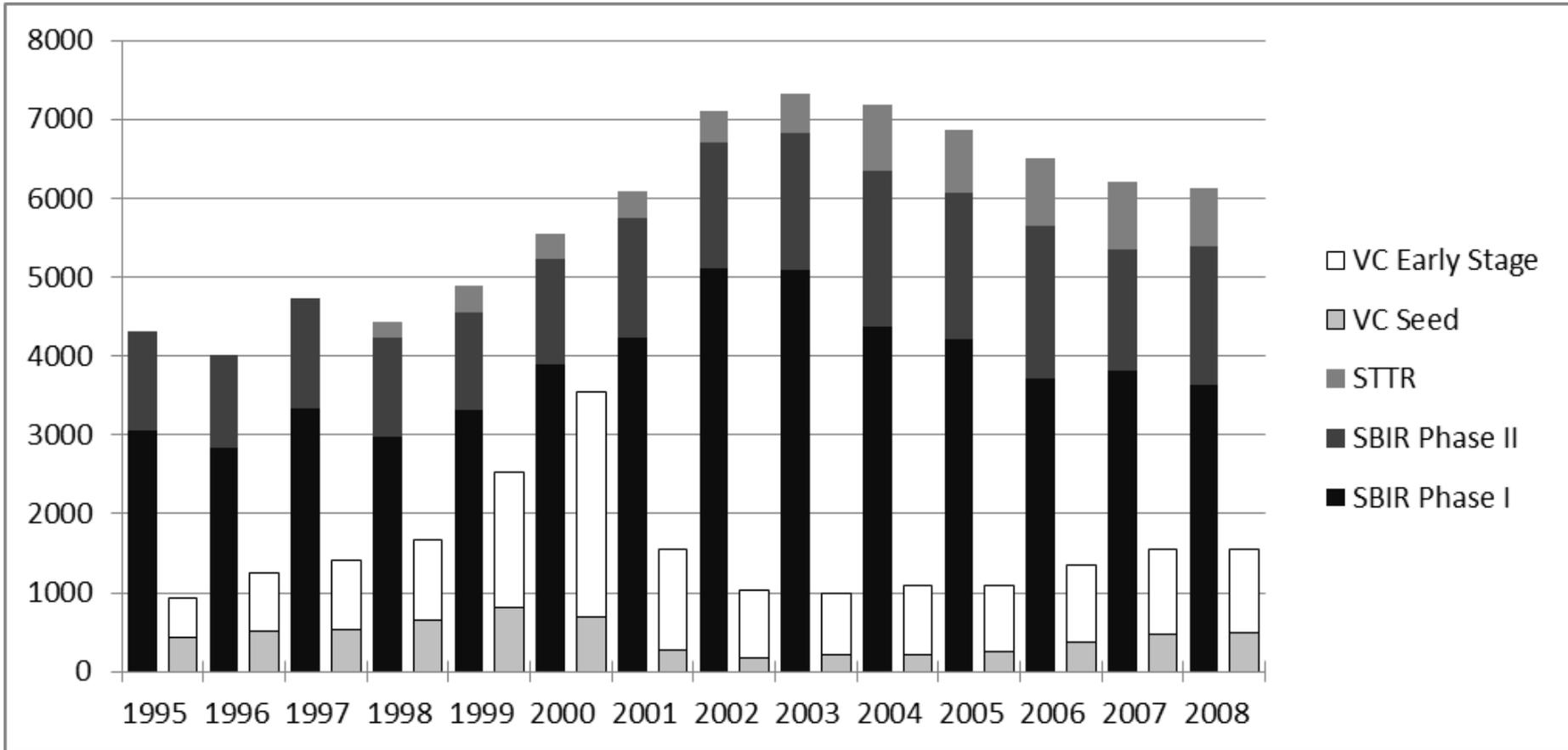
- 'mass production' system
- aviation technologies
- space technologies
- IT
- internet
- nuclear power
- nanotechnology
- green technology

Missions and risk-taking along entire innovation chain



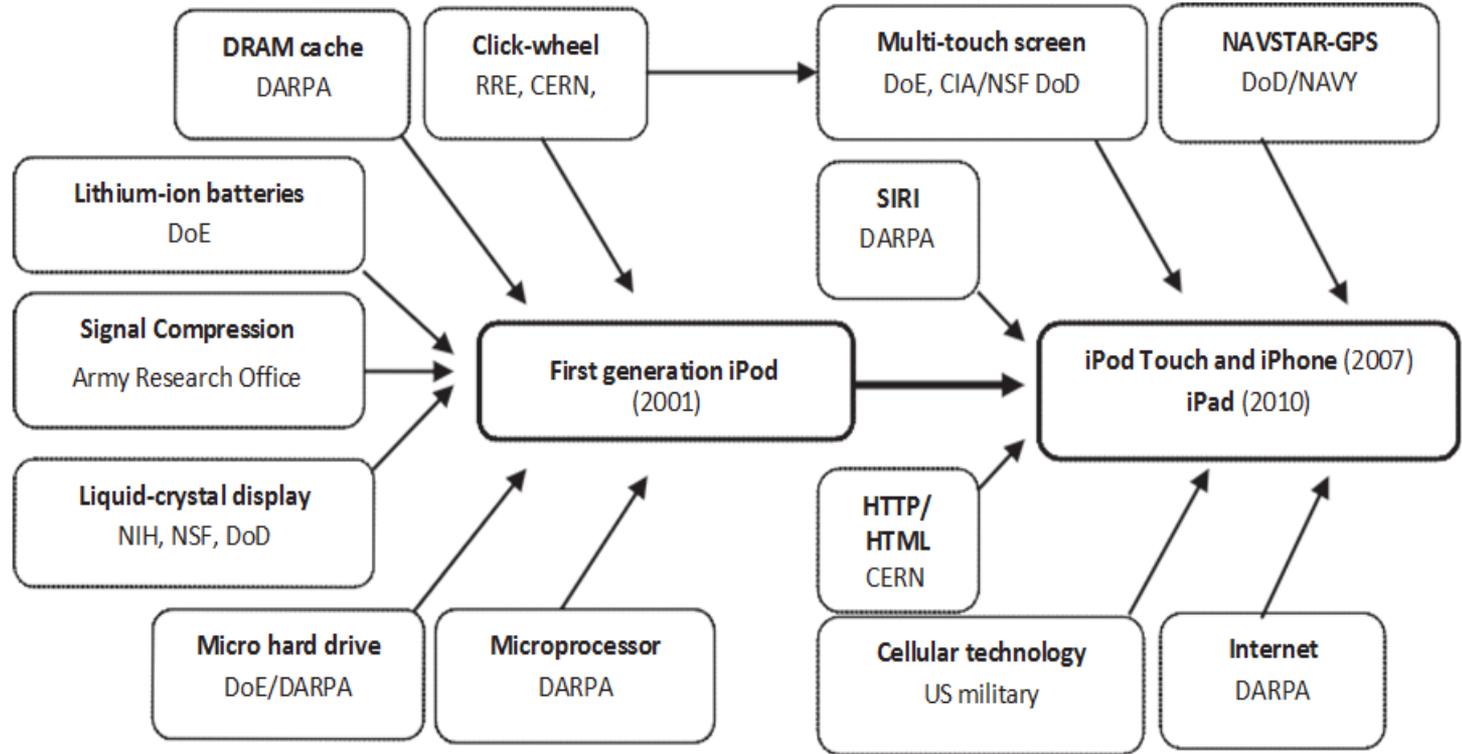
source: adapted from Auerswald/Branscomb , 2003

