Introducción al Crecimiento Económico

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Introduction

- In 2000, GDP per capita in the United States was $32500 (valued at 1995 $ prices). This high-income level are associated with high standard of living.
- In contrast, standard of living is much lower in many other countries: $9000 in Mexico, $2500 in India, and only $1000 in Nigeria (all figures adjusted for purchasing power parity).
- How can countries with low level of GDP per person catch up with the high levels enjoyed by the United States or the G7?
  - Only by high growth rates sustained for long periods of time.
- Small differences in growth rates over long periods of time can make huge differences in final outcomes.

Introduction

- US per-capita GDP grew by a factor ≈ 10 from 1870 to 2000: In 1995 prices, it was $3300 in 1870 and $32500 in 2000. Average growth rate was ≈ 1.75%. If US had grown with .75% (like India, Pakistan, or the Philippines), its GDP would be only $8700 in 1990 (i.e., ≈ 1/4 of the actual one, similar to Mexico, less than Portugal or Greece). If US had grown with 2.75% (like Japan or Taiwan), its GDP would be $112000 in 1990 (i.e., 3.5 times the actual one).

- At a growth rate of 1%, our children will have ≈ 1.4 our income. At a growth rate of 3%, our children will have ≈ 2.5 our income. Some East Asian countries grew by 6% over 1960-1990; this is a factor of ≈ 6 within just one generation!!!

- Once we appreciate the importance of sustained growth, the question is natural: What can do to make growth faster? (and sustainable…)

- Equivalently: What are the factors that explain differences in economic growth, and how can we control these factors?

- In order to prescribe policies that will promote growth, we need to understand what are the determinants of economic growth, as well as what are the effects of economic growth on social welfare. That's exactly where Growth Theory comes into picture...

The World Distribution of Income Levels and Growth Rates

- In 2000 there were many countries that had much lower standards of living than the United States. This fact reflects the high cross-country dispersion in the level of income.

- Figure 1.1 shows the distribution of (the log of) GDP per capita in 1960, 1980, and 2000 across the 147 countries in the Summers and Heston dataset.

- In 2000, the richest country was Luxembourg, with $44000 GDP per person. The United States came second, with $32500. The G7 and most of the OECD countries ranked in the top 25 positions, together with Singapore, Hong Kong, Taiwan, and Cyprus. Most African countries, on the other hand, fell in the bottom 25 of the distribution. Tanzania was the poorest country, with only $570 per person–that is, less than 2% of the income in the United States or Luxemburg! In 1960, on the other hand, the richest country then was Switzerland, with $15000; the United States was again second, with $13000, and the poorest country was again Tanzania, with $450.

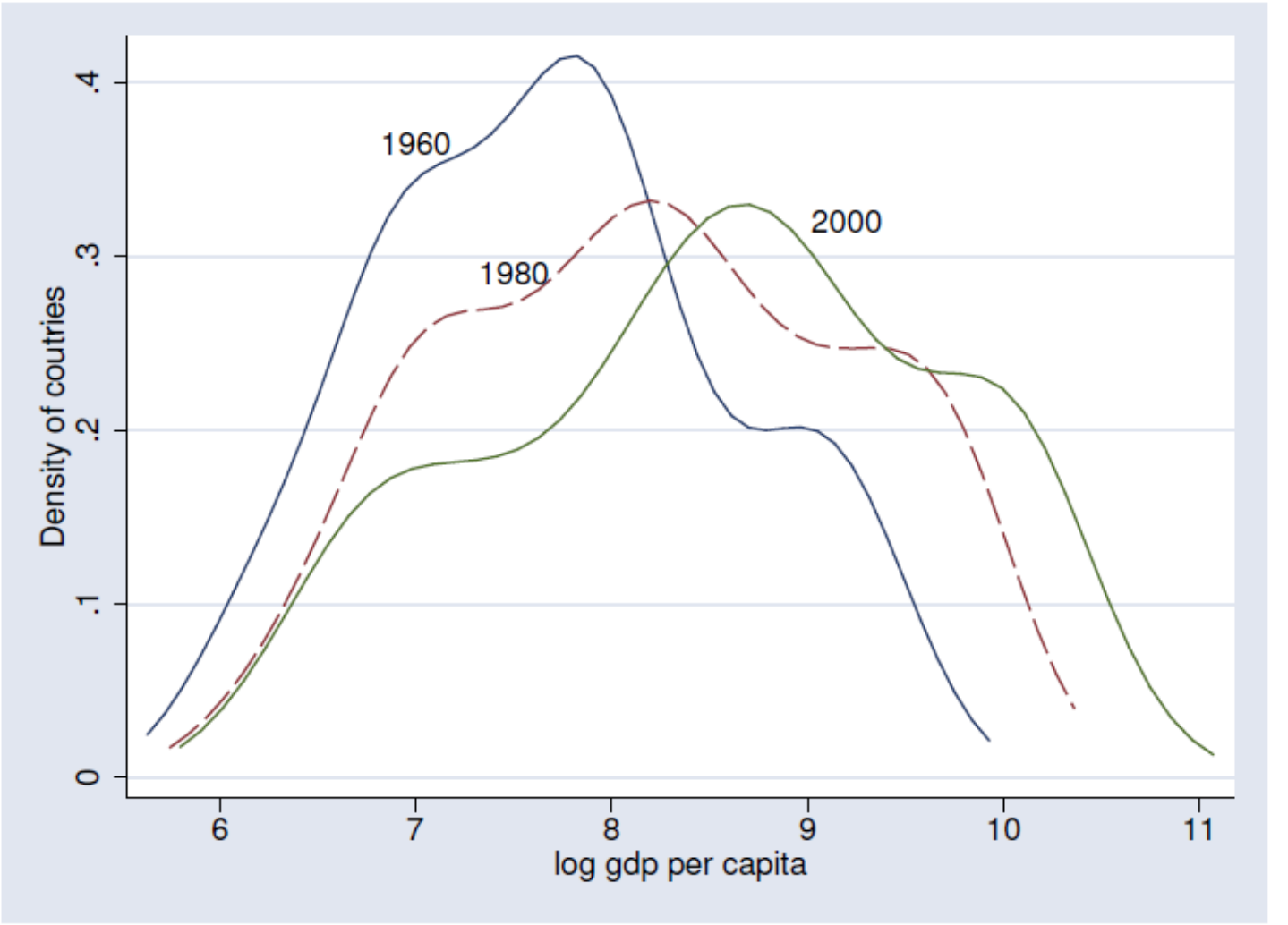


Figure 1.1: Estimates of the distribution of countries according to log GDP per capita (PPP-adjusted) in 1960, 1980 and 2000.

The World Distribution of Income Levels and Growth Rates

- The cross-country dispersion of income was thus as wide in 1960 as in 2000. Nevertheless, there were some important movements during this 40-year period. Argentina, Venezuela, Uruguay, Israel, and South Africa were in the top 25 in 1960, but none made it to the top 25 in 2000. On the other hand, China, Indonesia, Nepal, Pakistan, India, and Bangladesh grew fast enough to escape the bottom 25 between 1960 and 1970. These large movements in the distribution of income reflects sustained differences in the rate of economic growth.

- Figure 1.2 shows the distribution of the growth rates the countries experienced between 1960 and 2000. Just as there is a great dispersion in income levels, there is a great dispersion in growth rates. The mean growth rate was 1.8% per annum; that is, the world on average was twice as rich in 2000 as in 1960. The United States did slightly better than the mean. The fastest growing country was Taiwan, with an annual rate as high as 6%, which accumulates to a factor of 10 over the 40-year period. The slowest growing country was Zambia, with a negative rate at −1.8%; Zambia's residents show their income shrinking to half between 1960 and 2000.

- Figure 1.3 shows an example of how persistent the differences in growth rates were across countries.

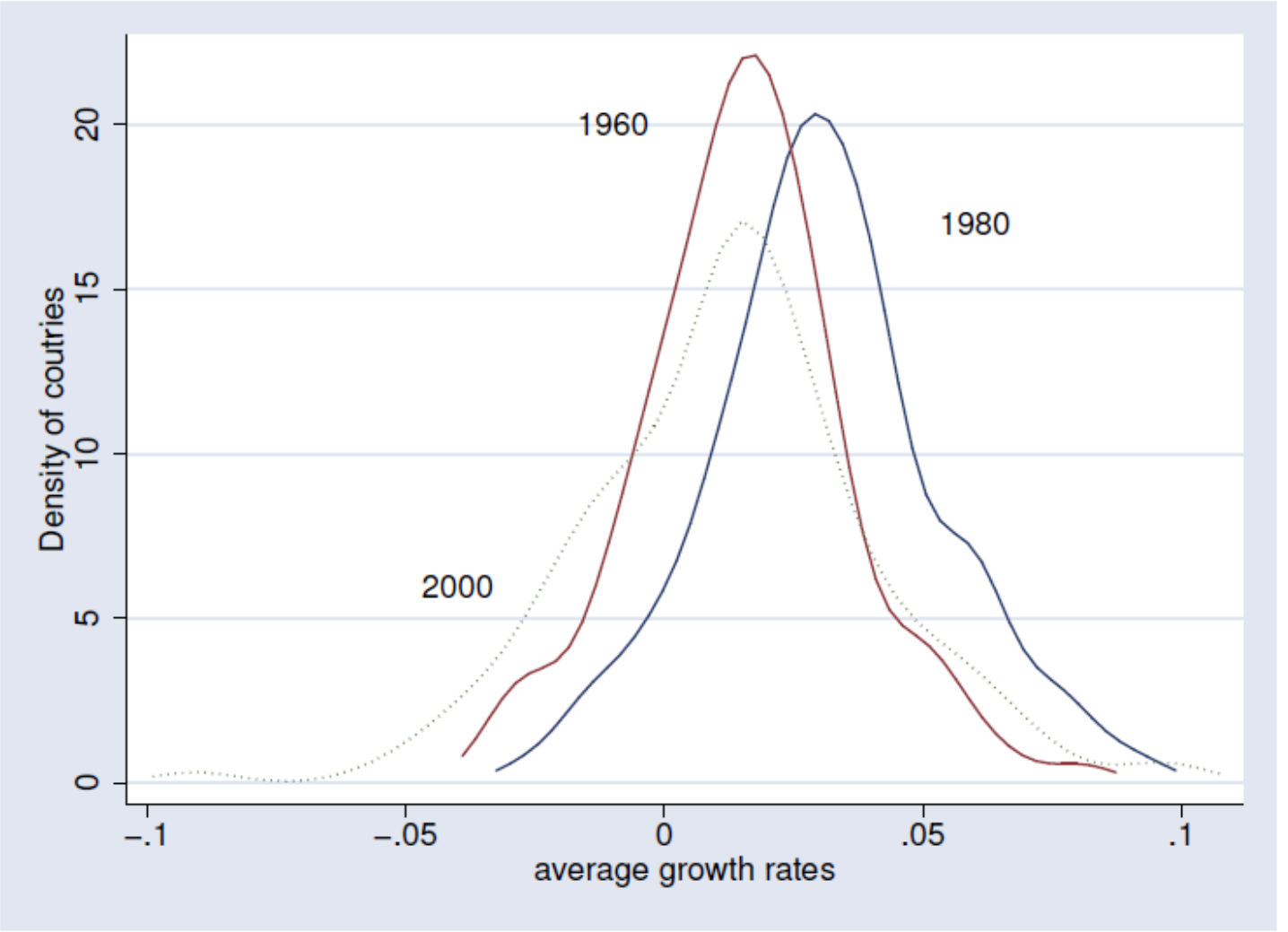


Figure 1.2: Estimates of the distribution of countries according to the growth rate of GDP per worker (PPP-adjusted) in 1960, 1980 and 2000.

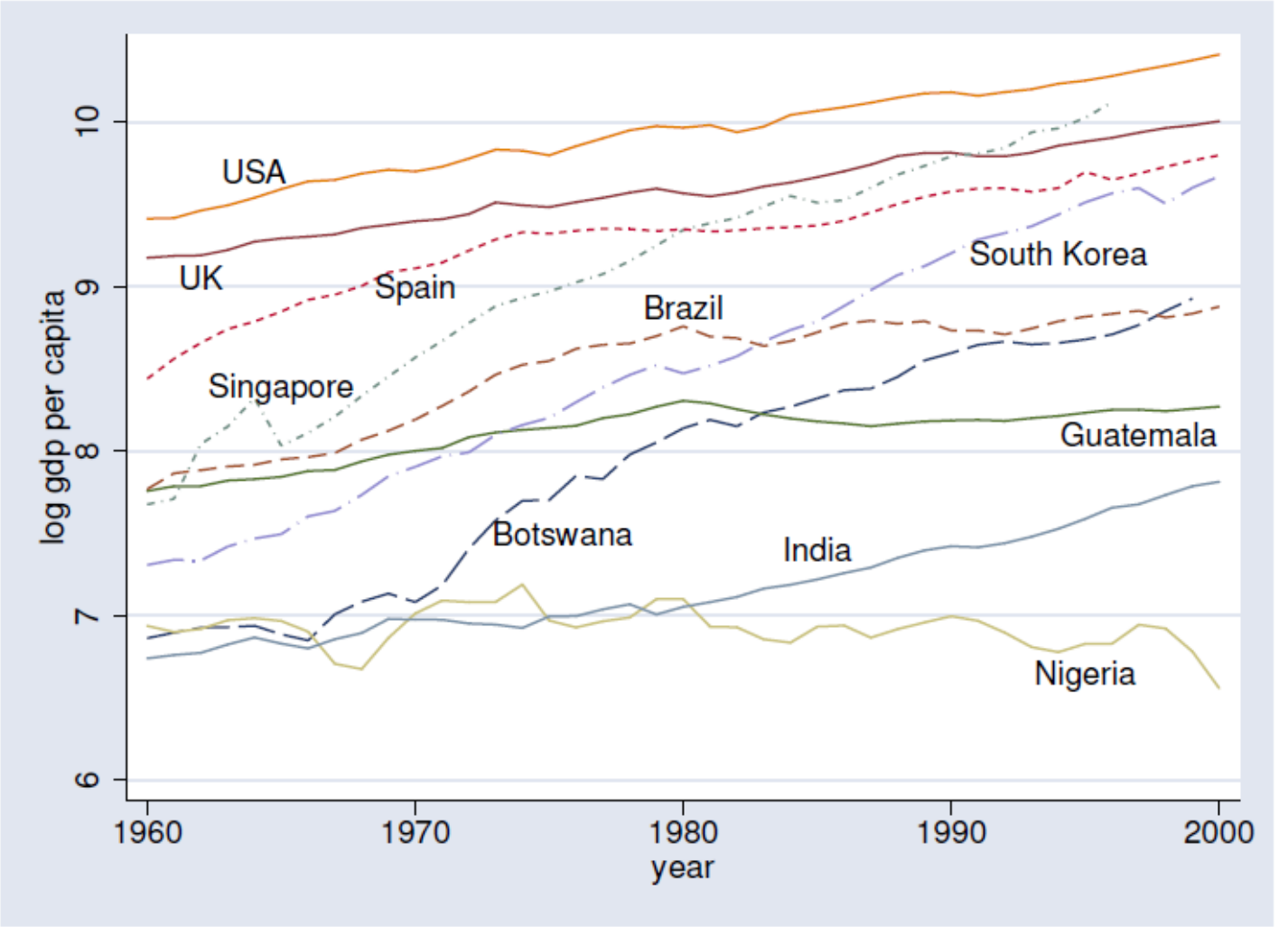


Figure 1.3: The evolution of income per capita in the United States, United Kingdom, Spain, Singapore, Brazil, Guatemala, South Korea, Botswana, Nigeria and India, 1960-2000.

