RIETI BBL Seminar Handout

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PRODUCTIVITY: THE MAIN DRIVER OF ECONOMIC GROWTH FOR JAPAN

Research Institute of Economy, Trade and Industry
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… productivity isn't everything, but in the long run it is almost everything.

Paul Krugman,1994

Outline

I. Overview of recent productivity trends

II. What is causing the productivity slowdown?

III. How to revive productivity growth?

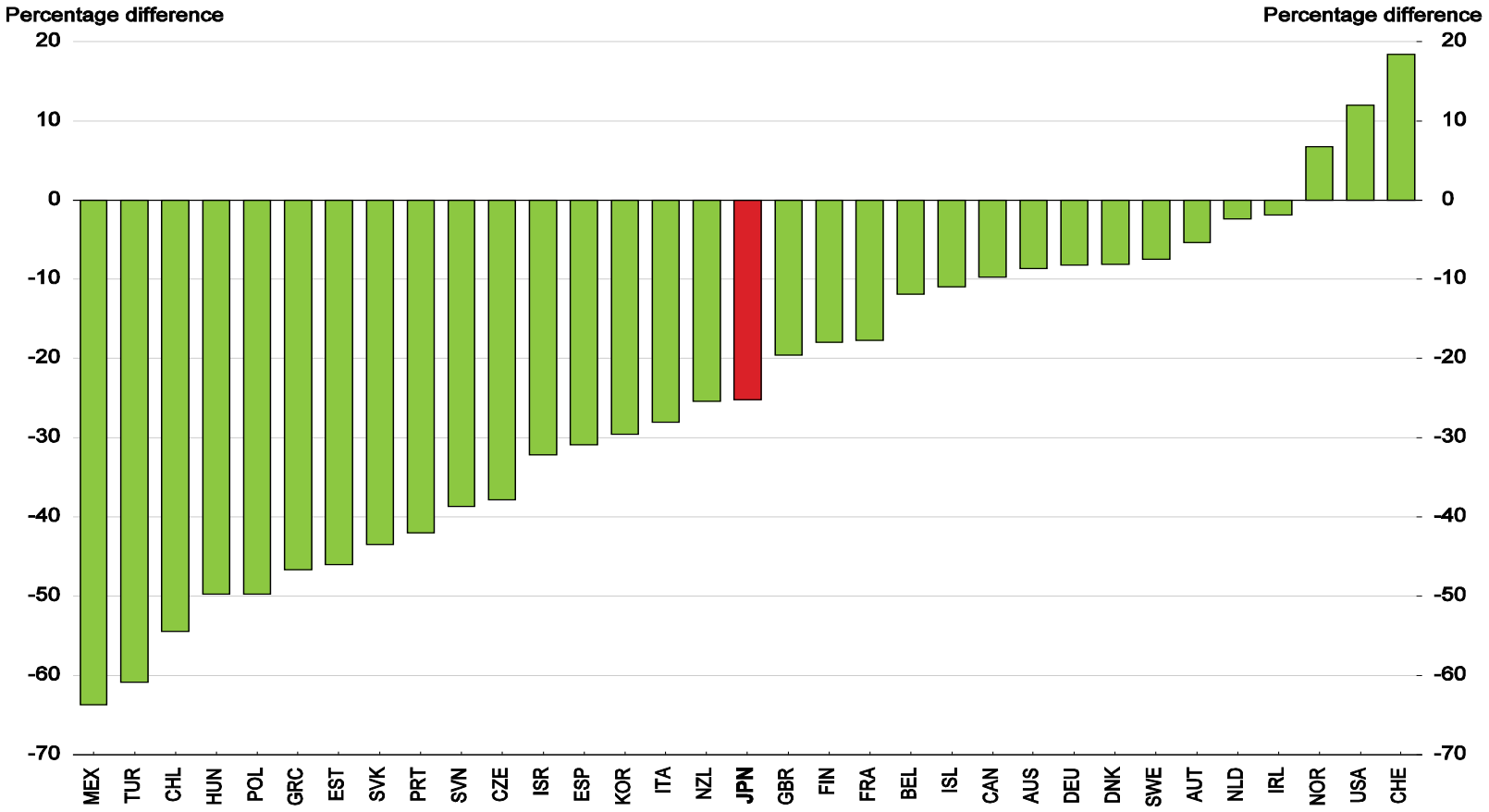
- A. Enhancing innovation
- B. Strengthening diffusion
- C. Improving resource allocation
- D. Encouraging risk-taking

IV. Conclusions

I. Overview of Recent Productivity Trends

Differences in GDP per capita

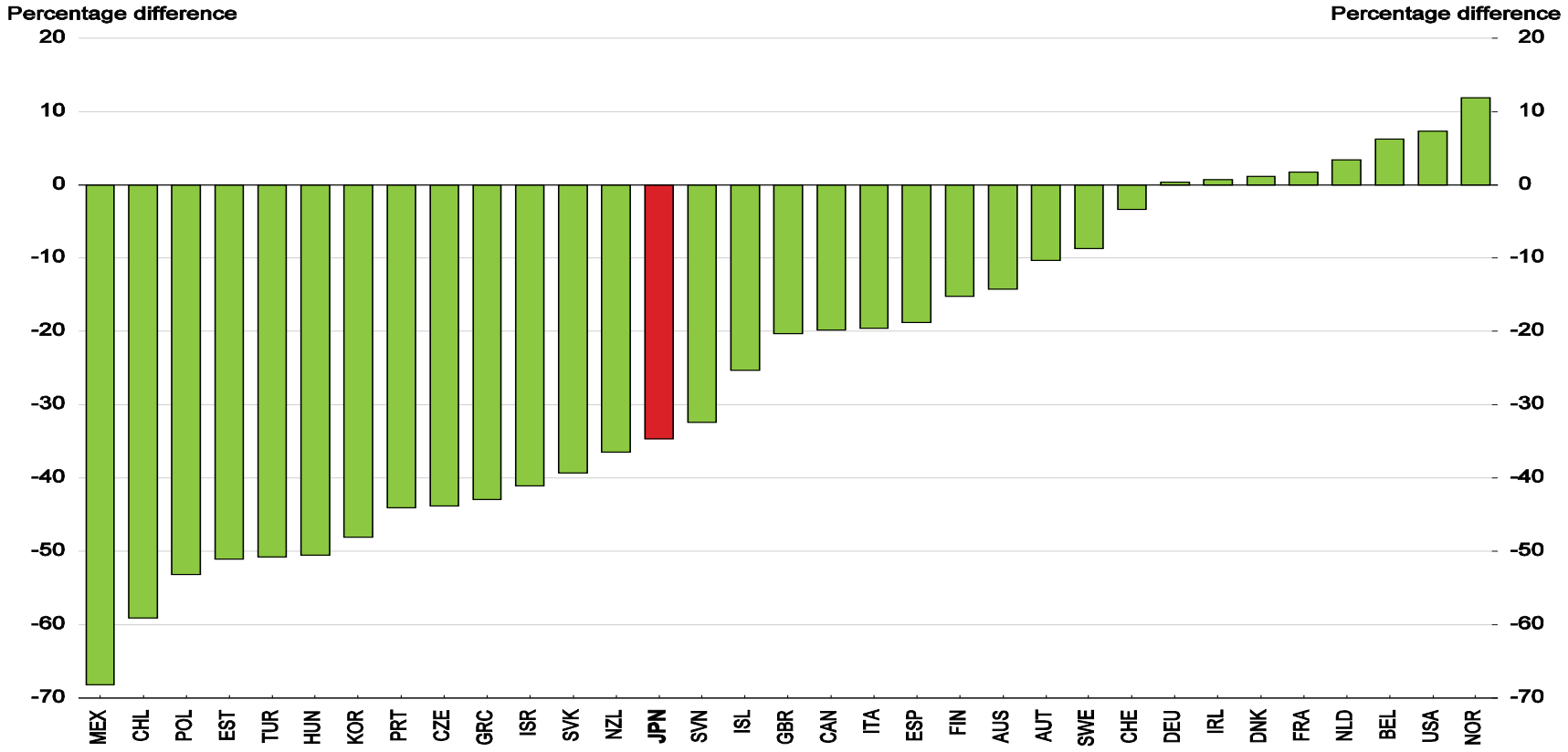
Percentage differences compared with the upper half of OECD countries, 201



1. Each countries' performance relative to the top 17 OECD countries in 2014 using 2010 PPP exchange rates.
Source: OECD Going for Growth Database.

Differences in GDP per capita mostly reflect labour productivity gaps

Percentage differences compared with the upper half of OECD countries, 201

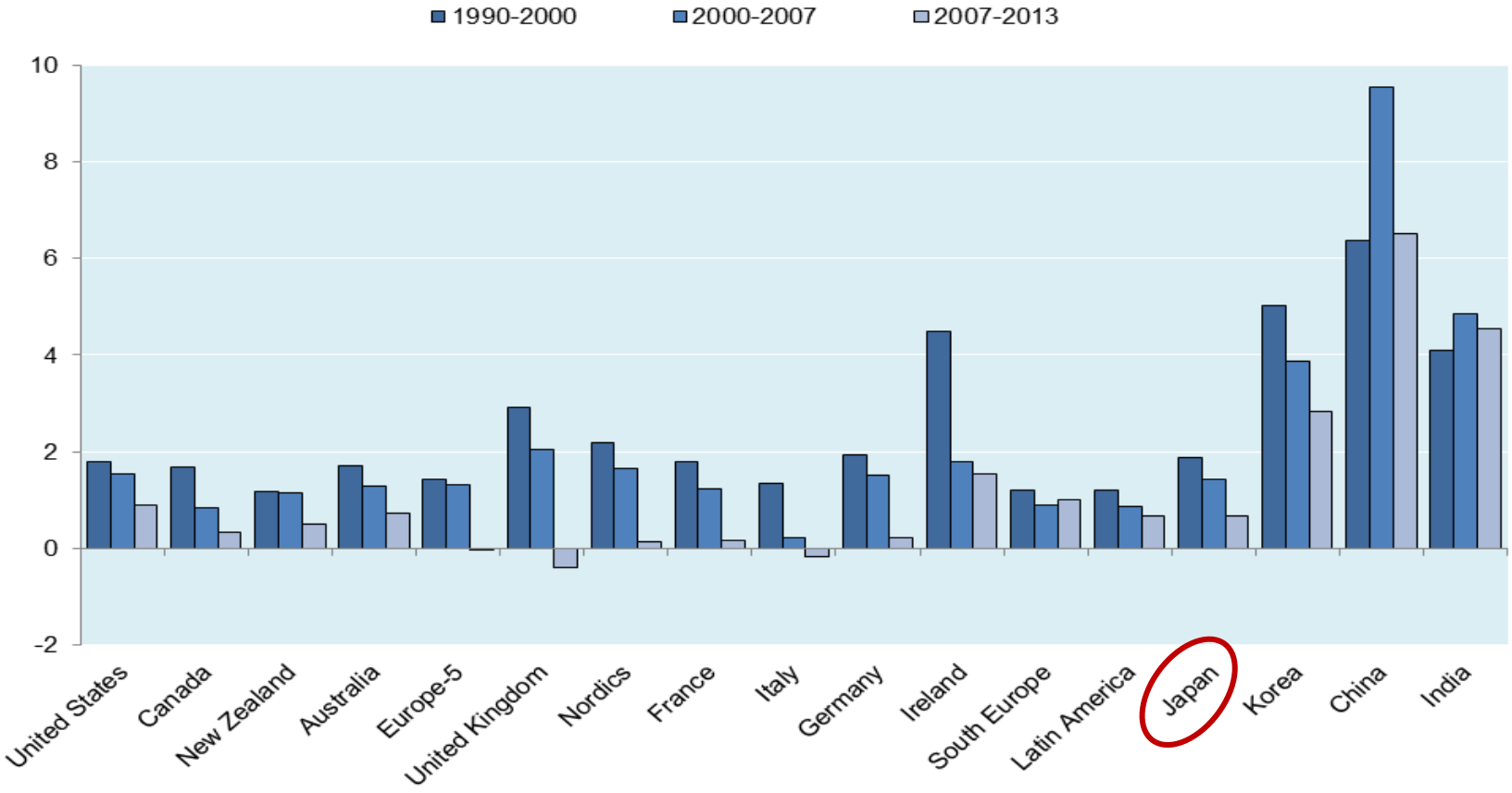


1. Each countries' performance relative to the top 17 OECD countries in 2014 using 2010 PPP exchange rates.
Source: OECD Going for Growth Database.