Private and Public (SBIR) Venture Capital



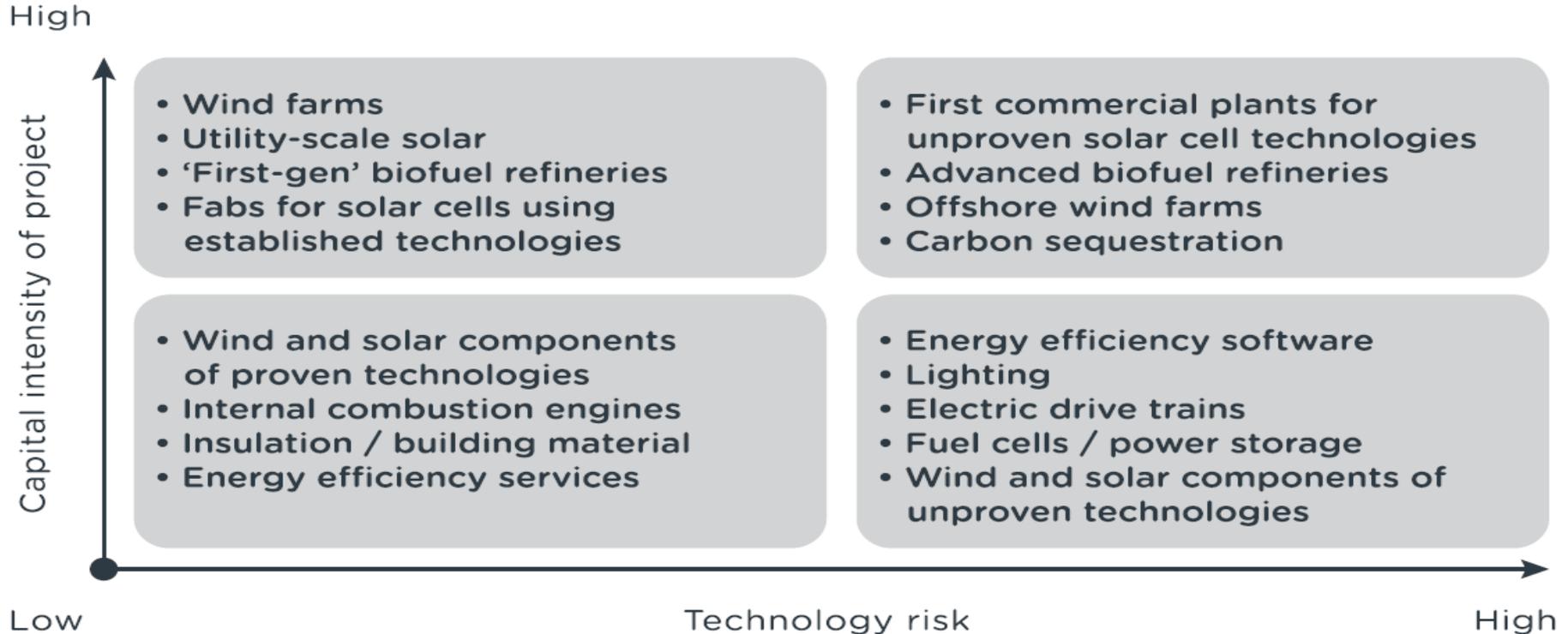
Source: Block and Keller, 2012

What makes the iPhone so 'smart'?