The World Distribution of Income Levels and Growth Rates

- Most East Asian countries (Taiwan, Singapore, South Korea, Hong Kong, Thailand, China, and Japan), together with Botswana (an outlier for sub-Saharan Africa), Cyprus, Romania, and Mauritius, had the most stellar growth performances; they were the “growth miracles” of our times. Some OECD countries (Ireland, Portugal, Spain, Greece, Luxemburg and Norway) also made it to the top 20 of the growth-rates chart. On the other hand, 18 out of the bottom 20 were sub-Saharan African countries. Other notable “growth disasters” were Venezuela, Chad and Iraq.

Unconditional versus Conditional Convergence

- Figure 1.4 graphs a country's GDP per worker in 1988 (normalized by the US level) against the same country's GDP per worker in 1960.

- Clearly, most countries did not experience a dramatic change in their relative position in the world income distribution. Therefore, although there are important movements in the world income distribution, income and productivity differences tend to be very persistent.

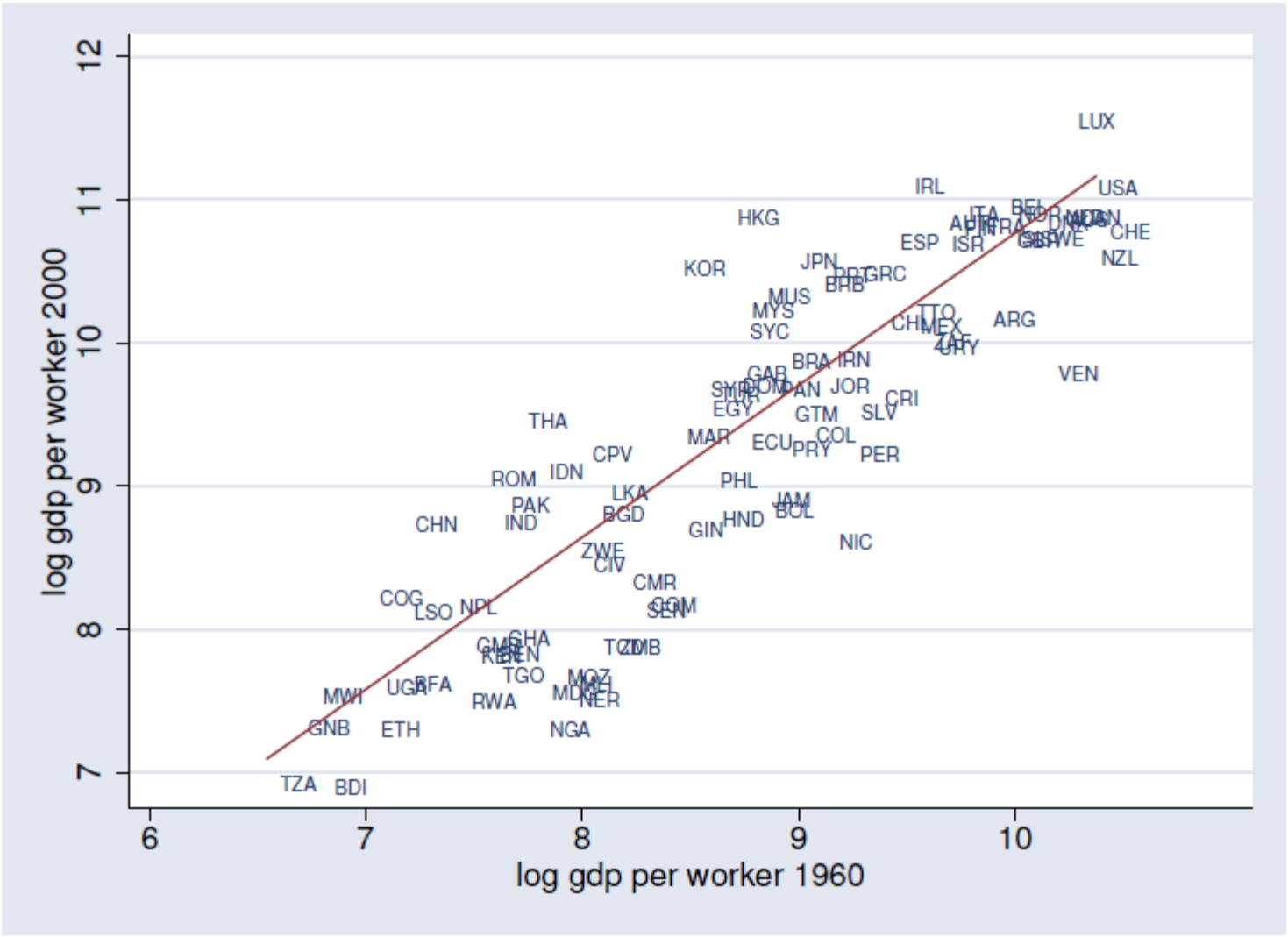


Figure 1.4: Log GDP per worker in 2000 versus log GDP per worker in 1960.

Unconditional versus Conditional Convergence

- This also means that poor countries on average do not grow faster than rich countries. And another way to state the same fact is that unconditional convergence is zero. That is, if we ran the regression

$$\Delta \ln y_{2000-1960} = \alpha + \beta \cdot \ln y_{1960},$$

- the estimated coefficient β is zero.

Unconditional versus Conditional Convergence

- On the other hand, consider the regression

$$\Delta \ln y_{1960-90} = \alpha + \beta \cdot \ln y_{1960} + \gamma \cdot X_{1960}$$

- where X1960 is a set of country-specific controls, such as levels of education, fiscal and monetary policies, market competition, etc. Then, the estimated coefficient β turns to be around 2% per annum. Therefore, poor countries tend to catch up with the rich countries within a group of countries that share similar characteristics. This is what we call conditional convergence.

- Conditional convergence is illustrated in Figure 1.5, for the group of OECD countries.

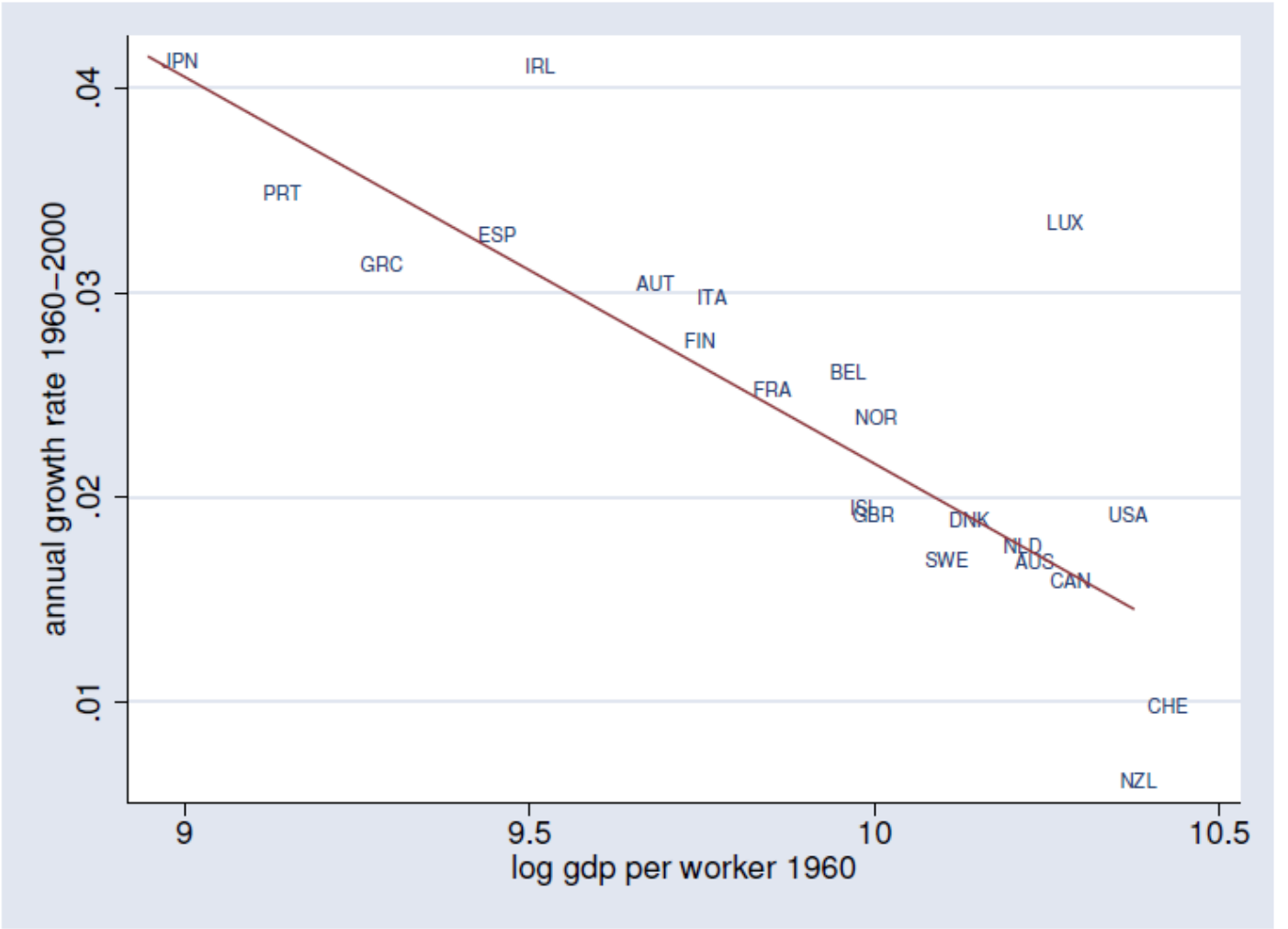


Figure 1.5: Annual growth rate of GDP per worker between 1960 and 2000 versus log GDP per worker in 1960 for core OECD countries.

Sources of Growth

- It is convenient to explain this accounting using a Cobb–Douglas specification. More specifically, suppose final output Y_t is produced using stocks of physical capital K_t and human capital H_t:

$$Y_t = A_t K_t^{\alpha} H_t^{1-\alpha}$$

- Where A_t is total factor productivity that can be decompose between A'_t and M_t ($A_t = A'_t M_t$). In this case, A'_t denotes the economy's stock of knowledge, and M_t is anything else that influences total factor productivity (the letter "M" is reminiscent of the "measure of our ignorance" and also is suggestive of "misallocation".

Growth decomposition

- Labor adjusted for human capital can be rewritten as *Lh, where L is employment and h is a* measure of human capital per worker.
- Using lowercase letters for per-capita, we have that:

$$y_{jt} = A_{jt} k_{jt}^{\alpha} h_{jt}^{1-\alpha}$$

Growth decomposition

- Given that the capital-output ratio remains invariant to a productivity increase in the long run, we can write the previous relation in terms of the capital-output ratio:

$$y_{jt} = A_{jt}^{\frac{1}{1-\alpha}} \left(\frac{k_{jt}}{y_{jt}} \right)^{\frac{\alpha}{1-\alpha}} h_{jt}$$

Table 3 Growth accounting for the United States

Period	Output per hour	Contributions from		
		K/Y	Labor composition	Labor-Aug. TFP
1948–2013	**2.5**	**0.1**	**0.3**	**2.0**
1948–1973	3.3	−0.2	0.3	3.2
1973–1990	1.6	0.5	0.3	0.8
1990–1995	1.6	0.2	0.7	0.7
1995–2000	3.0	0.3	0.3	2.3
2000–2007	2.7	0.2	0.3	2.2
2007–2013	1.7	0.1	0.5	1.1

Note: Average annual growth rates (in percent) for output per hour and its components for the private business sector, following Eq. (3).
Source: Authors calculations using Bureau of Labor Statistics, *Multifactor Productivity Trends*, August 21, 2014.

Growth decomposition

- We can consider two countries and decompose the output per capita gap between them as:

$$\frac{y_{jt}}{y_{it}} = \left(\frac{A_{jt}}{A_{it}}\right)^{\frac{1}{1-\alpha}} \left(\frac{k_{jt}/y_{jt}}{k_{it}/y_{it}}\right)^{\frac{\alpha}{1-\alpha}} \left(\frac{h_{jt}}{h_{it}}\right)$$

Growth decomposition

- The comparisons here are done with respect to the United States (country i).

- Therefore, output per capita differences can be explained by productivity differentials, differences in the capital-output ratio, and differences in human capital.

Development accounting

	GDP per worker, y	Capital/GDP $(K/Y)^{\alpha/(1-\alpha)}$	Human capital, h	TFP	Share due to TFP
United States	1.000	1.000	1.000	1.000	–
Hong Kong	0.854	1.086	0.833	0.944	48.9%
Singapore	0.845	1.105	0.764	1.001	45.8%
France	0.790	1.184	0.840	0.795	55.6%
Germany	0.740	1.078	0.918	0.748	57.0%
United Kingdom	0.733	1.015	0.780	0.925	46.1%
Japan	0.683	1.218	0.903	0.620	63.9%
South Korea	0.598	1.146	0.925	0.564	65.3%
Argentina	0.376	1.109	0.779	0.435	66.5%
Mexico	0.338	0.931	0.760	0.477	59.7%
Botswana	0.236	1.034	0.786	0.291	73.7%
South Africa	0.225	0.877	0.731	0.351	64.6%
Brazil	0.183	1.084	0.676	0.250	74.5%
Thailand	0.154	1.125	0.667	0.206	78.5%
China	0.136	1.137	0.713	0.168	82.9%
Indonesia	0.096	1.014	0.575	0.165	77.9%
India	0.096	0.827	0.533	0.217	67.0%
Kenya	0.037	0.819	0.618	0.073	87.3%
Malawi	0.021	1.107	0.507	0.038	93.6%
Average	0.212	0.979	0.705	0.307	63.8%
1/Average	4.720	1.021	1.418	3.260	69.2%

The product of the three input columns equals GDP per worker. The penultimate row, "Average," shows the geometric average of each column across 128 countries. The "Share due to TFP" column is computed as described in the text. The 69.2% share in the last row is computed looking across the columns, ie, as approximately 3.5/(3.5 + 1.5).
Source: Computed using the Penn World Tables 8.0 for the year 2010 assuming a common value of $\alpha = 1/3$.

Source: Jones (2016)

Growth decomposition

- For all countries considered, the most important gap is the TFP gap.