Productivity growth slowed across the OECD even before the crisis

Labour productivity growth since 1990

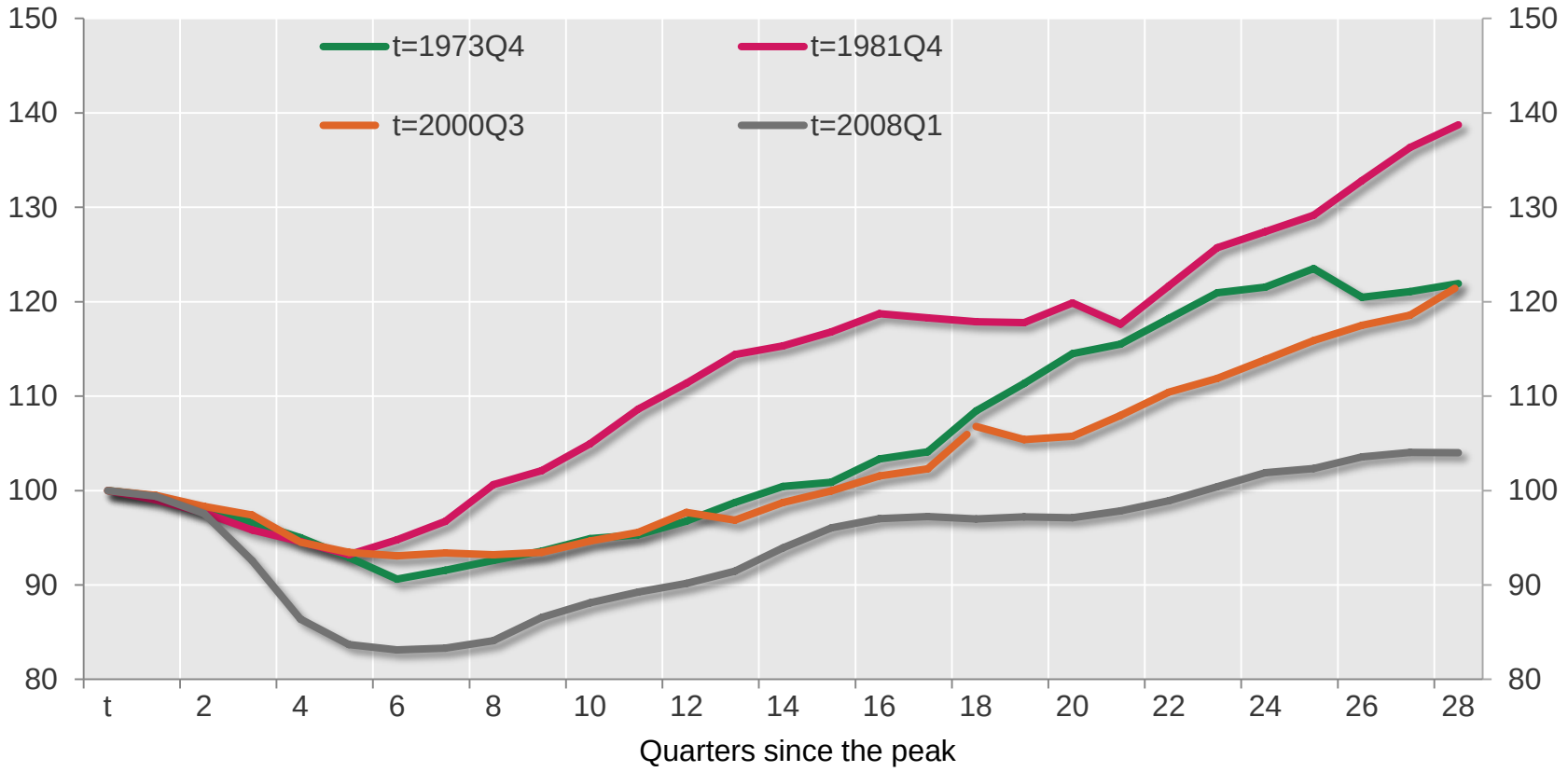
GDP per hour worked (China and India refer to GDP per worker)



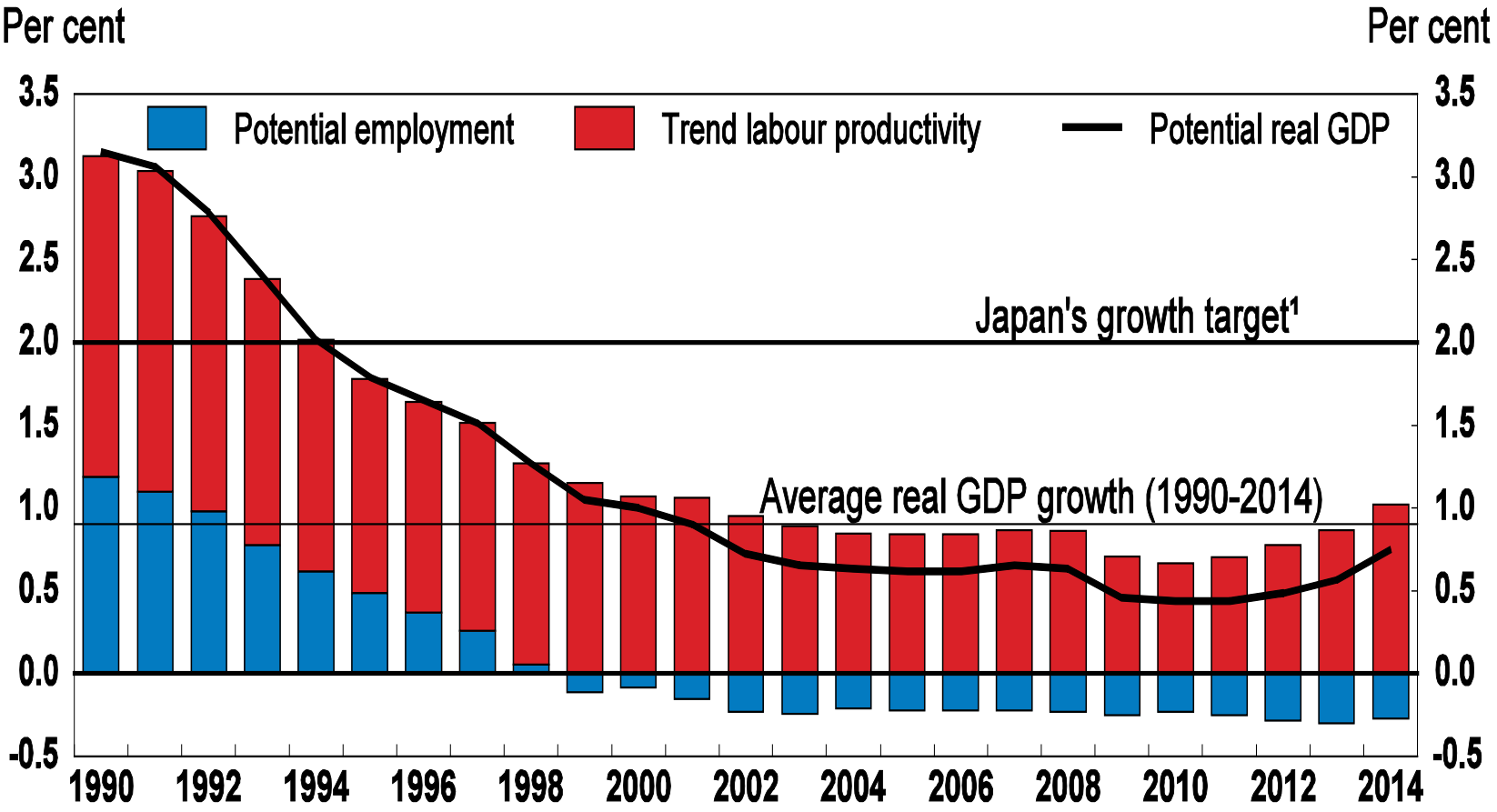
Source: OECD calculations based on the Conference Board Total Economy Database.

Since the crisis, business investment has been sluggish

Business investment in different cycles
Cyclical peak in OECD real business fixed investment=100
(date of peak indicated)



Trend labour productivity growth in Japan has fallen from around 2% in 1990 to 1% in 2014

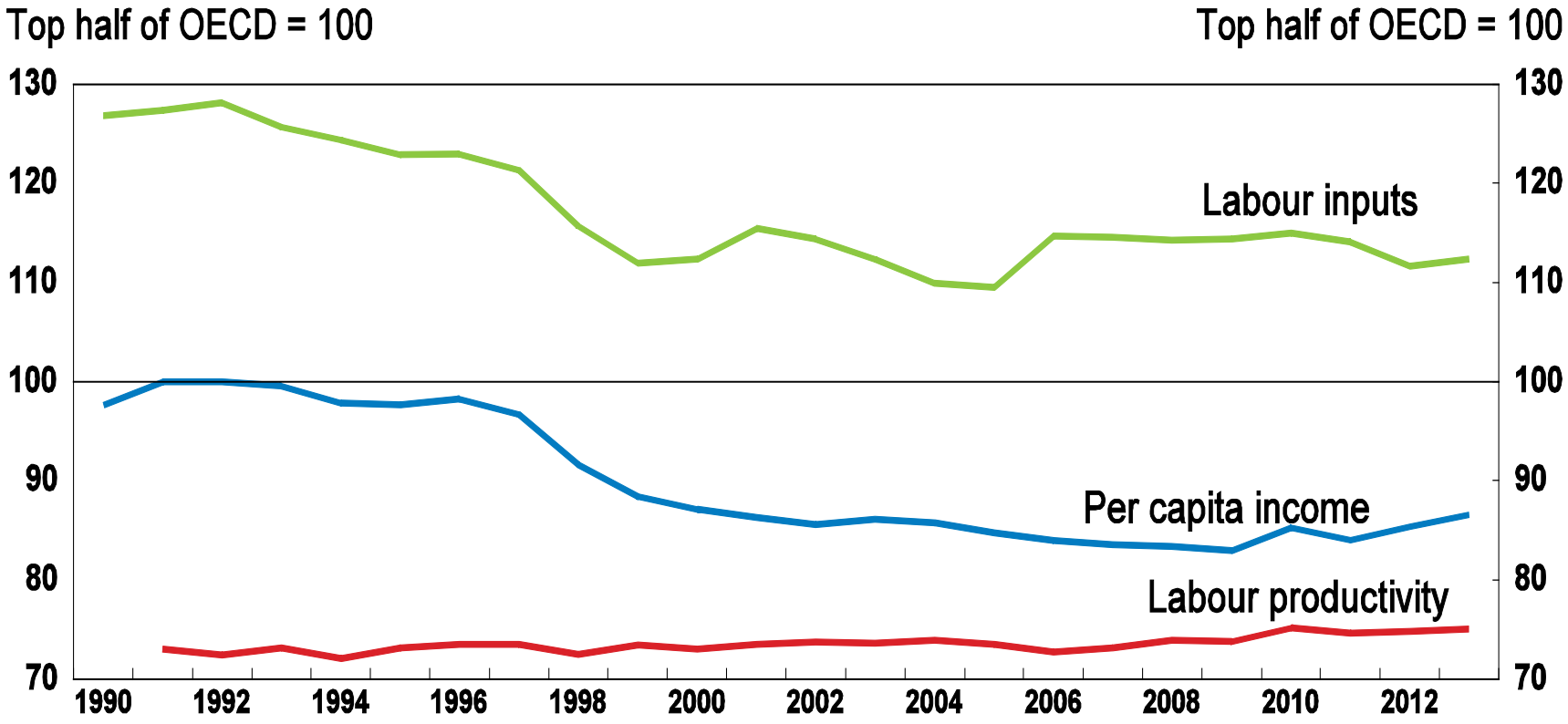


1. The 2% target was set in 2009 and maintained by subsequent governments.

Source: OECD Economic Outlook Database.

Japan's labour productivity has remained around a quarter below the top half of OECD countries

Japan relative to the top half of OECD countries[1]

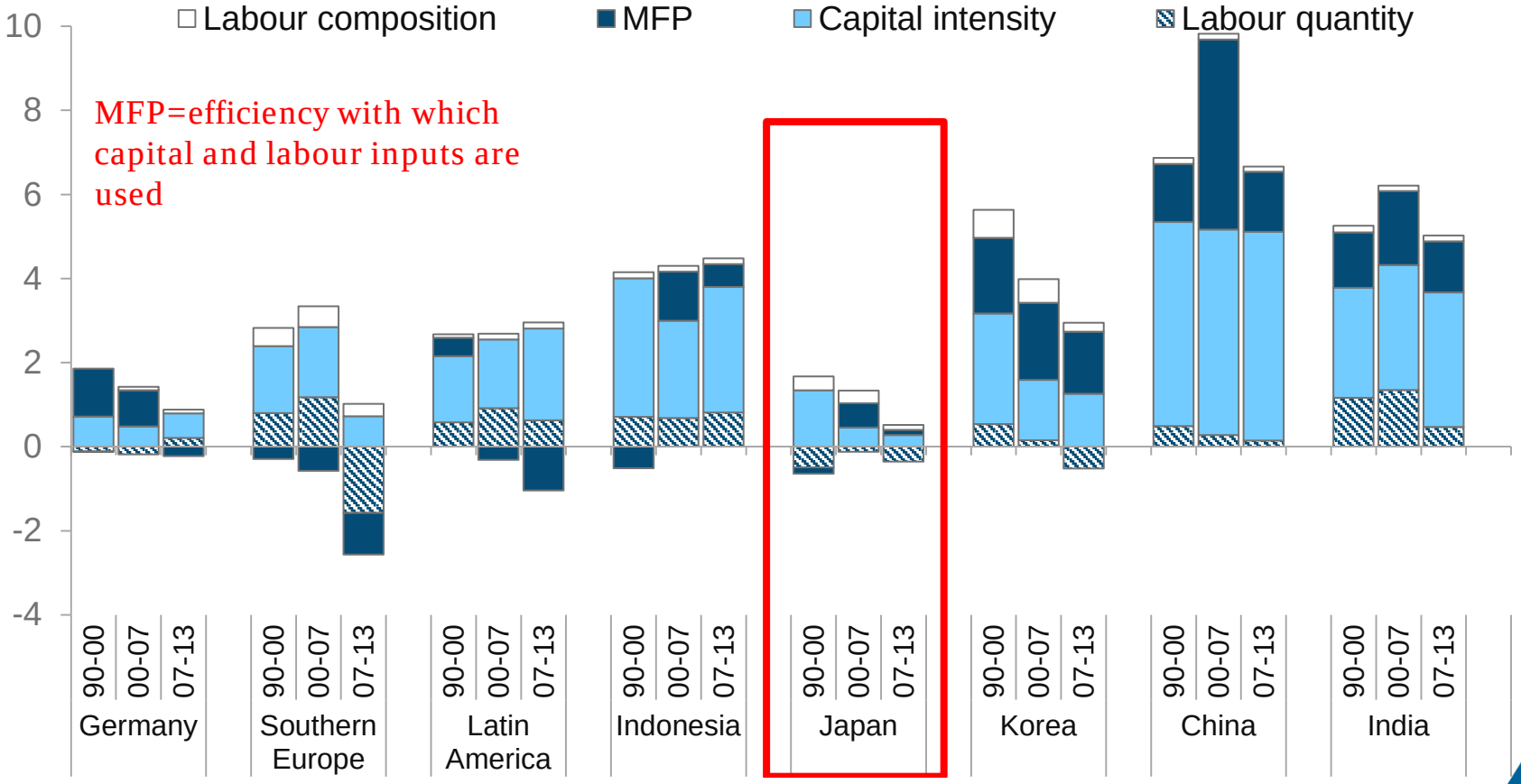


1. Per capita GDP is calculated using 2005 prices and PPP exchange rates. Labour productivity equals GDP per hour of labour input. Labour inputs equal total number of hours worked per capita.

Source: OECD Going for Growth Database.

