

Innovation Complementarities, Management Quality and Export Composition

W. F. Maloney

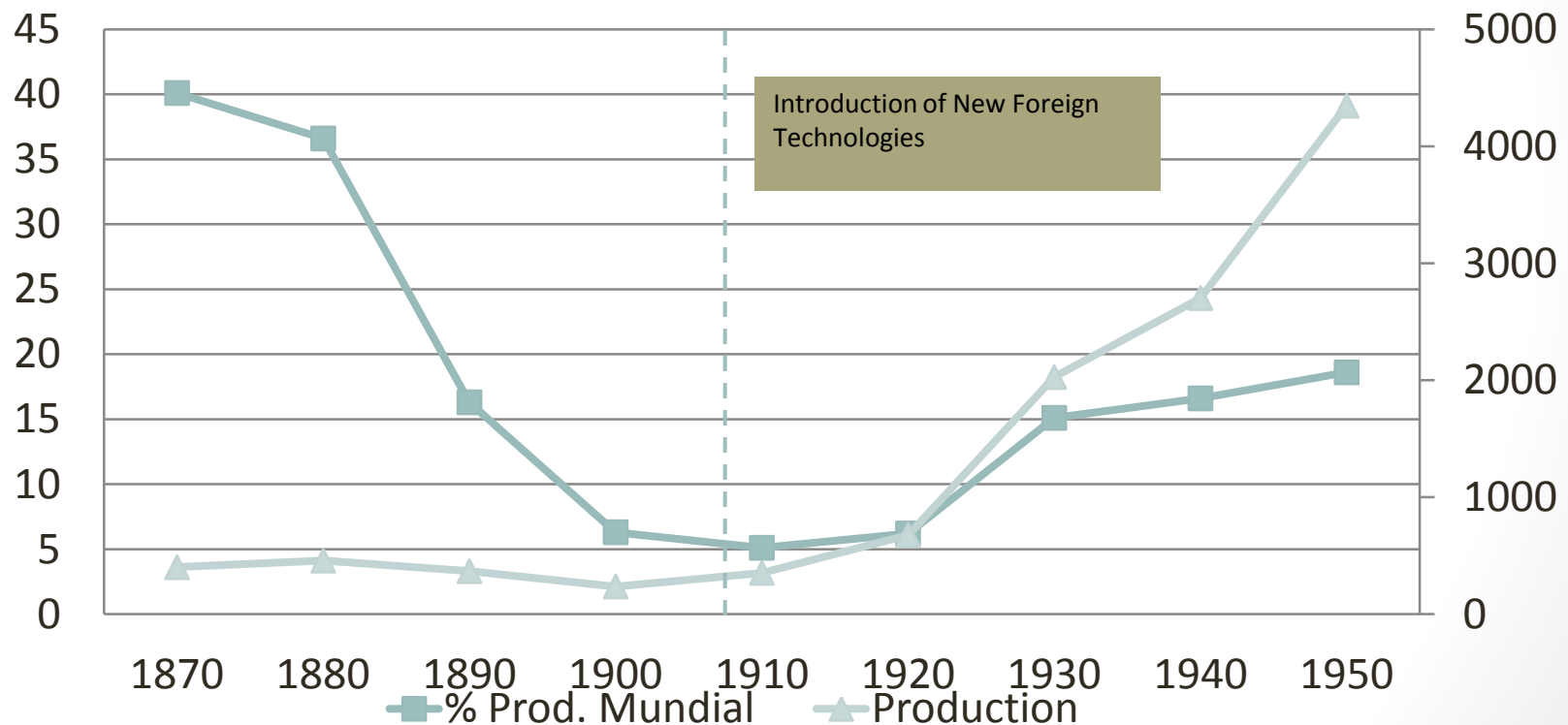
Research Department, World Bank

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Ancient Latin American Growth Mystery I: Same Good, Different Outcomes

**Copper in Chile, 1870-1950:
Production and % of World Production**



Ancient LA Growth Mystery II: Same Business Climate, Different Outcomes

Percentage of Firms Managed by Immigrants

Country	Year	% Immigrant Directors/Owners
Argentina	1900	80
Chile	1880	70
Colombia (Baranquilla)	1888	60
Mexico	1935	50

Source: Maloney 2013

Structure of the Presentation

- Part I: Export Composition: is this the missing ingredient?
- Part II: Innovation: the critical agenda
- Part III: Management quality as a missing complement

Export Composition-is this the
critical ingredient?

Empirical concerns of policy makers about export composition

1. Yes, Externalities dictate that market will not generate optimal basket
2. How do we measure these externalities?
3. Doesn't the whole world see the same benefit and drive the price down? (GE)
 - Interindustry spillovers, asymmetries
 - Should we look for safe rents, too? Natural Resources
 - More generally, must think of demand side as well
4. Do externalities necessarily come with a good, or does it matter how we produce it?
 - Heterogeneity, Heterogeneity, Heterogeneity

In practice, measurement of MEs is difficult, so we take shortcuts

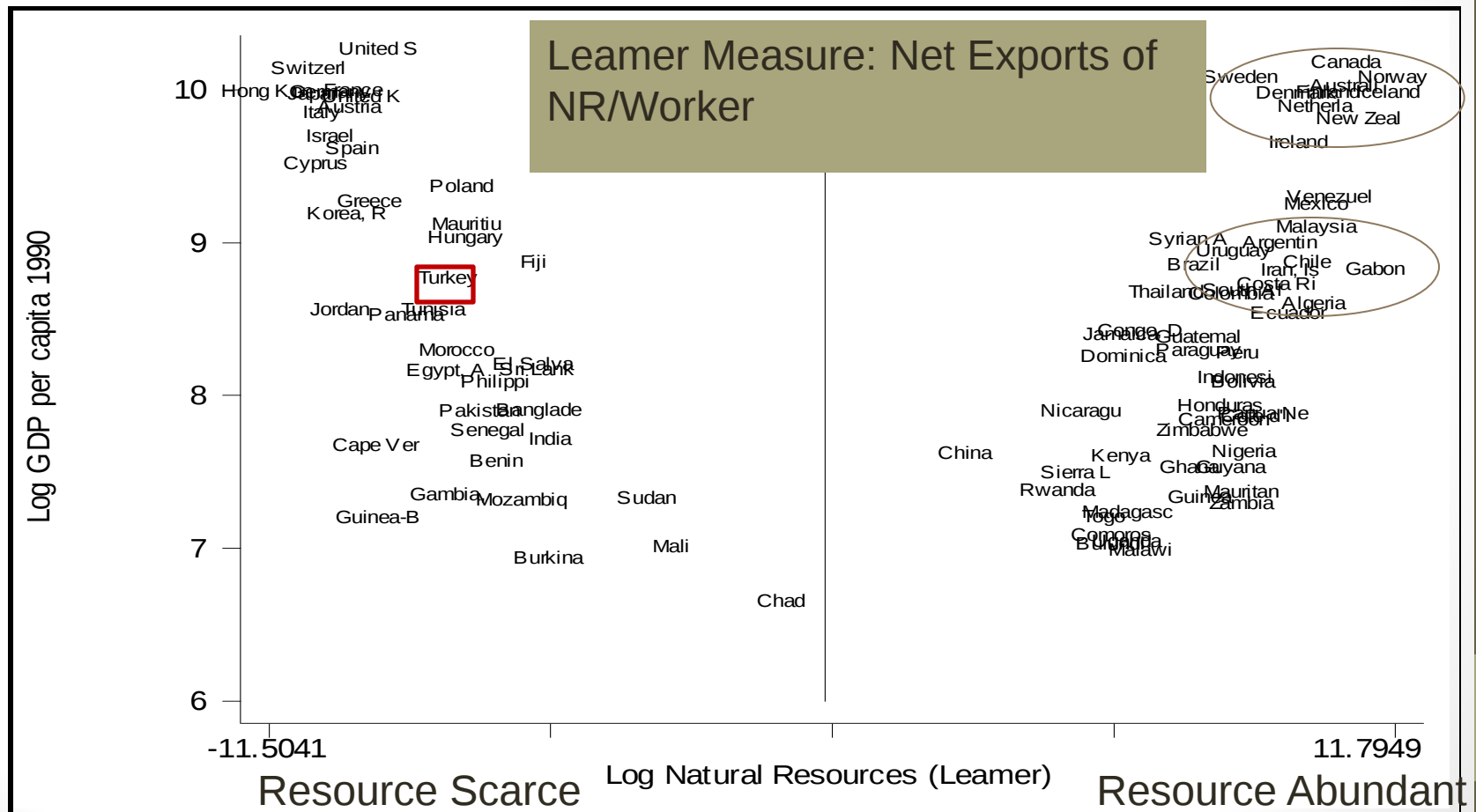
- Natural resources
 - Low productivity (Smith, Matsuyama, Sachs), few Externalities
 - Rent seeking
- High productivity goods
 - Rich Country Goods (Rodrik, Hausmann)
 - High tech (Lall) high inter-industry MEs

CURSED GOODS: NATURAL RESOURCES

Empirically, there is no resource curse

- In growth regressions
 - Minerals are good: Davis (1995), Sala-i-Martin et al. (2004), Stijns (2005), Brunnschweiler (2008, 2009)
 - Conditional on education (above 2 years of schooling): Bravo-Ortega & De Gregorio (2007)
 - Existing resource curse findings fragile: Lederman & Maloney (2007, 2008)
 - [Also, Jacob Viner and Douglass North years ago...]

There is lots of heterogeneity in experiences with NR



HIGH PRODUCTIVITY GOODS

Does It Matter What We Export?

