



# State investment banks: *investors of first resort*

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- **Smart** growth (better innovation)
- **Sustainable** growth (more green)
- **Inclusive** growth (less inequality)

# What is State's role?

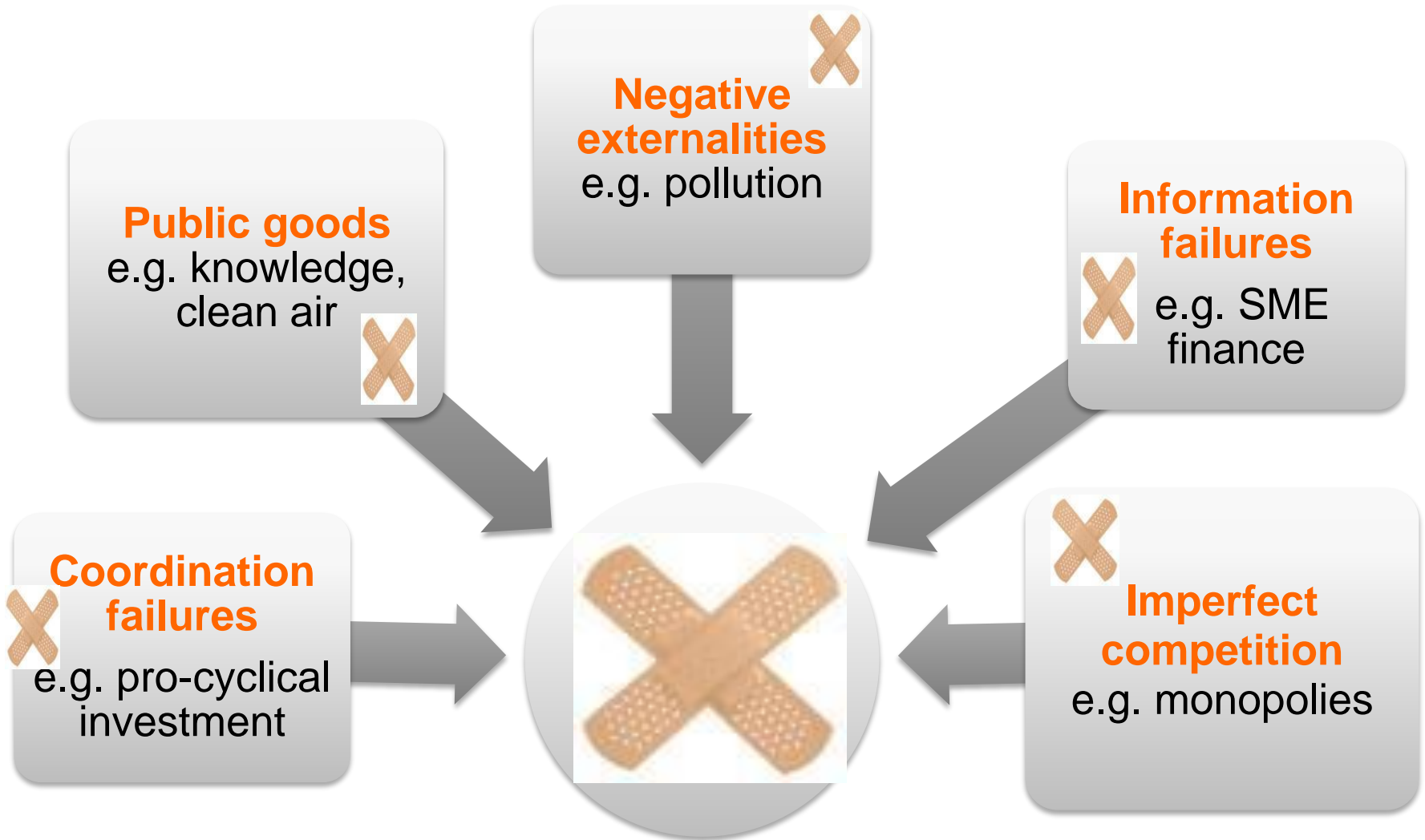
Set rules of the game and 'level' the playing field

De-risk, incentivise and 'facilitate' private sector

Solve market and system 'failures'

or....something more interesting?

# Fixing failures





"**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).

# the assumption



private sector

where are the european go ups?  
vs.



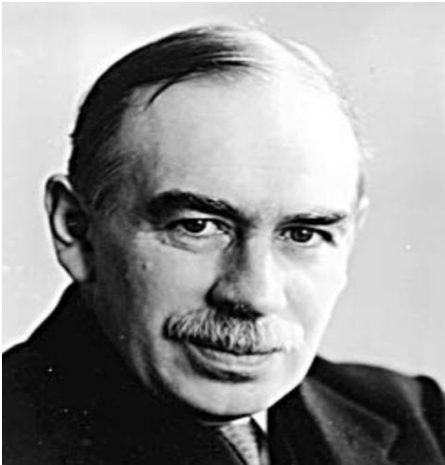
public sector

## A different view: market *shaping* & *creating*



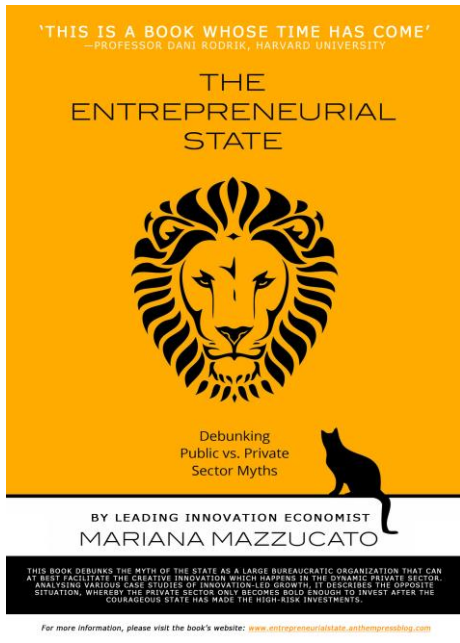
“The road to free markets was opened and kept open by an enormous increase in continuous, centrally organized and controlled interventionism... **Administrators had to be constantly on the watch to ensure the free working of the system.**”

**Karl Polanyi**, *The Great Transformation*, 1944



“The important thing for Government is not to do things which individuals are doing already, and to do them a little better or a little worse; but to **do those things which at present are not done at all.**”