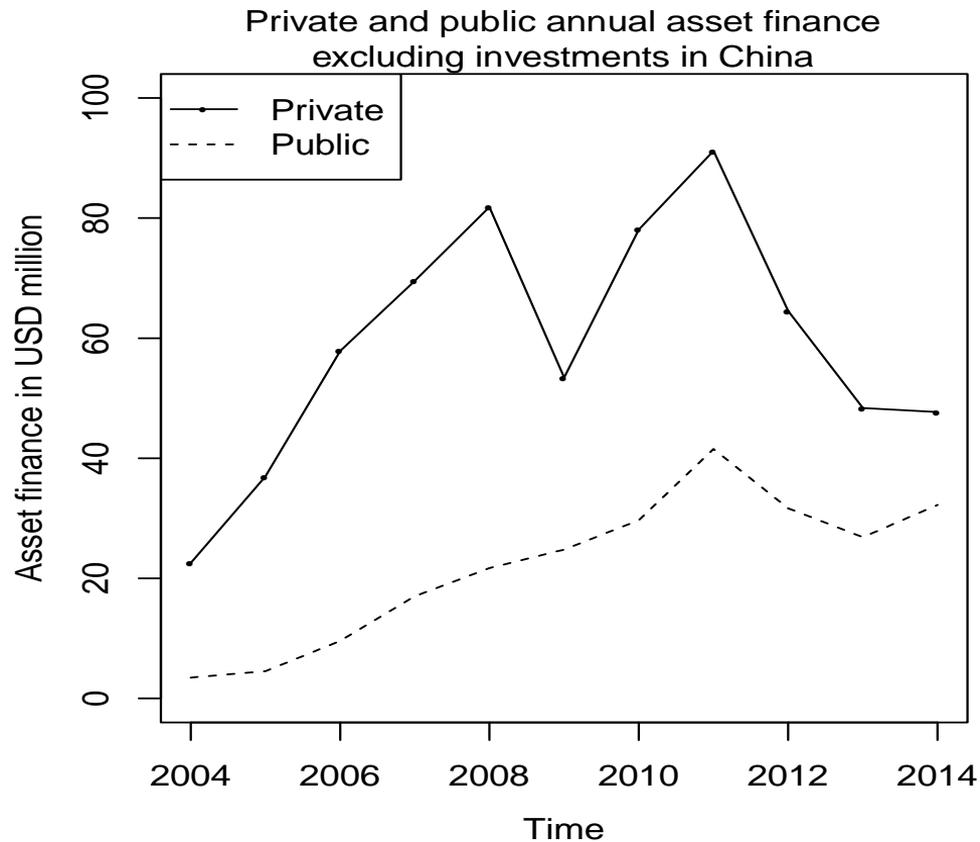
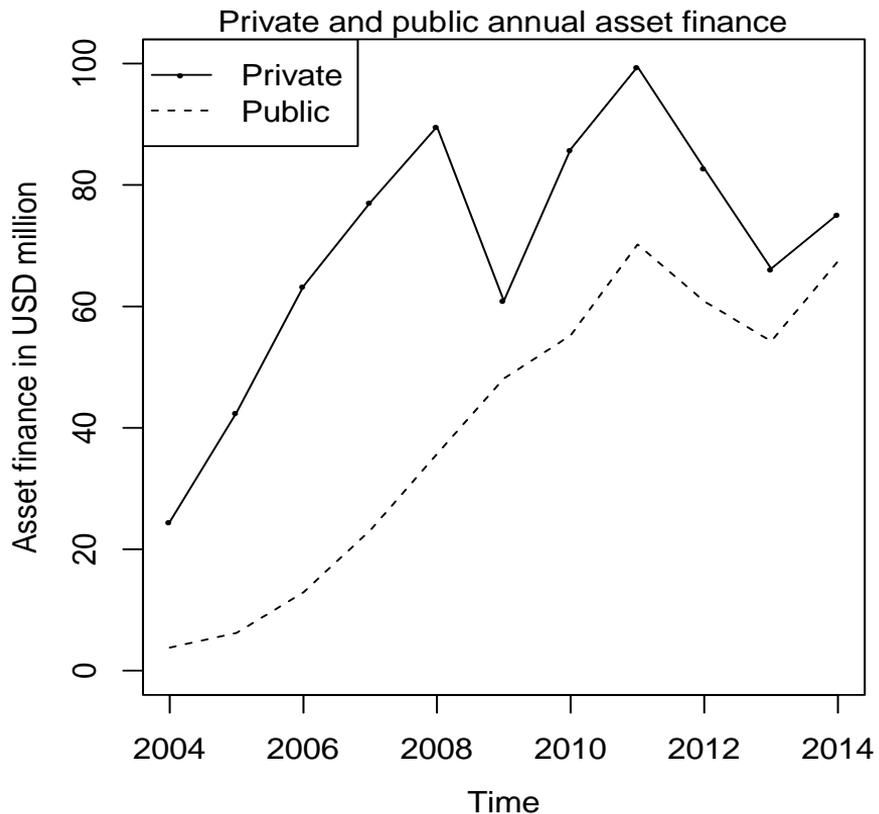


Technology risk in clean tech

(venture capital will ride the wave, who will kick/push?)



Public vs. Private risk-taking

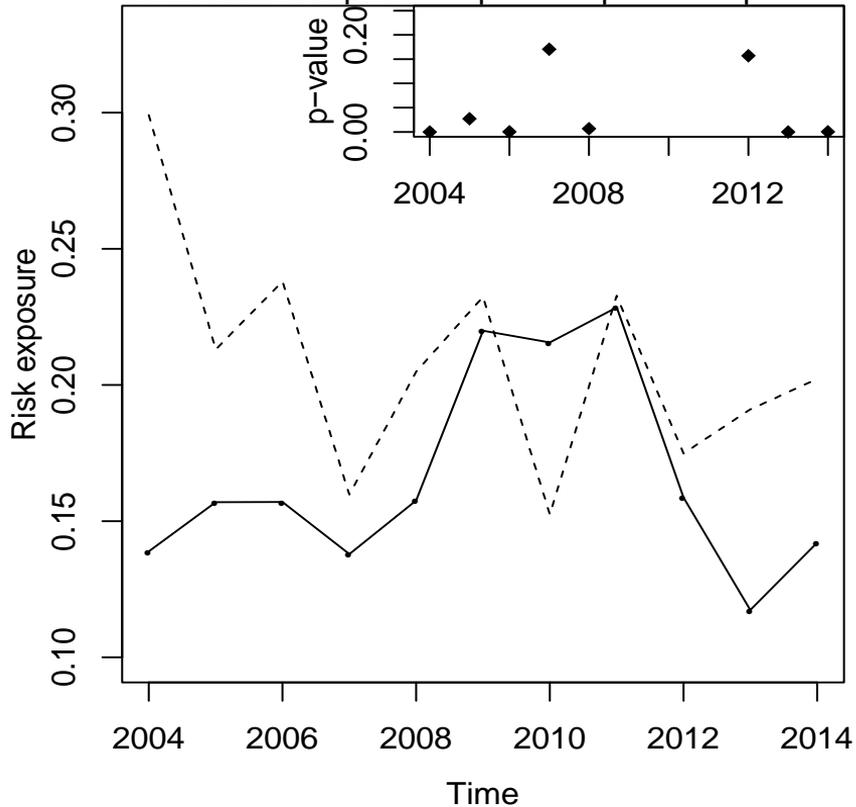


Source: Mazzucato and Semieniuk (2016), based on data by Bloomberg New Energy Finance.