Multi-factor productivity growth has also slowed down

Contribution of production factors to GDP growth
1990-2013 (%pts)



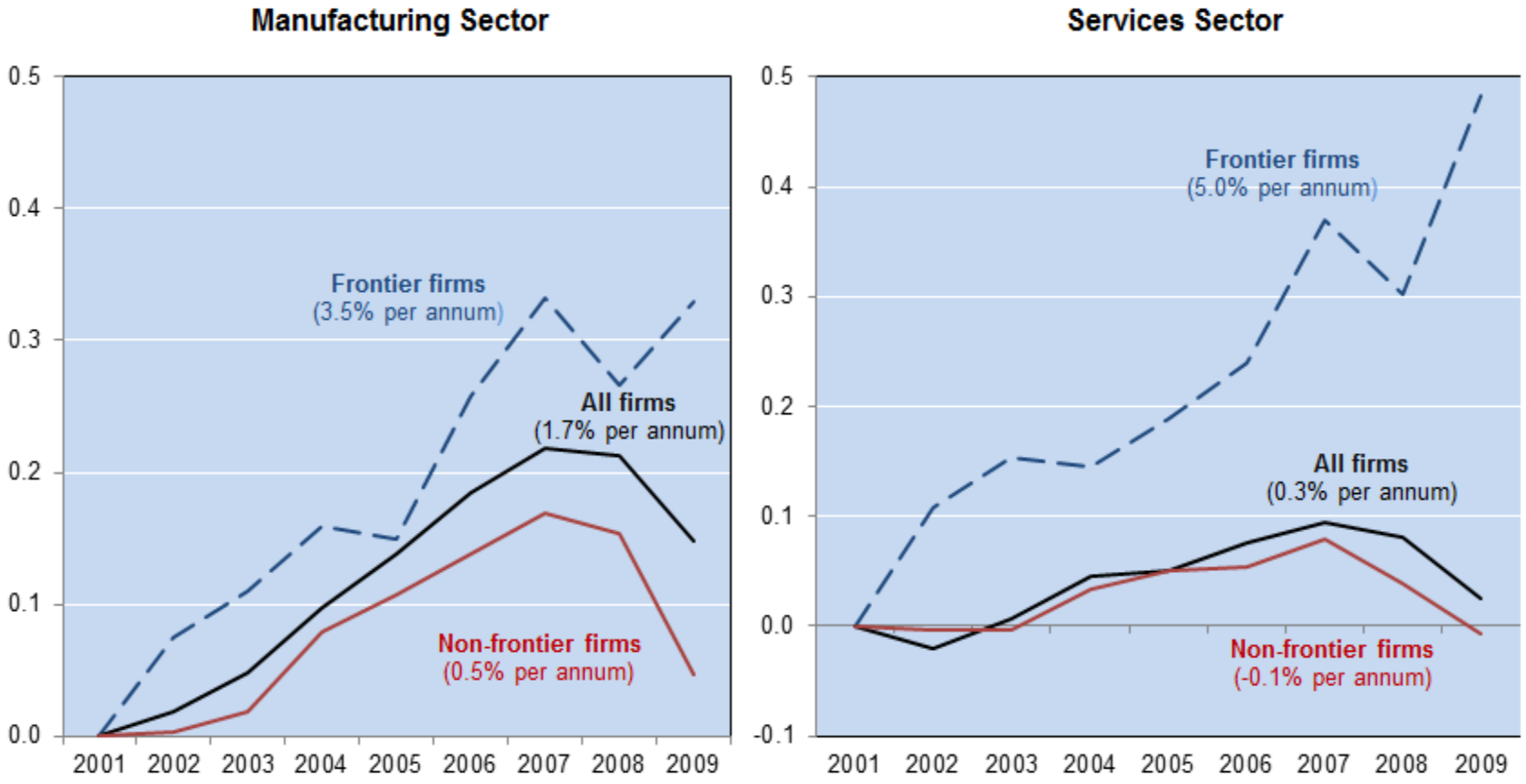
Source: Conference Board Total Economy Database.

II. What is Causing the Productivity Slowdown?

The breakdown of the technology diffusion machine

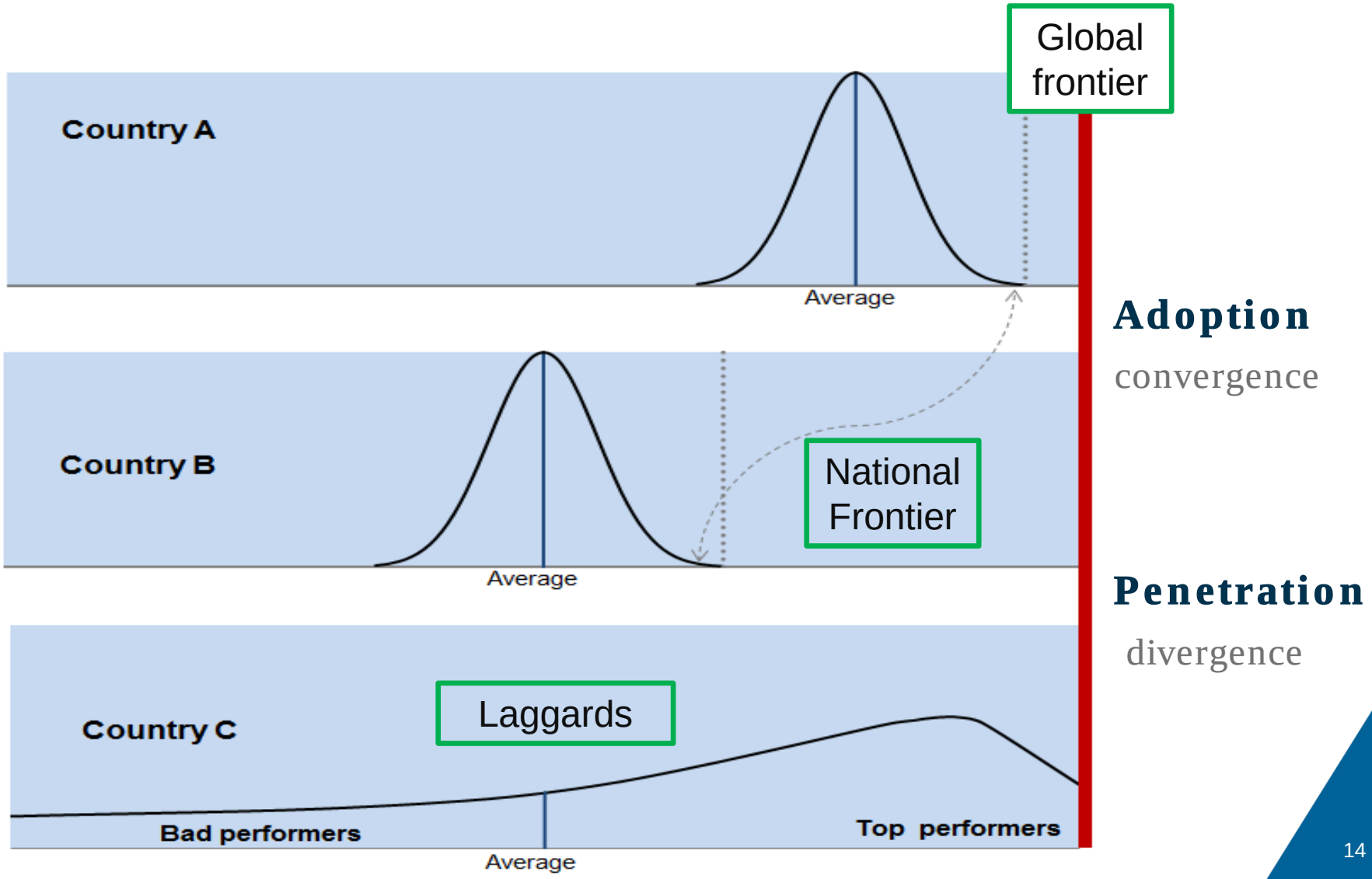
Solid growth at the global productivity frontier but spillovers were weak

Labour productivity; index 2001=0



Source: Andrews, D. C. Criscuolo and P. Gal (2015), **"**Frontier firms, technology diffusion and public policy: micro evidence from OECD countries**",** OECD Mimeo.

Analytical framework



The gap between global frontier firms and non-frontier firms is large

Mean firm characteristics: frontier firms and non-frontier firms

Selected OECD Countries, 2005 (unless otherwise noted)

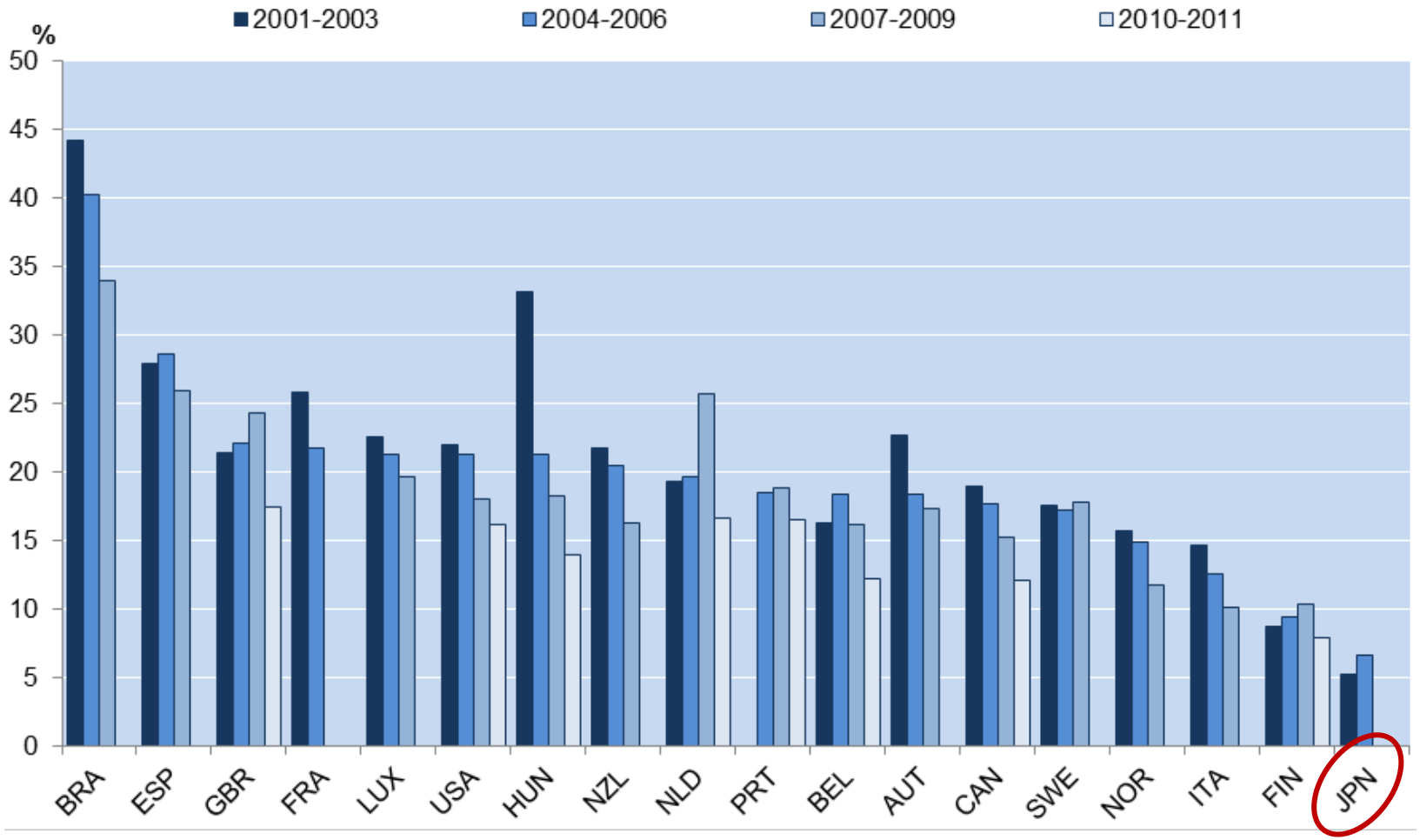
	Global Frontier Firms		Non-Frontier Firms		Difference in means
	Mean	Std Dev	Mean	Std Dev	
	Multi Factor Productivity (Solow)				
Productivity	4.06	1.04	2.51	0.91	1.5 ***
Employment	309	3770	229	4119	81
Capital stock (€m)	31	355	19	343	12 **
Turnover (€m)	250	1731	59	754	191 ***
Profit rate	0.57	0.33	0.13	6.33	0.45 ***
Age	21.5	20.3	23.2	18.6	-1.7 ***
MNE status*					
Probability	0.47	0.50	0.28	0.45	0.19 ***
Depreciated patent stock	3.71	45.15	0.90	56.17	2.8 ***

Notes: * Data refer to 2008

Source: Andrews, D. C. Criscuolo and P. Gal (2015), **"**Frontier firms, technology diffusion and public policy: micro evidence from OECD countries**",** OECD Mimeo.

Business dynamism has declined across the OECD

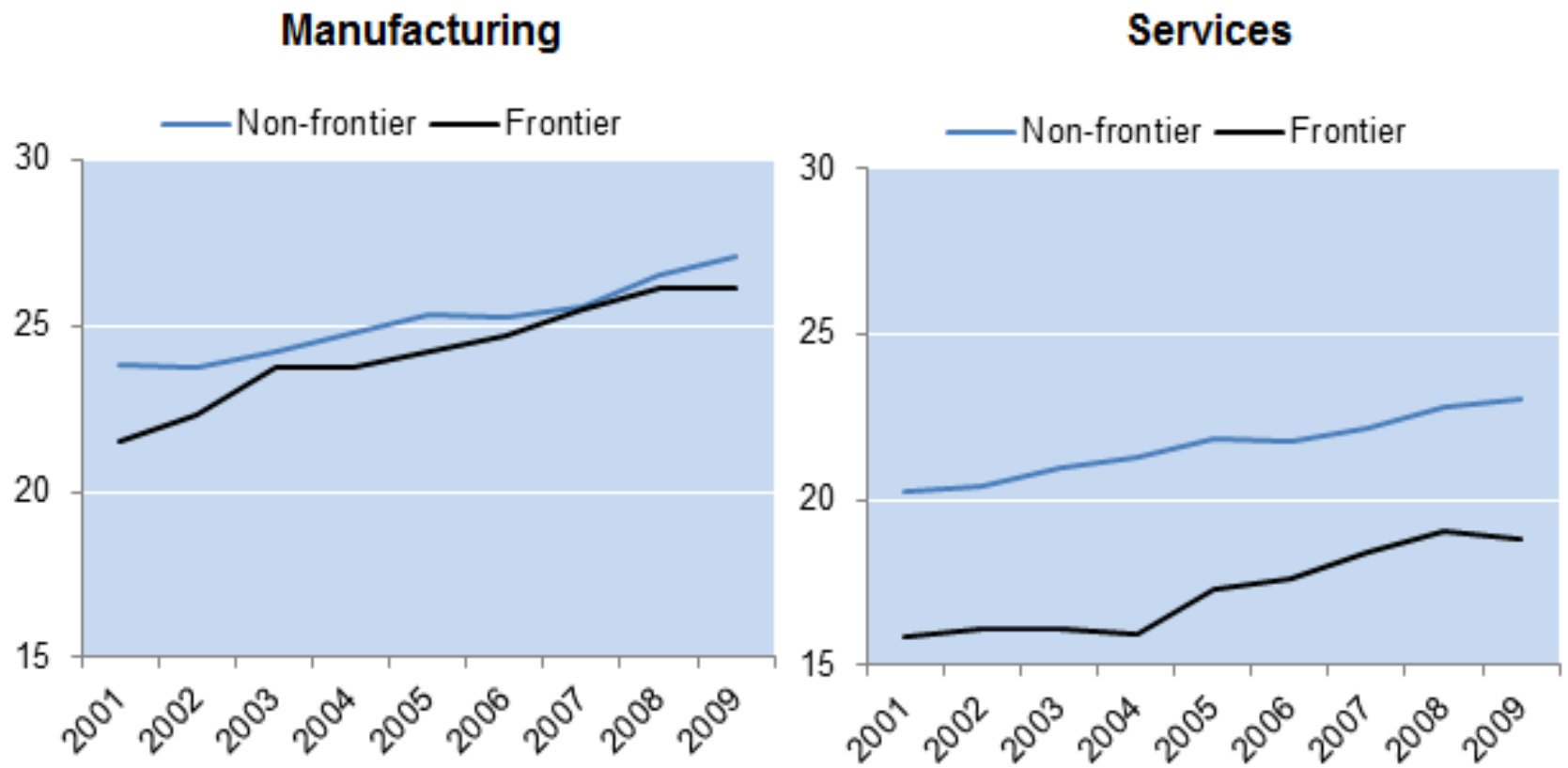
Declining start-up rates across OECD countries



Source: C. Criscuolo, P. N. Gal and C. Menon (2014), "The Dynamics of Employment Growth: New Evidence from 18 Countries", OECD Science, Technology and Industry Policy Papers no. 14.