**John M. Keynes**, *The End of Laissez Faire*, 1926

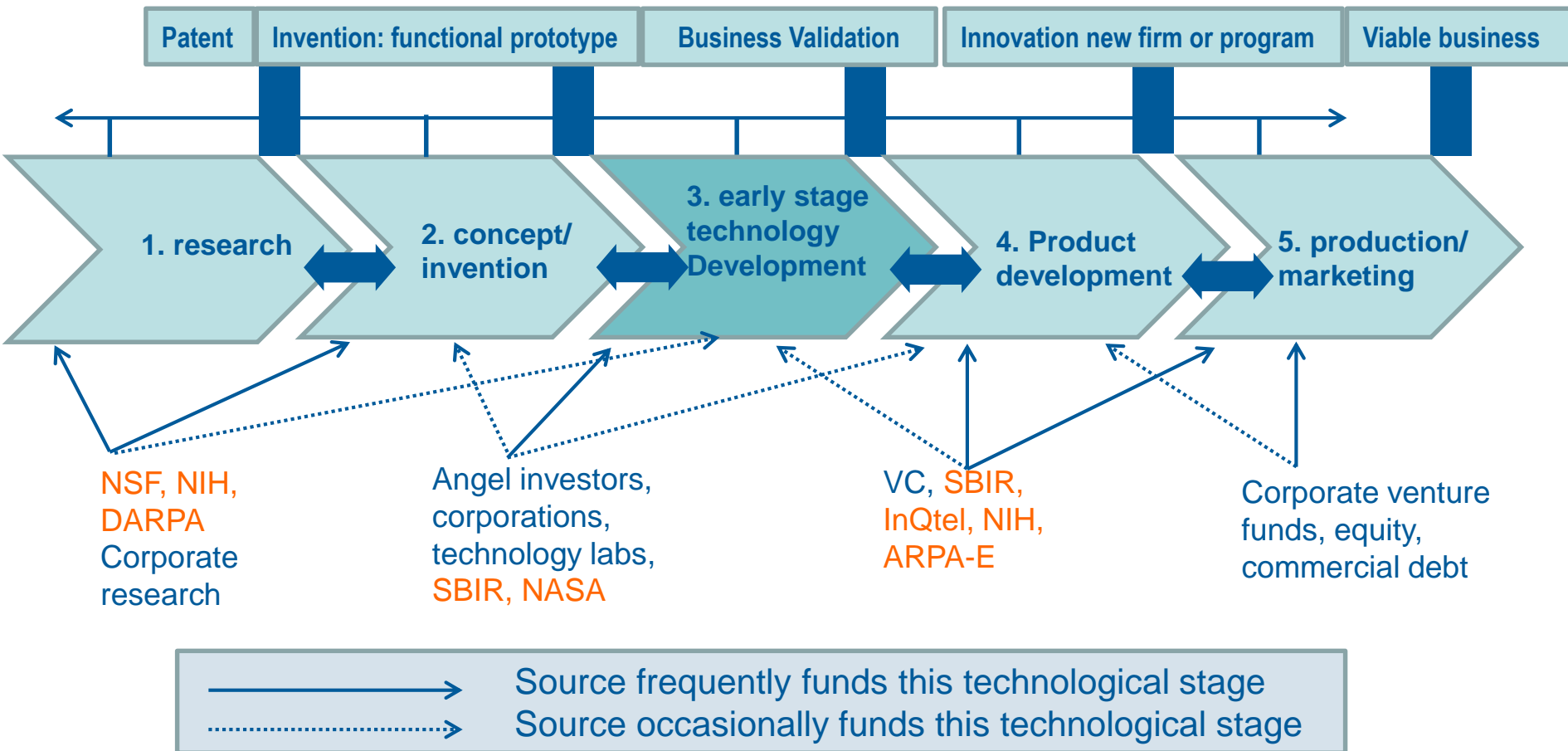




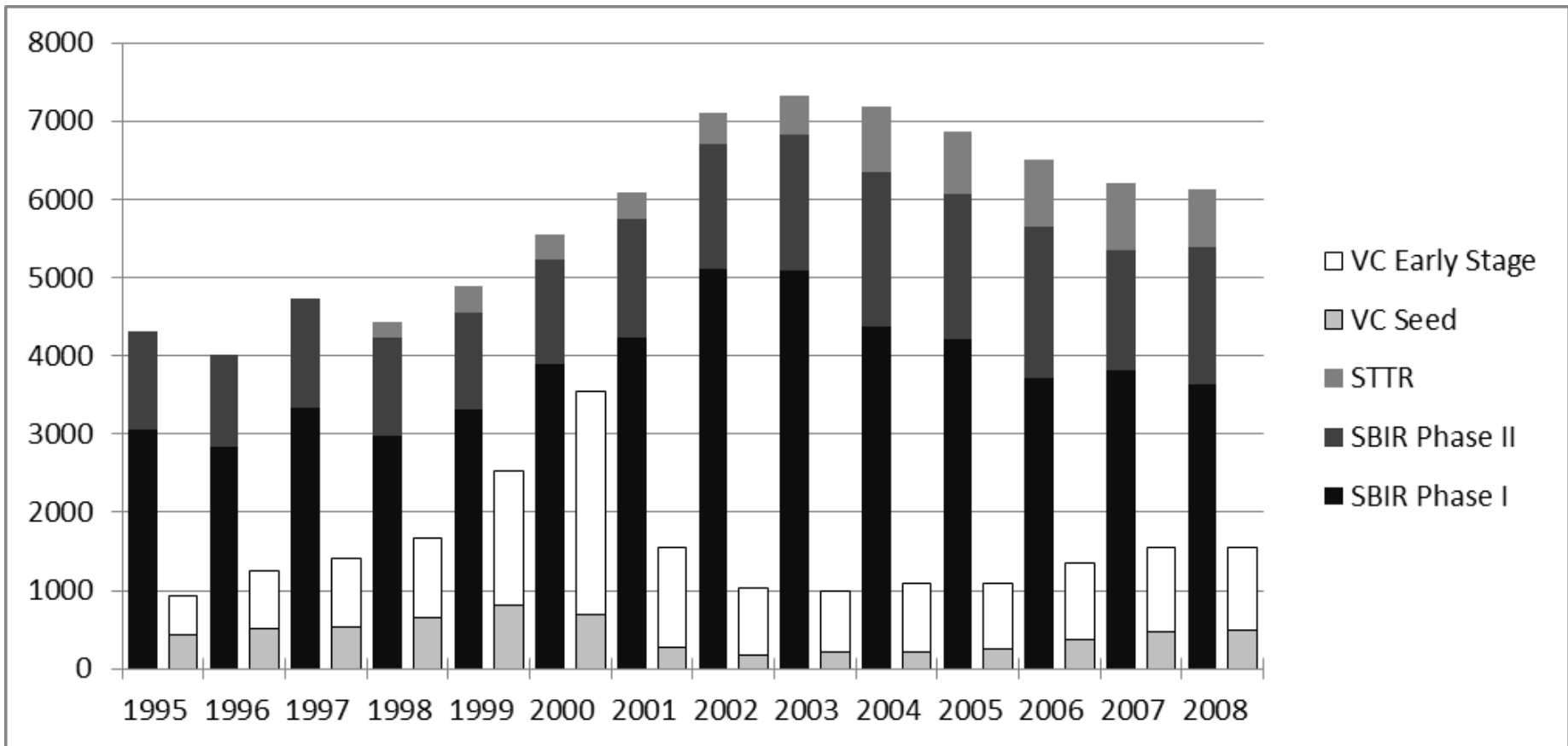
# Market failure policies don't explain *General Purpose Technologies*