Green entrepreneurial state!

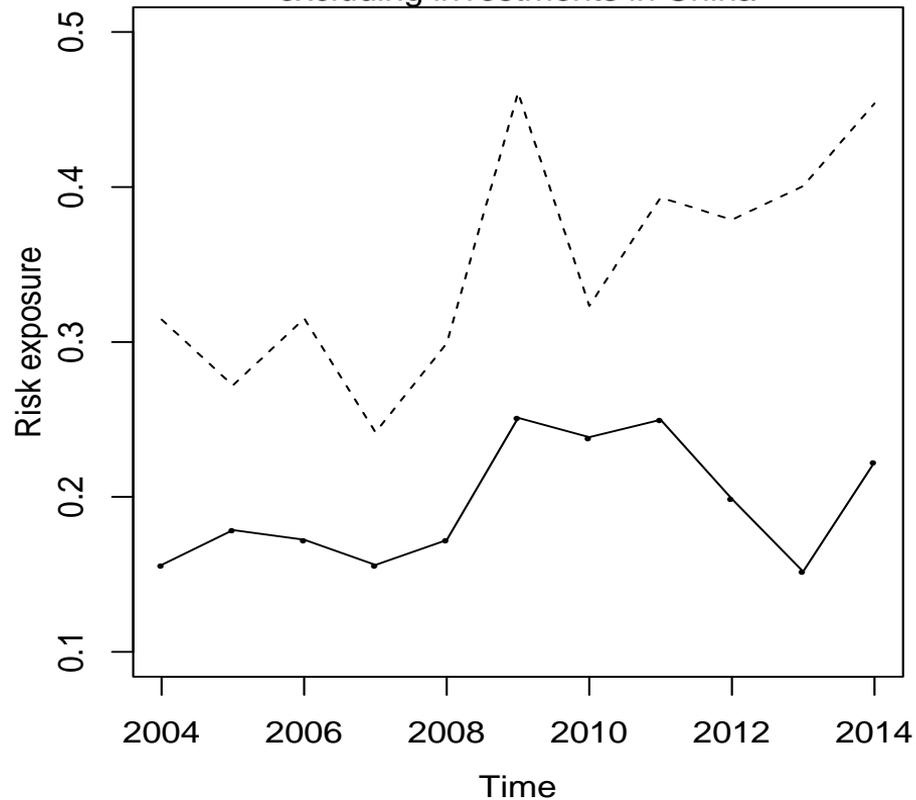
Private and public risk exposure

inset: ratio test p-value: public > private exposure



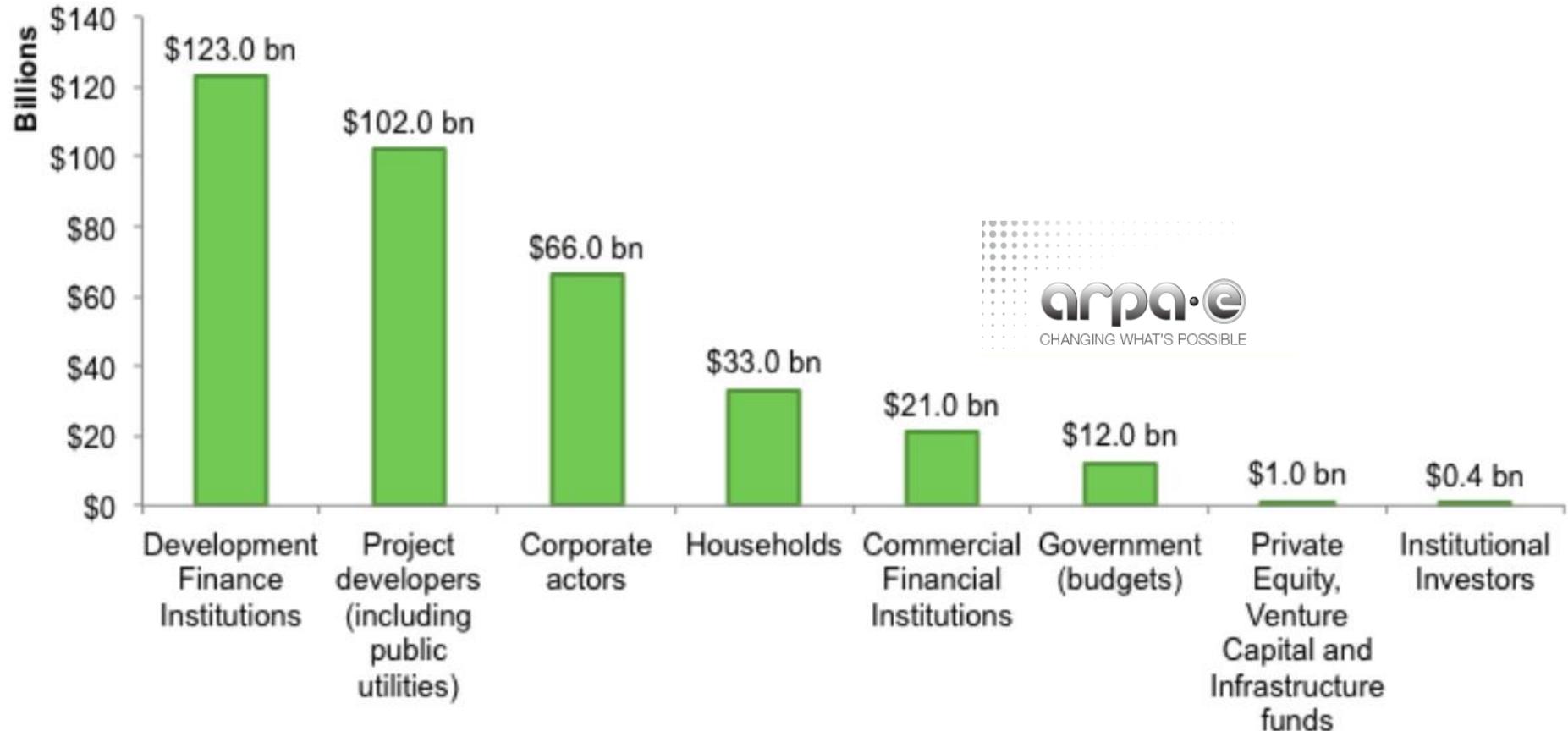
Private and public risk exposure

excluding investments in China



Source: Mazzucato and Semieniuk (2016), based on data by Bloomberg New Energy Finance.