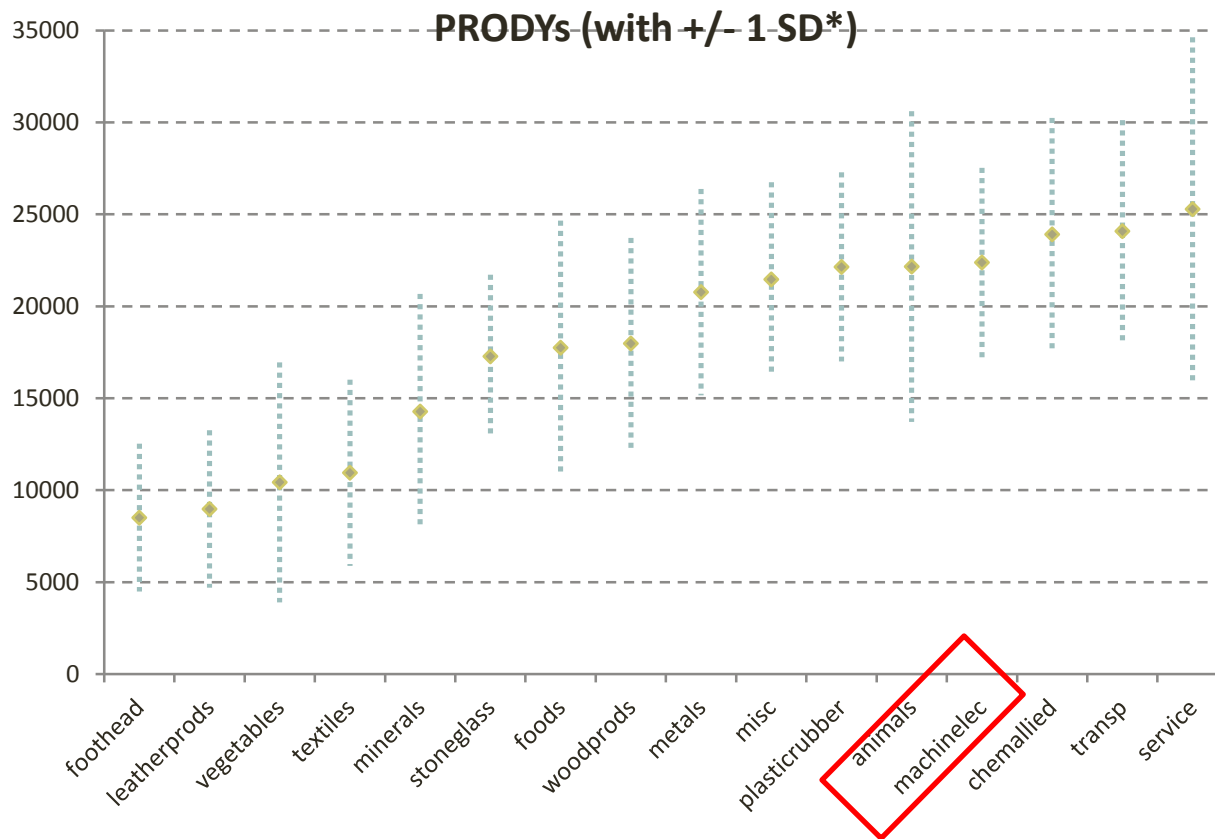
Hausmann, Hwang, Rodrik (2007)

- Model- broadly inter-industry spillover
 - Country should produce the highest productivity good *within its CA*
- Empirics:
 - PRODY= avg. income of countries producing good
 - EXPY= income value of our export basket
 - Similar to Lall (2000)
 - Find higher EXPY correlated with higher growth.

Caveats

- GE critique again?
- Rents- higher where rich countries already are?
 - Not generally the case- Nokia and TVs
 - If easy to move into these goods, then barriers to entry/rents low
- Empirical findings muddy
 - Animals, electrical machinery same PRODY

Again, high degree of heterogeneity



Caveats

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 - Finding of an impact on growth fragile

IS IT WHAT WE PRODUCE, OR HOW?
BEYOND GOODS

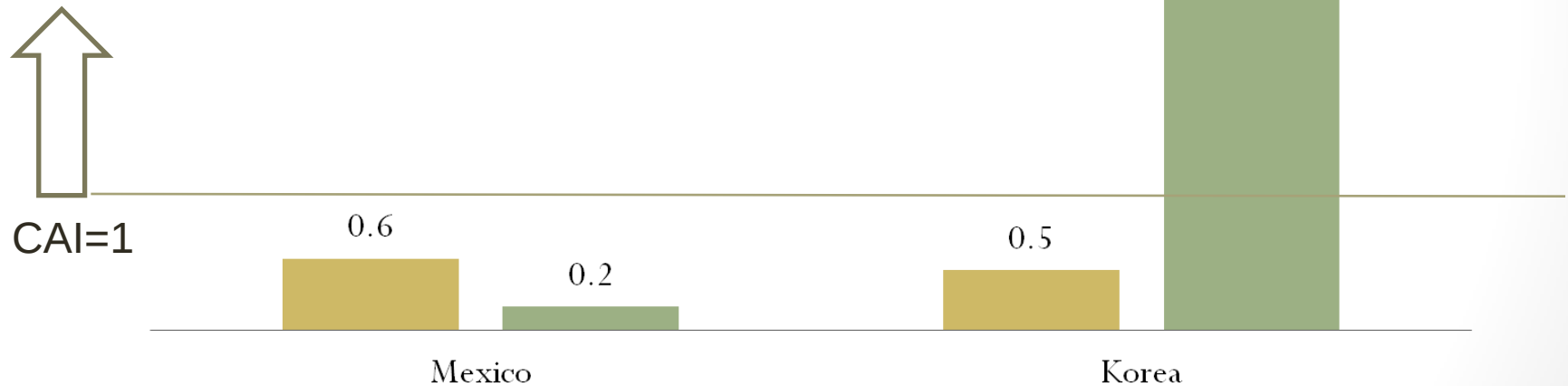
Is High Tech Necessarily High Tech?