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

# Missions and risk-taking along entire innovation chain

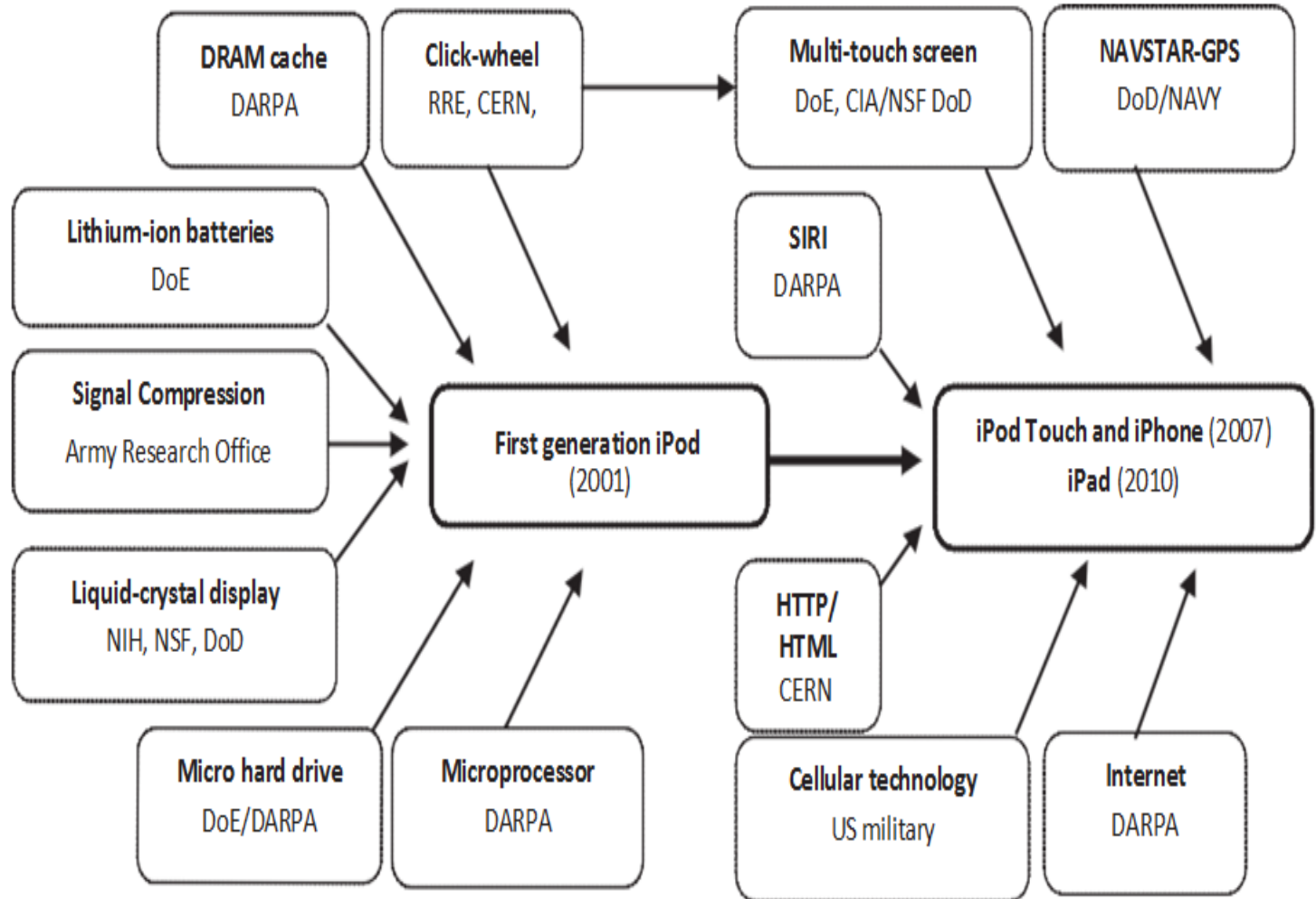


# Private and Public (SBIR) Venture Capital



Source: Block and Keller, 2012

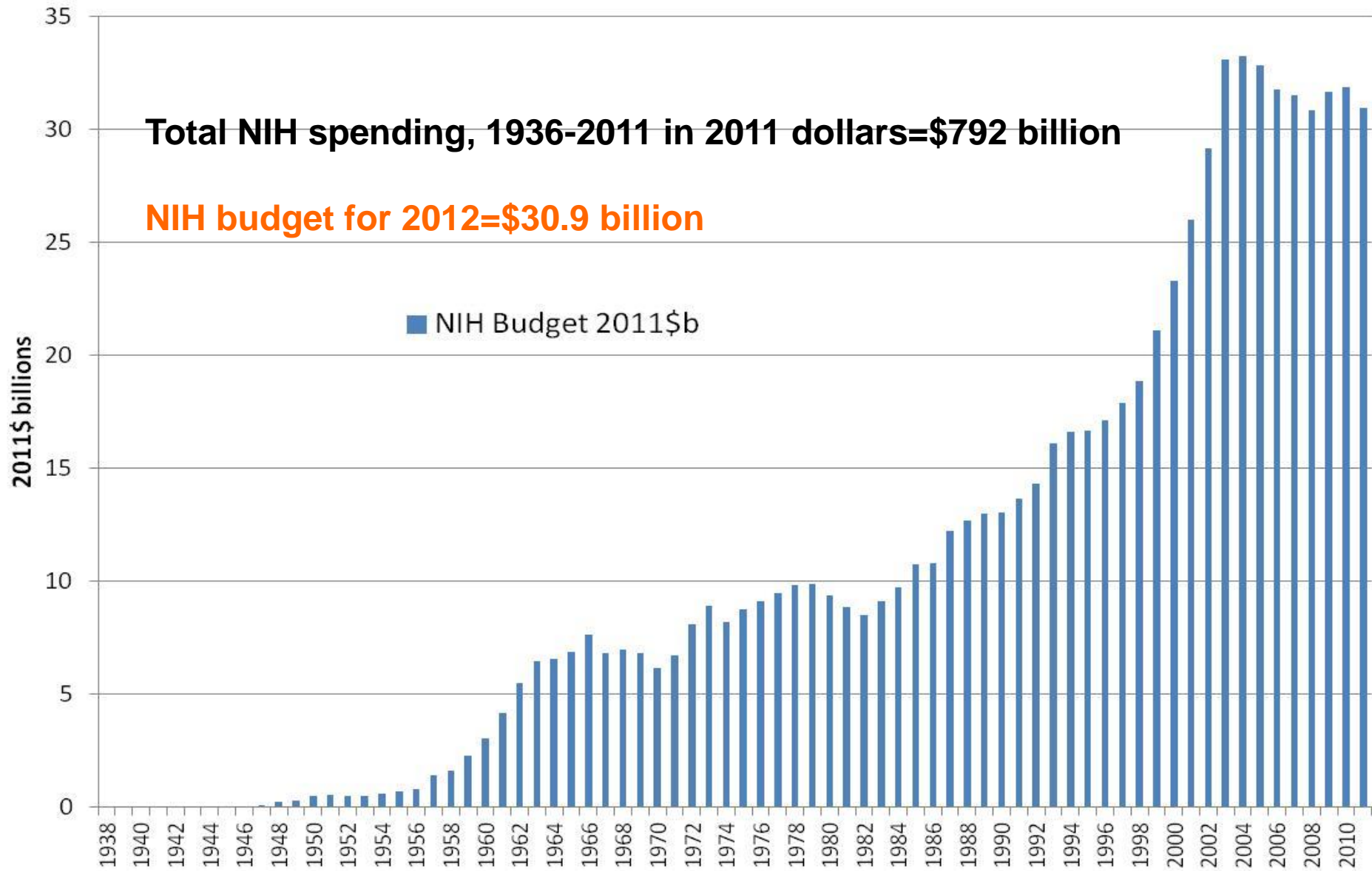
# What makes the iPhone so 'smart'?



# National Institutes of Health budgets 1936-2011

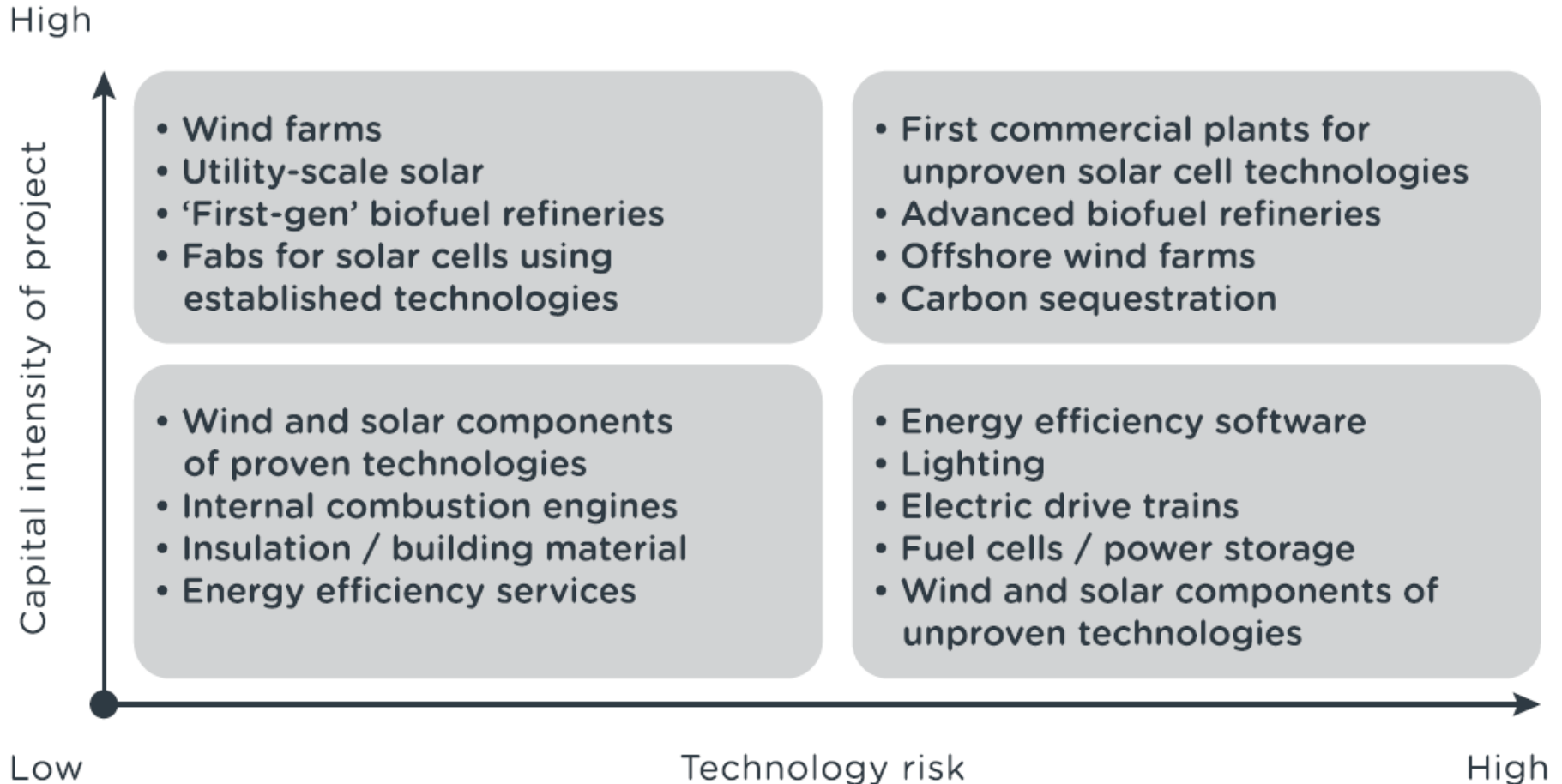
**Total NIH spending, 1936-2011 in 2011 dollars=\$792 billion**

