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

- Public goods e.g. knowledge, clean air
- Coordination failures e.g. pro-cyclical investment
- Negative externalities e.g. pollution
- Information failures e.g. SME finance
- Imperfect competition e.g. monopolies
"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 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

1. research
2. concept/invention
3. early stage technology Development
4. Product development
5. production/marketing

Source: adapted from Auerswald/Branscomb, 2003
Private and Public (SBIR) Venture Capital

Source: Block and Keller, 2012
What makes the iPhone so ‘smart’?

Source: Mazzucato (2013), p. 109, Fig. 13
Total NIH spending, 1936-2011 in 2011 dollars=$792 billion

NIH budget for 2012=$30.9 billion

Source: http://officeofbudget.od.nih.gov/approp_hist.html
Technology risk in clean tech

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

- **High**
  - Wind farms
  - Utility-scale solar
  - ‘First-gen’ biofuel refineries
  - Fabs for solar cells using established technologies
  - First commercial plants for unproven solar cell technologies
  - Advanced biofuel refineries
  - Offshore wind farms
  - Carbon sequestration

- **Low**
  - Wind and solar components of proven technologies
  - Internal combustion engines
  - Insulation / building material
  - Energy efficiency services
  - Energy efficiency software
  - Lighting
  - Electric drive trains
  - Fuel cells / power storage
  - Wind and solar components of unproven technologies

Source: Ghosh and Nanda, 2011
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

Boundary of the present study: asset finance

- Low Risk
  - High Capital Intensity
    - (project finance/existing firms)
  - Low Capital Intensity
    - (existing firms/bank debt)
- High Risk
  - High Capital Intensity
    - (Hard to fund)
  - Low Capital Intensity
    - (Venture Capital)

Public banks and RE investment

Green entrepreneurial state

KfW funding for industrial environmental and climate protection projects in Germany

2001-2012

- KfW Renewable Energies Programme
- Other Renewable energy programmes

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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

- Public goods, e.g. knowledge, clean air
- Negative externalities, e.g. climate change
- Information failures, e.g. bad vs. good borrowers
- Imperfect competition, e.g. monopolies, monopsonies
- Coordination failures, e.g. pro-cyclical investment behavior

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?

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?
“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
% State → internet → inclusive growth
Repurchases, dividends, net income, R&D 1980-2006
(293 corporations in the S&P500 in October 2007 in operation in 1980)

Fortune 500 companies have spent $3 trillion on buybacks over the last decade…

Value creation vs. Value extraction!

Source: Lazonick & Mazzucato, 2013; Lazonick, 2014
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)
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

9 Paradoxes of privatisation & public-service outsourcing
   Colin Crouch

10 Innovation and the economics of climate change
    Dimitri Zenghelis

11 Capitalism, technology and a green golden age
    Carlota Perez
The Entrepreneurial State: debunking private vs. public sector myths (2013) Anthem Press: M. Mazzucato


Financing renewable energy: who is financing what and why it matters (2016), forthcoming Technological Forecasting and Social Change, M. Mazzucato and G. Semieniuk