Comparative Advantage in Innovation: Electronics

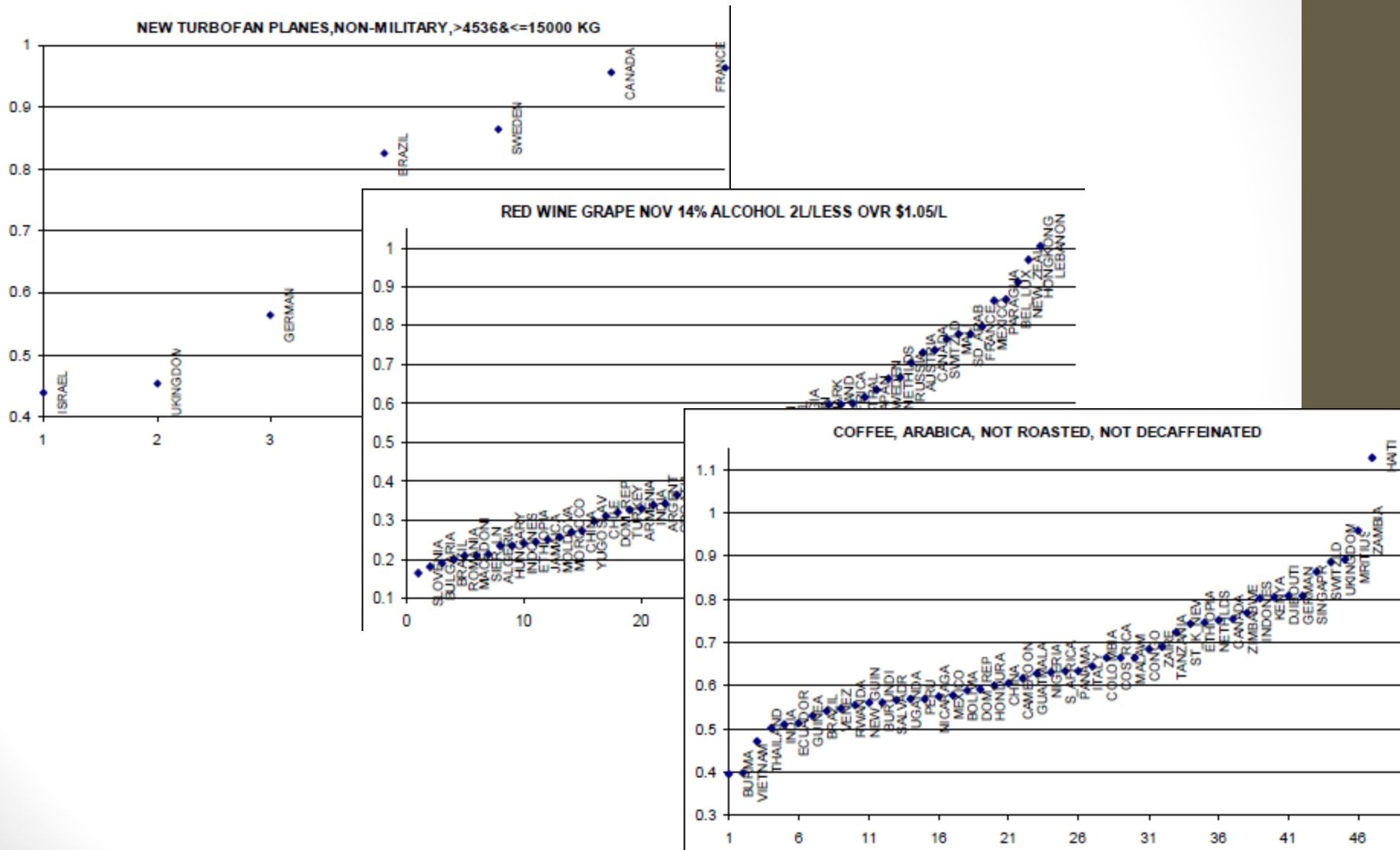


■ 1980 ■ 2000



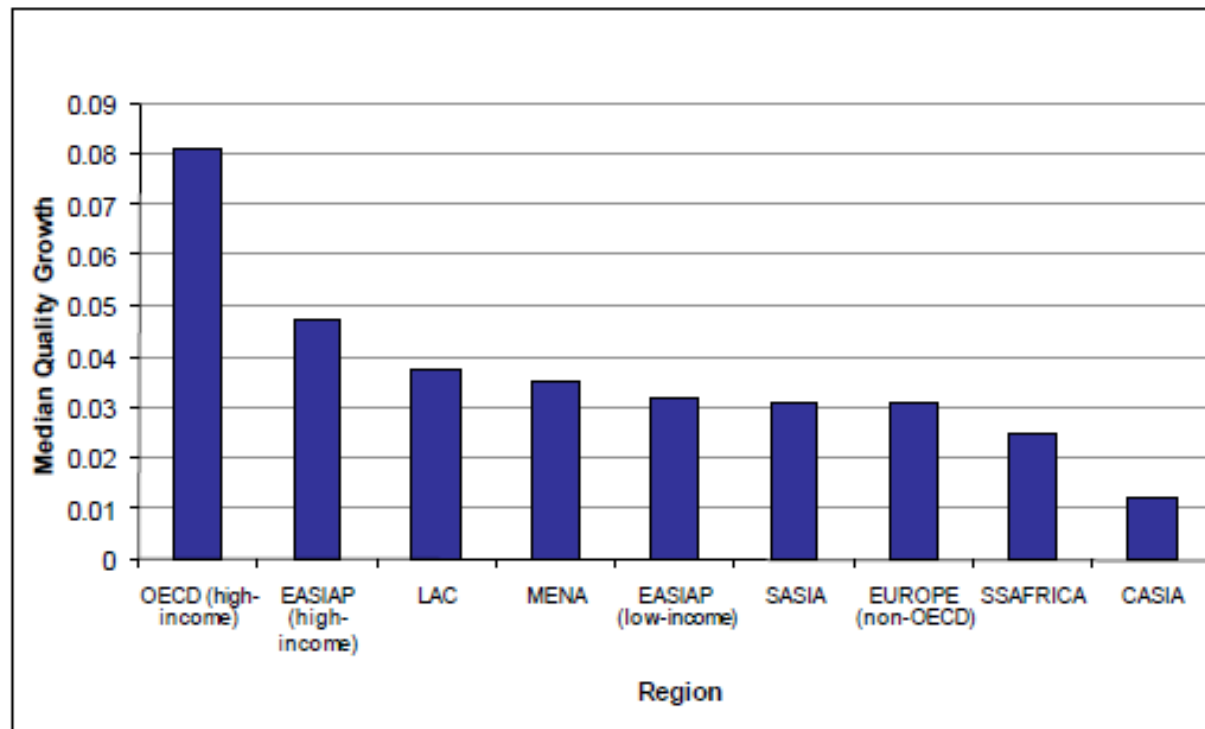
Fuente: Lederman and Maloney (2012)

Quality ladders by product and countries (relative unit values, standardized)



Growth in Quality Driven by Both What and How

Figure 6.2a Quality Growth by Region 1990-2001



Source: Krishna and Maloney 2011

GOODS OR TASKS

Goods or Tasks: Does China really export the iPod?

Table 2 China: 10 Exports with the Lowest Domestic Value Added

Electronic computer	4.6
Telecommunication equipment	14.9
Cultural and office equipment	19.1
Other computer peripheral equipment	19.7
Electronic element and device	22.2
Radio, television, and communication equipment	35.5
Household electric appliances	37.2
Plastic products	37.4
Generators	39.6
Instruments, meters and other measuring equipment	42.2

China: 10 Exports with the Highest Domestic Value Added

Agriculture, forestry, animal husbandry and fishing machinery	81.8
Hemp textiles	82.7
Metalworking machinery	83.4
Steel pressing	83.4
Pottery, china and earthenware	83.4
Chemical fertilizers	84.0
Fireproof materials	84.7
Cement, lime and plaster	86.4
Other non-metallic mineral products	86.4
Coking	91.6

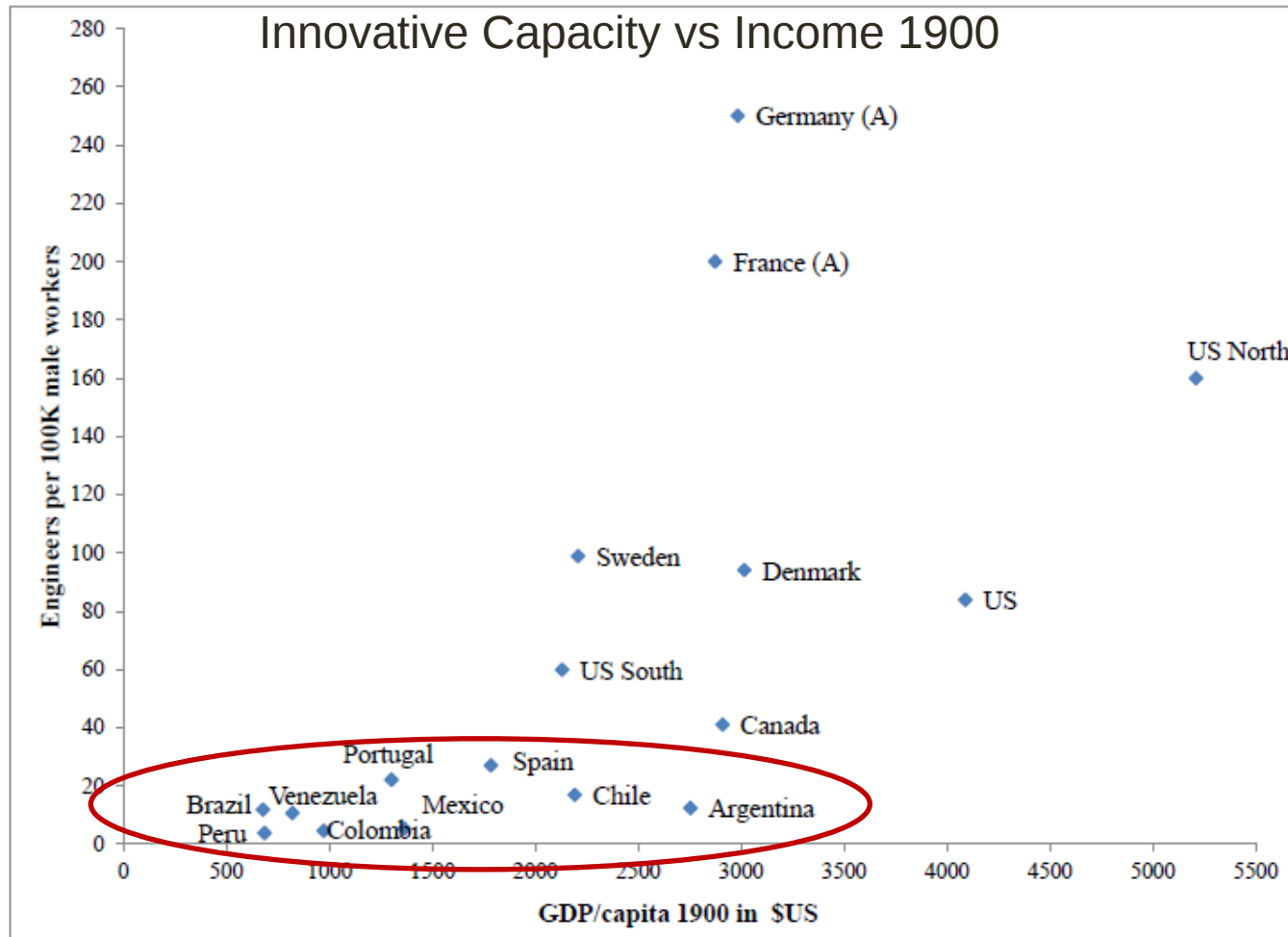
“..the electronic components we make in Singapore require less skill than that required by barbers or cooks, involving mostly repetitive manual operations”

Goh Keng Swee, Minister of Finance Singapore (1972)

Source: Koopmans, Wang, and Wei (2008).

Innovation: The Critical Agenda

Weak innovative capacity meant LA missed the 2nd Industrial Revolution



Source: Maloney y Valencia (2013)

Current literature focusing on R&D is not credible...

Estimated returns to R&D are very high...