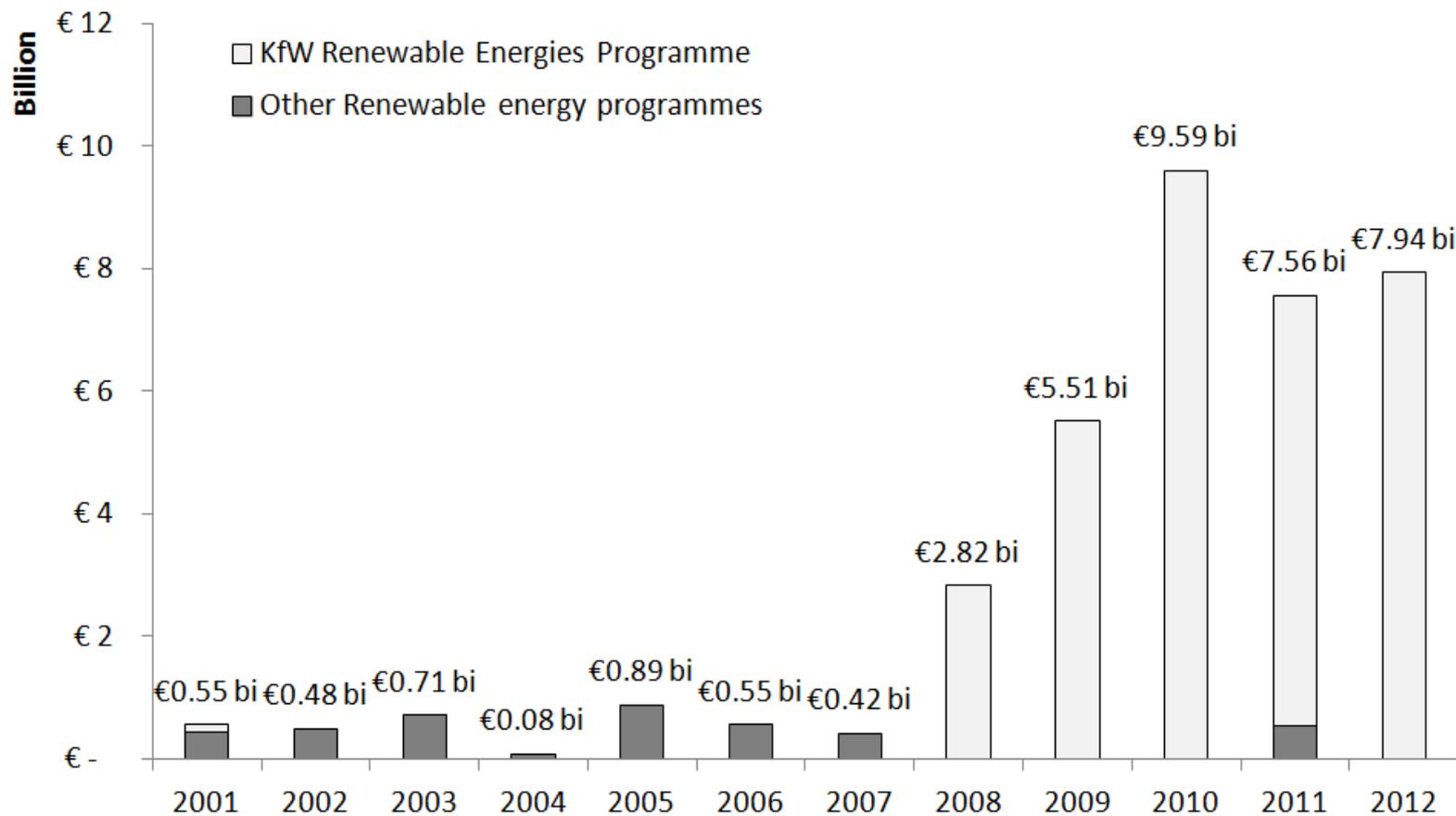
Green tech public & private investments (2011)



