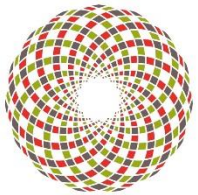
The Economics of Science and Science Policy

Adam B. Jaffe
Director, Motu Economic and Public Policy Research
Economics and Social Science Research Theme Leader,
Te Pūnaha Matatini CoRE

Speaker's Science Forum
3 December 2014



Te Pūnaha Matatini
Data ▪ Knowledge ▪ Insight

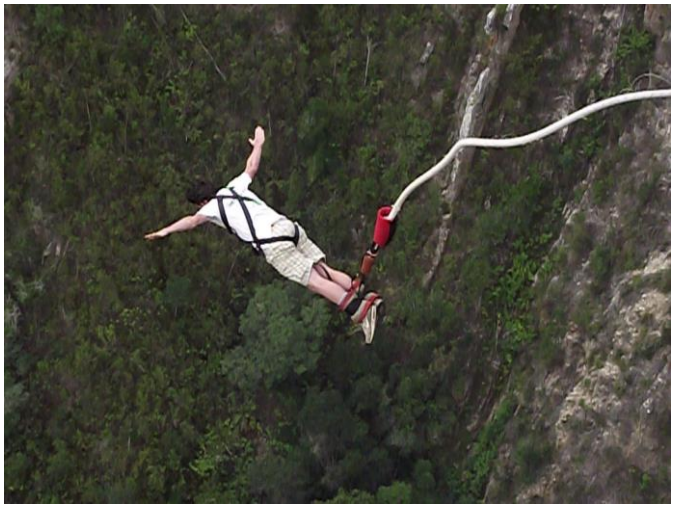
"Science and innovation have crucial roles in achieving high-quality economic, social and environmental outcomes for New Zealand."

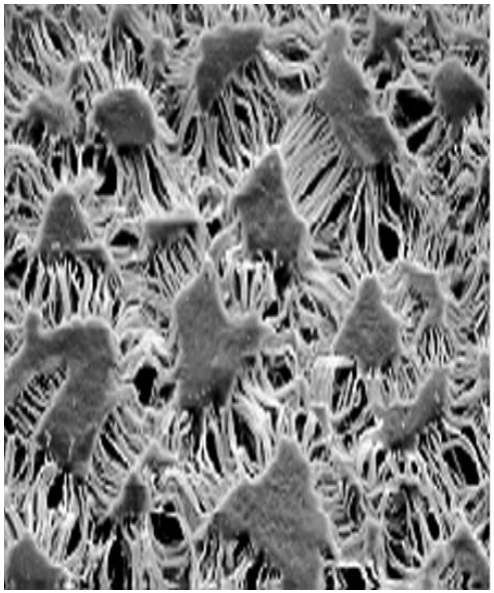
Draft National Statement of Science Investment