**NIH budget for 2012=\$30.9 billion**



# Technology risk in clean tech

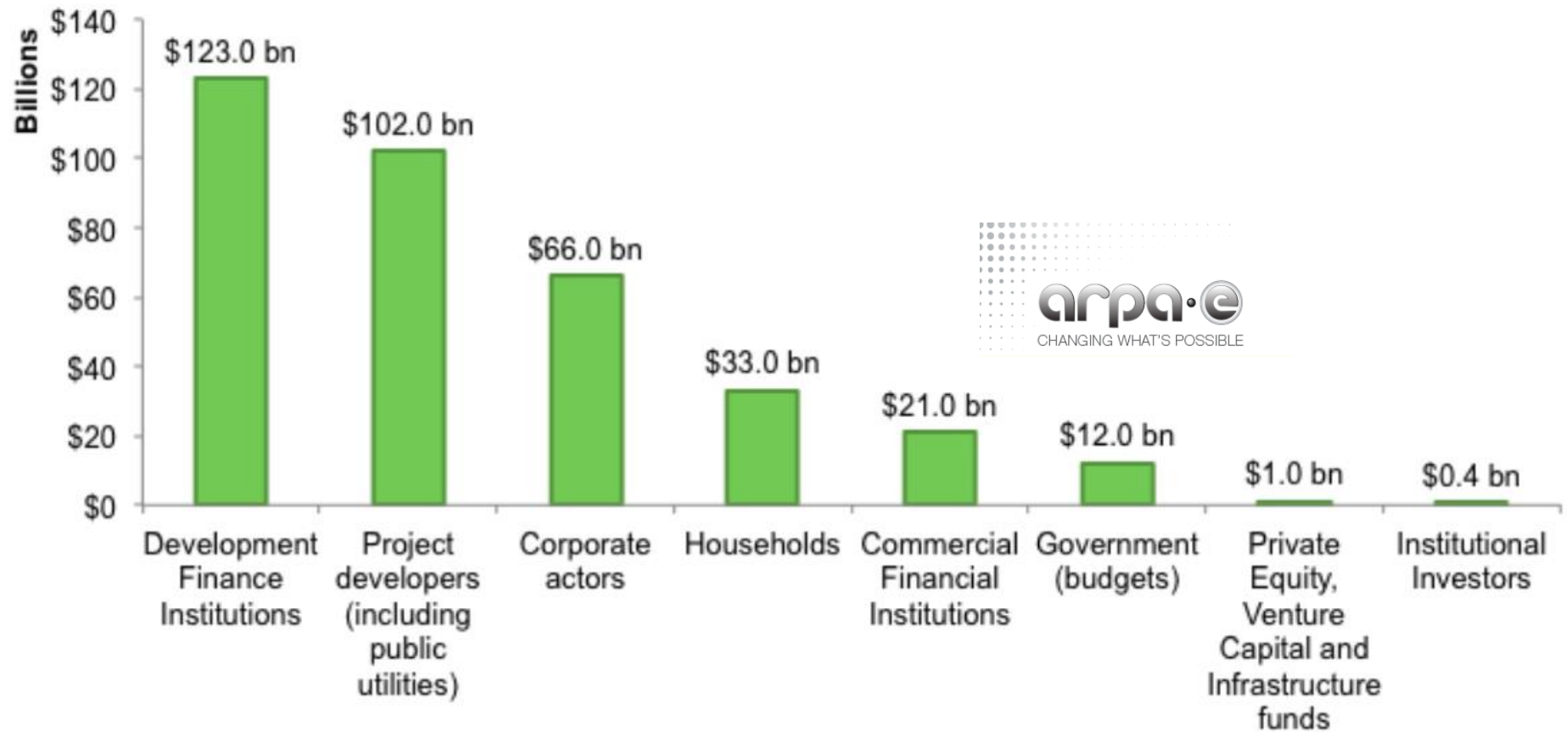
*(venture capital will ride the wave, who will kick/push?)*





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.