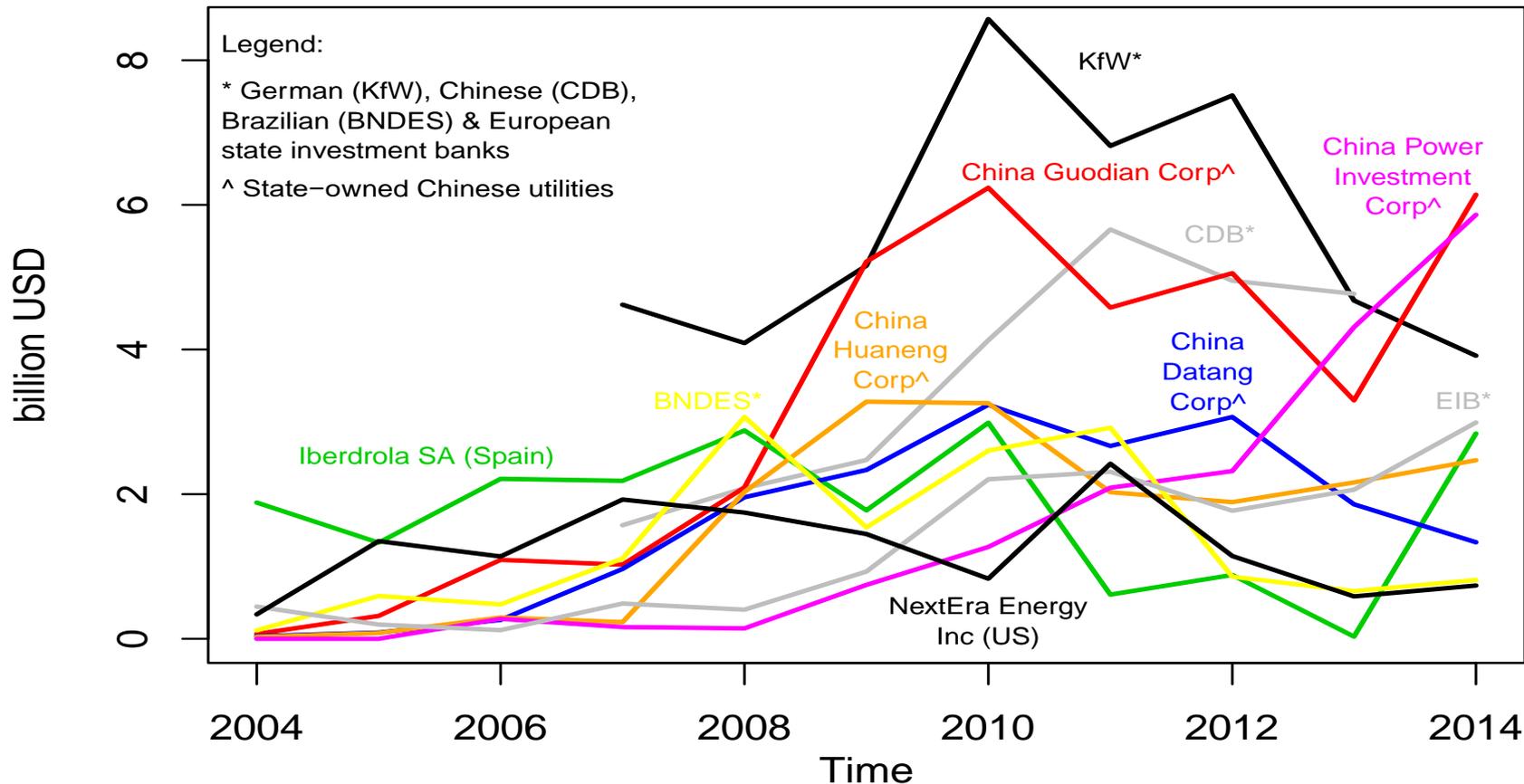
Source: Climate Finance Initiative

KfW funding for industrial environmental and climate protection projects in Germany

2001-2012



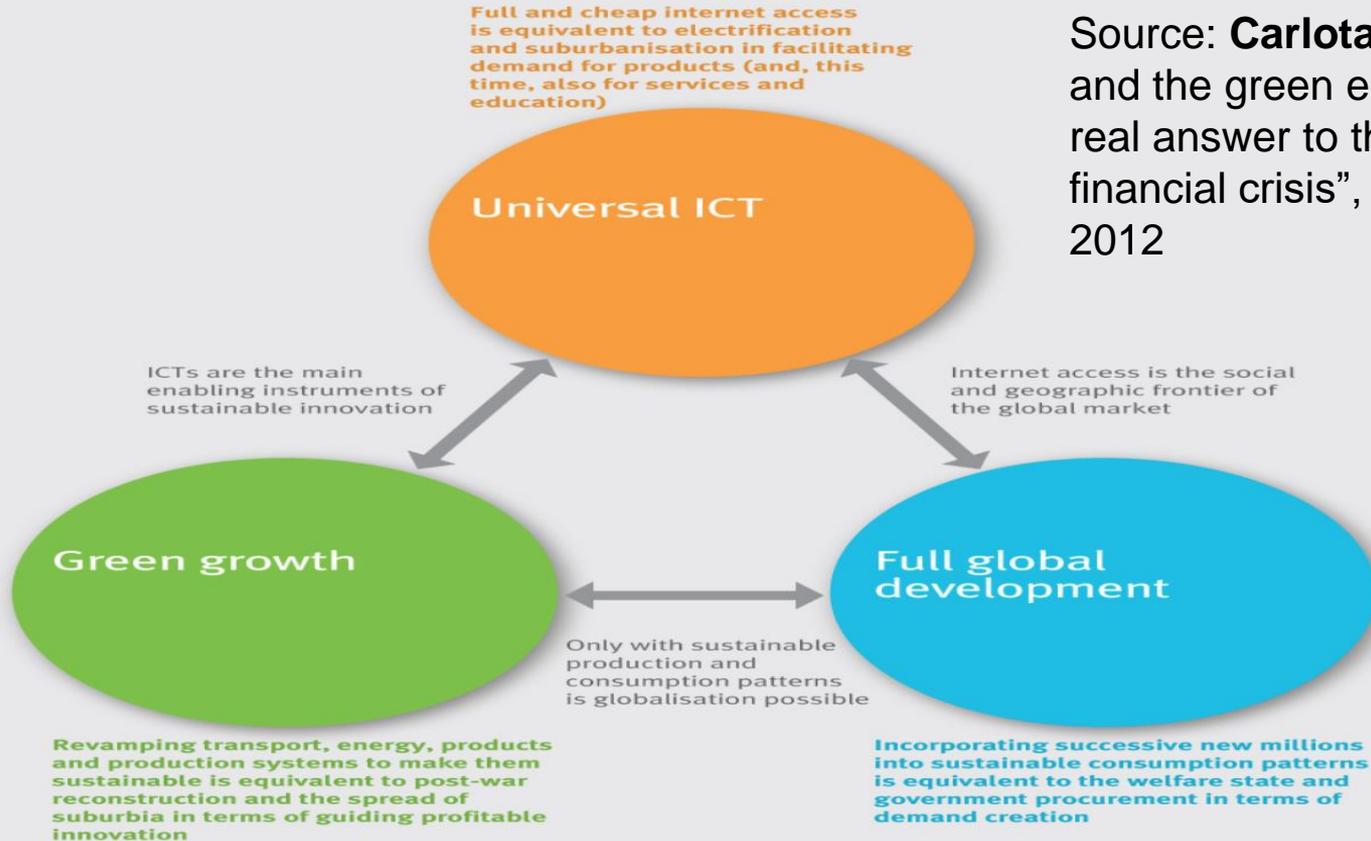
Public banks and RE investment



Source: Mazzucato and Semieniuk (forthcoming 2017), based on data by Bloomberg New Energy Finance.