Firms at the global productivity frontier have become older

Average age (years) of firms in the frontier and non-frontier groups

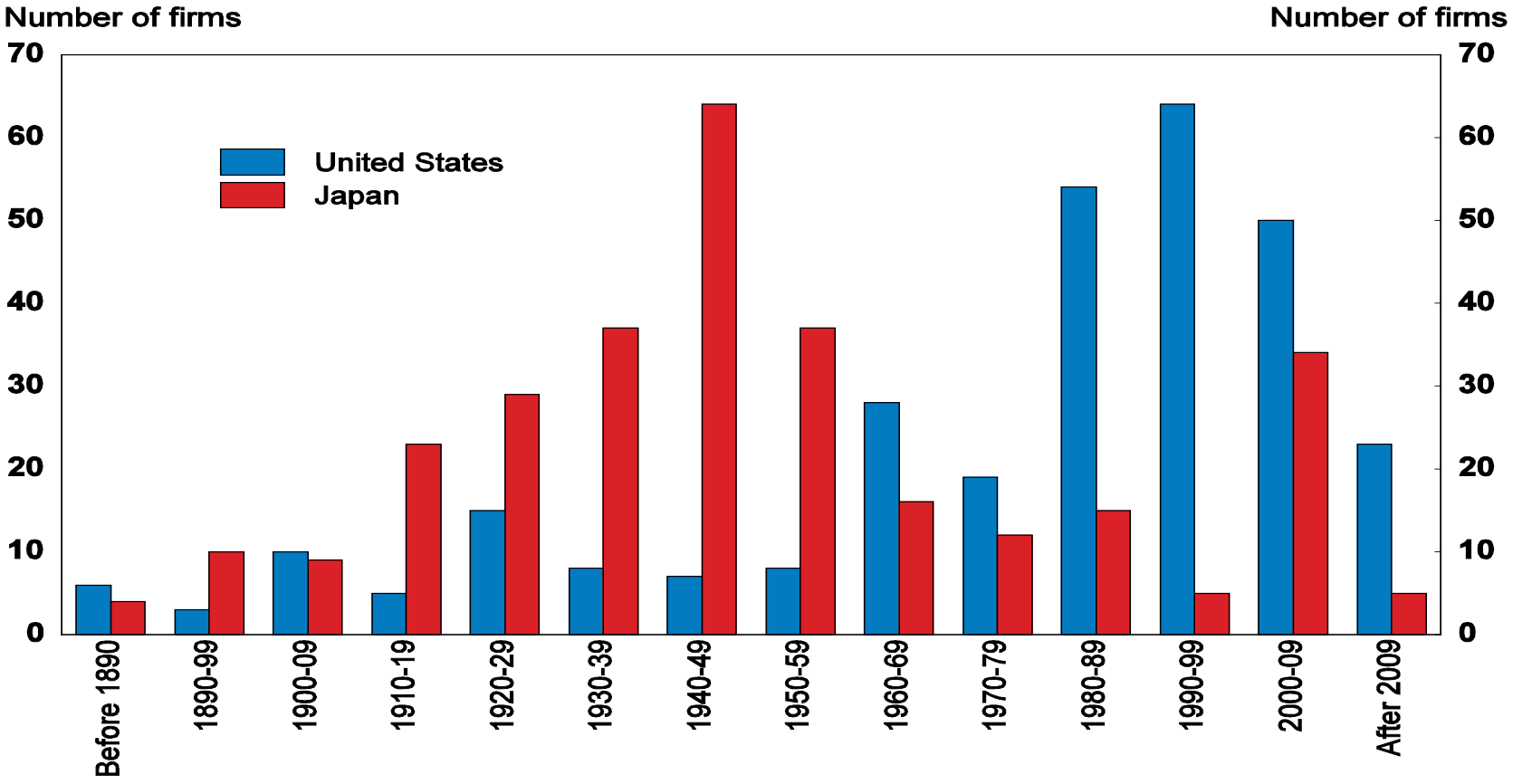


Notes: Frontier is measured by the top 100 firms in each 2-digit industry and each year, based on Solow residual-based MFP.

Source: Andrews, D. C. Criscuolo and P. Gal (2015), **"**Frontier firms, technology diffusion and public policy: micro evidence from OECD countries**",** OECD Mimeo.

Large firms in Japan are also relatively old

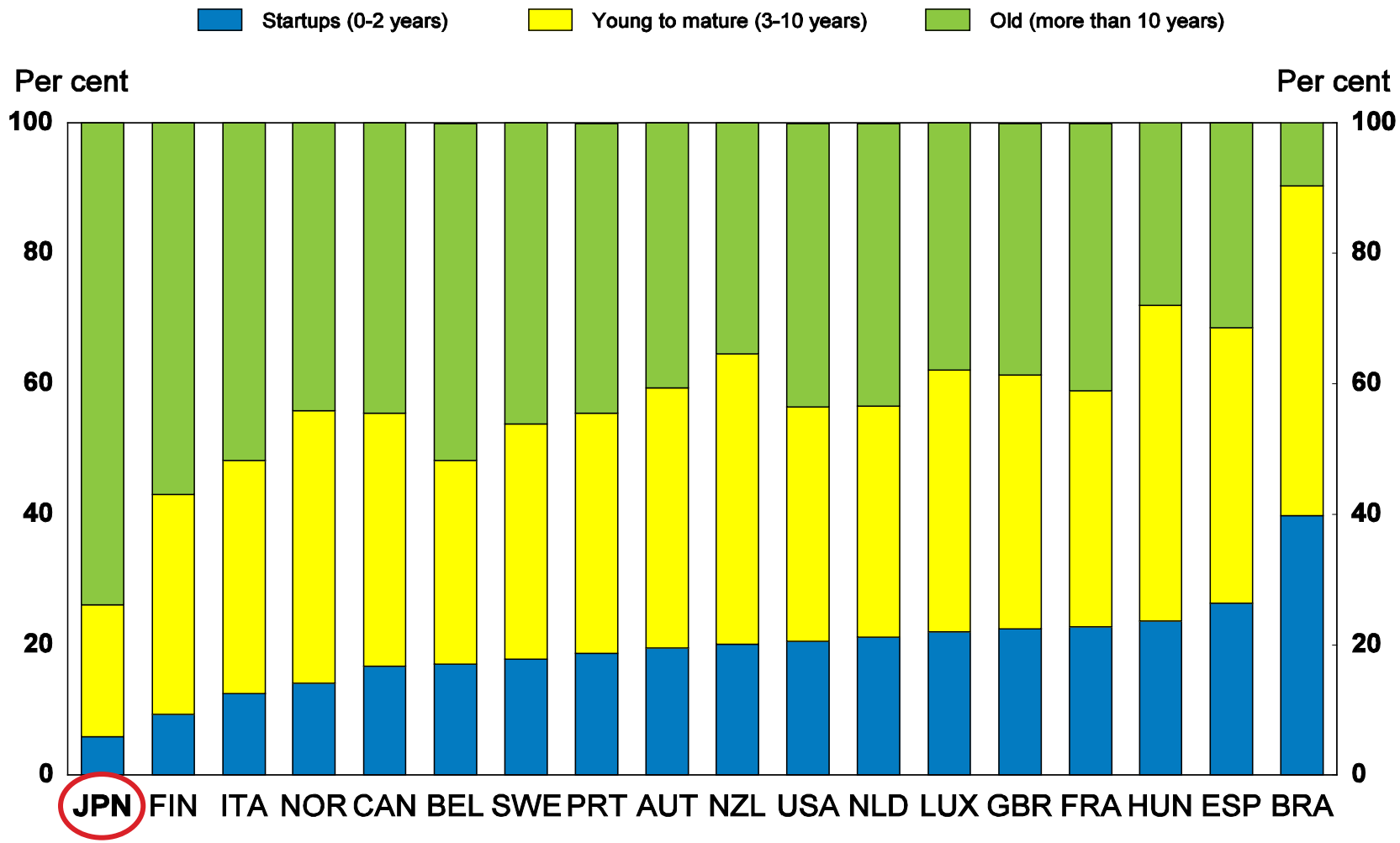
Year of establishment of the 300 largest firms by market capitalisation[1]



1. As of March 2015. The increase in the number of Japanese firms established between 2000 and 2009 reflects the creation of a large number of holding companies during that decade.

Source: 2015 *OECD Economic Survey of Japan.*

Small firms in Japan are also old, suggesting a lack of economic dynamism



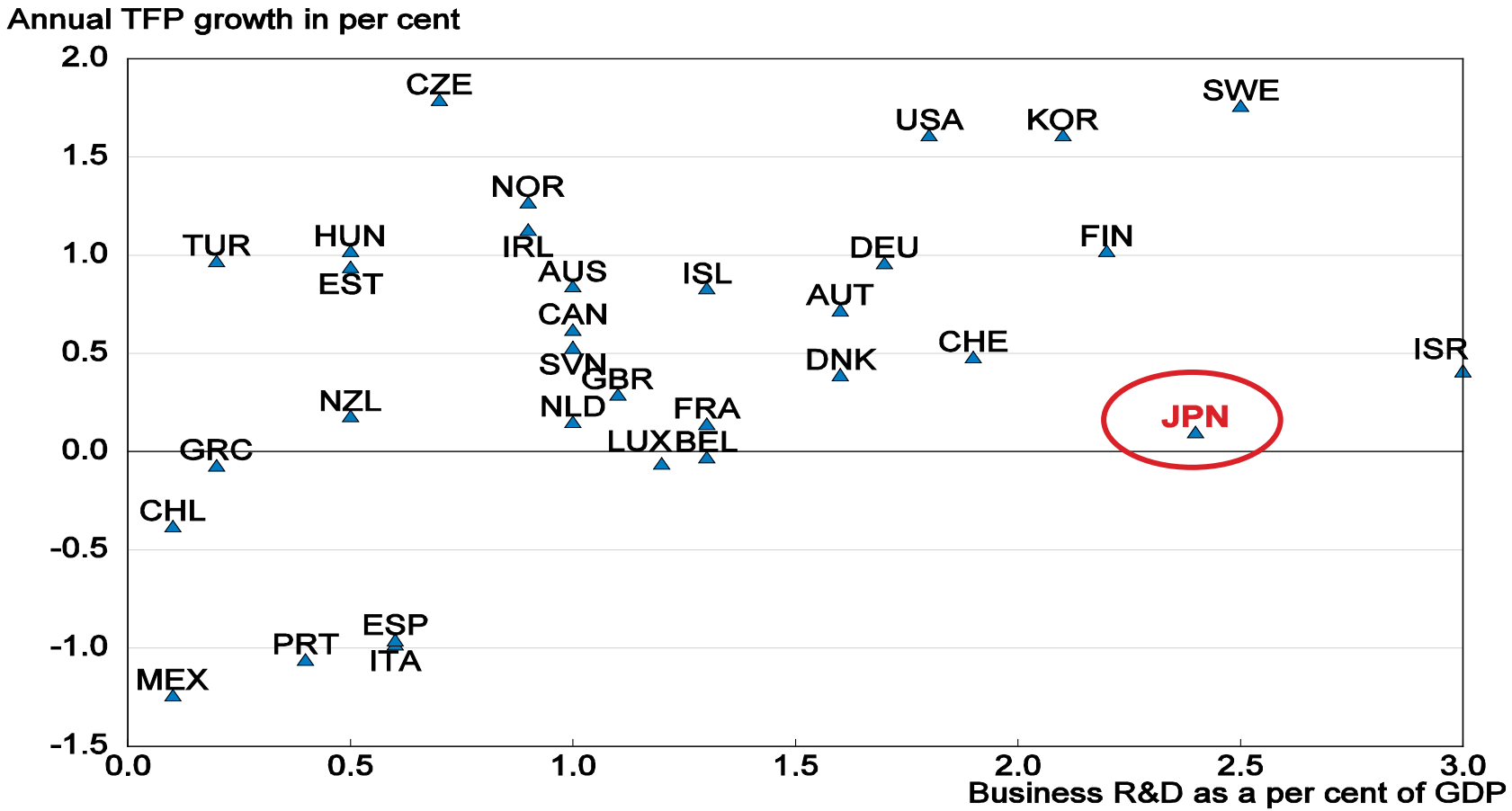
Source: Criscuolo *et al.* (2014).