- ▶ US firm level/industry data- social returns
 - ▶ Grilliches and Lichtenberg (1984) 71%
 - ▶ Terleckyj 1980, Scherer (1982) >100%
 - ▶ Griffith, Redding, Van Reenen (2004) 57%
 - ▶ Jones and Williams (1998) 28%
- ▶ X country
 - ▶ Coe and Helpman (1995) G7 123%
 - ▶ Van Pottlesberghe and Lichtenberg (2001) G7 68%
- ▶ ...And imply social rates of return far above private
 - ▶ Jones and Williams (1998): US should quadruple investment in RD

...and get higher with distance from the frontier

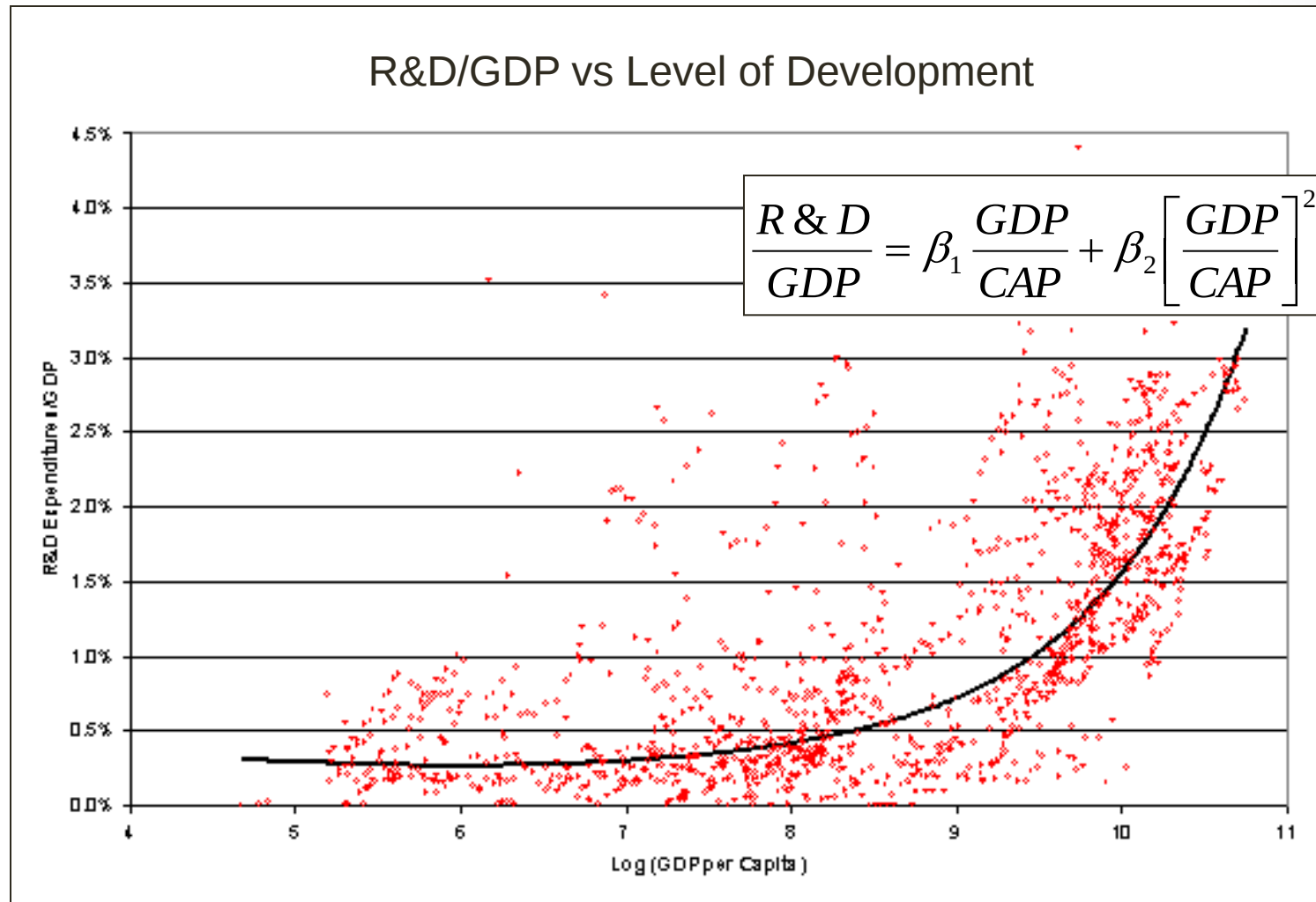
- ▶ Two Faces of R&D (Cohen and Levinthal 1989)
 - ▶ Invention
 - ▶ Learning\Catch-up
 - ▶ Poor countries should have much greater returns

- ▶ Griffith, Redding, Van Reenen (2004)

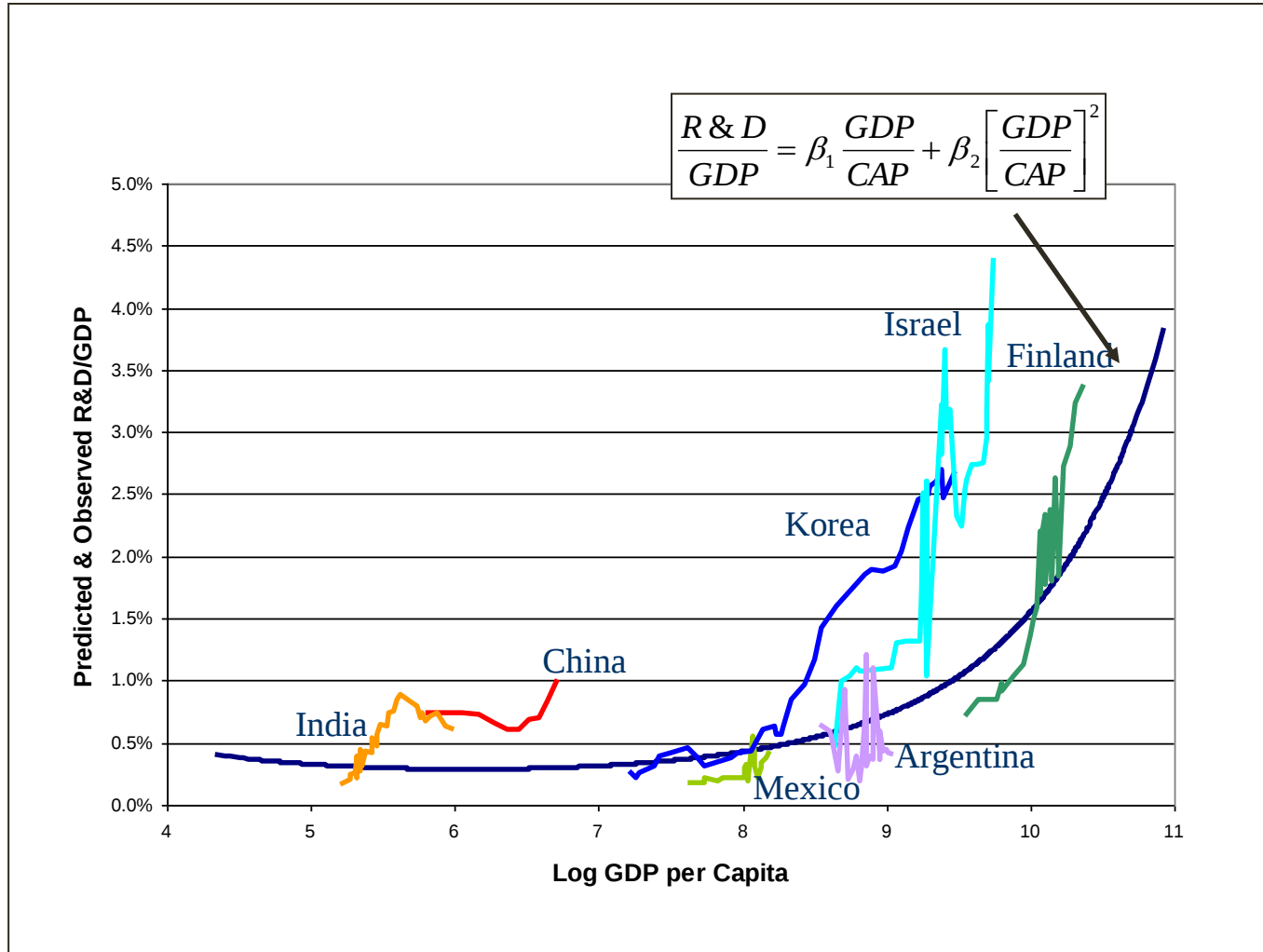
	Dist. Frontier	RoR R&D
▶ USA	-.18	57%
▶ UK	-.53	77%
▶ Italy	-.73	88%

- ▶ What should the rate of return be for Korea (-1.33), Malaysia (-2.28), Turkey (-2.5), Indonesia (-3.74)? 200%? 300%?

But poor countries do generally less R&D than rich countries...Why?