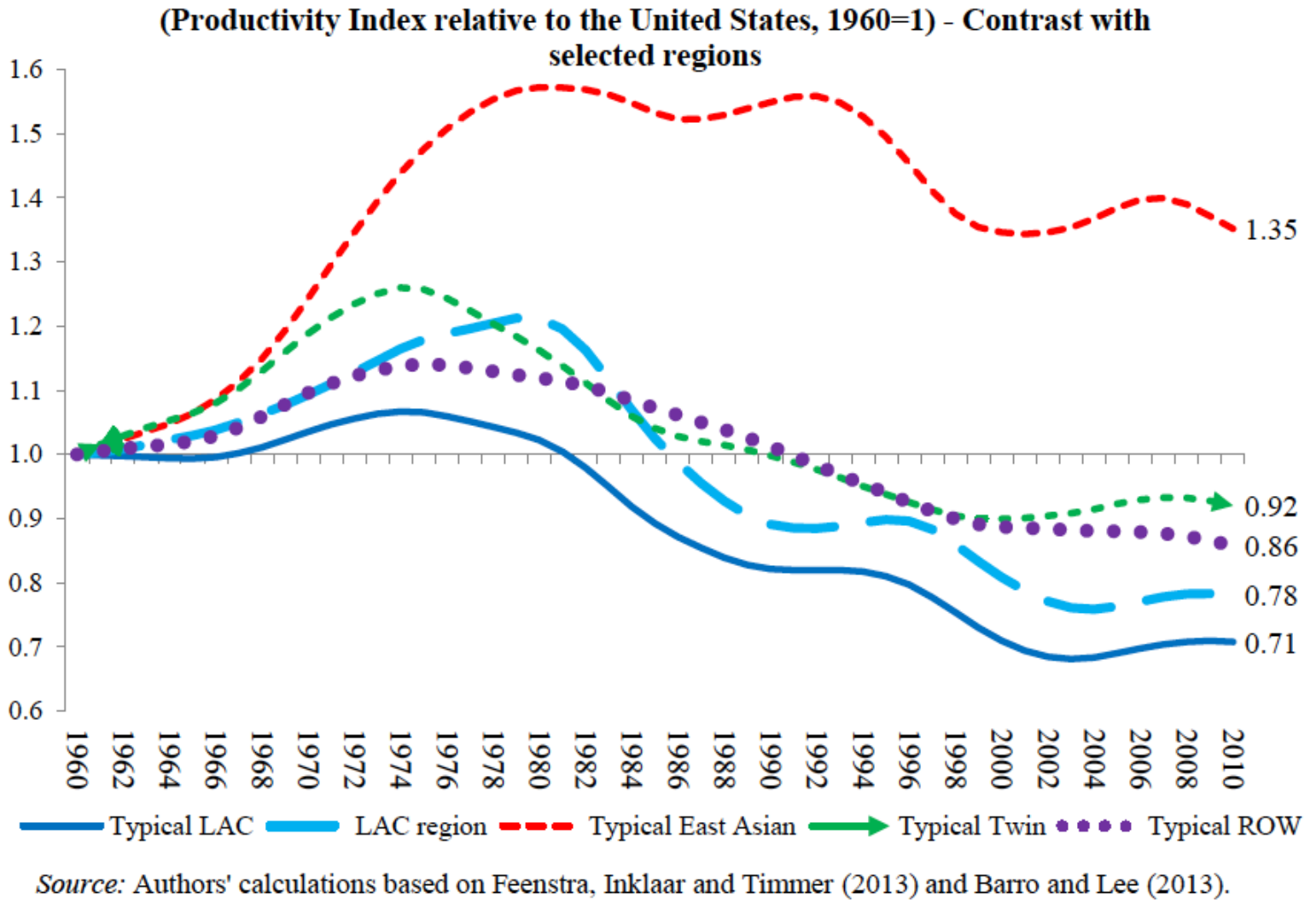
- It is also important to recall that the human capital gap is not corrected by quality and there is strong evidence that quality of education in the region is relatively poor, which may indicate that the human capital gap in previous table could be underestimated.

Growth decomposition

- Hence, the largest gains in terms of closing the income gap may be obtained by closing the productivity gap, that is, by increasing efficiency in the use of existing factors of production, in order to produce more with the same inputs.

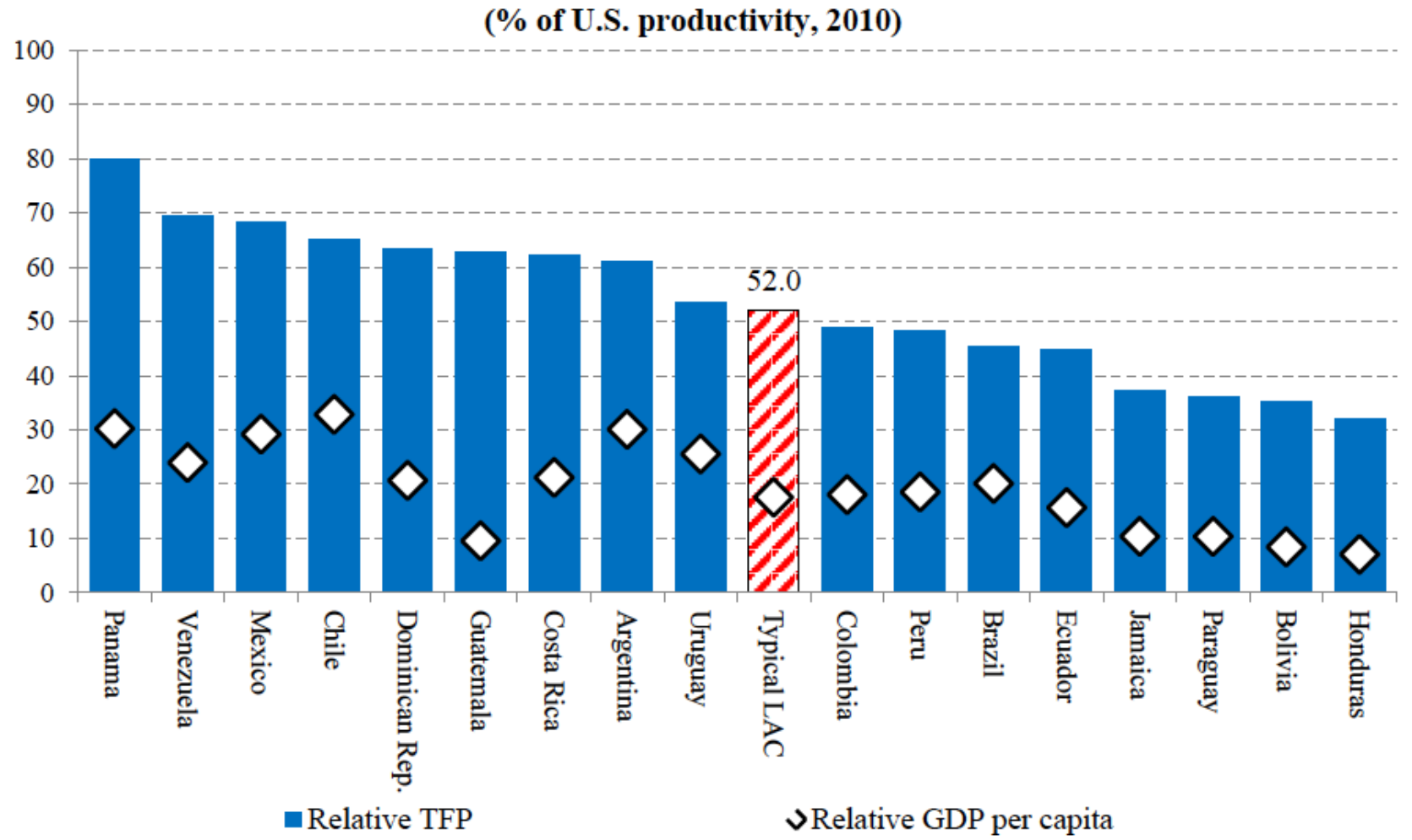
- Was the Asian “miracle” more the result of capital deepening than of productivity enhancement? a point originally raised by Young (1995).

Productivity Catch-up: Latin America and selected regions



Source: Fernández-Arias and Rodríguez-Apolinar (2016)

Relative productivity in LAC countries

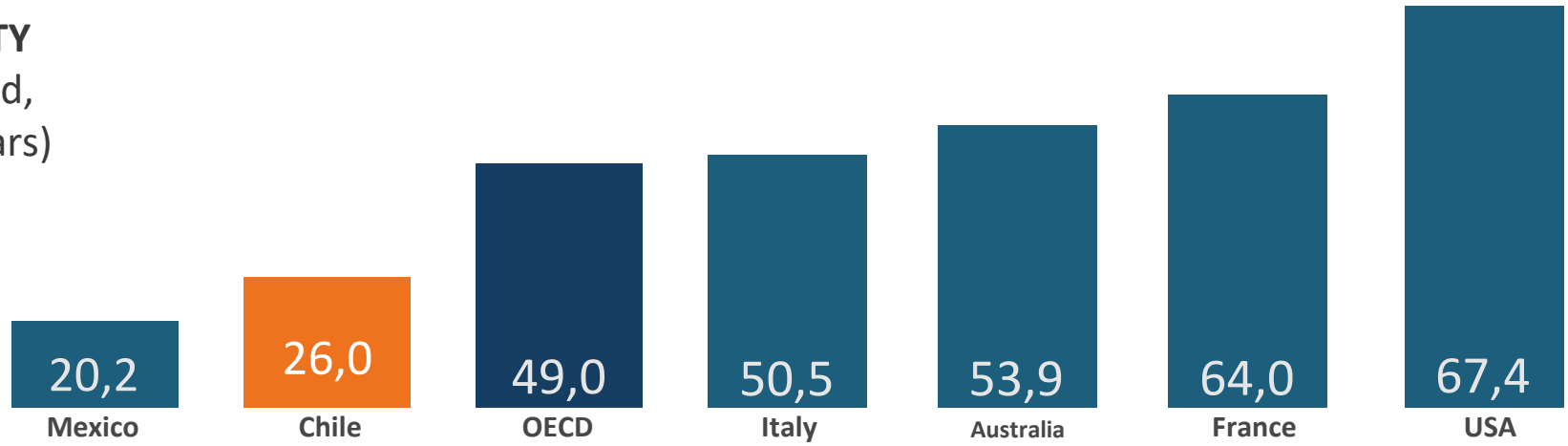


Source: Authors' calculations based on Feenstra, Inklaar and Timmer (2013) and Barro and Lee (2013).

Source: Fernández-Arias and Rodríguez-Apolinar (2016)

PRODUCTIVITY DIFFERENCES

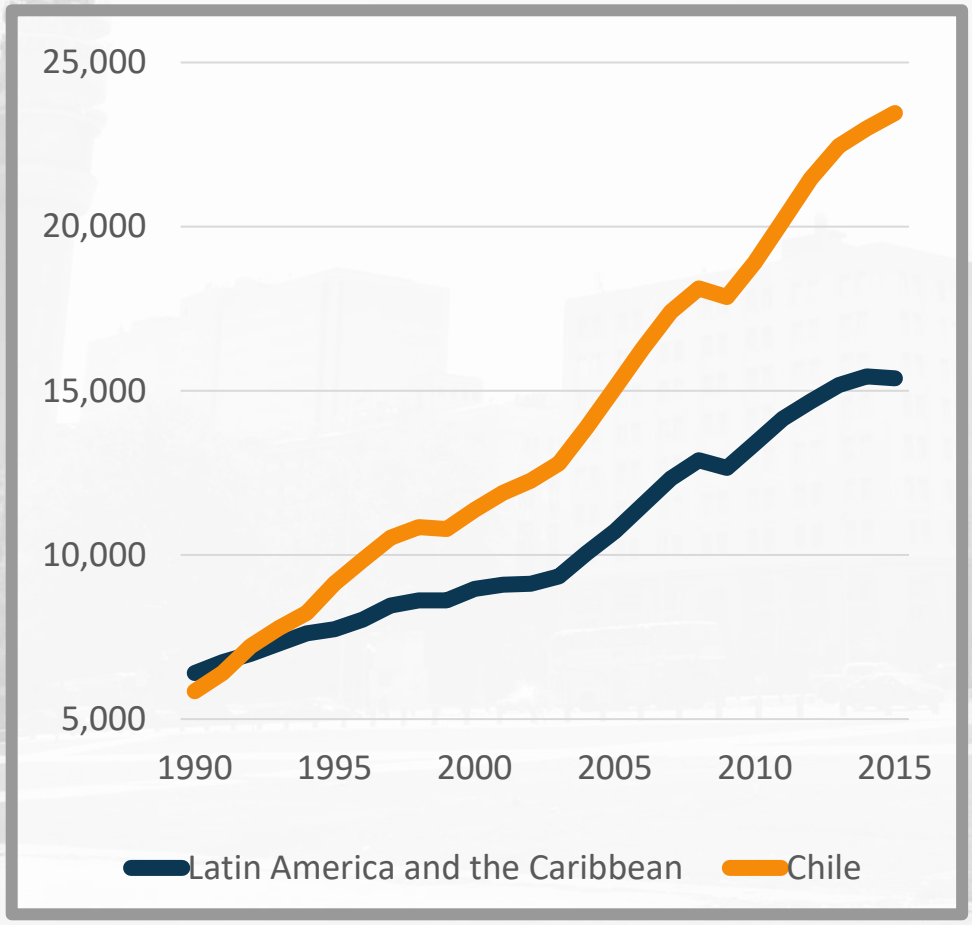
LABOR PRODUCTIVITY
(GDP per hour worked,
current and PPP dollars)



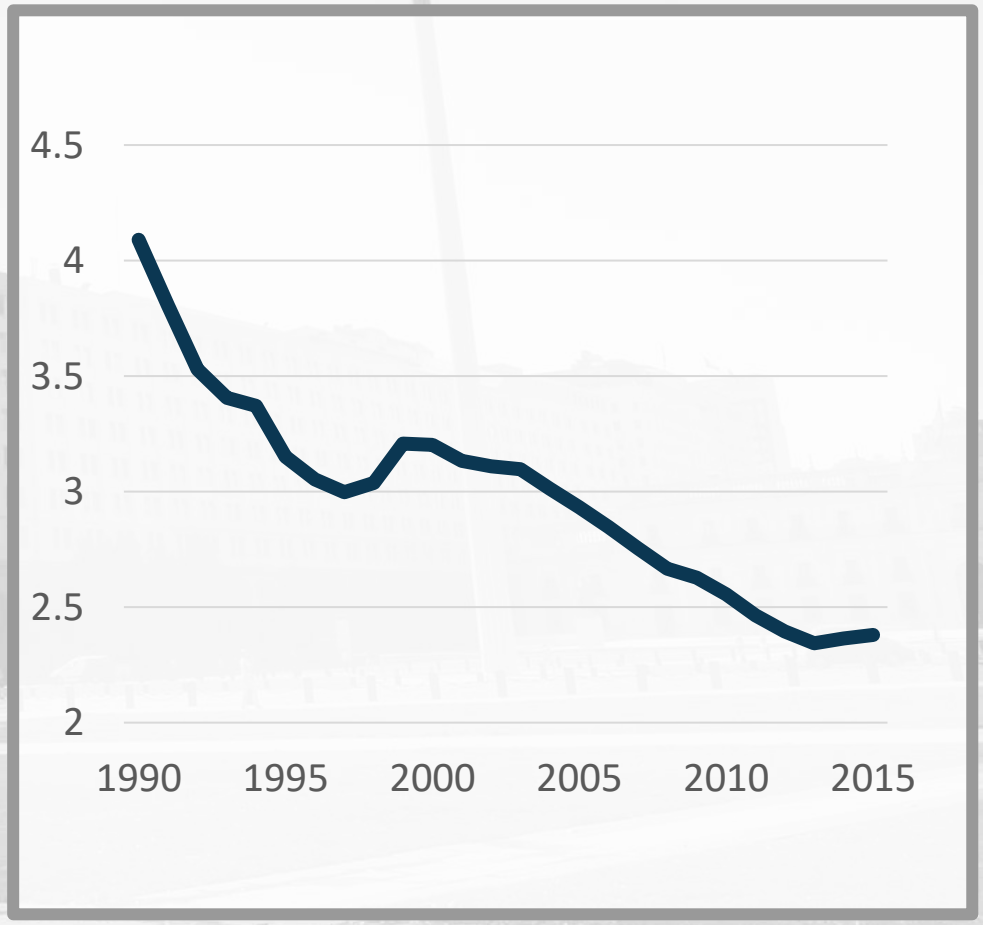
Source: OECD

Chile experienced solid economic growth, reducing in more than 40% its income per capita gap with respect to the United States