# Green tech public & private investments (2011)



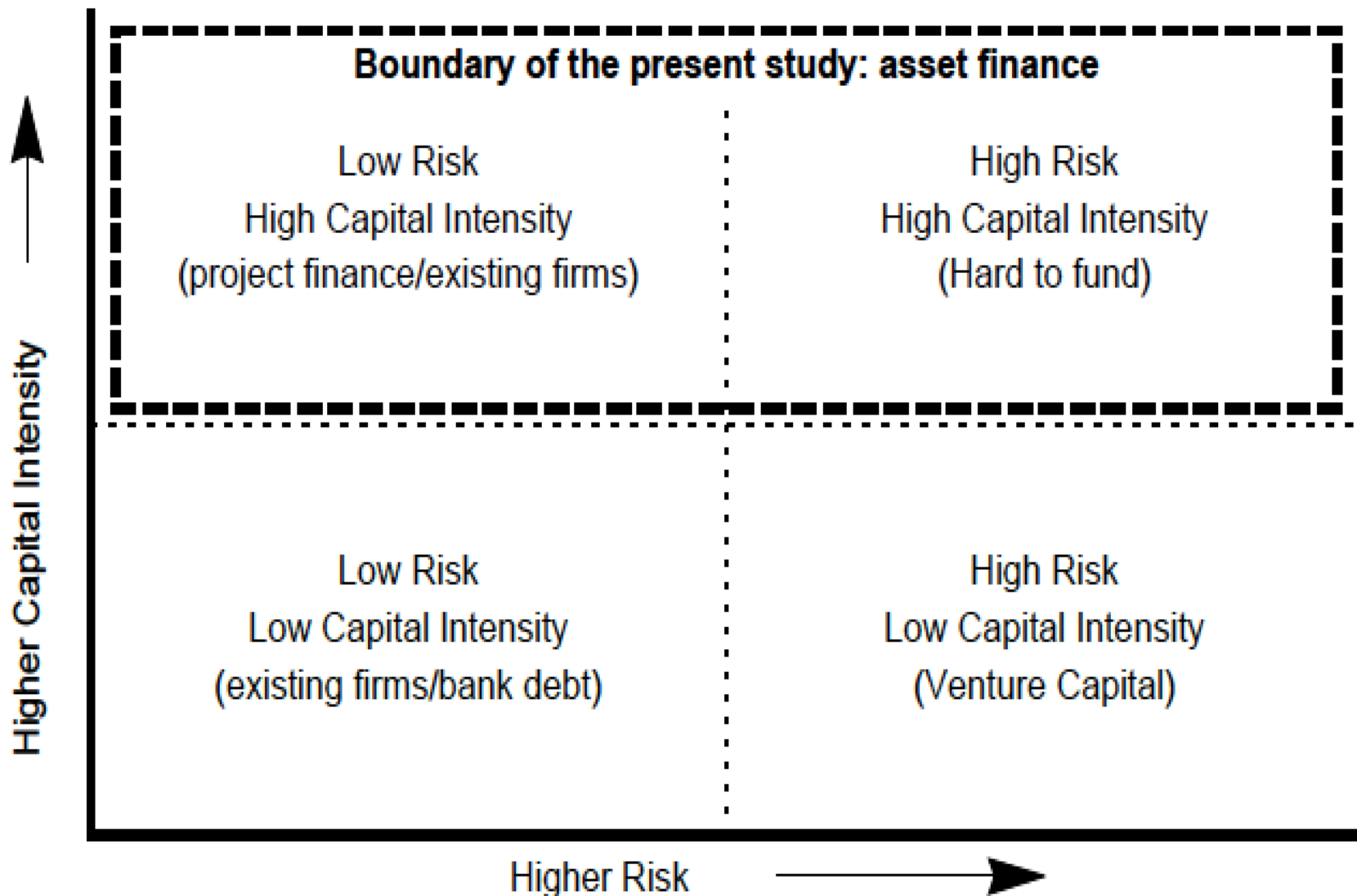
Source: Climate Finance Initiative



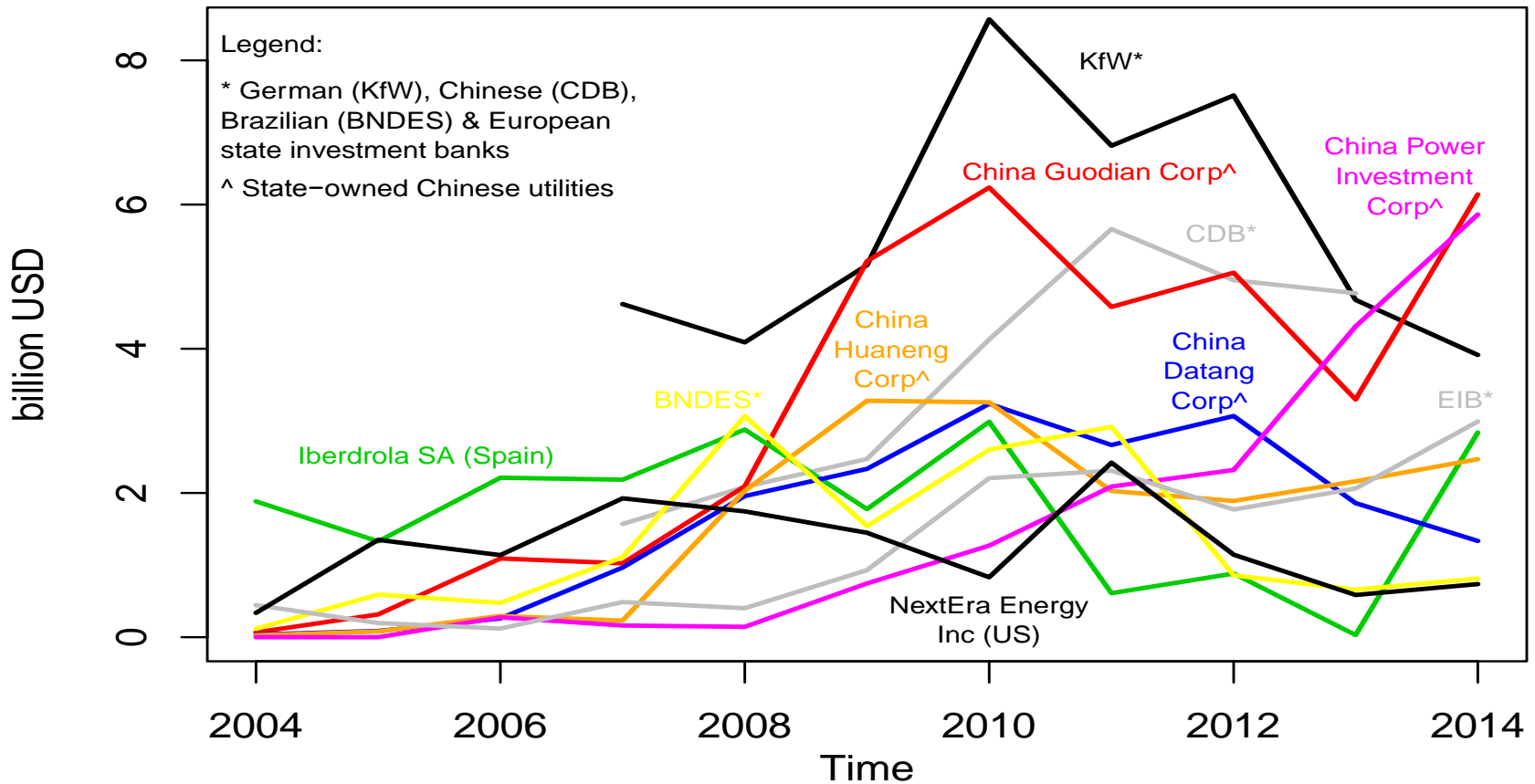
# The roles of state investment banks

1. Countercyclical lending to offset the 'credit crunch' during economic recessions → **countercyclical role (1940/50s-)**
2. funding for long-term projects, industrialization and capital development of the economy → **capital development role (1940s/50s-)**
3. targeting investments in high-risk R&D, innovative start ups, and lengthy innovations, areas that private capital has proved to be too short-termist and risk-averse to venture into → **venture capitalist role (1950s/60s-)**
4. Promotion of investments that help address complex societal problems such as climate change → **mission oriented role (2000s-)**

Figure 4: Risk-capital intensity classification of RE finance

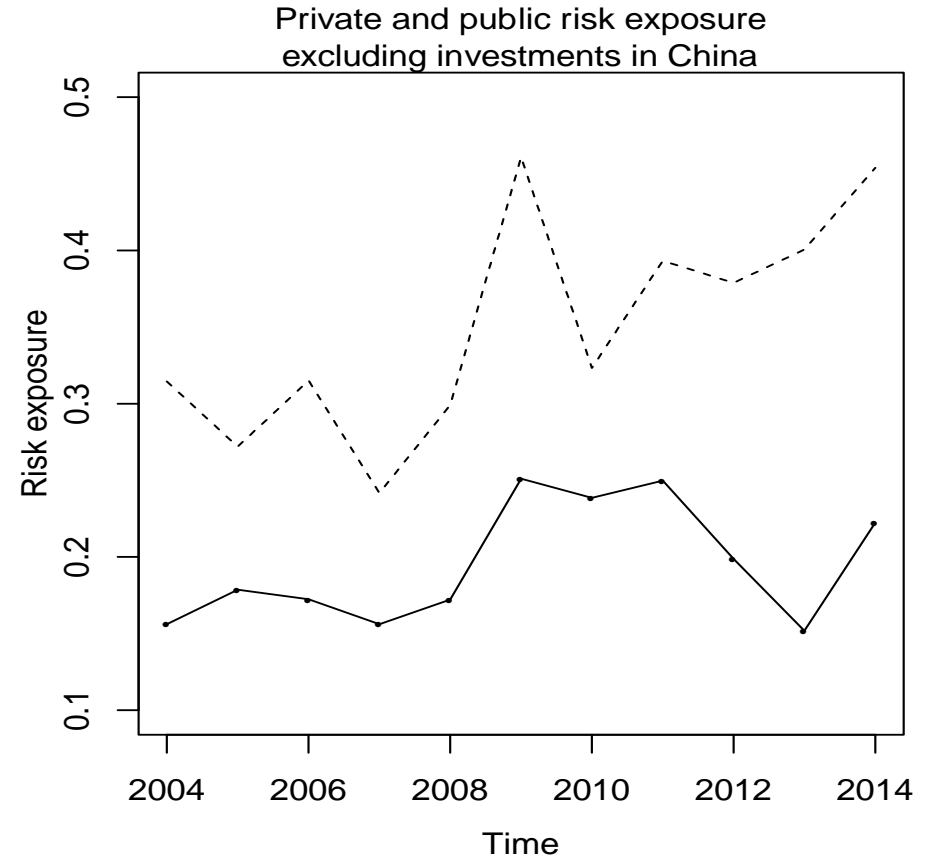
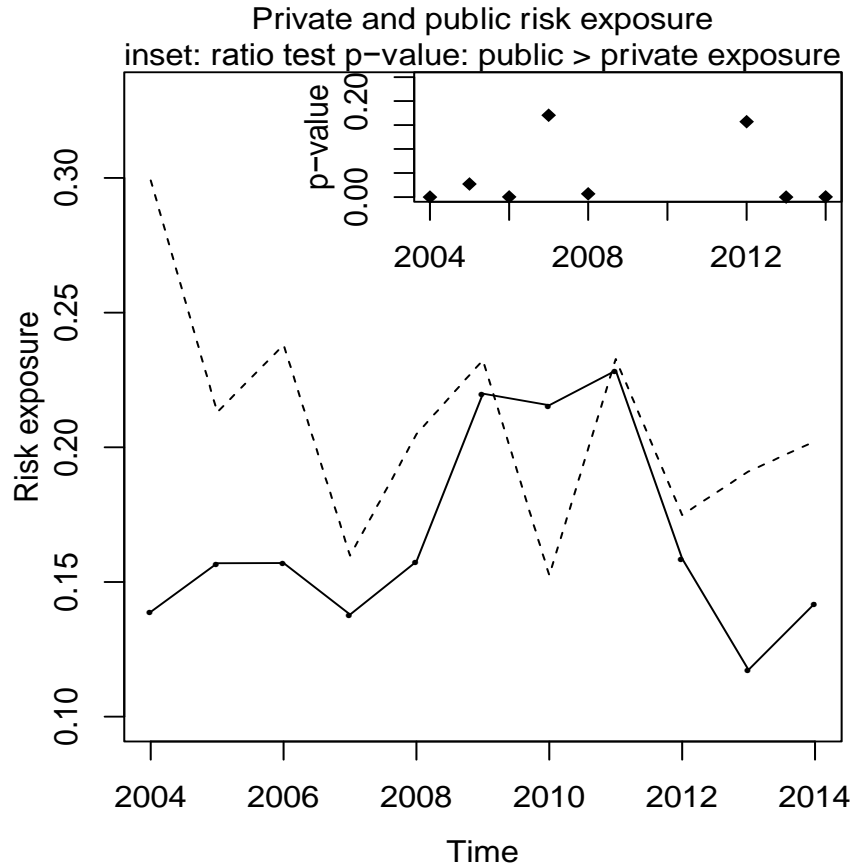