III.A How to Revive Productivity? Promoting Innovation

Techno-optimists versus techno-pessimists

Economic odd couple Robert Gordon, left, and Joel Mokyr encapsulate the debate on the future of innovation. *ROB HART FOR THE WALL STREET JOURNAL* “”Economists Debate: Has All the Important Stuff Already Been Invented? By Timothy Aeppel, June 15, 2014 10:38 p.m. ET

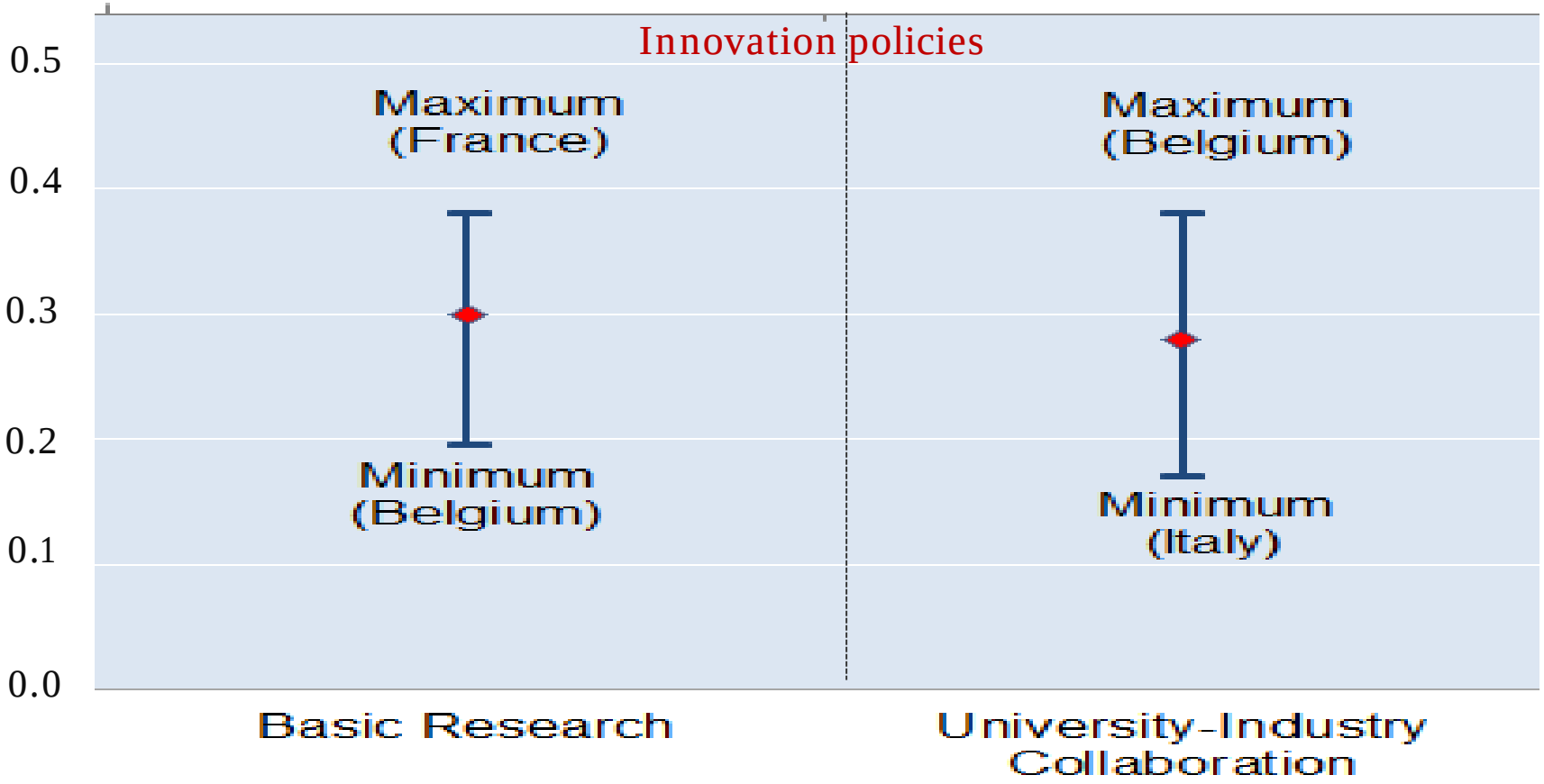
Total factor productivity growth is slow in Japan despite high business R&D



Source: 2015 *OECD Economic Survey of Japan*.

Policies shape the diffusion of new innovations from the global frontier

Estimated frontier spillover (% pa) associated with a 2% point increase in MFP growth at the global productivity frontier



Source: Saia, A., D. Andrews and S. Albrizio (2015), "Public Policy and Spillovers From the Global Productivity Frontier: Industry Level Evidence", *OECD Economics Department Working Papers*, No, 1238.

Increase R&D links between firms, academia and foreign sources

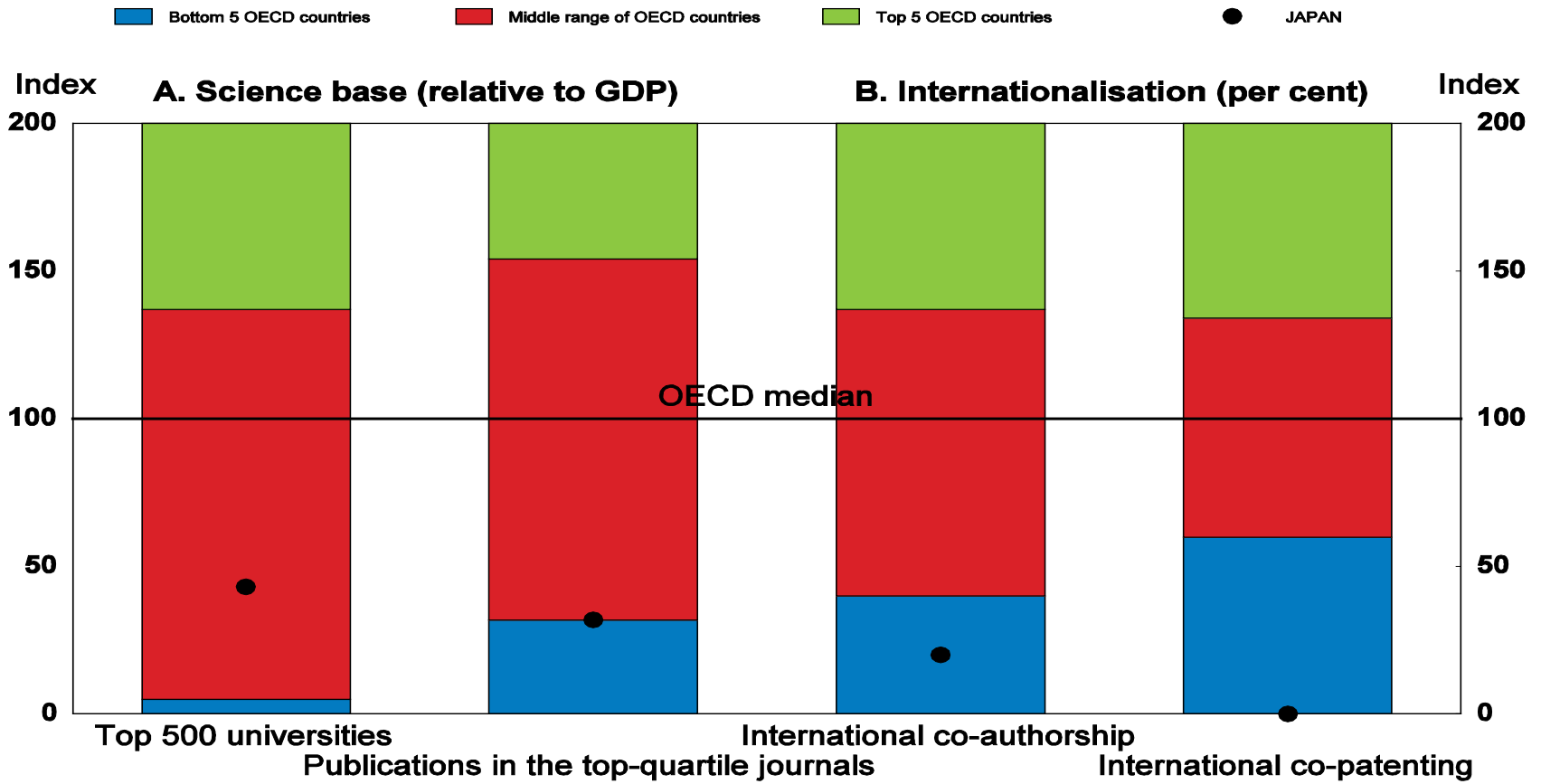
Japan's R&D funding in 2013

		Allocation of R&D spending by sector performing it performing it			
Source of funding	Share of total R&D R&D spending	Government t	Universities s	Business enterprises	Total
Government[1]	18.1	54.4	40.2	5.4	100.0
Universities	5.9	0.6	99.3	0.1	100.0
Business enterprises enterprises	75.5	0.6	0.5	98.9	100.0
Foreign sources	0.5	9.6	1.6	88.8	100.0

1. Includes private non-profit institutes.

Source: OECD R&D Statistics Database.

Japan's innovation system is weakened by problems in universities and a lack of participation in international R&D[1]



1. Normalised index of performance relative to the median values in the OECD, which are set at 100. The top performer is set at 200 and the lowest at zero. The fifth-highest performer in the case of the "Top 500 universities" had a score of 137 relative to the OECD median, while the fifth lowest had a score of 5. Japan, with a score of 43, was in the middle range.

Source: OECD (2014), *OECD Science, Technology and Industry Outlook 2014*, OECD Publishing, Paris.

Future growth depends on productivity but its outlook is uncertain

- There is considerable uncertainty about the outlook for innovation and technology.
- Given this uncertainty, we need to find sources of productivity growth that are certain to provide large scope for improvement.
- Three key sources of growth emerge:

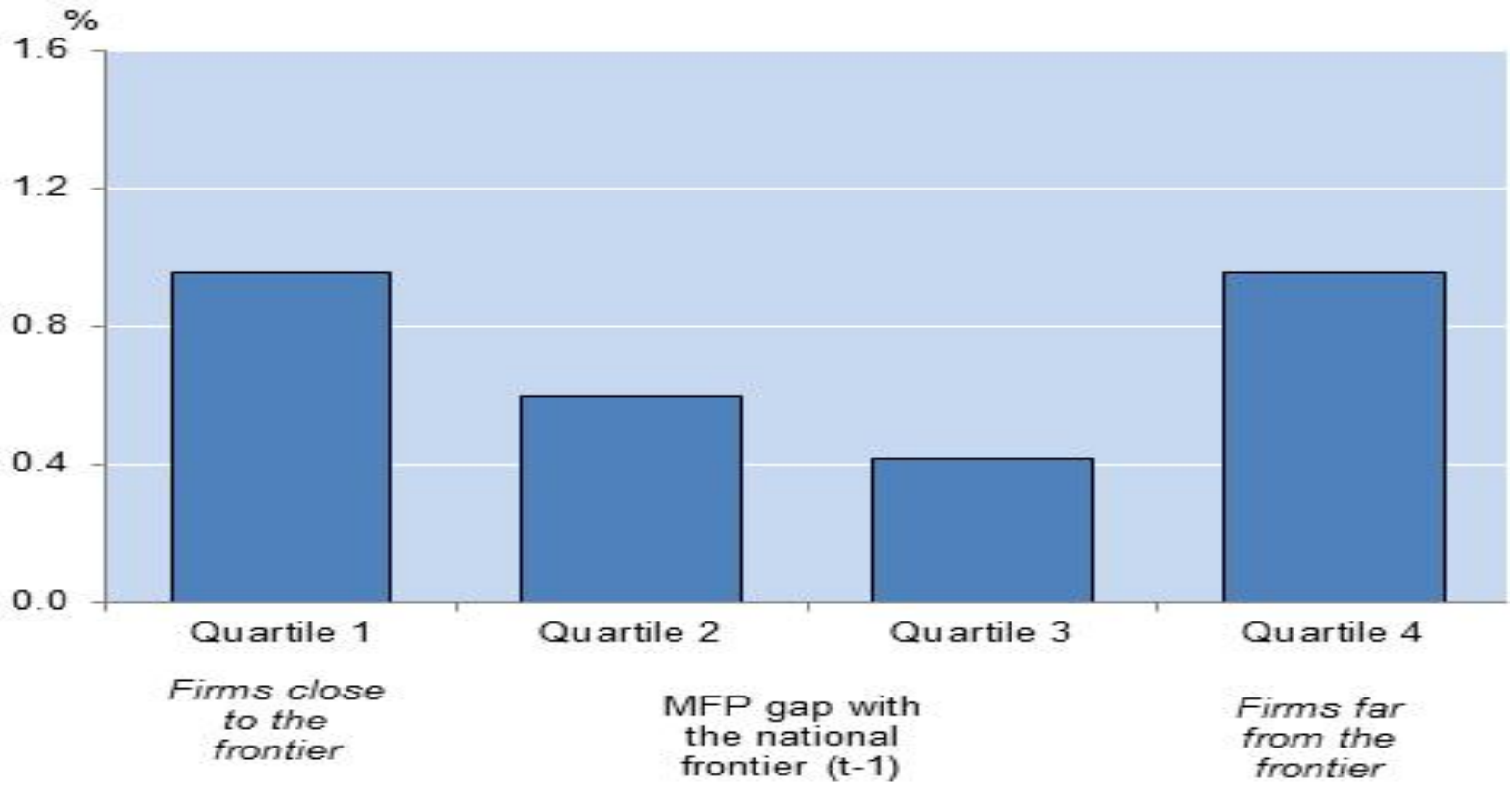
1. Effective diffusion
2. Efficient resource allocation
3. Promoting risk-taking