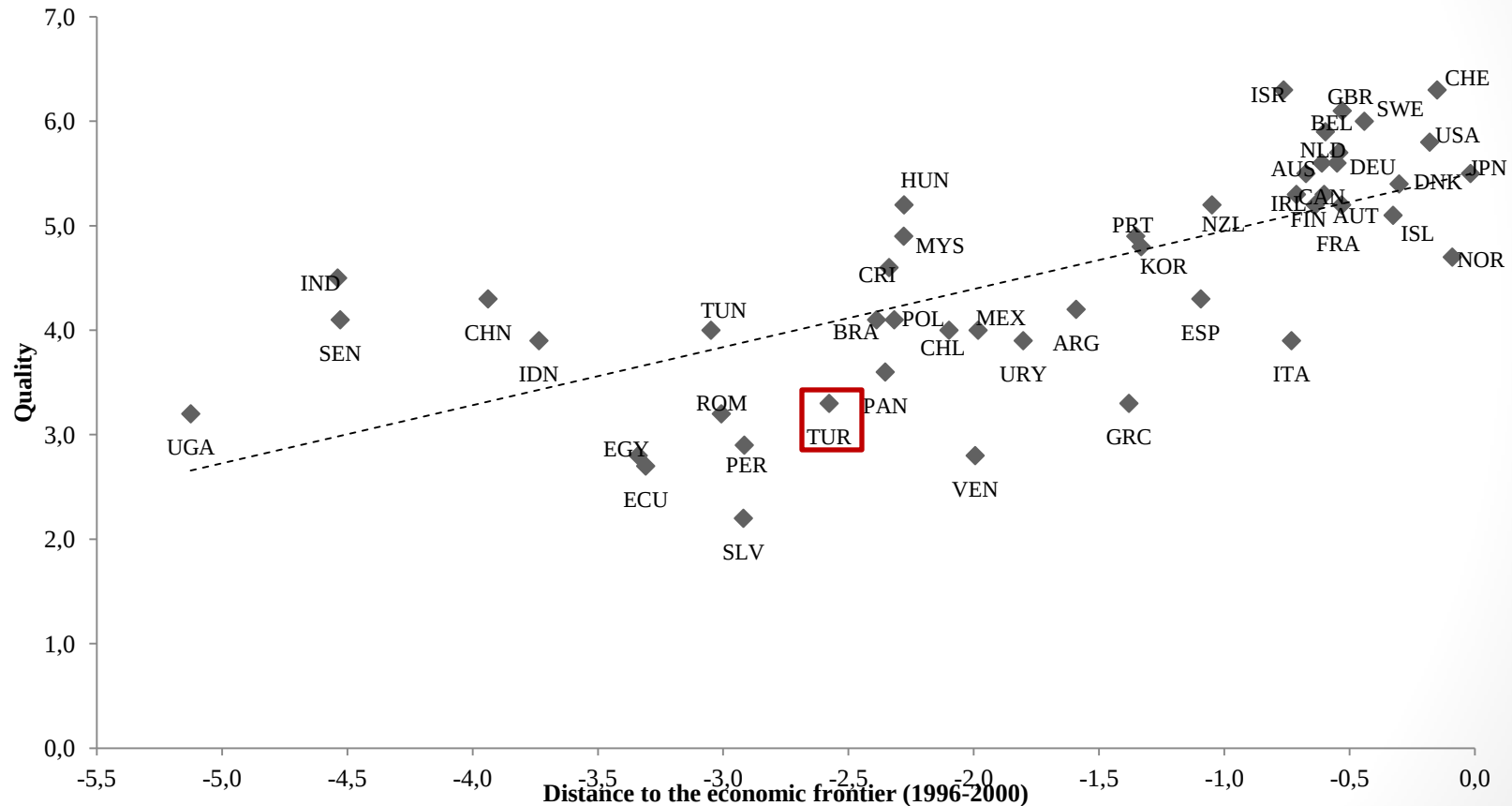
Innovation Superstars?



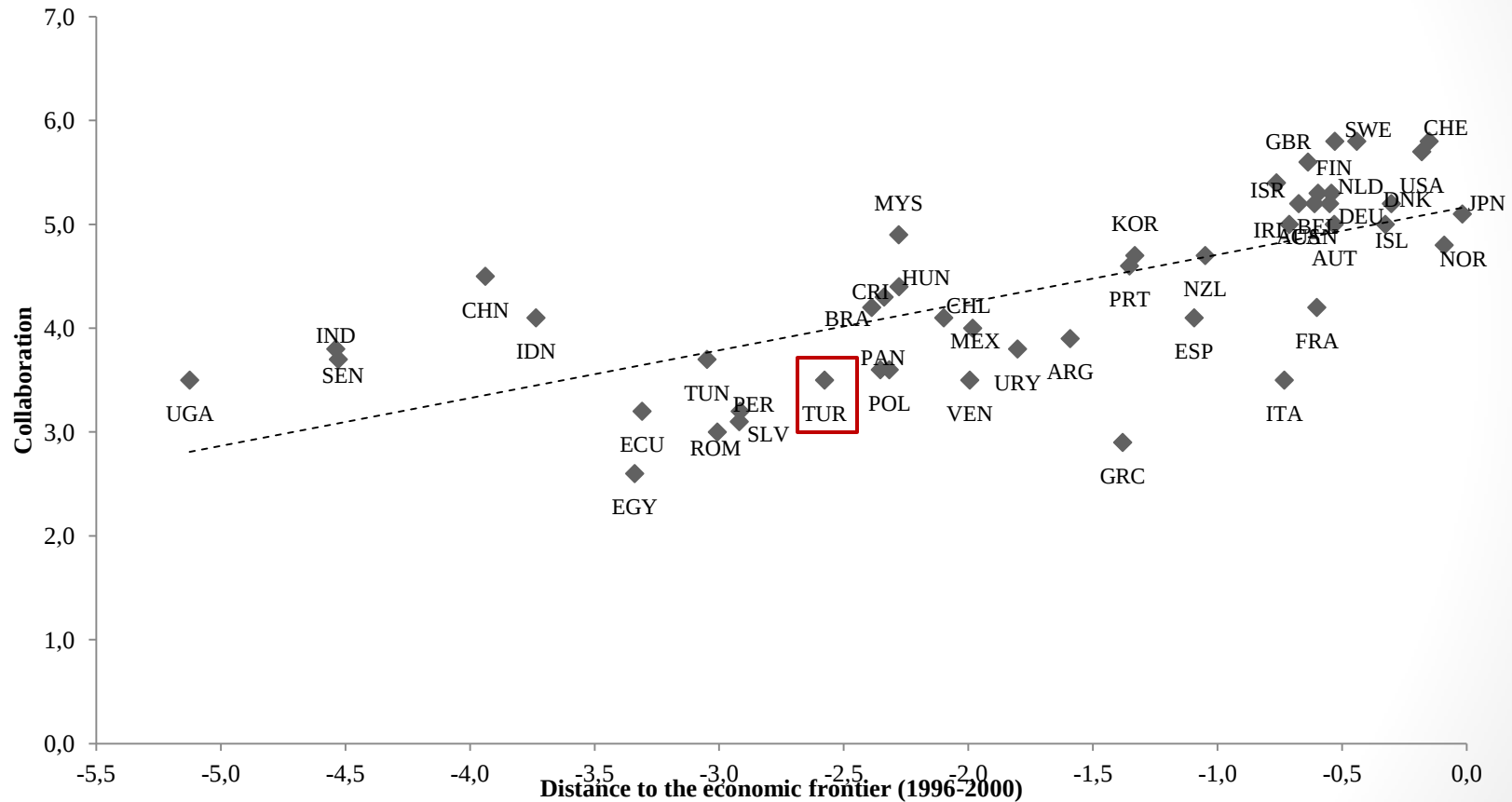
Source: Goni, Lederman, Maloney 2006

Source: Goni and Maloney 2012

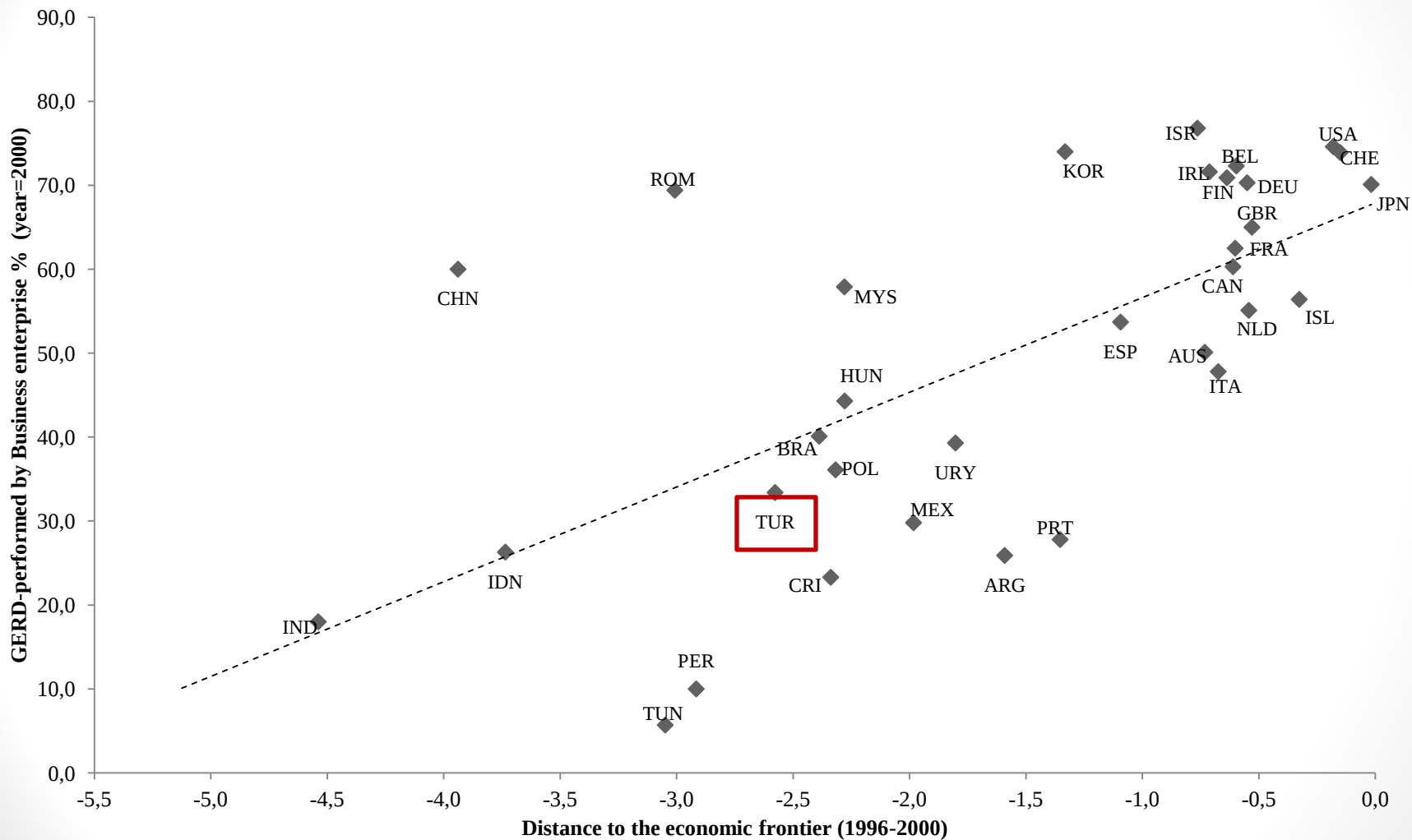
Perceived Quality of Research Institutions