Tilting the playing field via Demand

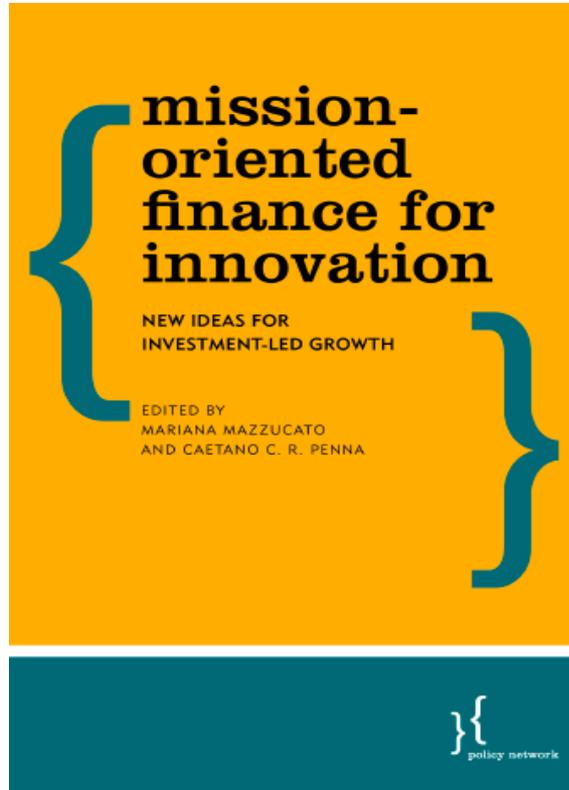
The potential for a new global positive sum game



Source: **Carlota Perez**, "Why IT and the green economy are the real answer to the financial crisis", *Green Alliance* 2012

We measure success by how many risks we have been willing to take (with inevitable failures) and whether the successes actually matter.

Cheryl Martin, ex-Director ARPA-E





A key element to get **an energy breakthrough** is more basic research. And that **requires the government to take the lead**. Only when that research is pointing towards a product then we can expect the private sector to kick in.

Source:

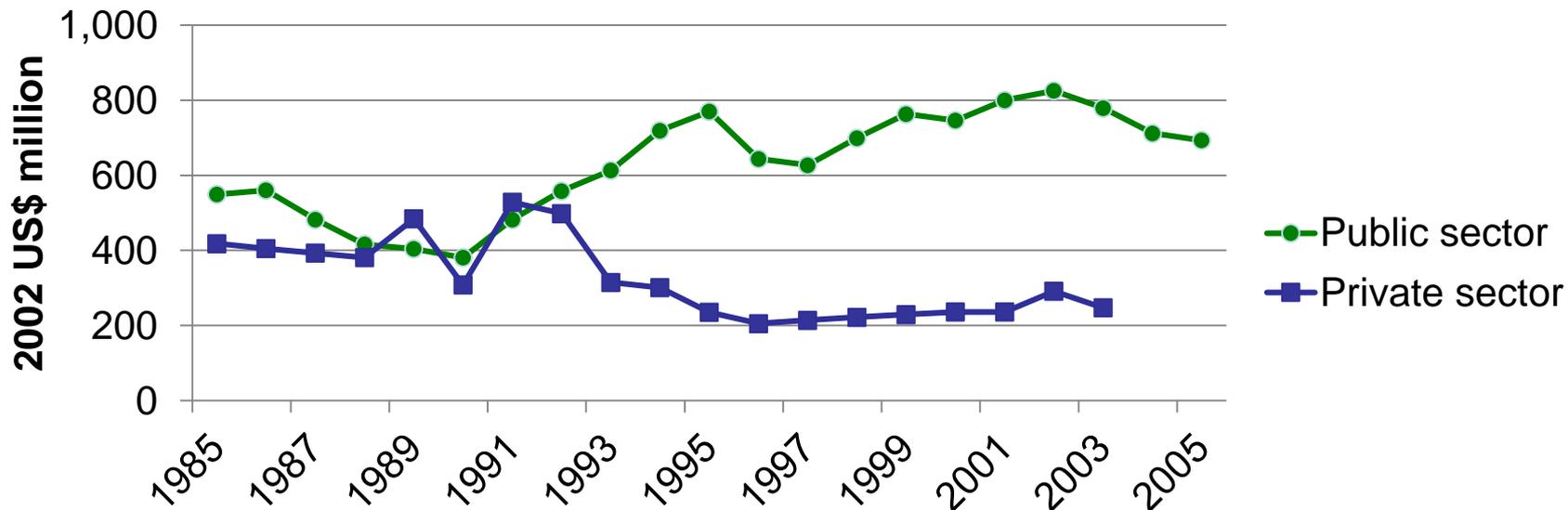
<http://www.youtube.com/watch?v=x54b>

VuduqaqU

But where are energy's Bell Labs?

Renewable energy R&D investments in the U.S.