III.B How to Revive Productivity? Accelerating Diffusion

Policies to facilitate the catch-up of laggards to the national frontier

Impact of policy reforms on the MFP growth of laggard firms, 2005

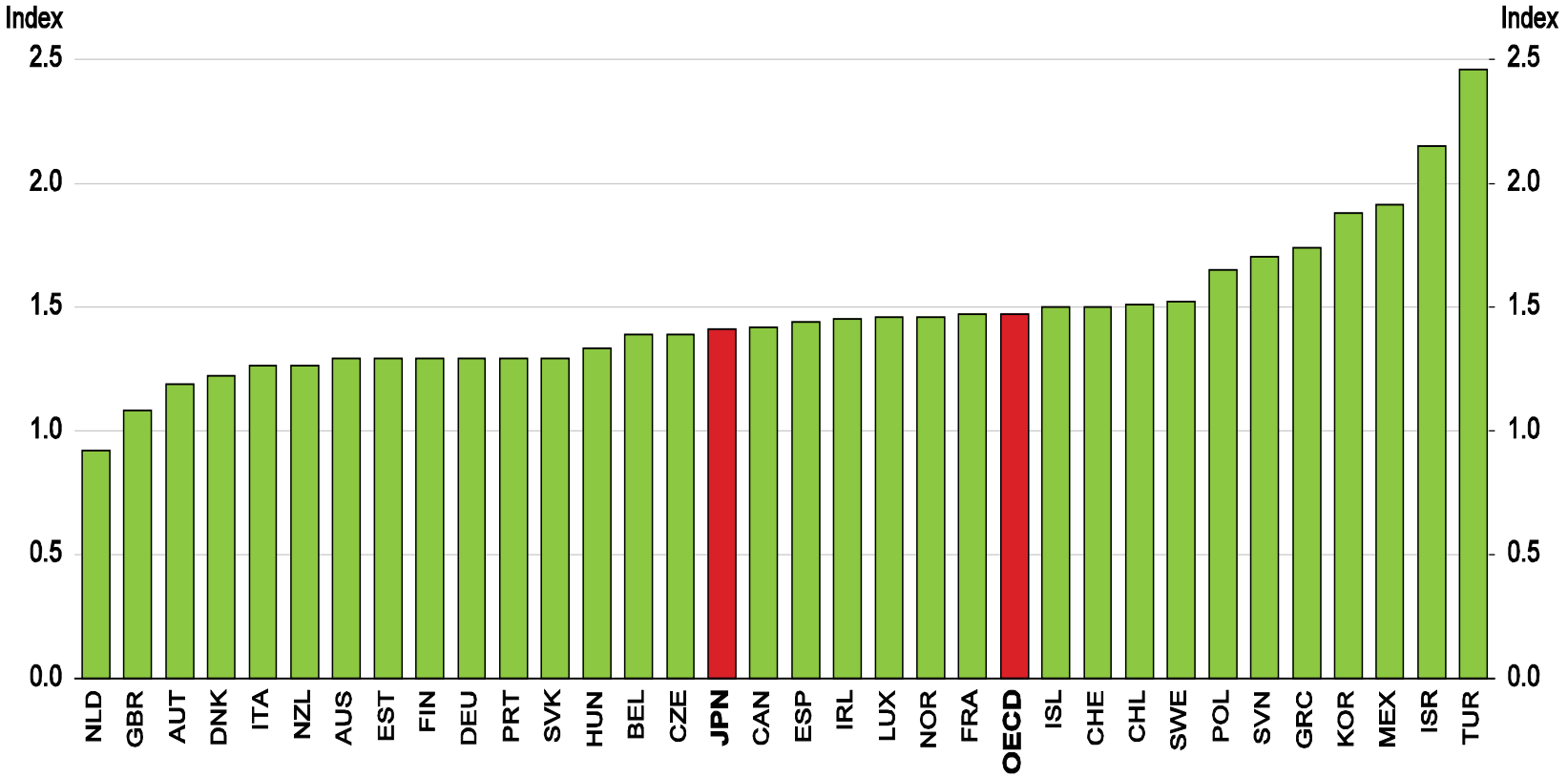
Reducing PMR from high level in Greece to the OECD average



Source: Andrews, D. C. Criscuolo and P. Gal (2015), **"**Frontier firms, technology diffusion and public policy: micro evidence from OECD countries**",** OECD Mimeo.

Product market regulation[1] in Japan is near the OECD average

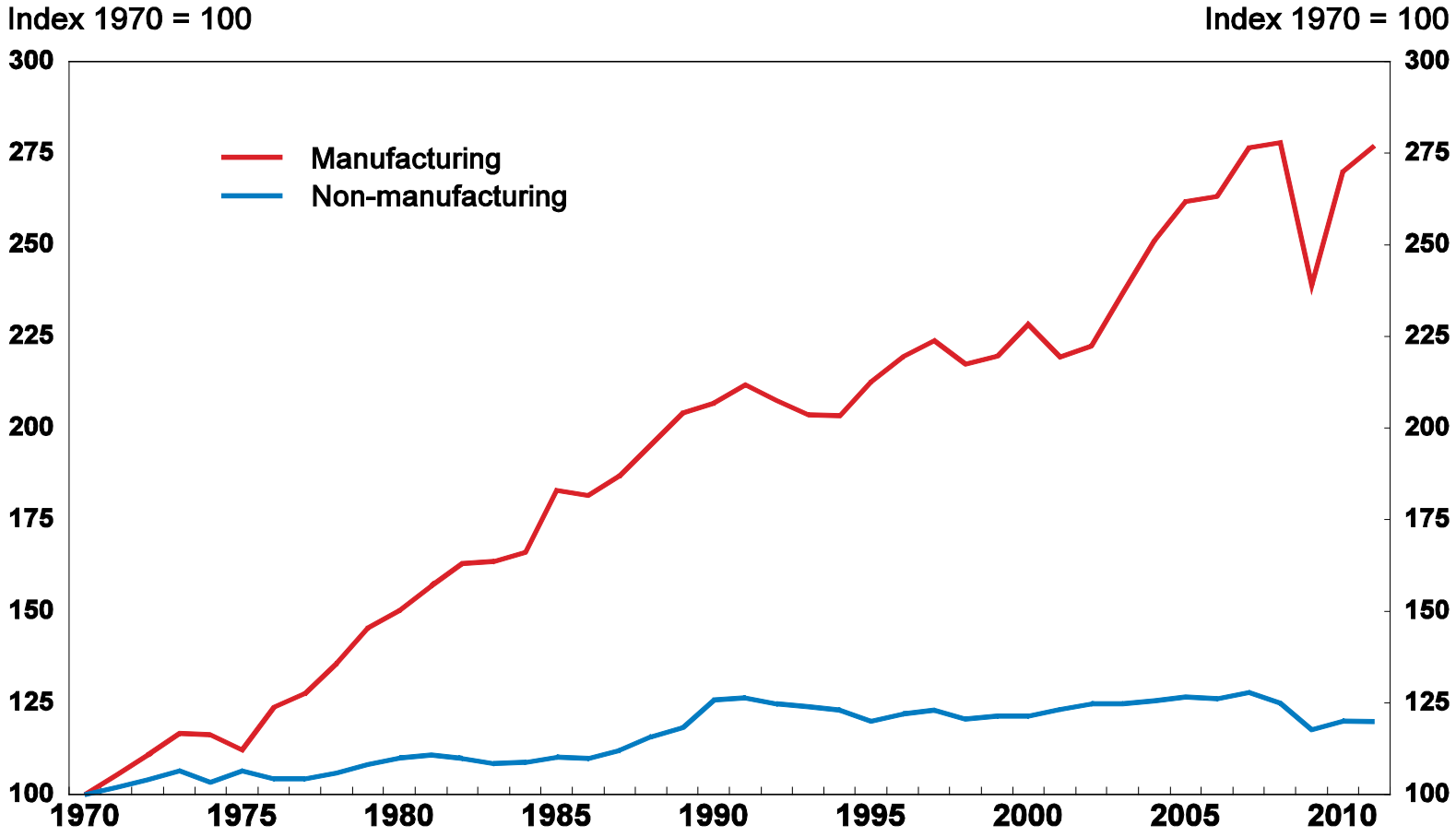
In 2013



1. The OECD Indicators of Product Market Regulation are a comprehensive and internationally-comparable set of indicators that measure the degree to which policies promote or inhibit competition. Empirical research shows that the indicators have a robust link to performance. The indicator, which ranges from zero (most relaxed) to three (most stringent), is available for 30 OECD countries. The overall indicator is based on more than 700 questions.

Source: OECD Product Market Regulation database and Koske et al. (2015).

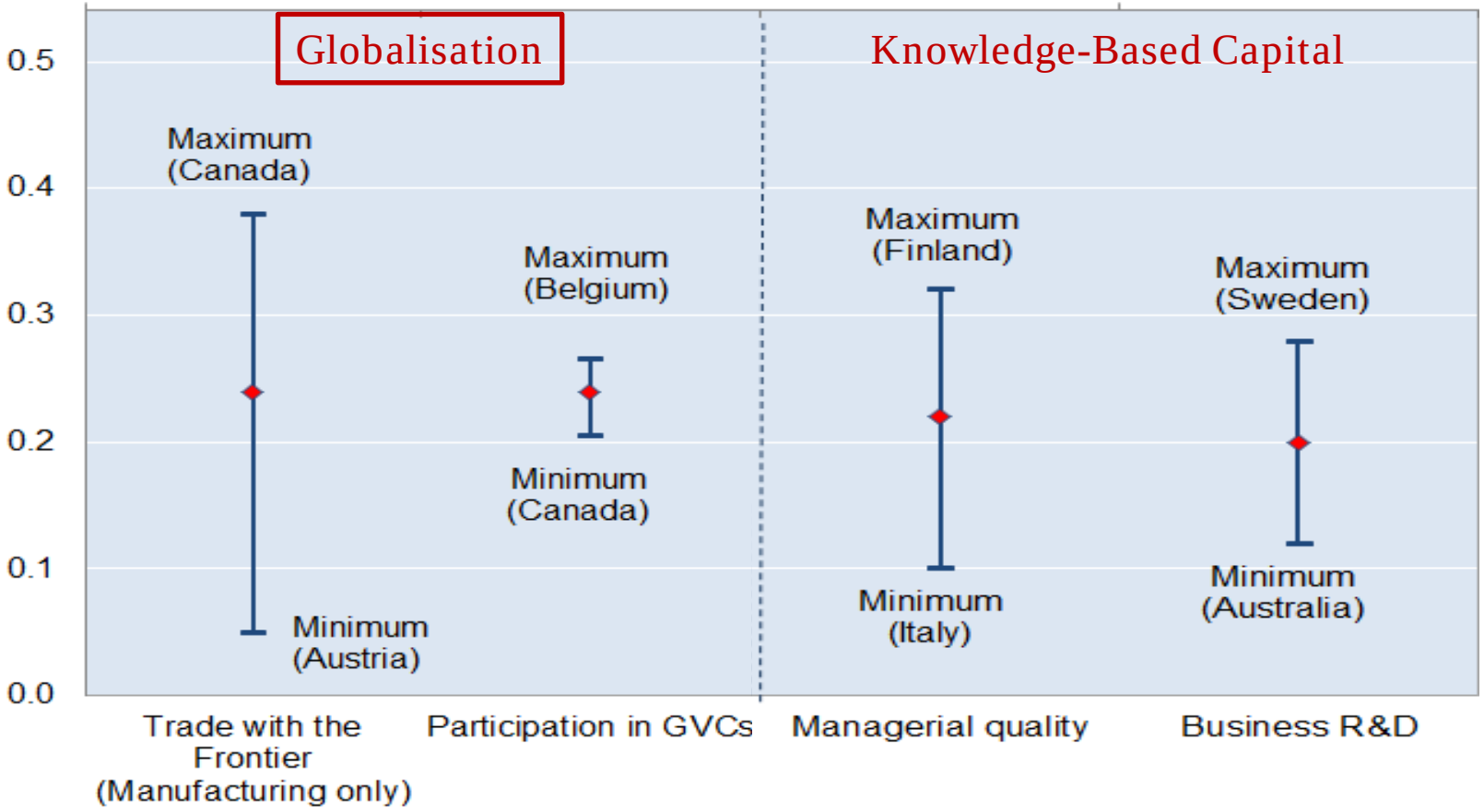
The productivity gap between manufacturing and services in Japan has widened sharply



Source: Japan Industrial Productivity Database 2014.

Reviving the diffusion machine: structural factors shape diffusion

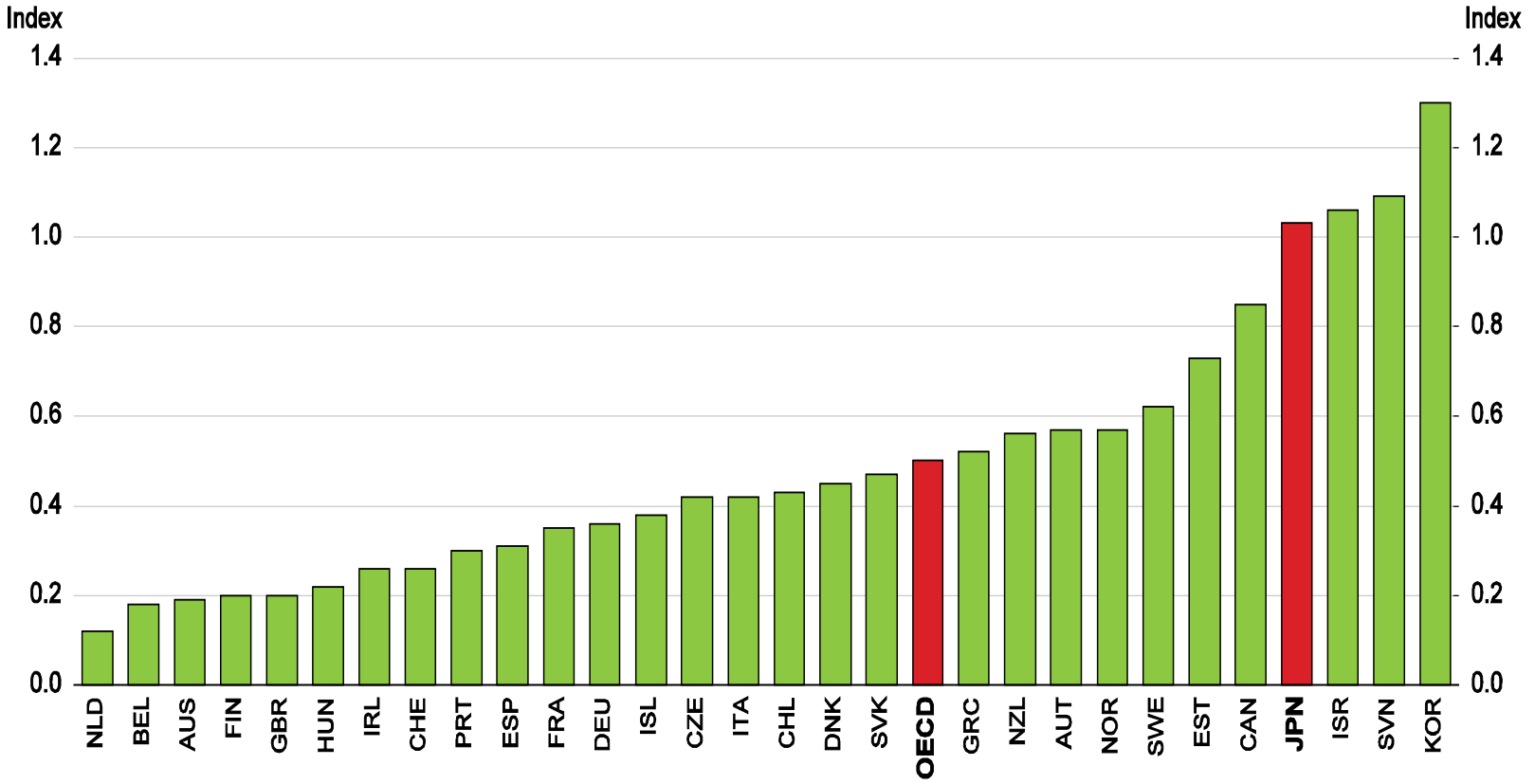
Estimated frontier spillover (% pa) associated with a 2% point increase in MFP growth at the global productivity frontier



Source: Saia, A., D. Andrews and S. Albrizio (2015), "Public Policy and Spillovers From the Global Productivity Frontier: Industry Level Evidence", OECD Economics Department Working Papers, No. 1238.