University-Industry Collaboration

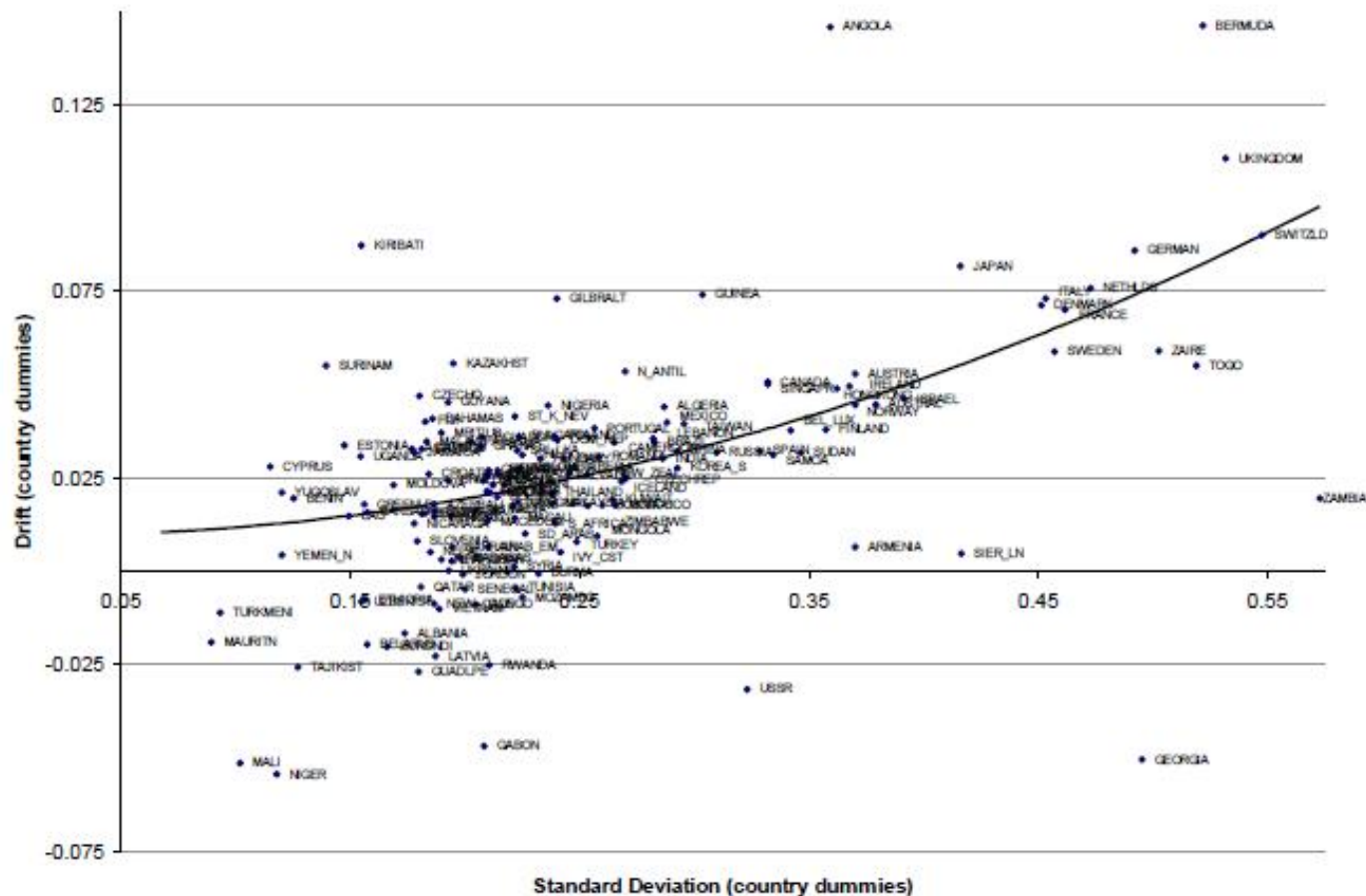


Business Share in R&D

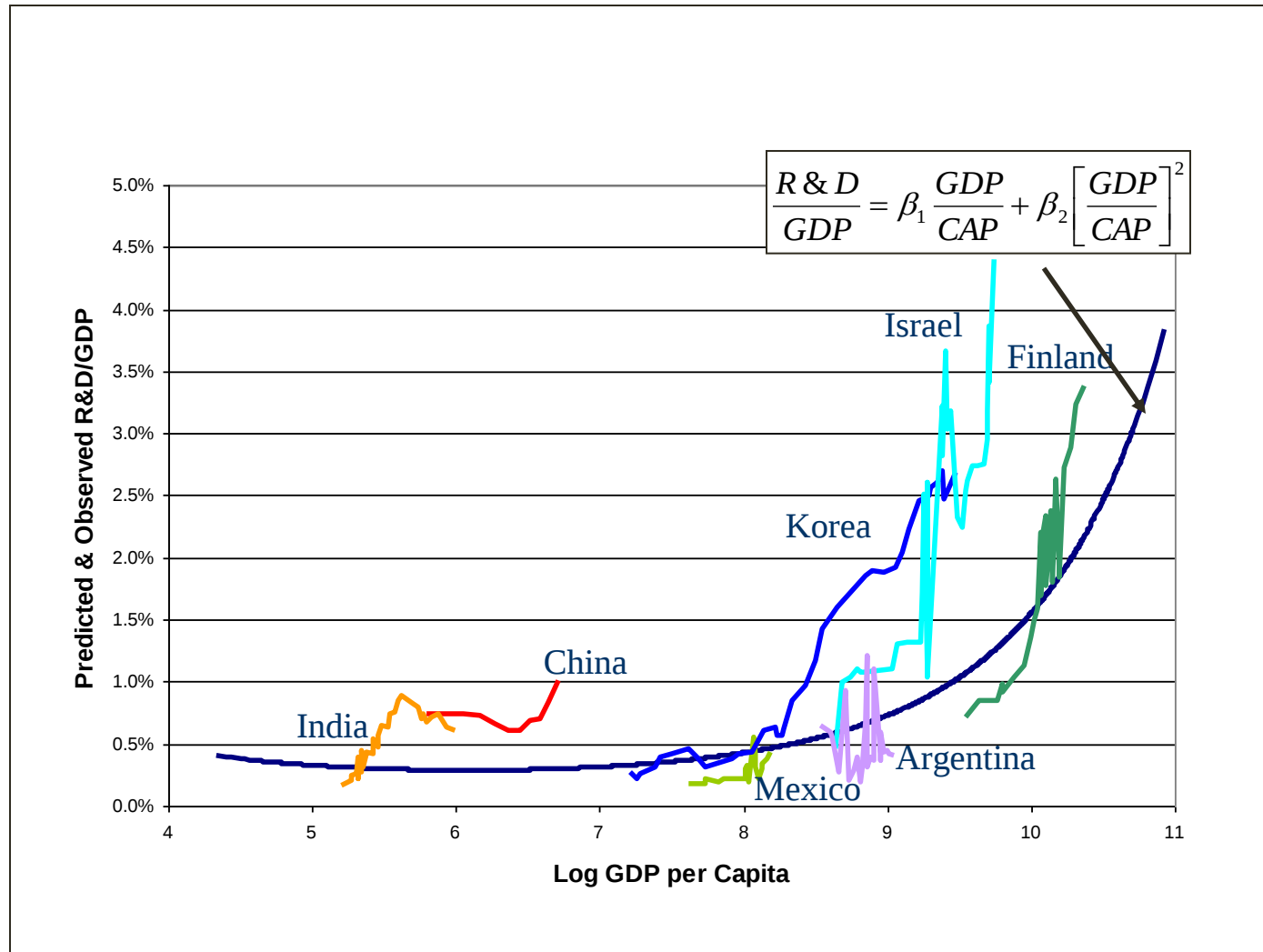


Ability to manage risk

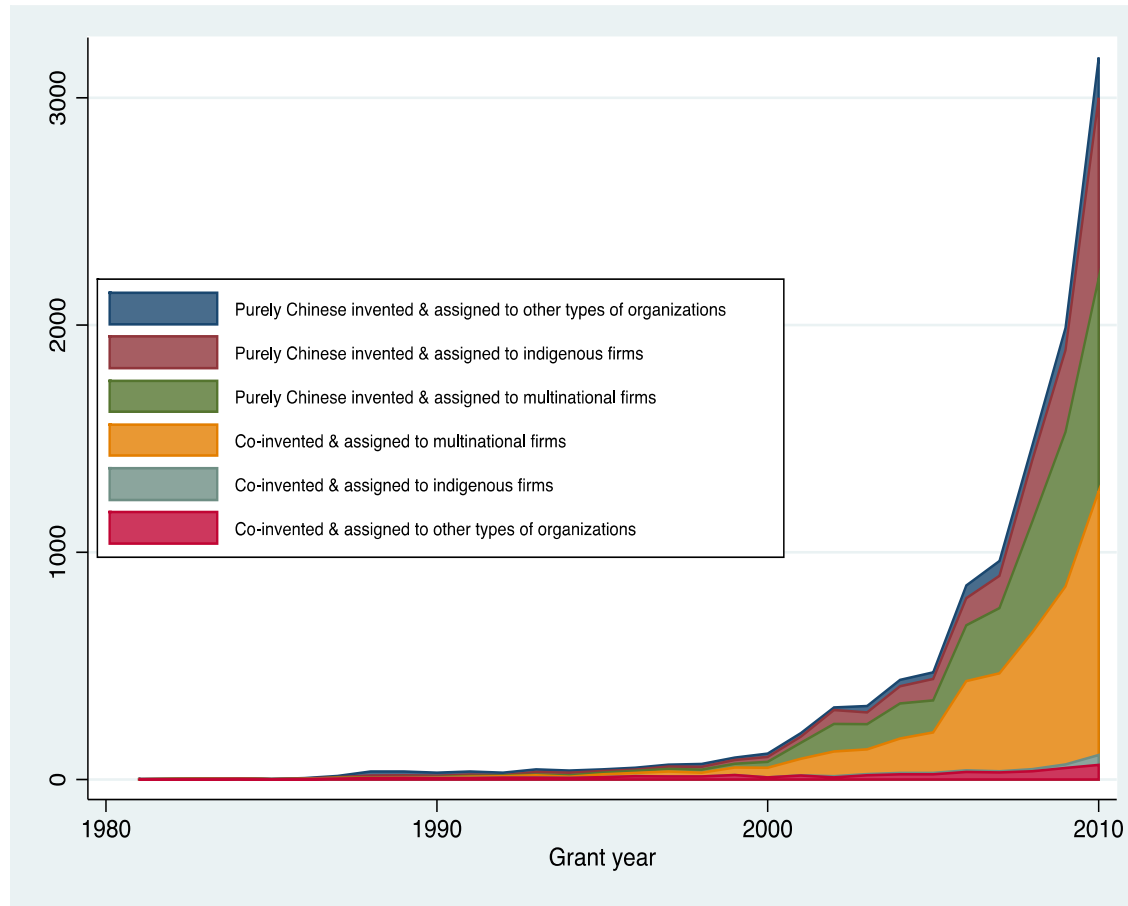
Export Quality Growth and Risk



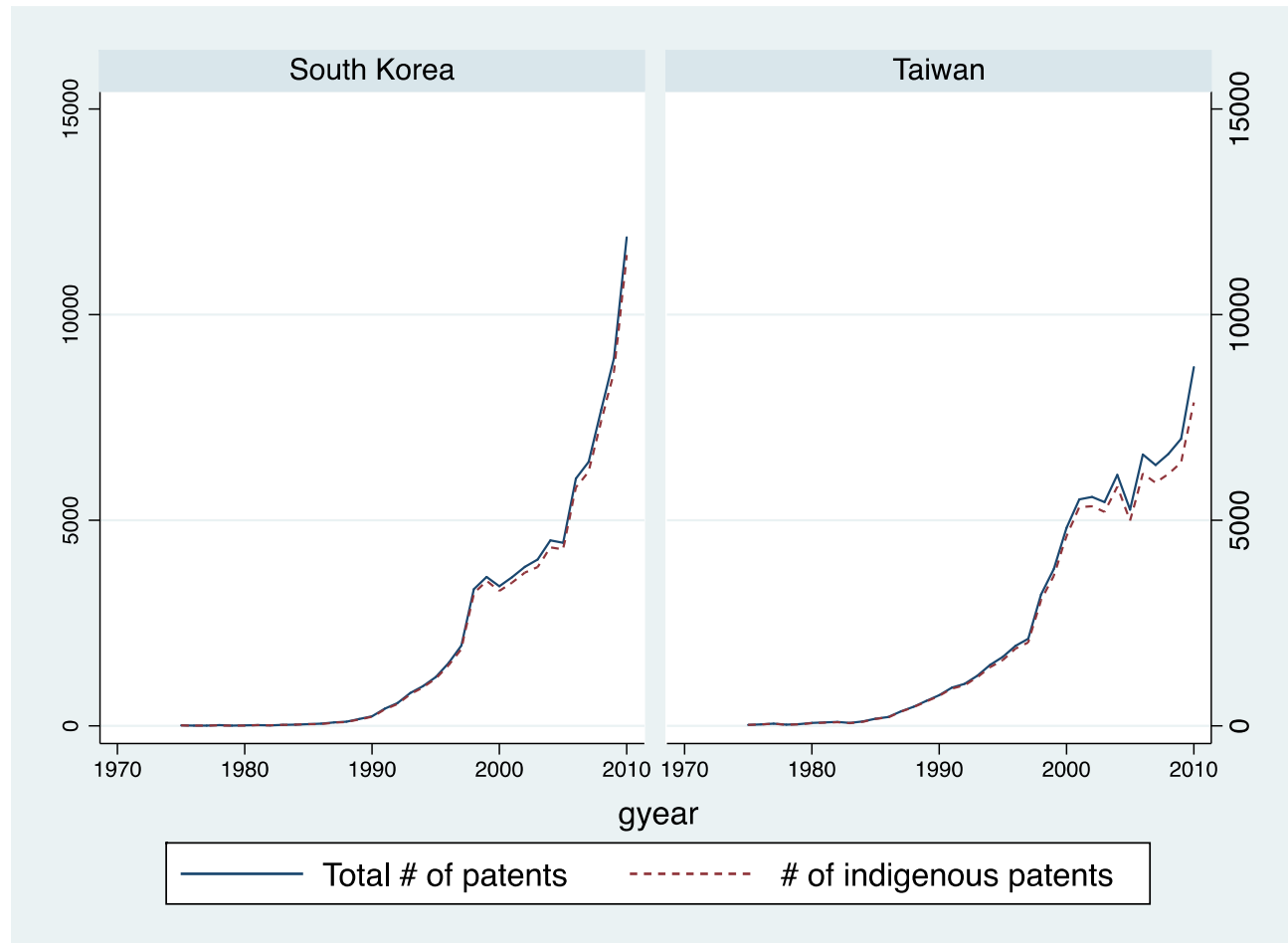