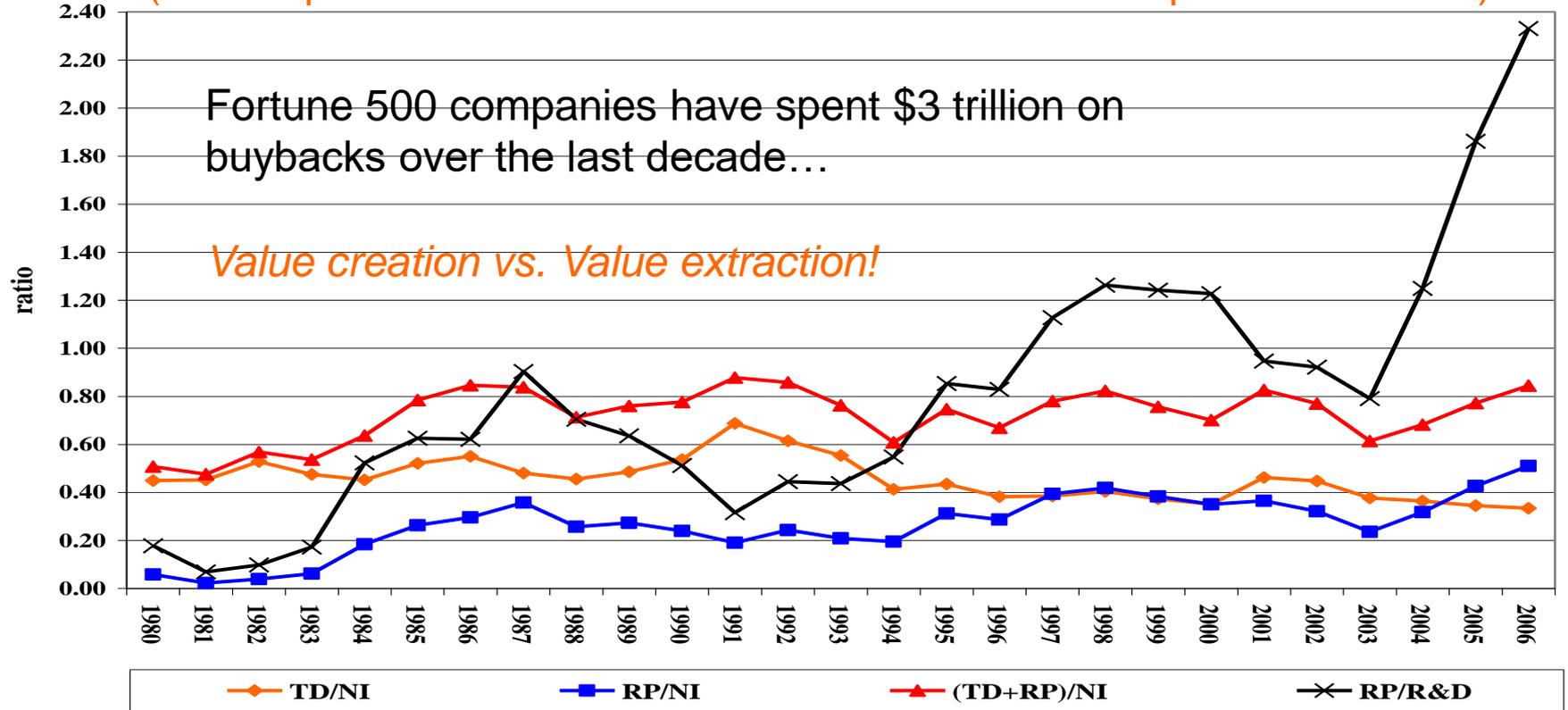
in million 2002 dollars



Source: Nemet and Kammen (2007), "U.S. energy research and development: Declining investment, increasing need, and the feasibility of expansion", *Energy Policy*, 35 (1), 746-755

Repurchases, dividends, net income, R&D 1980-2006

(293 corporations in the S&P500 in October 2007 in operation in 1980)



Source: Lazonick & Mazzucato, 2013; Lazonick, 2014

THE TOP 10 STOCK REPURCHASERS

2003-2012

At most of the leading U.S. companies below, distributions to shareholders were well in excess of net income. These distributions came at great cost to innovation, employment, and—in cases such as oil refining and pharmaceuticals—customers who had to pay higher prices for products.

Fortune 500 companies have spent **\$2.3 trillion** on **buybacks** from **2003-2012** (54% of their earnings), with another 37% on dividends.

(William Lazonick, HBR 2014)

#1 EXXON MOBIL	#2 MICROSOFT	#3 IBM	#4 CISCO SYSTEMS	#5 PROCTER & GAMBLE
NET INCOME \$347B	NET INCOME \$148B	NET INCOME \$117B	NET INCOME \$64B	NET INCOME \$93B
REPURCHASES \$207B	REPURCHASES \$114B	REPURCHASES \$107B	REPURCHASES \$75B	REPURCHASES \$66B
DIVIDENDS \$80B	DIVIDENDS \$71B	DIVIDENDS \$23B	DIVIDENDS \$2B	DIVIDENDS \$42B
TOTAL \$287B 83% of NI	TOTAL \$185B 125% of NI	TOTAL \$130B 111% of NI	TOTAL \$77B 121% of NI	TOTAL \$108B 116% of NI
CEO PAY \$289M	CEO PAY \$12M	CEO PAY \$247M	CEO PAY \$297M	CEO PAY \$90M
% STOCK BASED 73% \$211M	% STOCK BASED 0% \$0*	% STOCK BASED 64% \$158M	% STOCK BASED 92% \$273M	% STOCK BASED 16% \$14M

#6 HEWLETT-PACKARD	#7 WALMART	#8 INTEL	#9 PFIZER	#10 GENERAL ELECTRIC
NET INCOME \$41B	NET INCOME \$134B	NET INCOME \$79B	NET INCOME \$84B	NET INCOME \$165B
REPURCHASES \$64B	REPURCHASES \$62B	REPURCHASES \$60B	REPURCHASES \$59B	REPURCHASES \$45B
DIVIDENDS \$9B	DIVIDENDS \$35B	DIVIDENDS \$27B	DIVIDENDS \$63B	DIVIDENDS \$87B
TOTAL \$73B 177% of NI	TOTAL \$97B 73% of NI	TOTAL \$87B 109% of NI	TOTAL \$122B 146% of NI	TOTAL \$132B 81% of NI
CEO PAY \$210M	CEO PAY \$189M	CEO PAY \$127M	CEO PAY \$91M	CEO PAY \$126M
% STOCK BASED 37% \$78M	% STOCK BASED 62% \$117M	% STOCK BASED 62% \$79M	% STOCK BASED 25% \$23M	% STOCK BASED 25% \$32M

Better 'deal' between public & private

- reinvesting profits
- retaining golden share of IPR
- capping prices (Bayh Dole act allows it)
- negotiating conditions (generics)
- income contingent loans
- retain some equity (Tesla & Solyndra lesson)
- % payback into an 'innovation fund'
- State investment banks

(discussed in Mazzucato, 2015; 2016)



Economics and policy
for Sustainable and
Inclusive Growth

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From Market Fixing to Market-Creating: A new framework for innovation policy (2016) *Industry and Innovation*, Vol. 23 (2), **M. Mazzucato**

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The risk-reward nexus in the innovation-inequality relationship: Who takes the risks? Who gets the rewards? (2013), *Industrial and Corporate Change*, 22:4:1093-1128, **W. Lazonick & M. Mazzucato**.

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