Ministry of Business, Innovation and Employment

May 2014

New Zealand Innovations





Overview

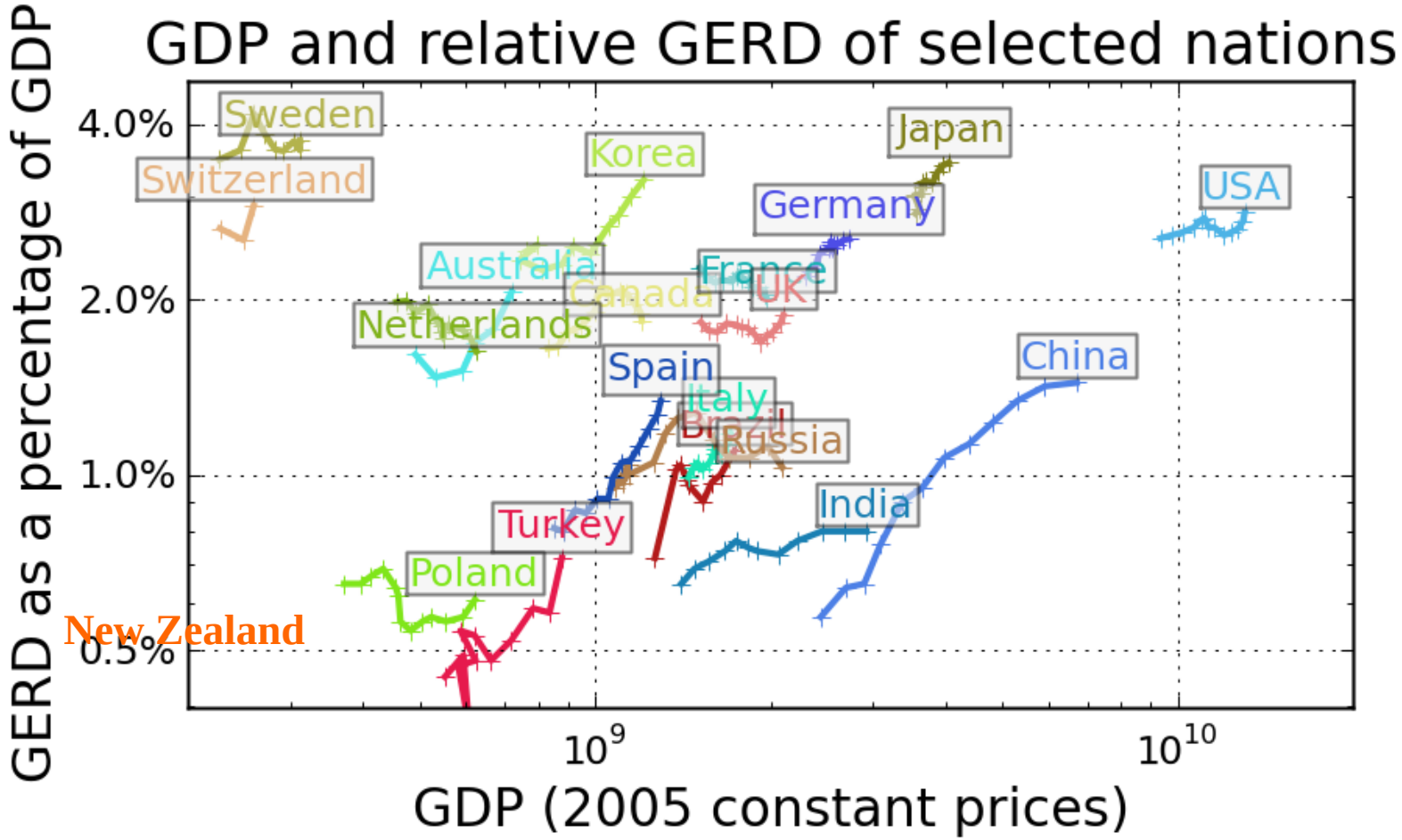
- ‘Science of Science Policy’
- Public research drives economic growth
- Will it play in New Zealand?
- Measuring impacts

Motu

"The Science of Science Policy (SoSP) is an emerging interdisciplinary and international field of research and community of practice that seeks to develop theoretical and empirical models of the scientific enterprise."

U.S. Office of Science and Technology Policy
Executive Office of the President

What do we know—payoff to science



Data from the UNESCO Institute for Statistics
By Nicolau Werneck <nwerneck@usp.br>