GDP per capita *(PPP, current US$)*



USA/Chile GDP per capita ratio



Source: Consensus Forecast, IMF, LME

Chile: TFP Trends

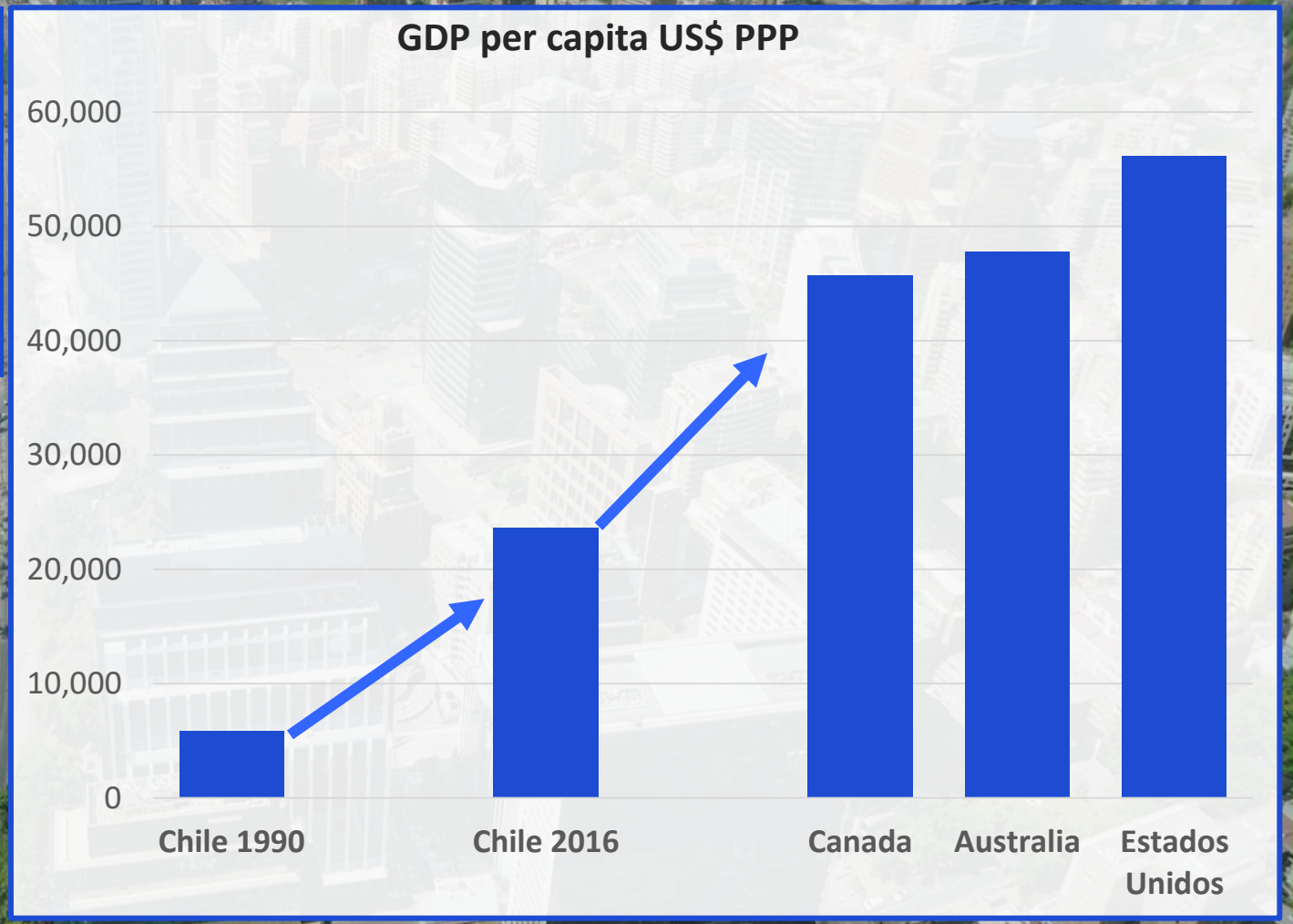
TFP Comisión Nacional de Productividad

	1990-2000	2000-2010	2010-2015	2000-2015
TFP	2.3%	0.3%	-0.2%	0.1%
TFP excluding mining	2.3%	1.6%	0.8%	1.4%

Source: Productivity Commission Chile (2016)

PRODUCTIVITY

65%
of income gap due to productivity differences

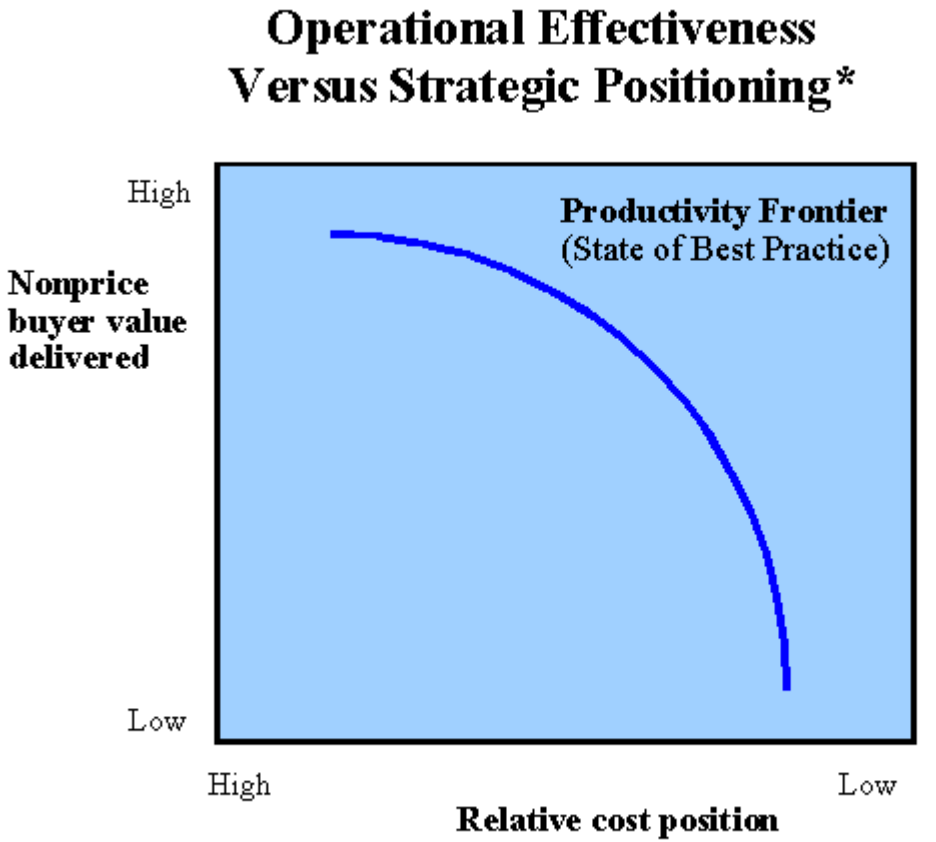


Distance to frontier, selection and economic growth (Acemoglu, Aghion and Zilibotti (2006))

“…A likely equilibrium sequence is for an economy to start with an investment based strategy…Intuitively, this strategy corresponds to an equilibrium where selection is less important, insiders are protected, and savings are channeled through existing firms in an attempt to achieve rapid investment growth and technology adoption. As the economy approaches the world technology frontier, lack of selection becomes more costly and there is typically a switch to an innovation-based strategy...”

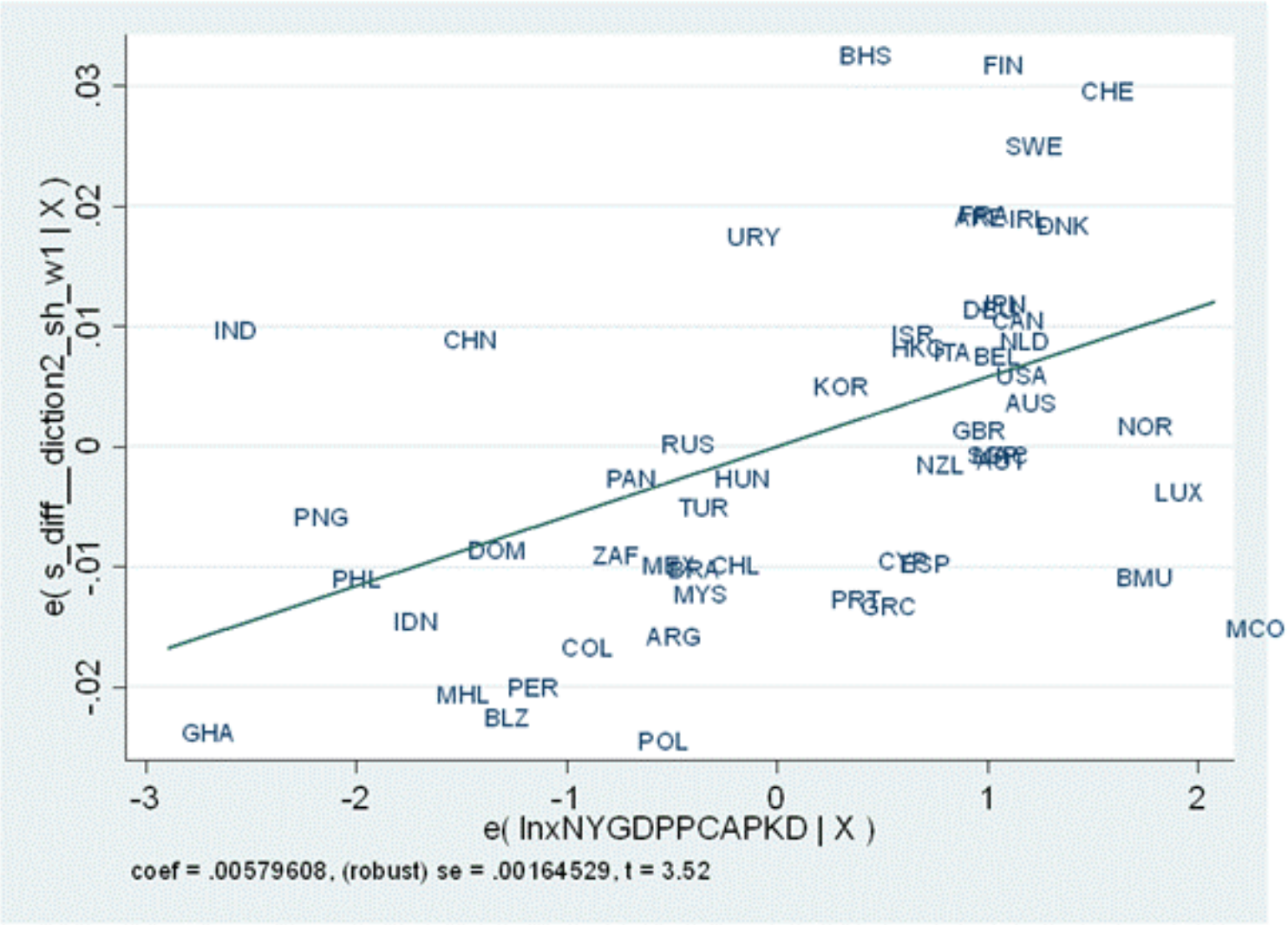
“…an economy may stay in the investment-based strategy too long. Delayed switch to the innovation-based strategy reduces growth because the economy is not making best use of innovation opportunities. More important, there exists a level of development (distance to frontier) such that, if an economy does not switch out of the investment-based strategy before this threshold, it will be stuck in a non-convergence trap where convergence to the frontier stops.”

Distance to frontier and business strategy

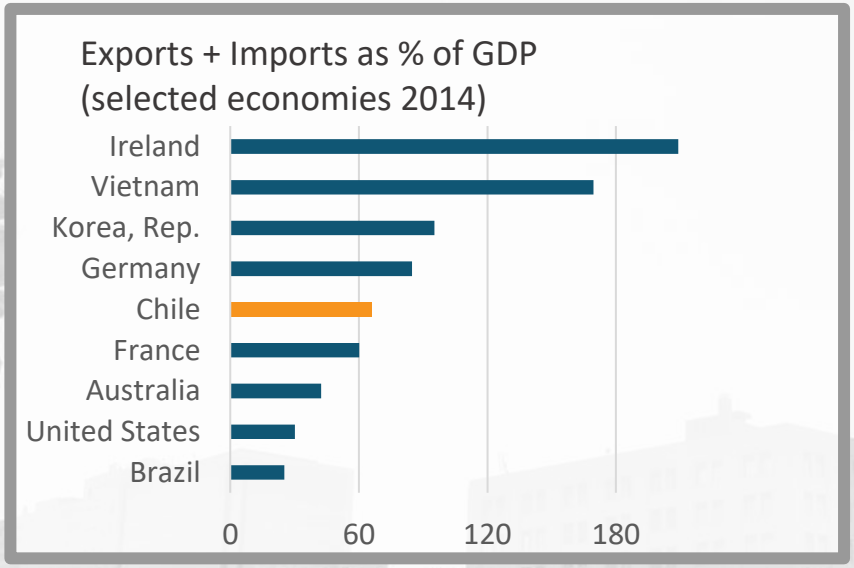


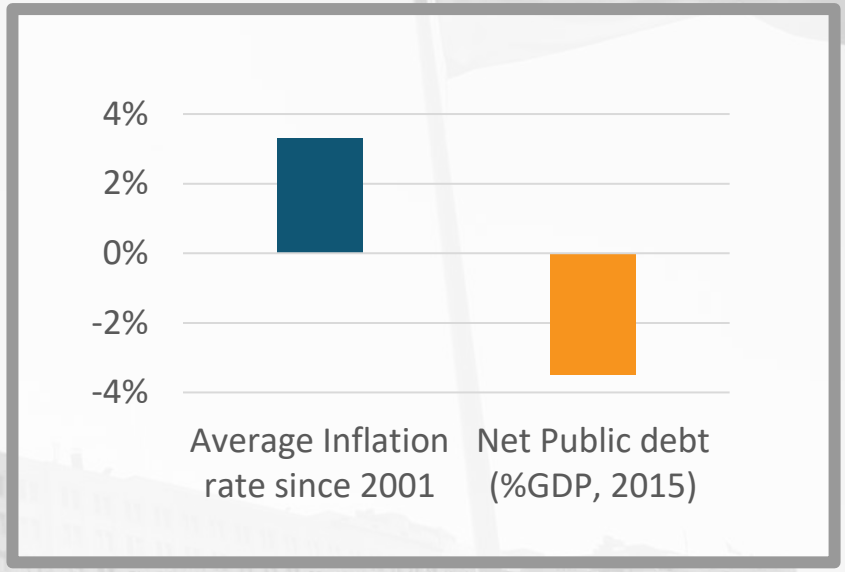
* Adapted from Porter's illustration p. 62

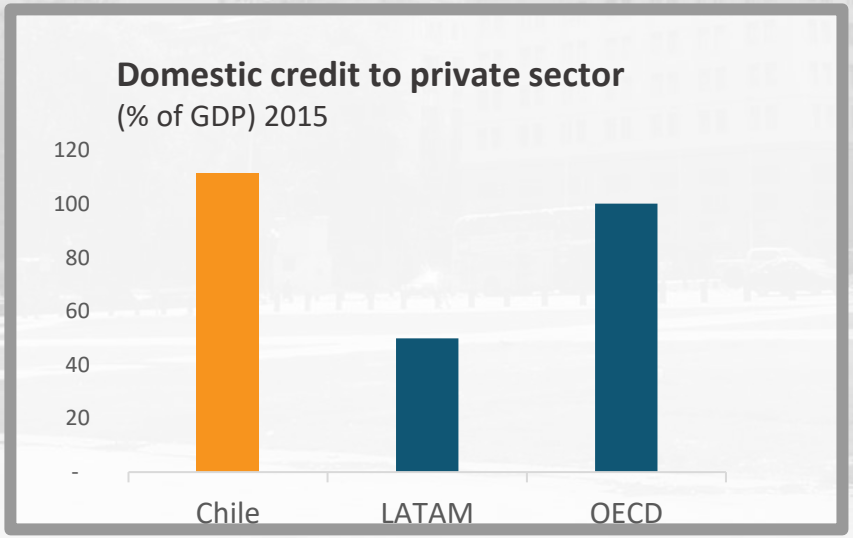
Business strategy and income per capita



STAGE DEPENDENT ECONOMIC INSTITUTIONS: Trade openness, sound macroeconomic framework, financial stability and solid institutions