So, China: Waste or Wisdom?



Who's doing R&D? Patents granted by the USPTO to inventors based in China

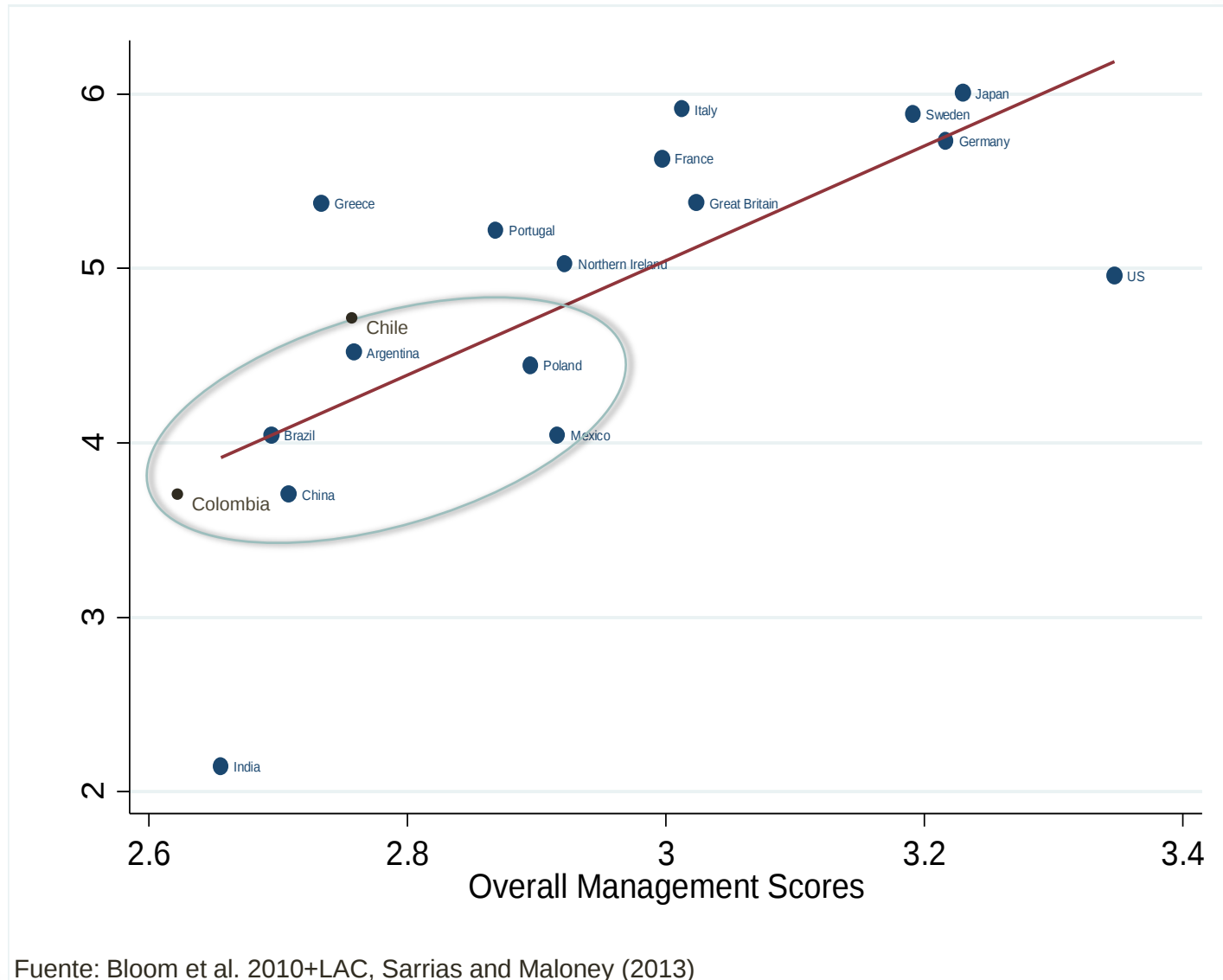


China differs from Taiwan and Korea in the composition of their innovation surges



Management Quality: A Missing Complement?