# Public banks and RE investment



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

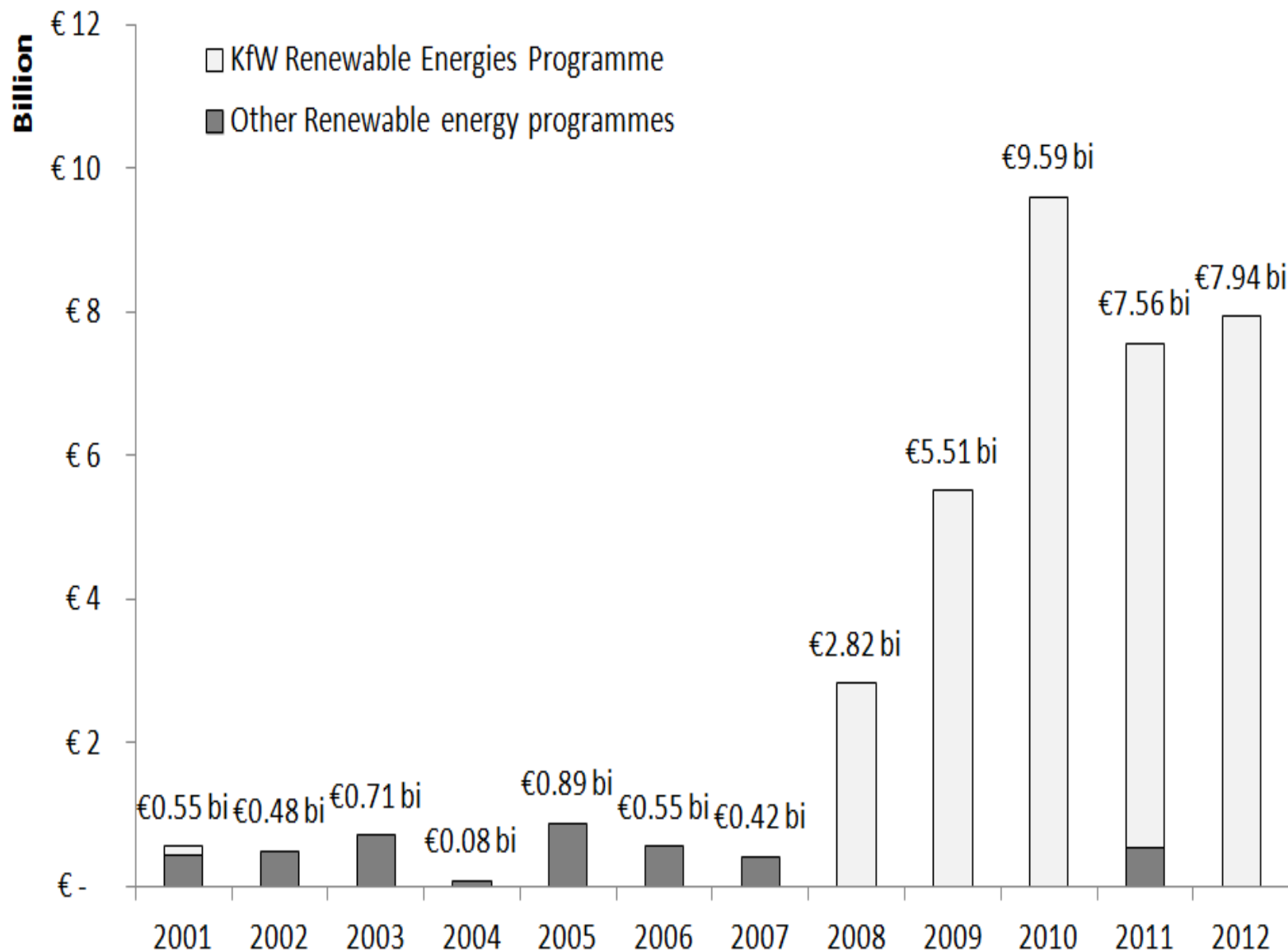
# Green entrepreneurial state



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

# KfW funding for industrial environmental and climate protection projects in Germany

## 2001-2012



# China Development Bank

China's 2020 goal of producing 20% energy from renewables. 5 year plan includes \$1.7 trillion dollars in 5 new (green) sectors.

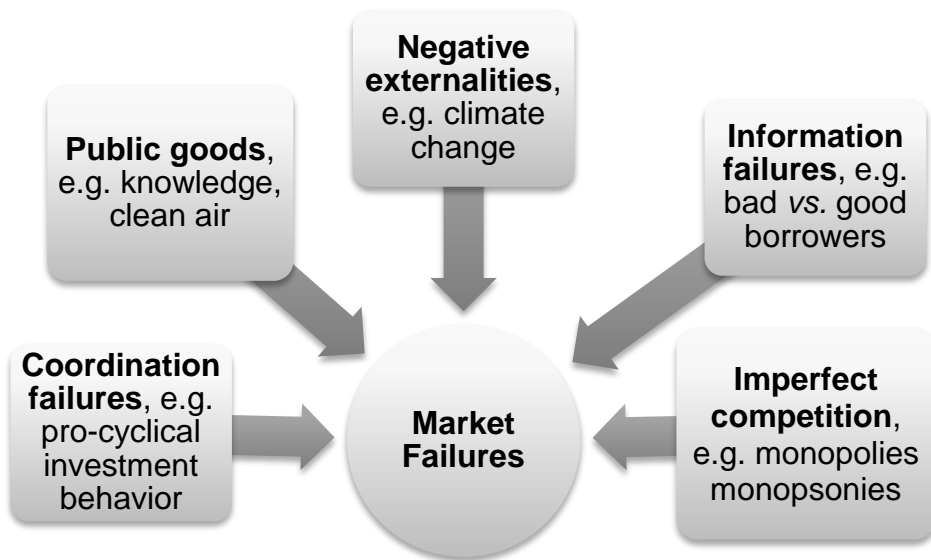
CDB founded **CDB Capital**, a 'public equity' fund with **\$US 5.76 bn to finance innovative start-ups** from the energy and telecom sectors.

*Yingli Green Energy* received **\$1.7 bn** from 2008 through 2012 with a **\$5.3 bn line of credit** opened for it. **LDK Solar (\$9.1 bn)**; **Sinovel Wind (\$6.5 bn)**; **Suntech Power (\$7.6 bn)**; and **Trina Solar (\$4.6 bn)**,

Patient committed finance has “allowed Chinese companies to further ramp up production and drive down costs” of renewable energy technologies

# The role of the SIBs in the economy: via market failure lens

## Types of market failures



## Limitations of MFT

- Concerned with steady state situations  
→ patches on existing trajectories.
- No justification for the directionality needed for great transformations.
- Evaluation toolbox: static cost-benefit analysis, based on ex-ante assumptions that do away with uncertainty.
- Ignores issues of distribution of risks/rewards.
- Practical consequences and criticisms:
  - **Minimal state**: organised to insulate public sector from private interest.
  - **Crowding out**: anything beyond fixing failures unwarranted.
  - **Cannot pick winners**: rent seeking and inefficiency.

# So, what about the criticisms then?

- **Financial repression/crowding out:**
  - a matter of empirical investigation → SIBs should do what the private sector is/will not.
  - Full employment, crowd in, ‘dynamize in’, and envisioning
- **Misallocation of resources**
  - public sector structure: not *in opposition* to market forces, but *complementary* to them → making choices and coordinate the socio-techno-economic system.
  - Maximization of absorptive capacity



- **Incapacity to pick winners**
  - MFT says little about state as *lead investor and risk taker*.
  - Picking winners requires adoption of *portfolio approach*: (a) success from few projects can cover losses from many projects and (b) the state learns from its losing investments.
- **Inefficient governmental structures**
  - A key limitation of MFT: inability to justify or explain the state as shaper and creator of markets – not just fixing them when they fail → promoting ‘great transformations’.
  - Economic development and transformation of socio-techno-economic landscape as: (i) non-probabilistic risk-taking – uncertain – process; (ii) a process of experimentation and discovery; and (iii) as a continuous process of learning → the strict focus on the *economic efficiency* is misleading.

# ROAR

**ROUTES & DIRECTIONS.** How to use policy to set direction of change and enable bottom up experimentation?

**ORGANIZATIONS.** How to build explorative public sector organizations that learn-by-doing, and welcome trial and error?

**ASSESSMENT.** How to evaluate public sector market creating investments (pushing market frontiers beyond ‘crowding in’)?

**RISKS AND REWARDS.** How to form new deals between the public and private sectors, socializing both risks and rewards?

"From Market Fixing to Market-Creating: A new framework for innovation policy", Special Issue of *Industry and Innovation*: "Innovation Policy – can it make a difference?" Volume 23, Issue 2, 2016, M. Mazzucato

# Creating missions not fixing markets

**NASA's mission** is to “*Drive advances in science, technology, aeronautics, and space exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.*” NASA 2014 Strategic Plan

“*Creating breakthrough technologies for national security is the mission of the Defense Advanced Research Projects Agency (DARPA).*”

“The **ARPA-E mission** is to *catalyze* the development of transformational, high-impact energy technologies.”