Japan's barriers to trade and investment are among the highest in the OECD

In 2013[1]



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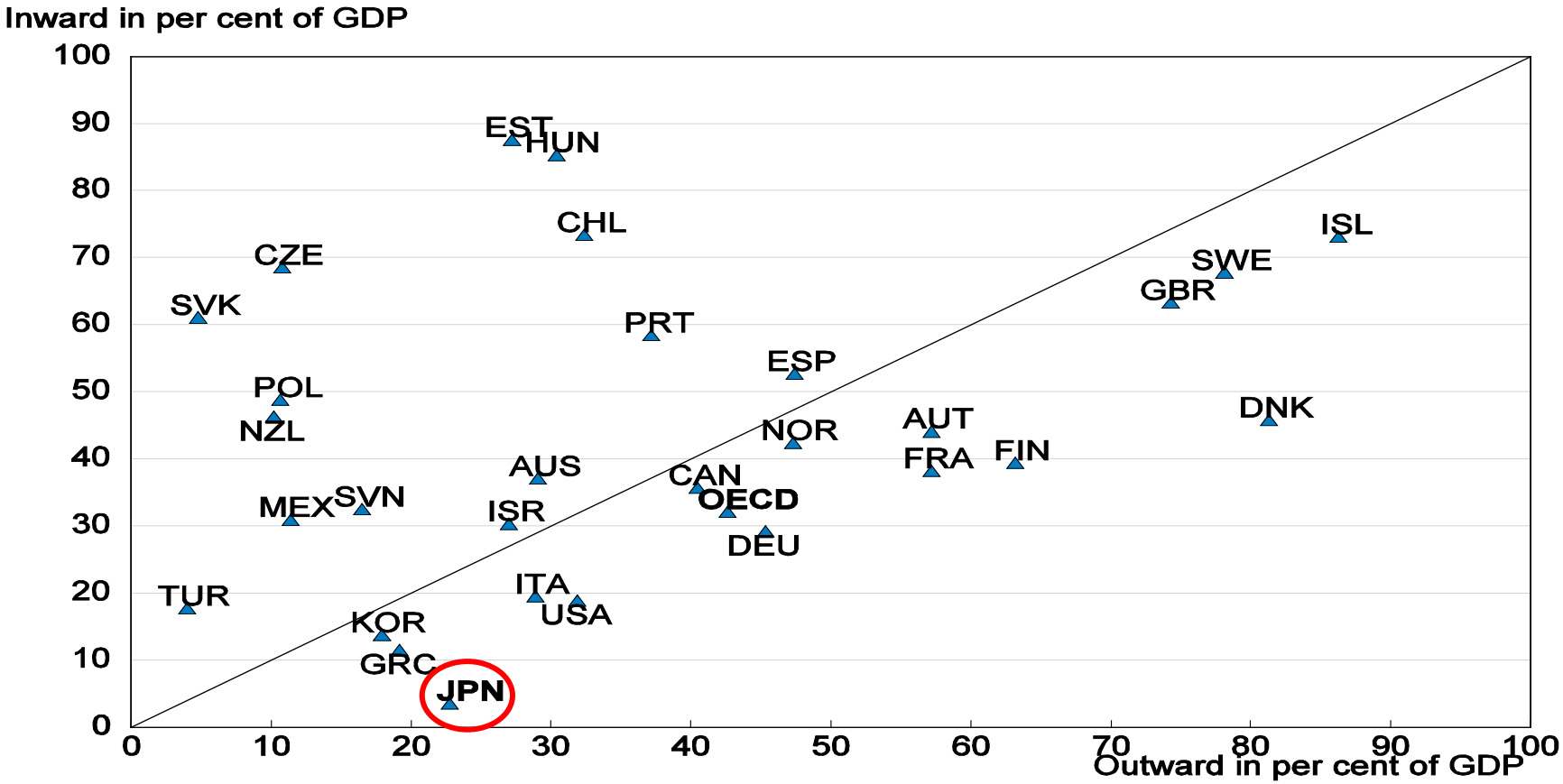
Source: OECD Product Market Regulation database and Koske et al. (2015).

The stock of inward FDI in Japan is the smallest in the OECD

Inward and outward stocks of direct investment as a per cent of GDP in 2013[1]

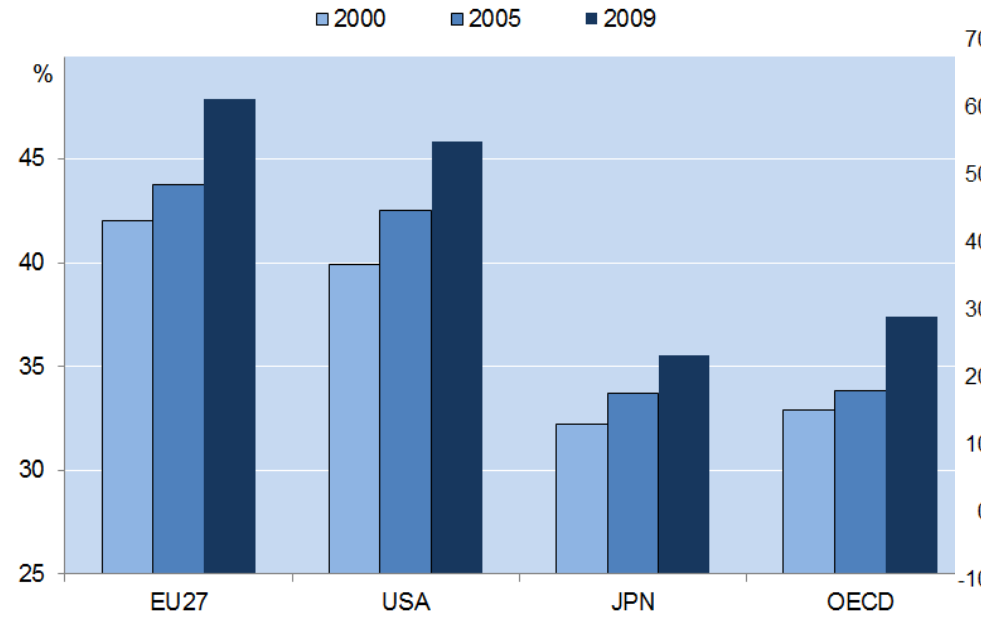


1. Belgium (189,200), Ireland (231,173), Luxembourg (301,234), The Netherlands (134,83.7) and Switzerland (194,115).

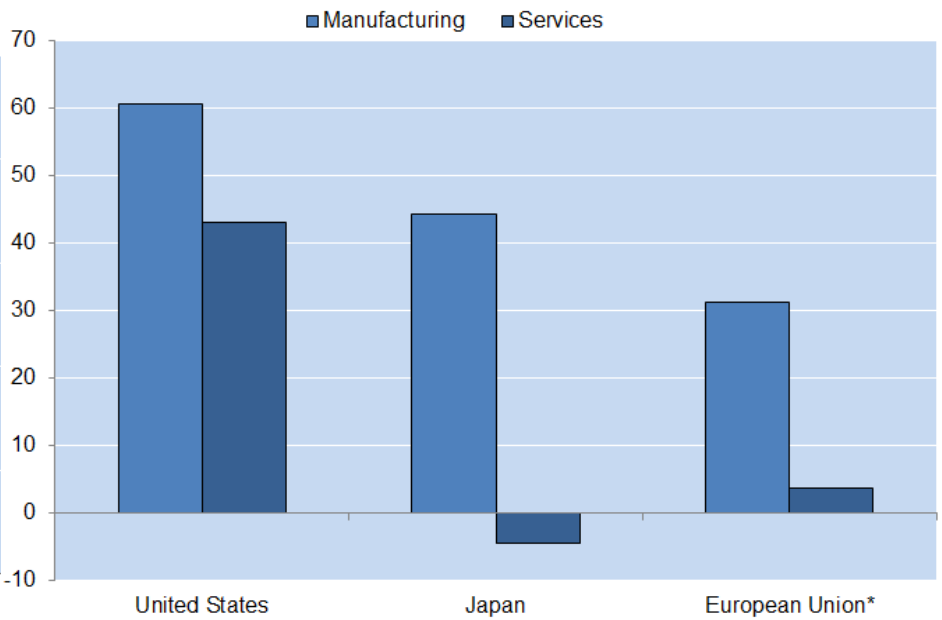
Source: OECD (2014), *Economic Globalisation Indicators 2014*, OECD, Paris.

Services are the oil that greases the wheels of globalisation

A: Value added share of domestic services in gross exports has been rising



B: Resource misallocation in services is a problem

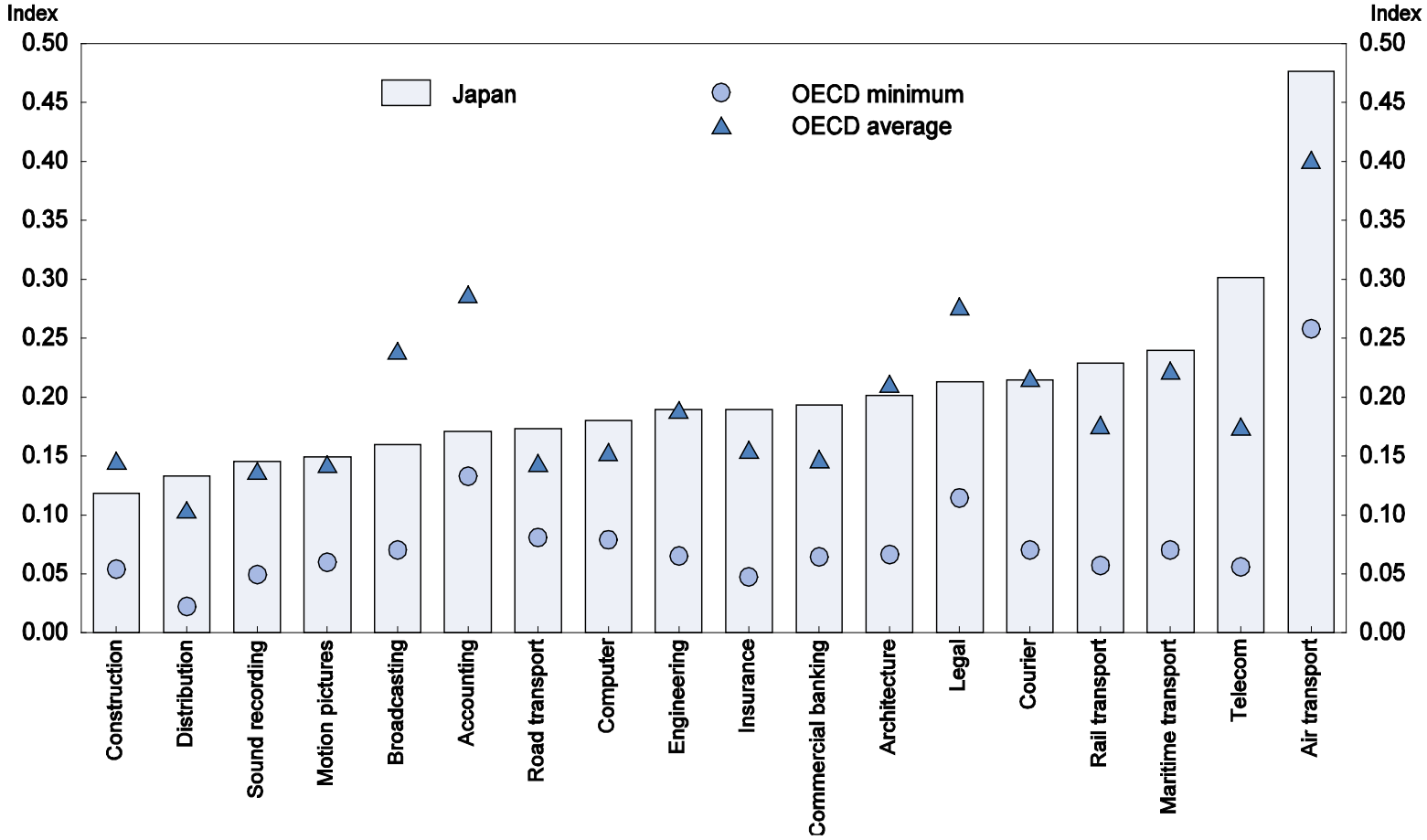


<u>Conclusion</u>: an inefficient domestic services sector can erode the productivity benefits of globalisation. There is a big role for policy to promote efficiency in services.

Source: Panel A OECD TiVA Database. Panel B: Andrews, D. and F. Cingano (2014), "Public Policy and Resource Allocation: Evidence from Firms in OECD Countries", Economic Policy, 29(78), pp. 253-296.