Management Quality and Productivity



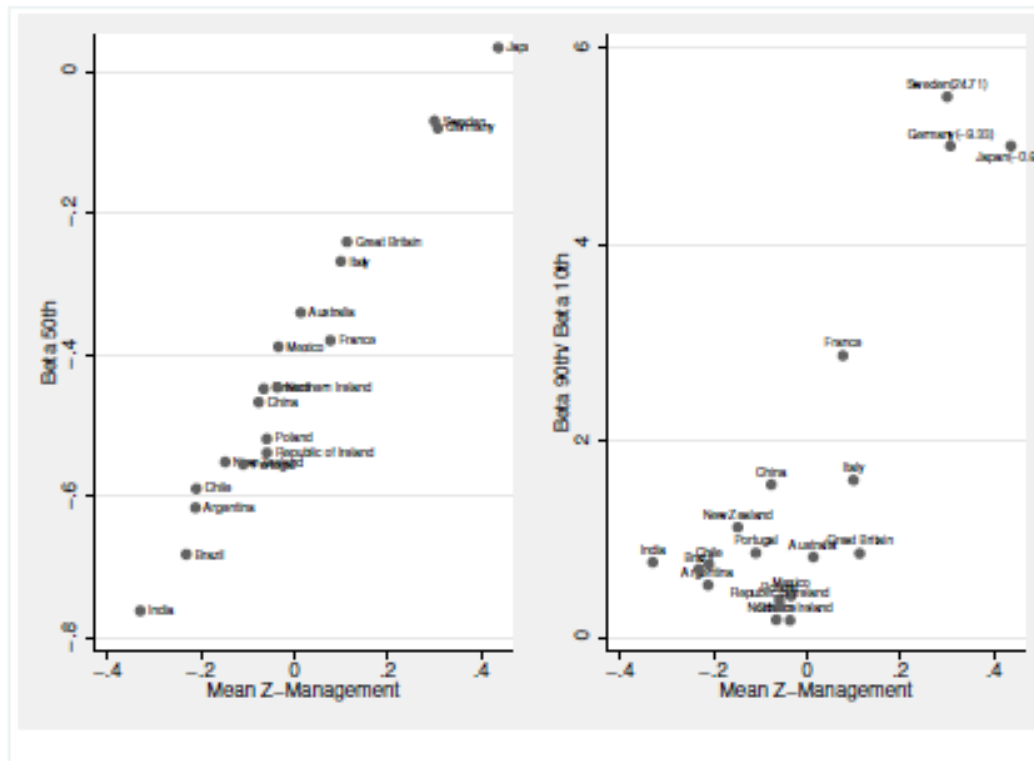
China: Unprepared for indigenous Innovation

Table 2: China's Relative Ranking on Management scores

		Mean all countries	China's Value	Rank (of 21 countries)
Management	Average of all management questions	2.9391	2.8757	14
	Subcomponents			
Operations	Average of O1 & O2	2.8812	2.6006	17
Monitor	Average of M1 to M5	3.2298	3.1318	11
Target	Average T6 to T10	2.9001	2.8459	14
People	Average of P1 to P6	2.7485	2.7794	10
	Sub-subcomponents			
O1	Introduction to Lean (Modern) Manufacturing	2.8464	2.5917	16
O2	Rationale for Lean (Modern) Manufacturing	2.9161	2.6095	17
M1	Process Documentation	3.1904	2.9588	16
M2	Performance Tracking	3.3595	3.3941	8
M3	Performance Review	3.3236	3.4647	6
M4	Performance Dialogue	3.1674	2.9647	18
M5	Consequence Management	3.1082	2.8765	19
T1	Type of Targets	2.9063	2.5706	19
T2	Interconnection of Goals	3.0623	3.0882	9
T3	Time Horizon	2.8714	2.6294	17
T4	Goals are Stretching	2.9744	2.7588	17
T5	Clarity of Goals and Measurement	2.6862	3.1824	1
P1	Instilling a Talent Mindset	2.4244	2.5647	7
P2	Building a High-Performance Culture	2.5484	3.0765	2
P3	Making Room for Talent	3.0080	2.8765	14
P4	Developing Talent	2.9888	2.7353	17
P5	Creating a Distinctive EVP	3.0270	2.9941	13
P6	Retaining Talent	2.4948	2.4294	11

Convergence to the management frontier-not just more competition

Figure 5: Change in distributions relative to the frontier with convergence: Quantile coefficients relative to the frontier (US) vs Mean Z-Score

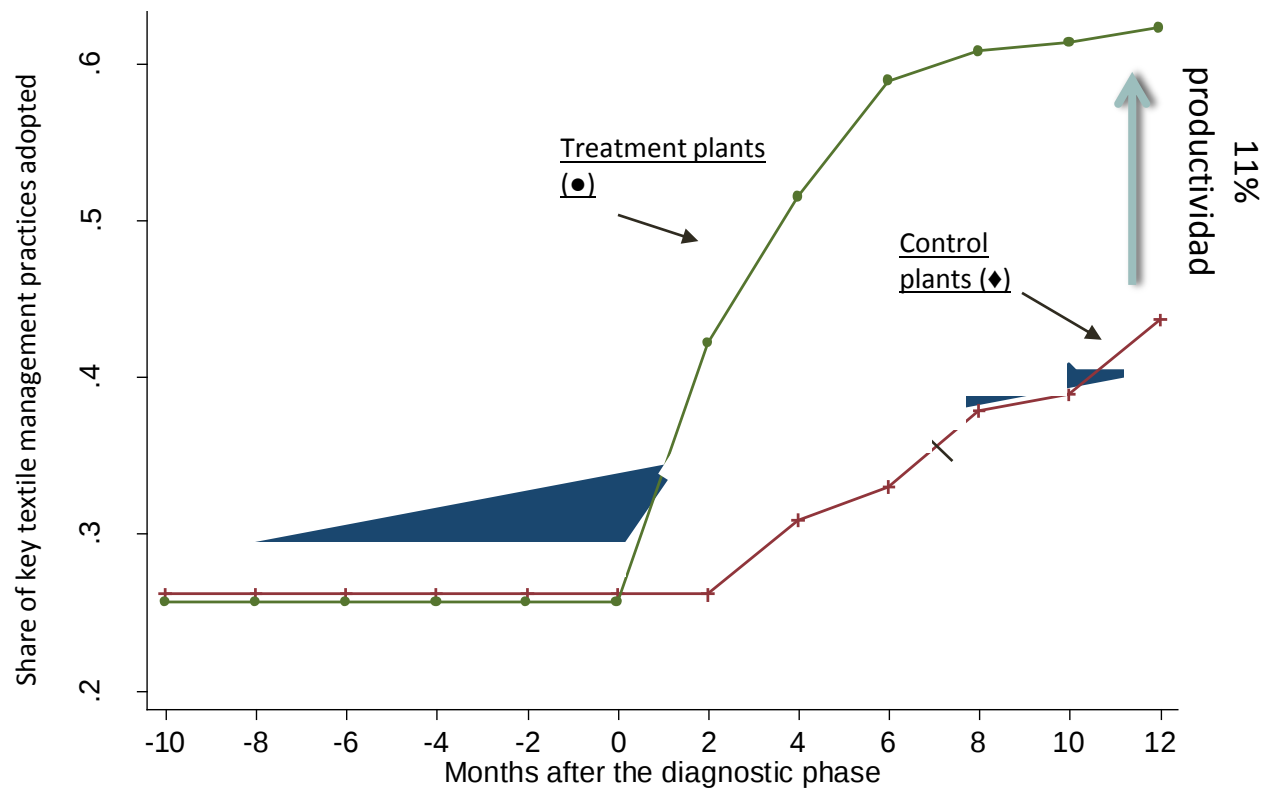


Note: First line: Plot of coefficient on country dummies at the 50th quantile (median) of management score on constant and country dummy vs. mean management score. 2. Plot of 90th coefficient over 10th. Second line, the same, but after conditioning for all available covariates.

Direct interventions in management quality?

- Japan, Korea, Singapore: All employed management promotion programs for SMEs
 - Korea: The Small and Medium Industries Promotion program
 - Singapore: Local Industry Upgrading Program (LIUP)
 - India
 - Colombia
- Lays the foundation for progressively more adoption and invention of new technologies.

India-Successful Management Intervention



Source: Bloom, et al 2013

Colombia

- Technological Extension pilot-Autoparts
- RCT 180 firms
 - Individual company intervention
 - Group intervention- Lower cost, more dynamism?
- Current plans to scale up to whole sector

Thank You