Competitiveness Ranking
1st Pillar: Institutions

Economy	Rank
Finland	1
Japan	16
United States	27
Chile	**35**
South Korea	63
Mexico	109

Source: World Bank and World Economic Forum

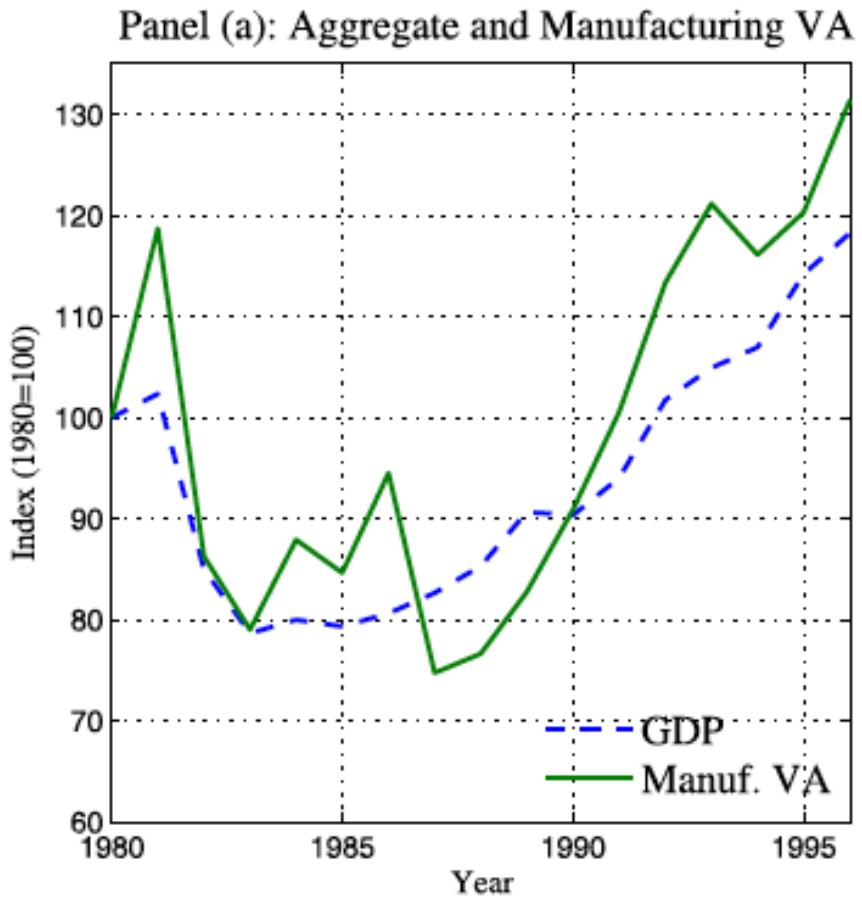
How to increase productivity at this stage of development?

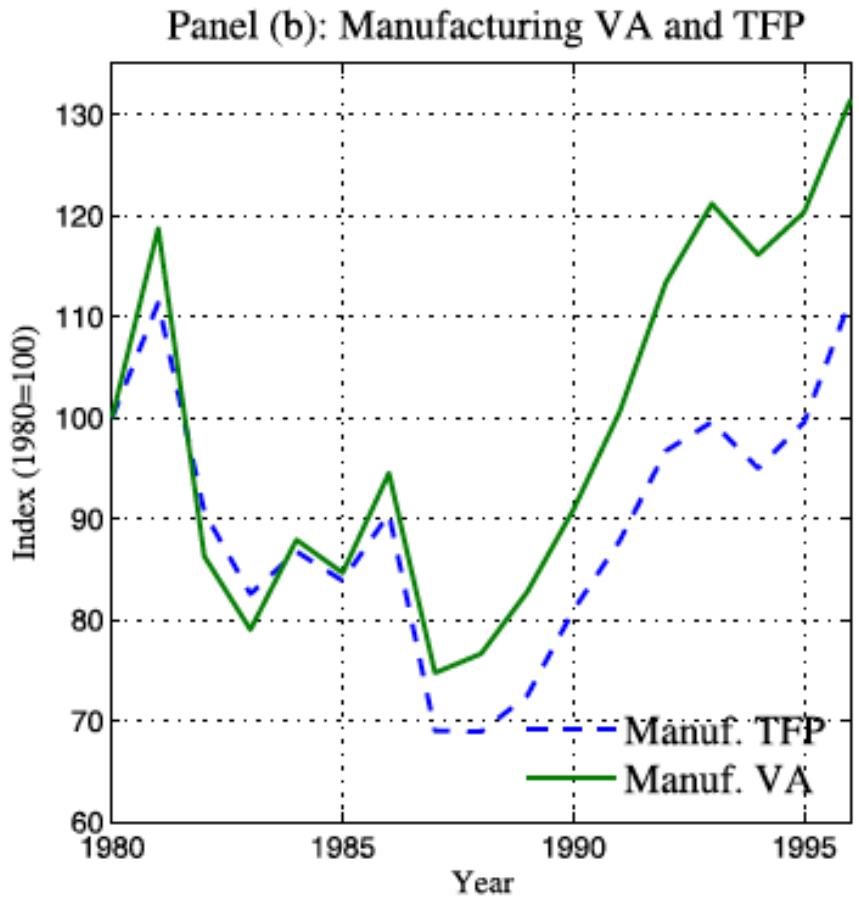
Entrepreneurship and innovation:

- Generating new ideas (Business sophistication: new products and services, more efficient processes)
- Structural transformation

Continue improving allocation of resources

Chilean manufacturing value-added and TFP:1980-1995

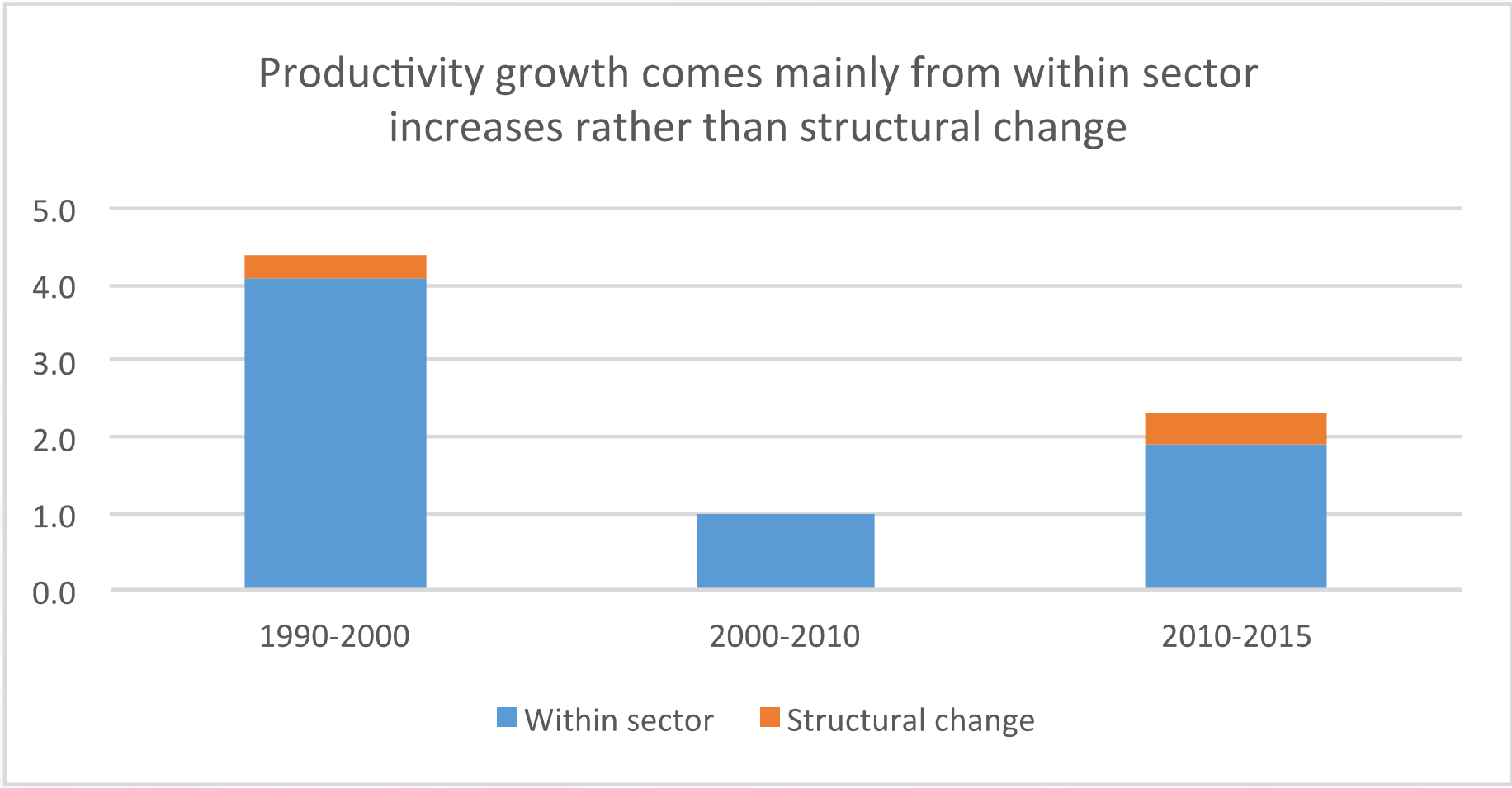




Note: Panel (a) shows Chilean GDP and value-added (referred to as "VA") for the manufacturing sector, while panel (b) shows value added and TFP for the manufacturing sector. Measured TFP is $\frac{VA}{K^{\alpha}L^{1-\alpha}}$ with $\alpha = 0.3$. Both GDP and the value-added for manufacturing sector are detrended by 2 percent per year and normalized such that their 1980 values equal to 100. The manufacturing TFP is detrended by 1.4 percent per year and normalized in a similar way.

Source: Chen and Irarrazabal (2015)

Chile: Decomposition of productivity growth



Source: Productivity Commission Chile (2016)

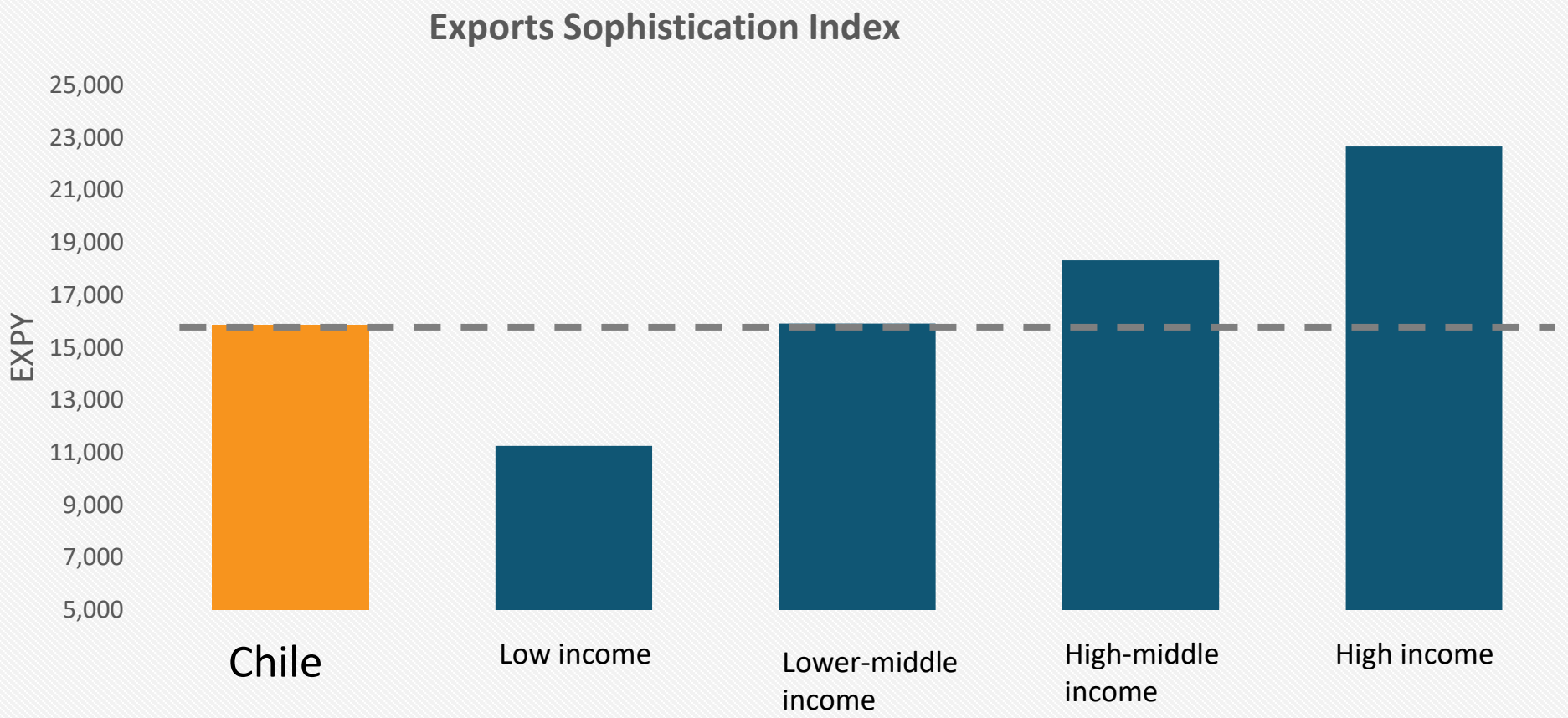
Chile: Productivity in SMS firms is low

Sales per worker

	Total	Micro (1-9 workers)	Small (10-49 workers)	Medium (50-249 workers)	Large (>250 workers)
Chile	103	86	85	97	106
Exporters	206	203	191	186	214
OECD	256	153	212	271	337
High income	313	236	231	306	365
Medium income	261	160	224	299	349
Low income	121	74	127	139	172
USA	282	208	186	229	340

Source: Productivity Commission Chile (2017)

CHILE'S DIVERSIFICATION AND SOPHISTICATION LEVEL IS COMPARED TO A **LOWER-MIDDLE INCOME COUNTRY**

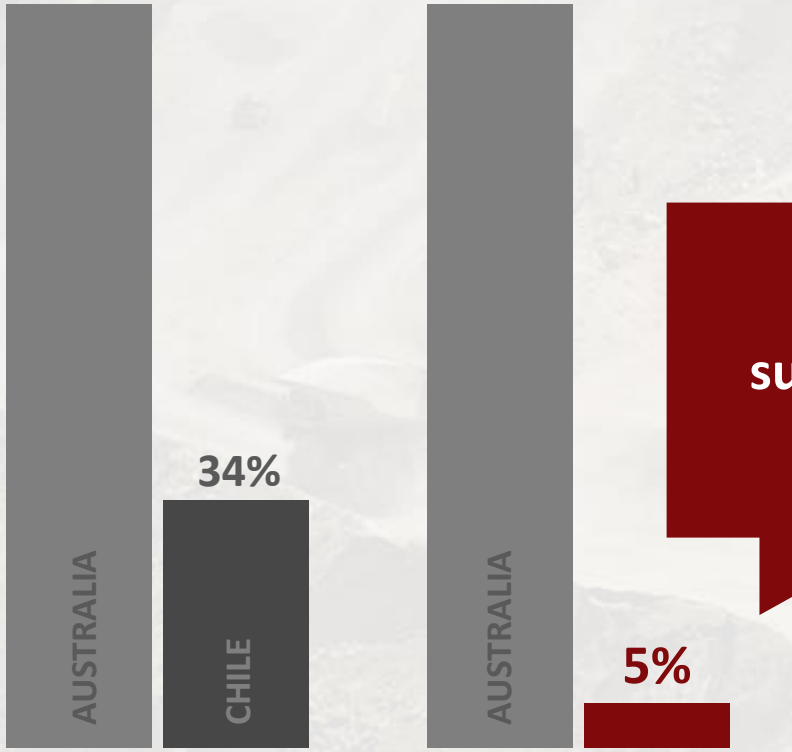


Source: Own elaboration, based on WDI

…diversification is not an impossible mission

Chilean mining and mining related exports

(As a percentage of australian exports)