“**NIH's mission** is to seek fundamental knowledge about the nature and behavior of living systems and the *application* of that knowledge to enhance health, lengthen life, and reduce illness and disability.”

“The **mission** of the **KfW Group** is to support change and encourage *forward-looking ideas* – in Germany, Europe and throughout the world.”

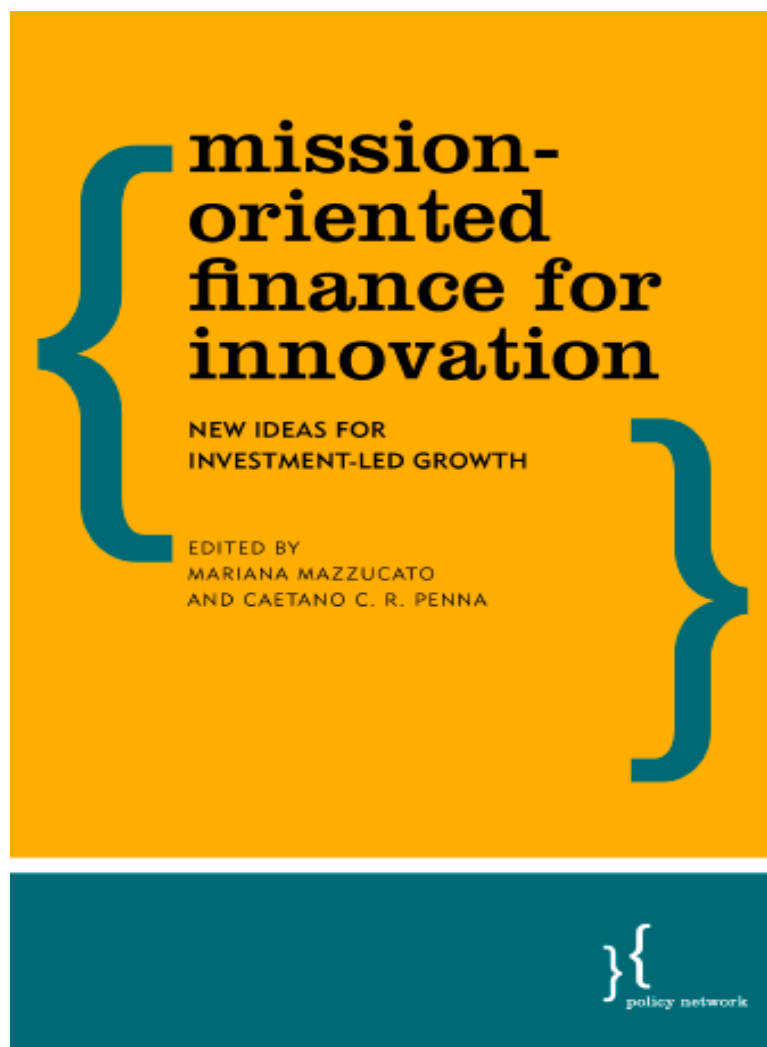
IPD workshop paper:

**China Development Bank:  
Born Bankrupt, Born Shaper**  
by Qiyuan Xu

*“Our **mission** is not merely to support social and economic development, but to drive the formation of sound markets and institutions that underpin such development.” (Chen, 2013)*

*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



# from Government Failure to Government Learning (from failure)

## Organizational Experimentation

“The design of a good policy is, to a considerable extent, the design of an organizational structure capable of learning and of adjusting behavior in response to what is learned”

**Dick Nelson and Sydney Winter, 1982**

## Policy as Process

“shift from total confidence in the existence of a fundamental solution for social and economic problems to a more questioning, pragmatic attitude –from ideological certainty to more open-ended, eclectic, skeptical inquiry”

**Albert Hirschman, 1987**

## The Hiding Hand (Serendipity)

history’s generous tricks, silver linings and “felicitous and surprising escapes from disaster”

## More than crowding-in: *creating* animal spirits

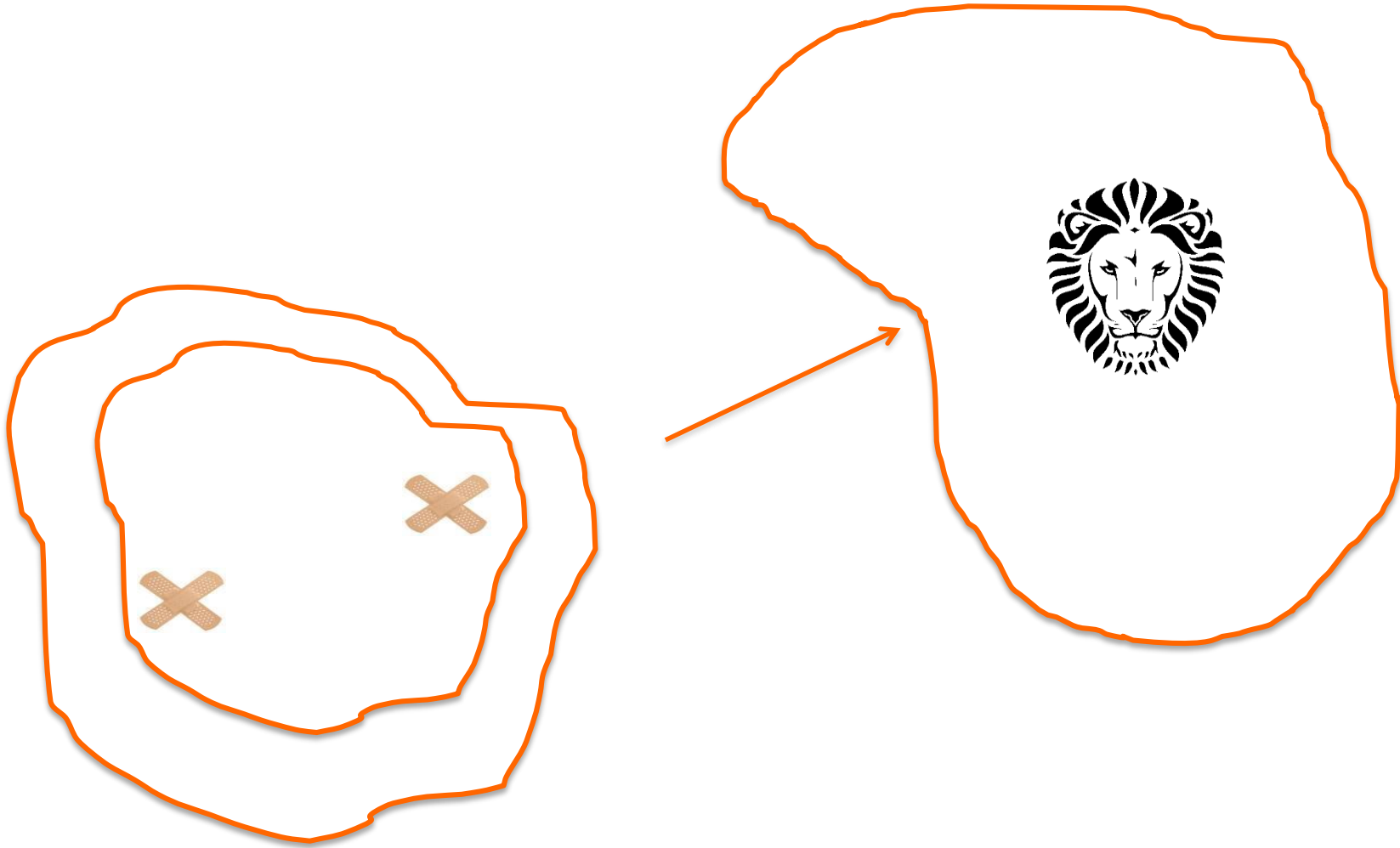
Businessmen have a different set of delusions from politicians, and need, therefore, different handling. They are, however, much milder than politicians, at the same time allured and terrified by the glare of publicity, easily persuaded to be 'patriots', perplexed, bemused, indeed terrified, yet only too anxious to take a cheerful view, vain perhaps but very unsure of themselves, pathetically responsive to a kind word. You could do anything you liked with them, if you would treat them (even the big ones), **not as wolves or tigers, but as domestic animals** by nature, even though they have been badly brought up and not trained as you would wish....



**John M. Keynes's** private letter to **Franklin D. Roosevelt**

Feb 1, 1938

# Measuring the *dynamising* in process





- **BBC** Charter Review: why not soap operas?
- Do **public banks** crowd out private ones?
- **Health**: why many drugs and so little life-style?