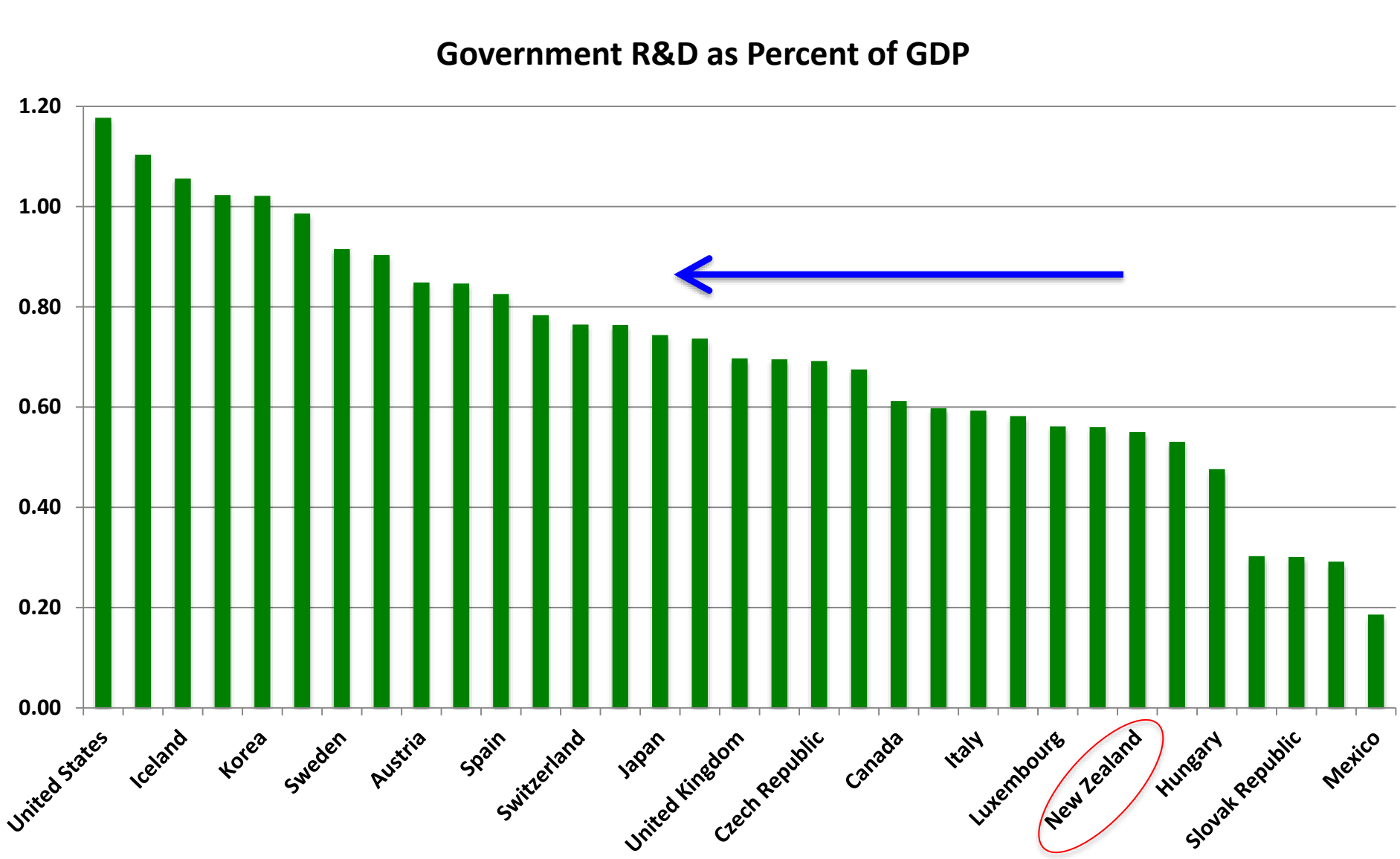
Why not free-ride on others' science?

- "Absorptive capacity"
- NZ-specific issues (National Science Challenges)
- Attract and keep "stars"

Would it work here?

- Handicaps:
  - Small
  - Far

- Advantages
  - Flexible economy
  - Well-educated work force
  - English language
  - Well connected to anglo-american science


Government R&D as Percent of GDP
1.20
1.00
0.80
0.60
0.40
0.20
0.00
United States
Iceland
Korea
Sweden
Austria
Spain
Switzerland
Japan
United Kingdom
Czech Republic
Canada
Italy
Luxembourg
New Zealand
Hungary
Slovak Republic
Mexico

How will we know if it is working?

- Need to measure outcomes:
  - What are we getting for our money
  - Which kinds of programmes work best
  - How to minimize overhead/administrative costs

PROTOTYPE DIMENSIONS OF PUBLIC RESEARCH IMPACT

Economic

- New or improved products or services
- Reduced operating cost or reduced commercial risk
- Increased wages or improved job opportunities

Environmental

- Reduced pollution or other anthropogenic environmental impact

Public policy

- Improvement of public policy or of the delivery of public services

Capability

- Enhancement of the scientific and technological capabilities of the work force

Social

- Improved morbidity and mortality, or reduction in the cost of maintaining health
- Increased communal knowledge and interest in science
- Reduction in real or perceived communal risk
- Enhancement of international reputation, or contribution to sustainable development
- Enhancement of other social, cultural or community values

Examples of Metrics

Impact dimension	Direct Measure	Proxy or indicator	Intermediate outcome
1. New or improved products or services	additional revenue	enumeration of new products and processes	private sector development investment
4. Reduced pollution or other anthropogenic environmental impact	reduction in emissions or other environmental impact (tons; percent of total emissions)		
5. Improvement of public policy or of the delivery of public services	issuance or implementation of policy or practice incorporating research results		workshops or other delivery of policy, programmatic or operational advice to governmental body
7. Improved morbidity and mortality, or reduction in the cost of maintaining health.	increase in quality-adjusted life years		adoption of new technology or practice in health care
8. Increased knowledge and interest in science			time spent in interactions with public
			development and use of educational materials
9. Reduction in real or perceived communal risk		expert assessment of communal risk reduction	
		survey results regarding public risk perceptions	
11. Enhancement of social, cultural or community values		expert assessment of values impacts	

Bottom Line

- Increase public investment in science
- Evidence-based policy rather than policy-based evidence
  - Perfect measurement: impossible
  - Some meaningful measurement: useful and doable
  - No measurement: leaves us in the dark

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