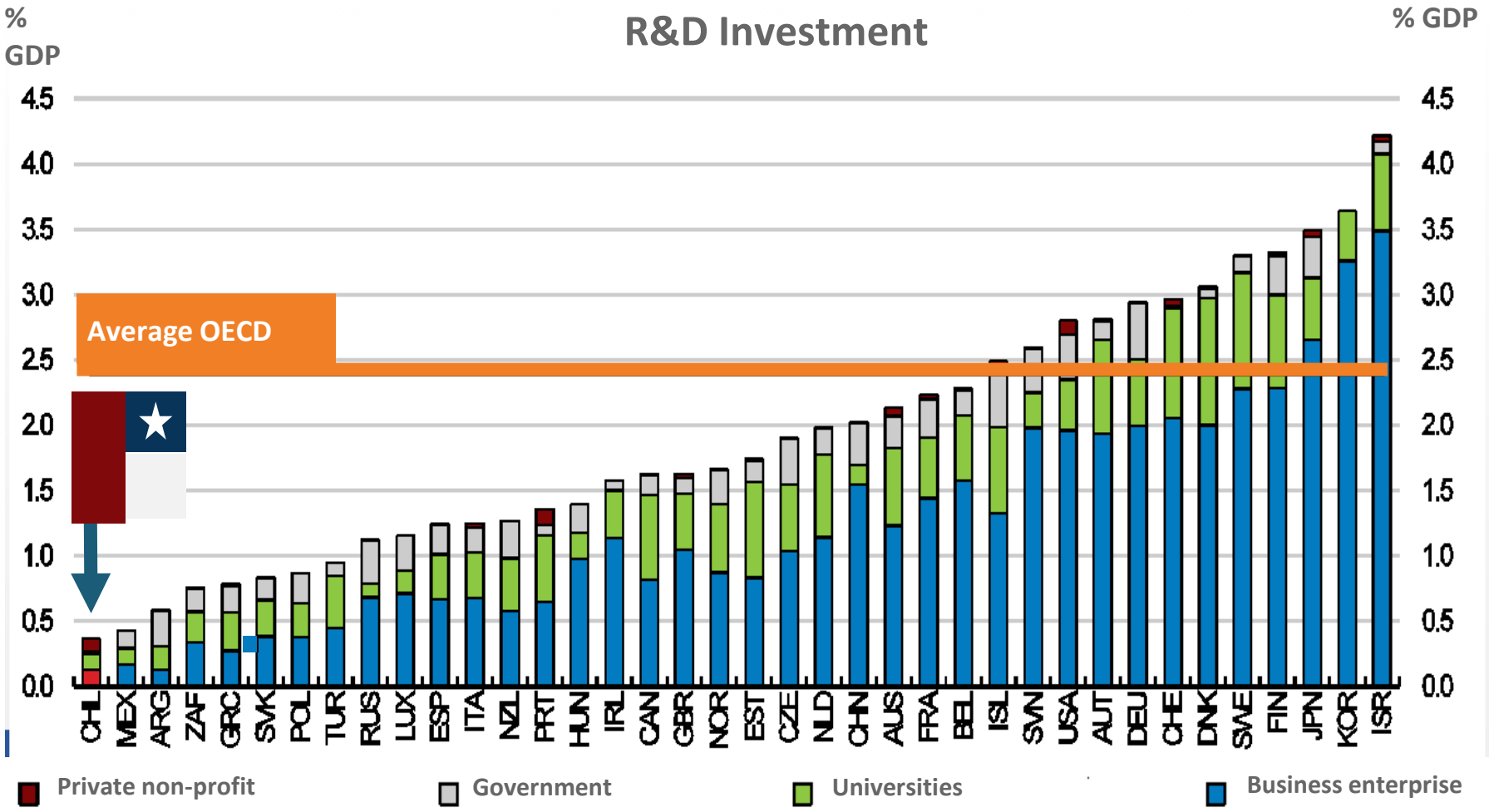
Chile: Mining suppliers exports

Goods: US$ 443 millones

Services: US$ 94 millones

Source: Fundación Chile 2015

Low investment in R&D (source of funds)



Source: OCDE Economic Survey Chile 2015

Innovation and inclusion (selection)

- If we are going to be successful in generating permanent gains in productivity through innovation, we need inclusion.
- A significant source of misallocation in developing economies is talent misallocation. Ideas.
- Democratization of entrepreneurship and innovation must be also part of the agenda.

Innovation and inclusion (selection)

Robinson (2013)

2008-2010

- In the first cabinet of President Sebastian Pinera 86% of the Ministers attended private schools, of these more than one half came from just 4: Tabancura, Sagrados Corazones Manquehue, Verbo Divino, San Ignacio.

- Of the CEOs of the top 100 Chilean companies by market capitalization 86% attended private schools, of these one half came from just 4: Tabancura, Sagrados Corazones Manquehue, Verbo Divino, San Ignacio.

1958-1960

- In the first cabinet of President Jorge Alessandri 81% of the Ministers attended private schools, of these one half came from just 3: Sagrados Corazones Manquehue, Liceo Aleman de Santiago (Verbo Divino), San Ignacio (Tabancura did not exist).

- Only 54% of business elites attended private school and of these only 23% went to these same three schools.

DESPITE TALENT IS DISTRIBUTED UNIFORMLY,
OPPORTUNITIES ARE CONCENTRATED

Chile

Only 6% of public companies' board members are women
(SVS 2016)

Non of the TOP 20 companies by market cap on Chile's stock market **has less tan 25 years old.**

Elite high school students **become much more likely** to work in management roles

(Zimmerman 2013, University of Chicago)

IN THE UNITED STATES, BETWEEN 1960-2008, 20% OF GROWTH IS EXPLAINED BY IMPROVED ALLOCATION OF TALENT

(Jones, 2016)

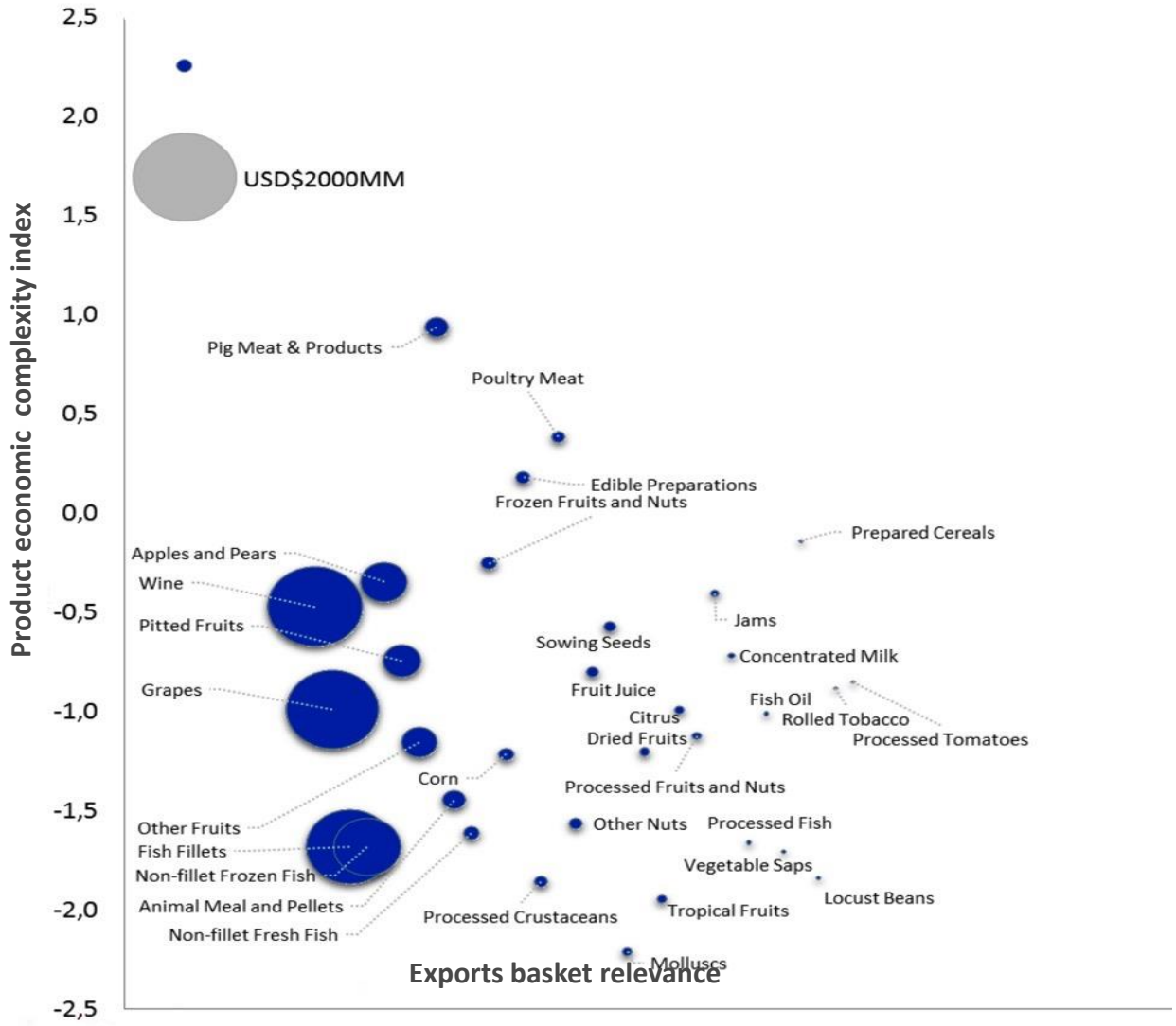
How to increase productivity?

- Structural transformation
- State capacity and political consensus: interventions at different levels (coordination effort) and long-term horizon.
- Competition policy/balanced political power