## from Public Goods to *Public Value*

*“Public values are those providing normative consensus about (1) the rights, benefits, and prerogatives to which citizens should (and should not) be entitled; (2) the obligations of citizens to society, the state, and one another; (3) and the principles on which governments and policies should be based” (Barry Bozeman, 2007, 13).*



*The Value of*  
**EVERYTHING**

WHO MAKES *and* WHO TAKES  
*from the* REAL ECONOMY

.....

MARIANA MAZZUCATO



MARIANA MAZZUCATO

*the*

**VALUE**

OF

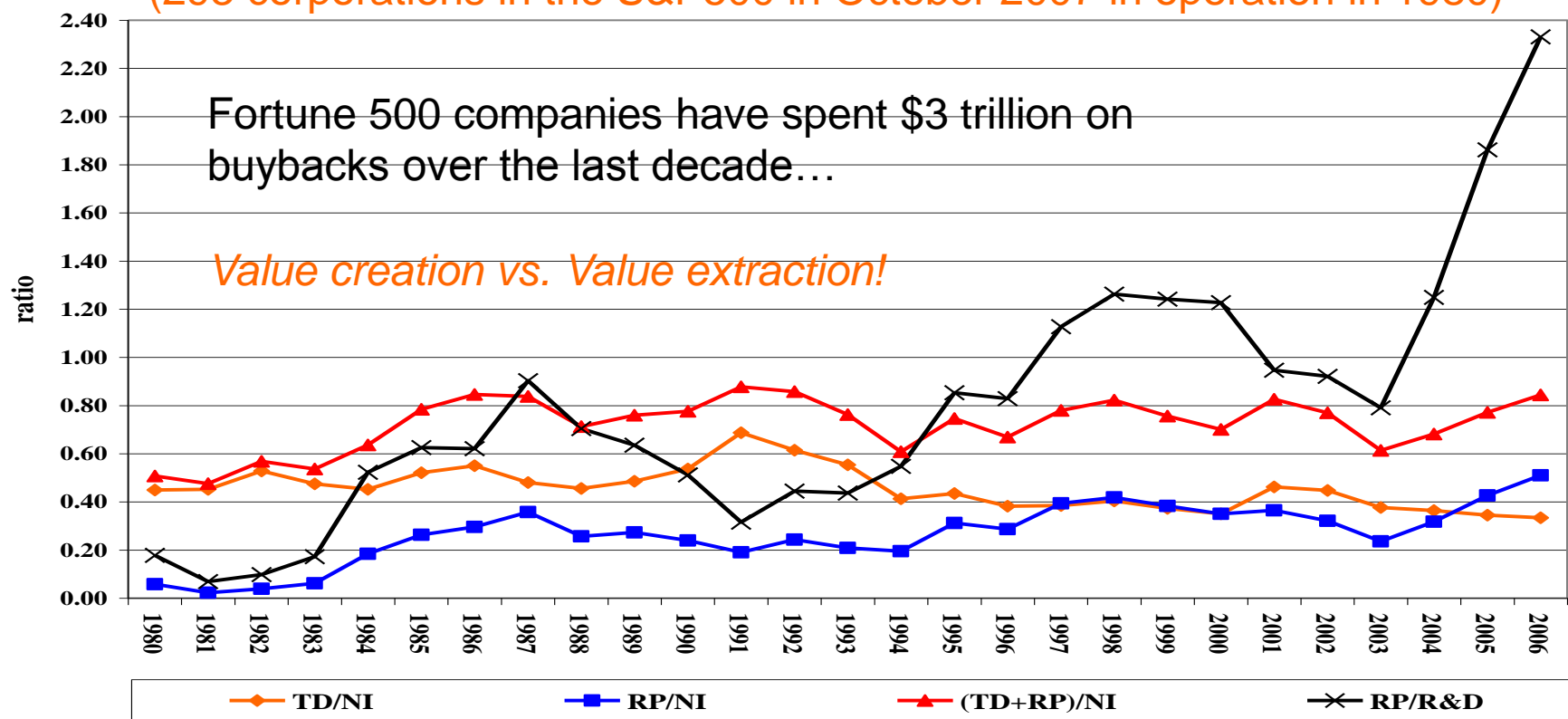
**EVERYTHING**

*Makers and Takers  
in the  
Global Economy*



# 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.

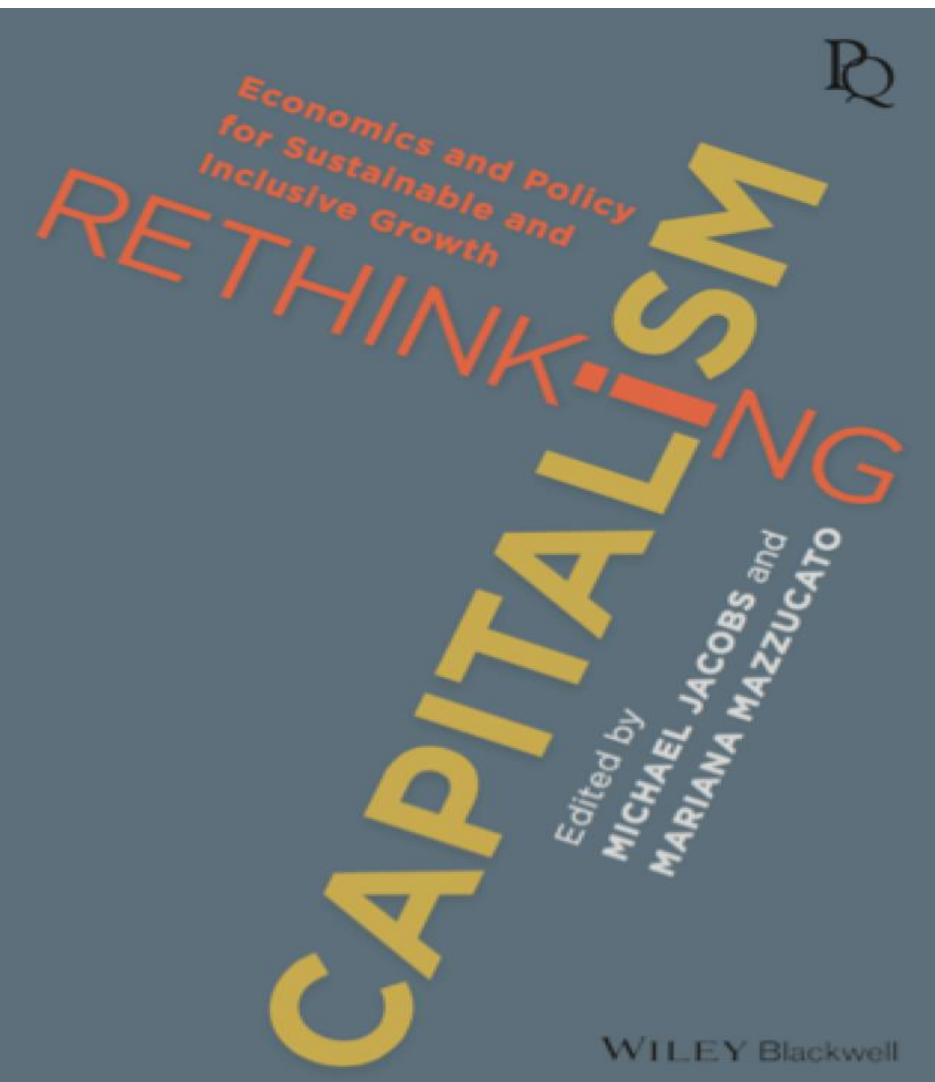
(William Lazonick, HBR 2014)

#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)



- 1 Rethinking capitalism: an introduction**  
Michael Jacobs and Mariana Mazzucato
- 2 The failure of austerity: rethinking fiscal policy**  
Stephanie Kelton
- 3 The theory of money and macroeconomic policy**  
Randall Wray and Yeva Nersisyan
- 4 The costs of short-termism**  
Andrew Haldane
- 5 Innovative enterprise and the theory of the firm**  
William Lazonick
- 6 Innovation, the state and patient capital**  
Mariana Mazzucato
- 7 Investment-led growth: a solution to the EU crisis**  
Stephany Griffith-Jones and Giovanni Cozzi
- 8 Inequality and economic growth**  
Joseph Stiglitz
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Colin Crouch
- 10 Innovation and the economics of climate change**  
Dimitri Zenghelis
- 11 Capitalism, technology and a green golden age**  
Carlota Perez



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*Beyond market failures: the market creating and shaping roles of state investment banks* (2016), *Journal of Economic Policy Reform*, DOI 10.1080/17487870.2016.1216416, **M. Mazzucato and C. Penna**

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*Innovation as Growth Policy* (2015) in *The Triple Challenge: Europe in a New Age*. J. Fagerberg, S. Laestadius, and B. Martin (eds.) Oxford University Press: Oxford. **M. Mazzucato and C. Perez**