ECONOMIC DIVERSIFICATION **DOES NOT MEAN TO LEAVE BEHIND OUR NATURAL RESOURCES**, BUT TO BUILD A PLATFORM BASED ON THEM

Agro Foods exports basket

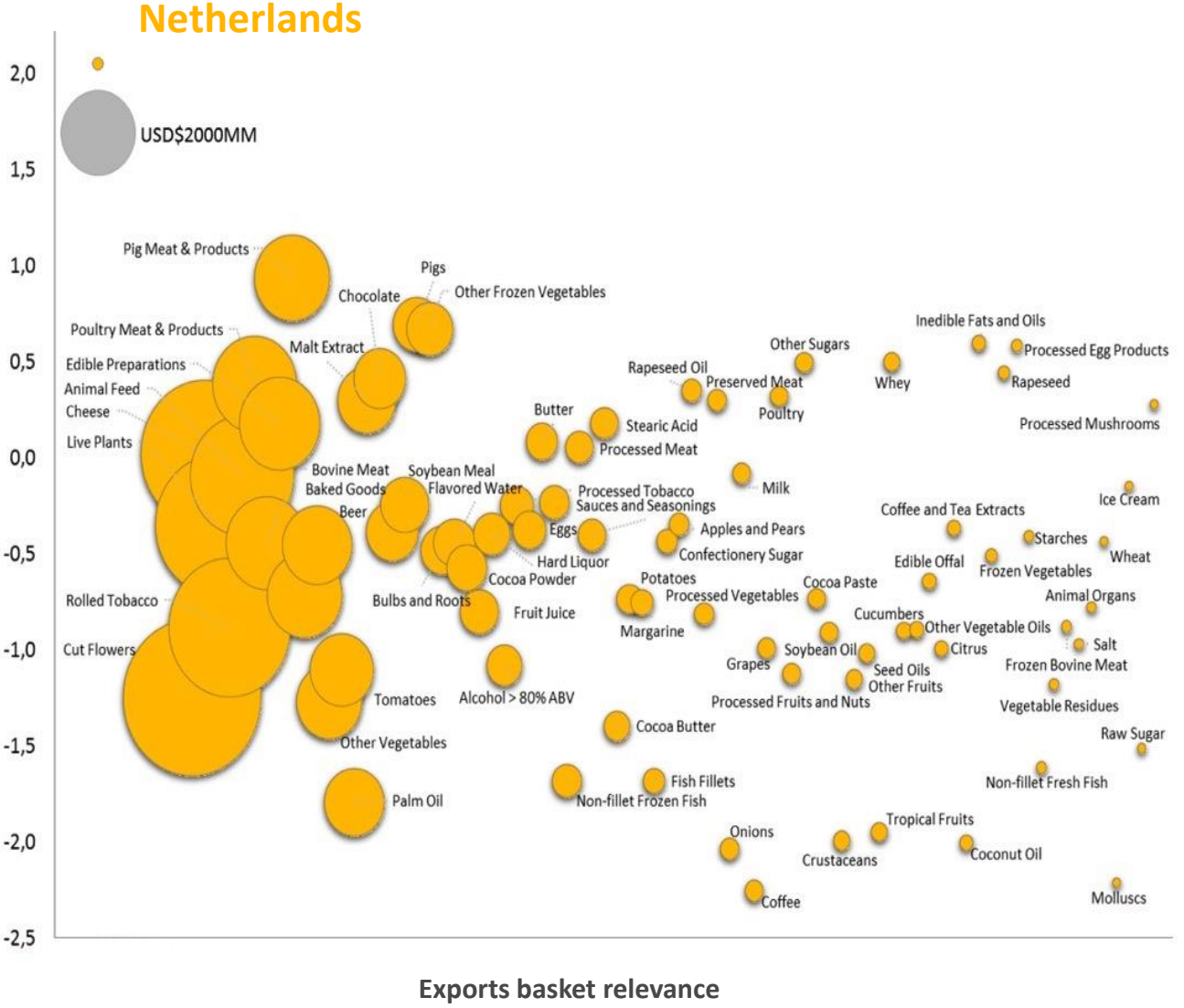
Chile



Source: Wageningen UR Chile, Observatory of Economic Complexity del MIT

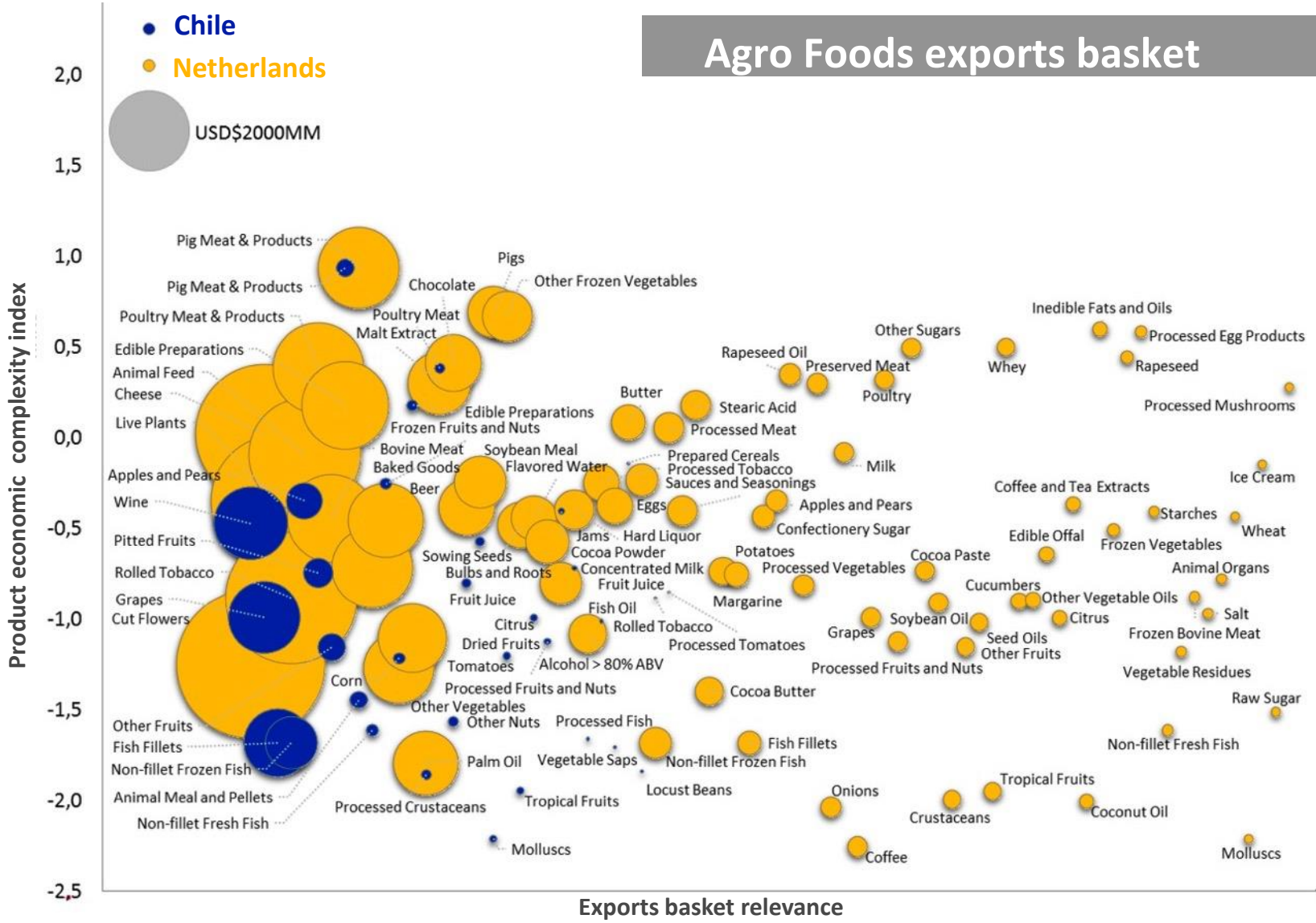
Agro Foods exports basket

THAT IS THE EXPERIENCE
AUSTRALIA, NZ, NETHERLANDS AND NORWAY SHOWED US



Source: Wageningen UR Chile, Observatory of Economic Complexity del MIT

OUR STRATEGY IS TO ADD KNOWLEDGE BASED ON **NATURAL RESOURCES** AND **COMPARATIVE ADVANTAGES**



Source: Wageningen UR Chile Observatory of Economic Complexity del MIT

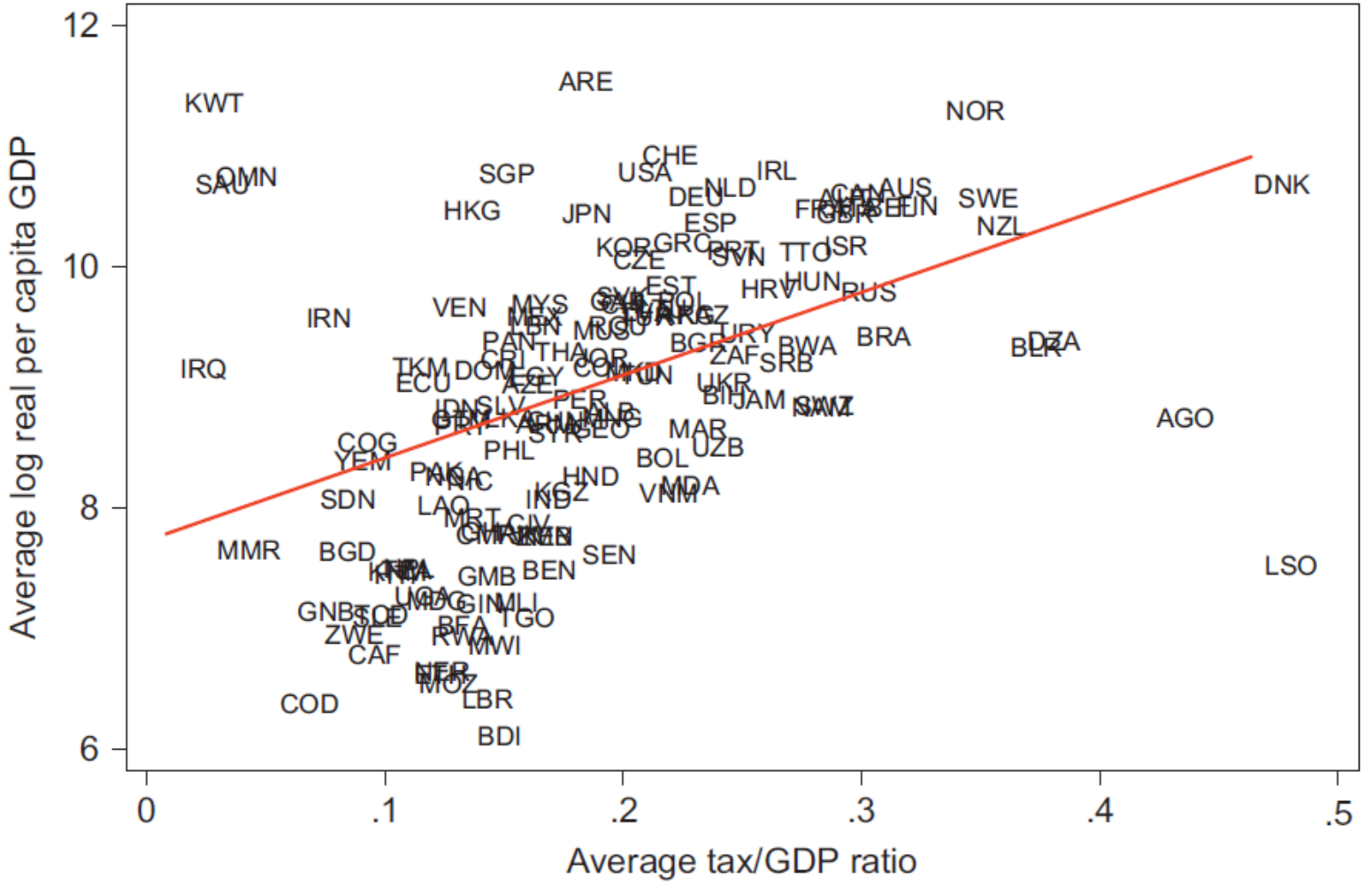
State capacity

- A striking feature of economic development is an apparent symbiotic evolution of strong states and strong market economies. However, traditional analyses of economic development tend to focus on the expansion of the market economy with less attention paid to the expansion of the state.
- Just as private physical and human capital accumulation is a key engine of private sector growth, the buildup of public capital is also an engine of state expansion. It is arguable that a good part of investing in state effectiveness comes from improving the states ability to implement a range of policies, something which we will refer to as state capacity.

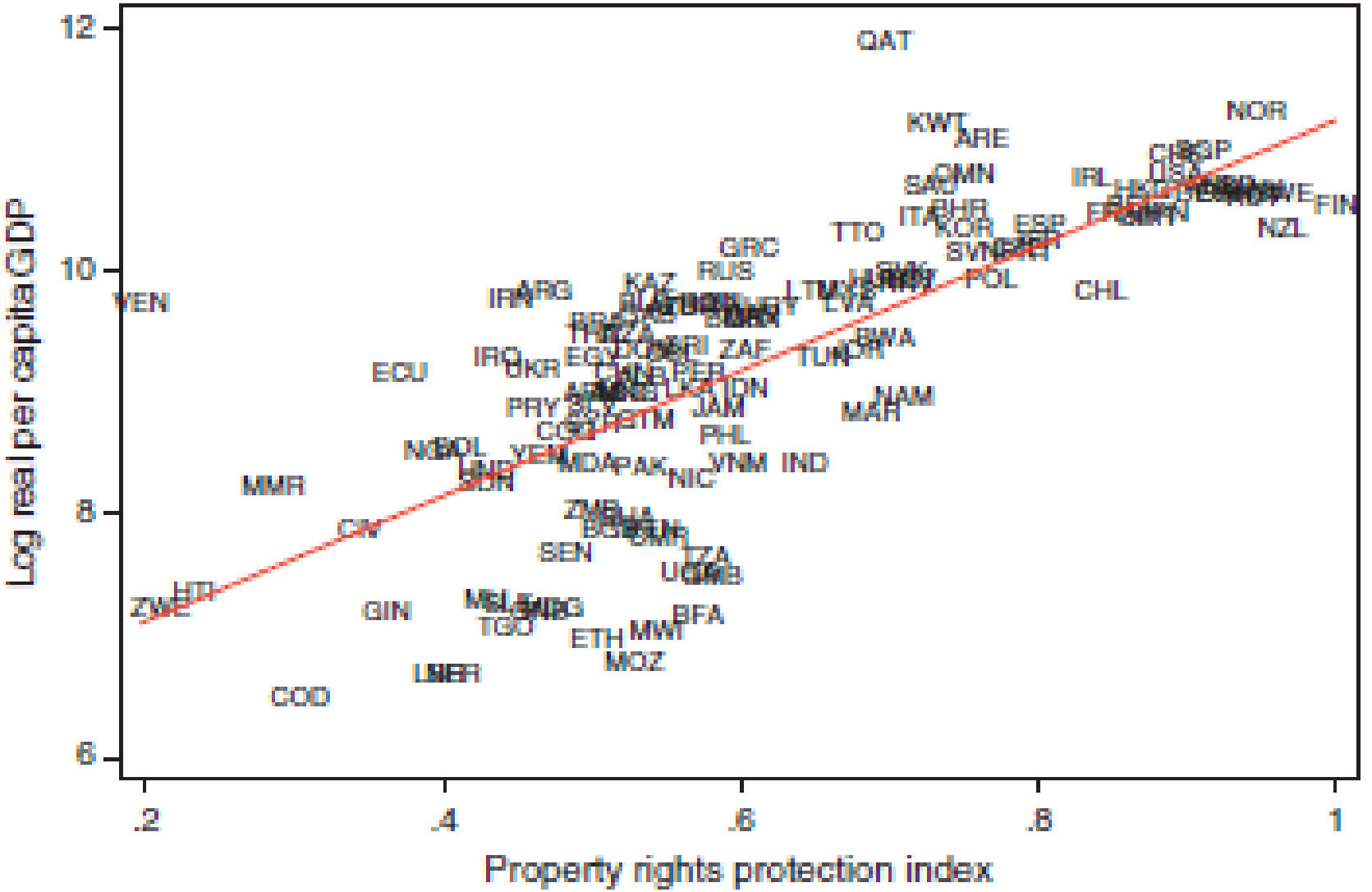
State capacity

- Historians see the evolution of state capacity—especially the capacity to raise taxes—as a central fact to be explained, whereas economists typically assume that such institutional capacity exists.

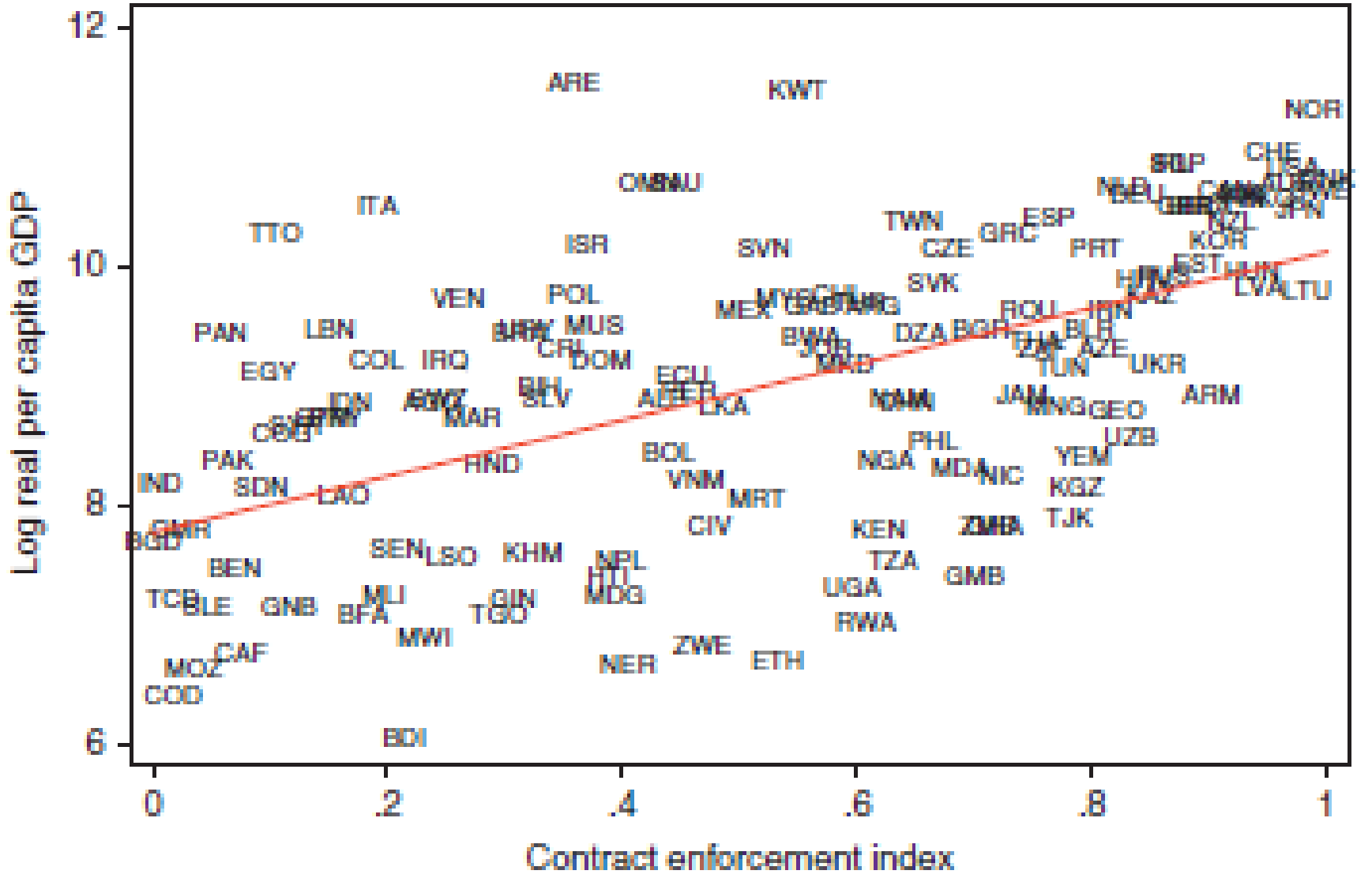
State capacity and economic development



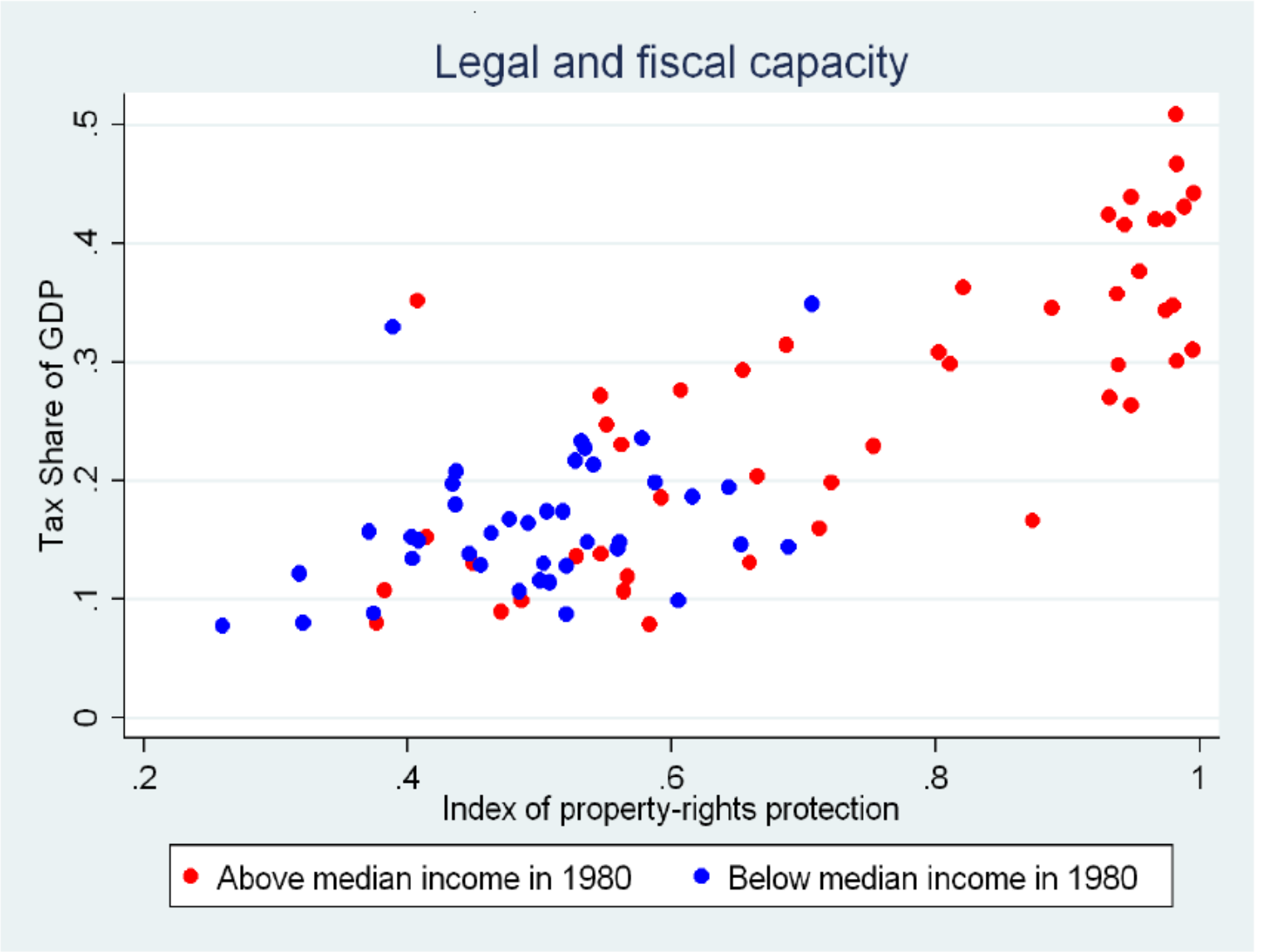
State capacity and economic development



State capacity and economic development



State capacity and economic development



Financial Depth and State Capacity

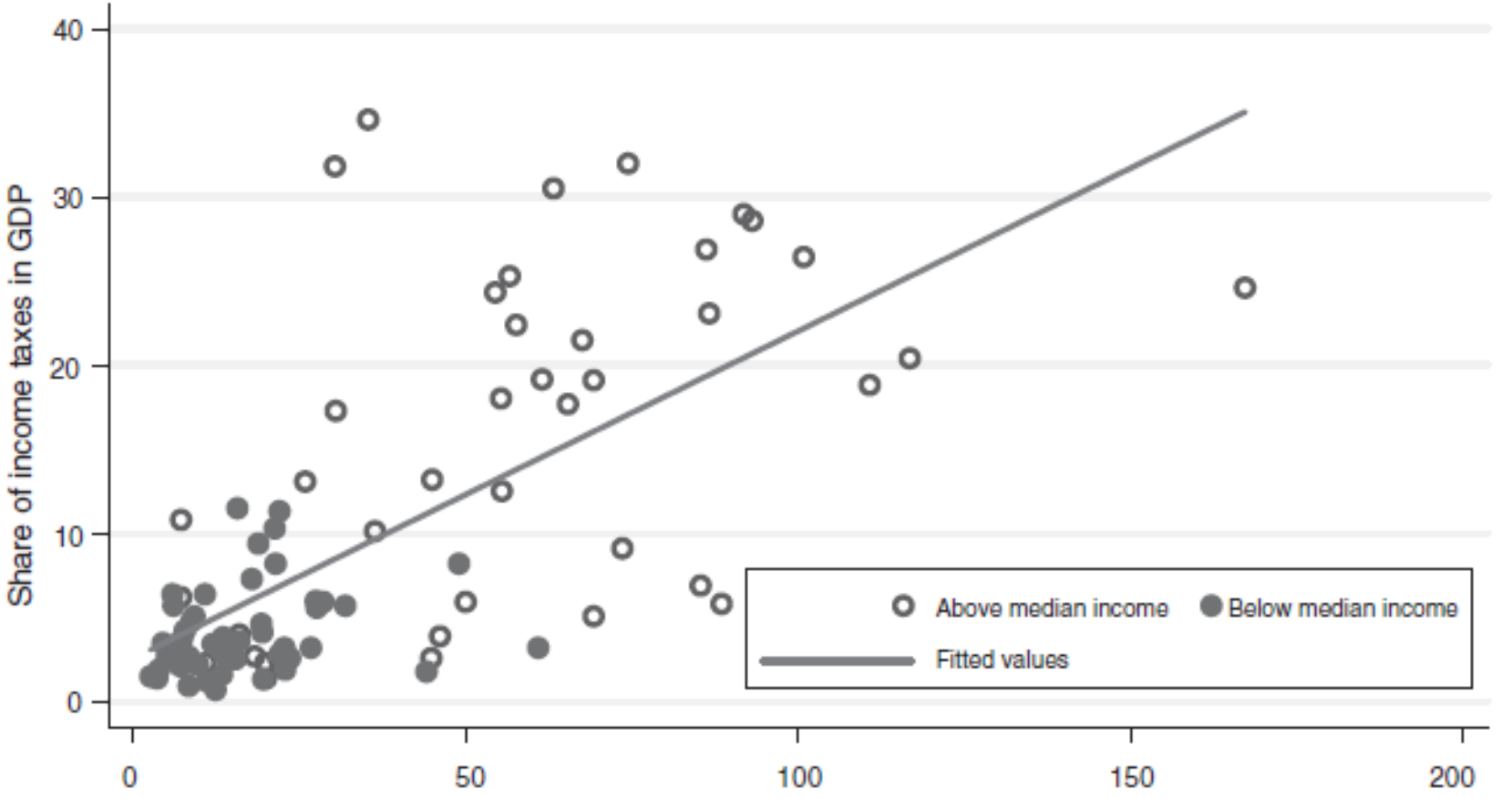
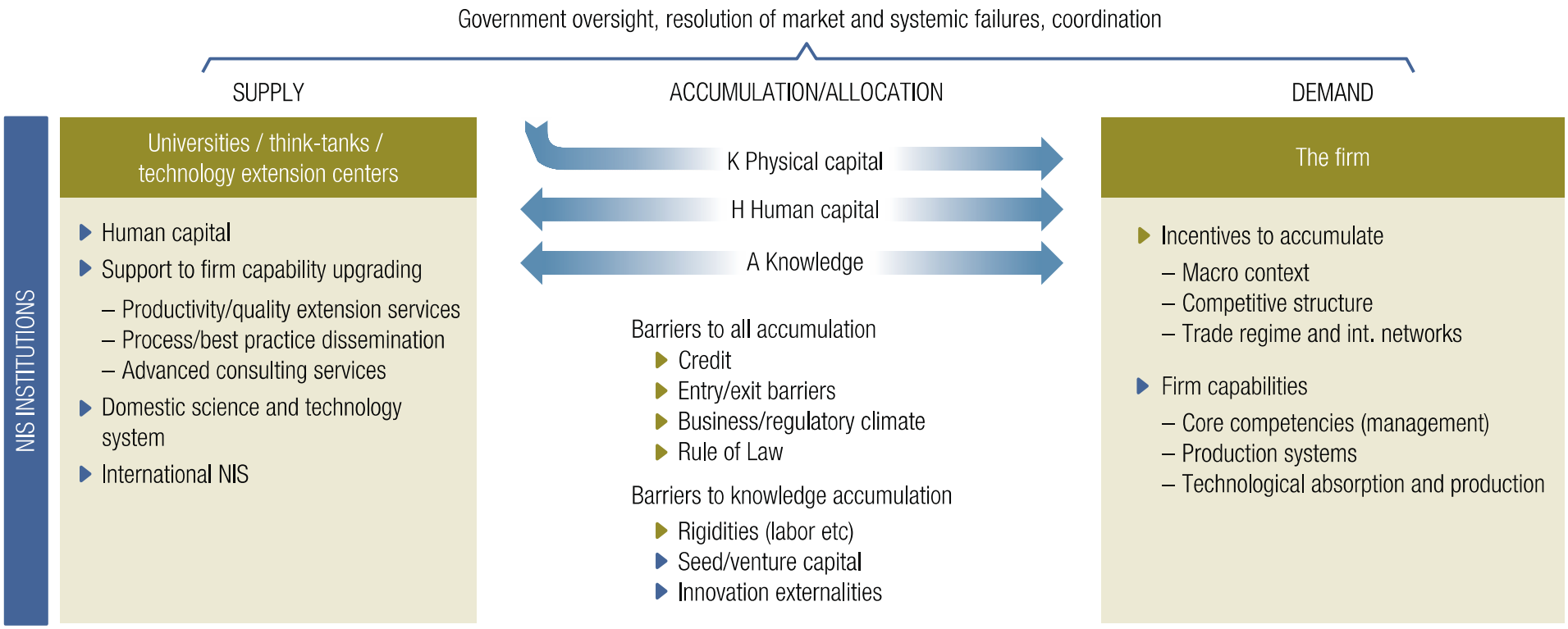


FIGURE 1. PRIVATE CREDIT TO GDP

How to increase productivity?

FIGURE 3.4 The Expanded National Innovation System (NIS)



Source: Maloney 2017.

How to increase productivity?

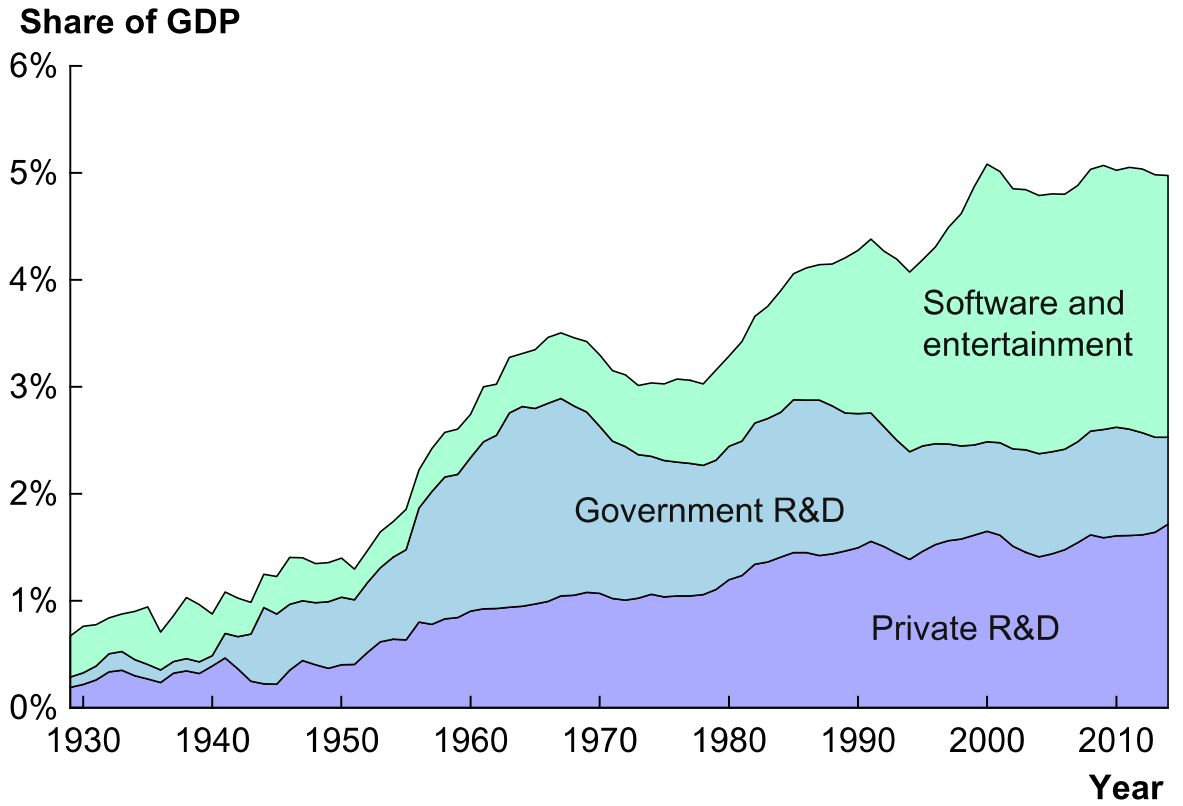


Fig. 9 Research and development spending, United States. Source: *National Income and Product Accounts, U.S. Bureau of Economic Analysis via FRED database. "Software and entertainment" combines both private and public spending. "Entertainment" includes movies, TV shows, books, and music.*

Source: Jones (2016)

The innovation policy dilemma and competition

- Lack of competition generates rents. If those rents are high and the threat of new firms coming into the market are low (credit constraints, distribution channels…), why innovate? The paradox…

- Labor share of countries with potentially high returns to R&D (medium distance to frontier): 44%
- Labor share frontier: 63%

- If difference is due to profits (rents), incentives to innovate will be low because rents generate power to block entrance of new actors…

no cambia sus expectativas. No pretende superar a Ariztía y menos a Súper Pollo.

"Para qué pelear con Súper Pollo, mejor es convivir. Como se dice: si tiene un enemigo muy poderoso, mejor únase a él", comenta Covarrubias padre.

"En los pollos pretendemos mantener el mercado que hemos conquistado y crecer junto con el país. Con Ariztía y Agrosuper tenemos una asociación gremial muy fuerte, a través de la cual hemos logrado acuerdos con respecto a lo que le corresponde a cada uno en el mercado. No nos vamos a quemar por un 1% más", afirma Covarrubias hijo

A ENGORDAR CHANCHITOS

Como con el cerdo no hay acuerdos hacia

In this newspaper interview (2007), the CEO of a poultry company in Chile explains the "collaboration" with other companies in the sector: "…with Ariztia and Agrosuper (competitors) we have a strong trade business association through which we have reached accords regarding how much corresponds to each one in the market."

The accord…

PRINCIPALES ACUERDOS DEL CONVENIO 1995

1. El cumplimiento del acuerdo está basado en el honor de los suscriptores.
2. Se establece una lista de precios mínimos para grandes clientes y para cobertura.
3. Los precios mínimos se determinaron en base al mercado. Es la intención de los suscriptores mantener márgenes de utilidad similar en el tiempo.
4. Se establecen diferenciales por zona.
5. ***La producción estará regulada por cada empresa de acuerdo a su capacidad de venta.***
6. Los stocks de congelado son competencia de cada empresa.
7. Se establece plena libertad para hacer publicidad, con la sola prohibición de no alterar los precios de venta a través de comisiones, aportes, arriendos , cajas para pollo asado , etc.
8. Los plazos de venta no podrán usarse como forma de descuento de precio.
9. Los distribuidores son terceros que realizan la función de reparto en forma exclusiva para una empresa en una zona geográfica determinada. Cada productor será plenamente responsable de sus distribuidores.
10. No se pueden efectuar descuentos por volumen, por debajo los precios mínimos establecidos.

5. Production will be regulated for each company according to its production capacity.