Japan's restrictions match or exceed the OECD average in 14 of 18 service sectors

The indices take values between zero and one (the most restrictive)

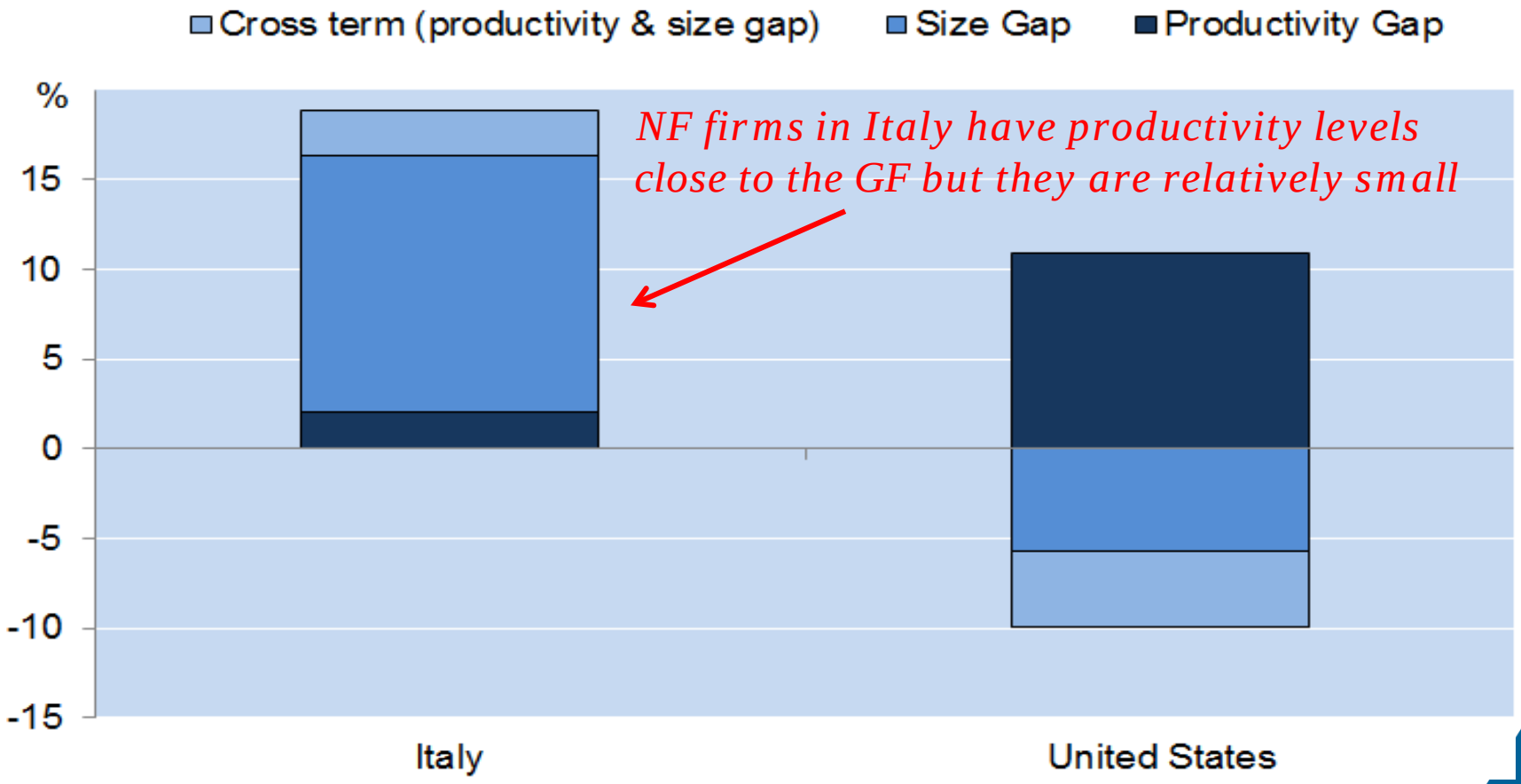


Source: OECD.

III.C How to Revive Productivity? Resource Reallocation

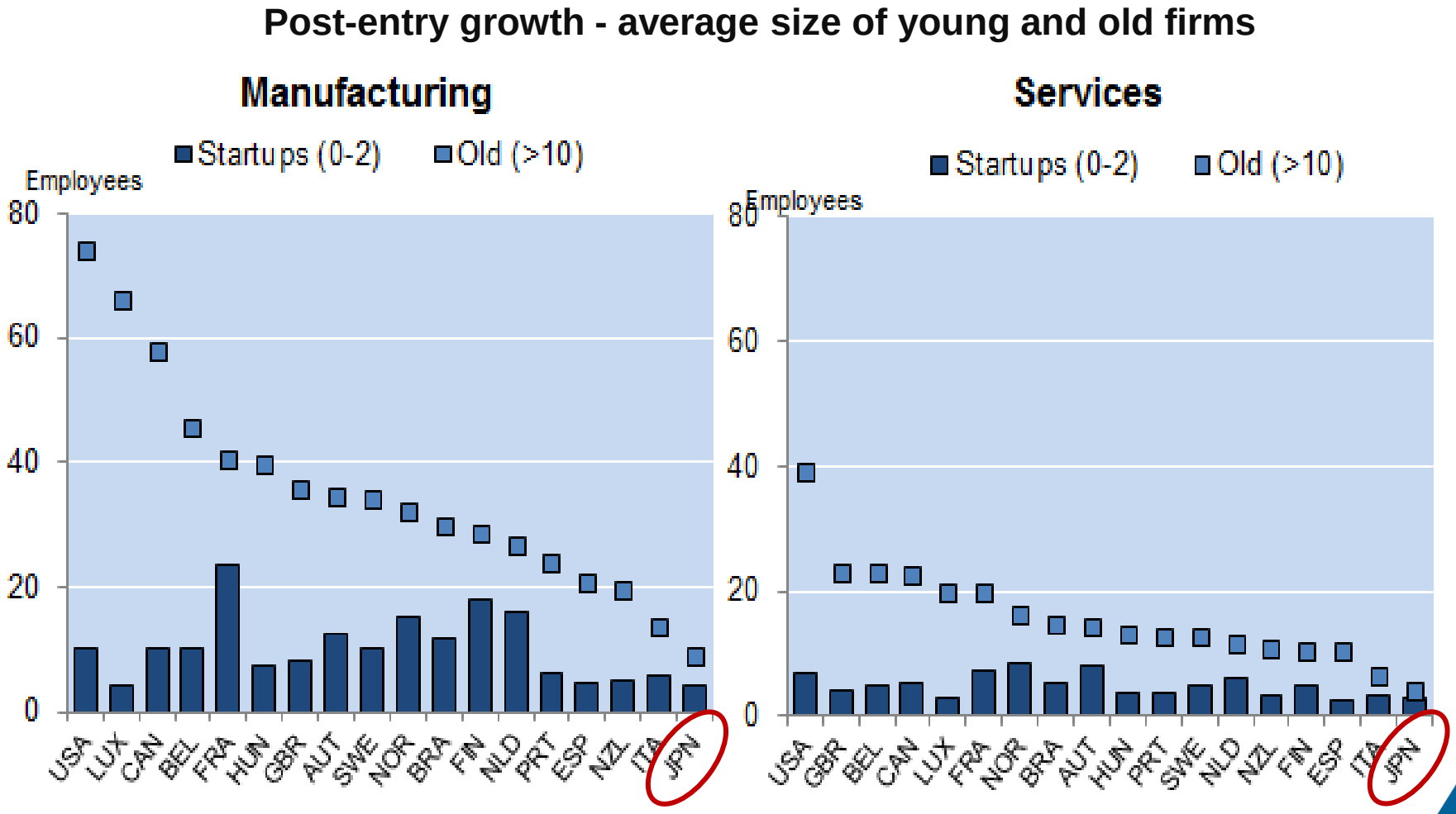
Aggregate gains from diffusion is magnified by efficient reallocation

How much higher would overall manufacturing sector labour productivity be if NF firms were as productive and large as GF firms?



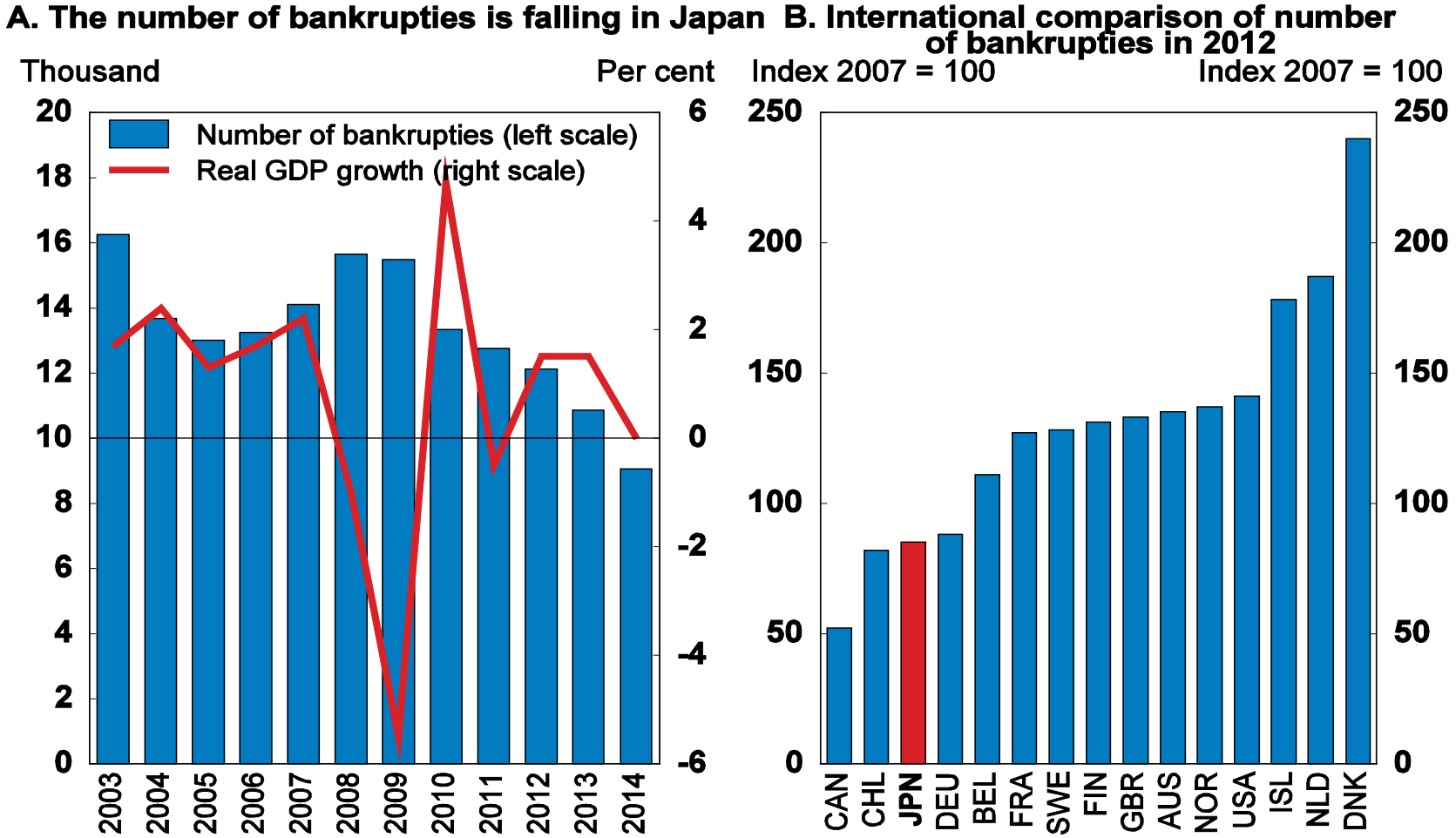
Source: Andrews, Criscuolo and Gal (2015), "Frontier firms, technology diffusion and public policy: micro evidence from OECD countries" OECD Mimeo.

Increasing the size of firms is difficult in Japan



Source: C. Criscuolo, P. N. Gal and C. Menon (2014), "The Dynamics of Employment Growth: New Evidence from 18 Countries", OECD Science, Technology and Industry Policy Papers no. 14.

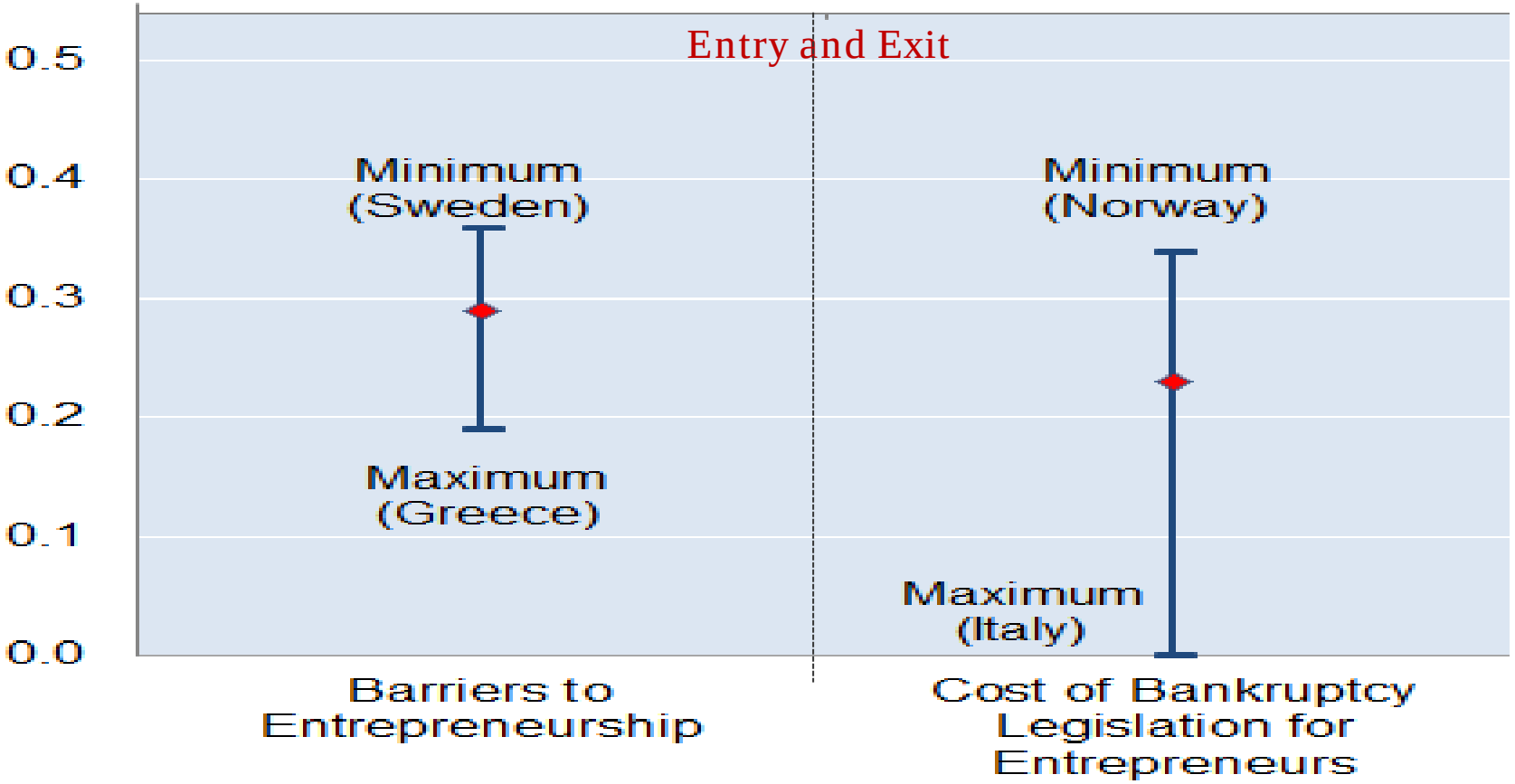
It is crucial to ensure the exit of non-viable firms



Source: OECD (2014f, *Entrepreneurship at a Glance 2014*, OECD Publishing, Paris; OECD Economic Outlook Database.

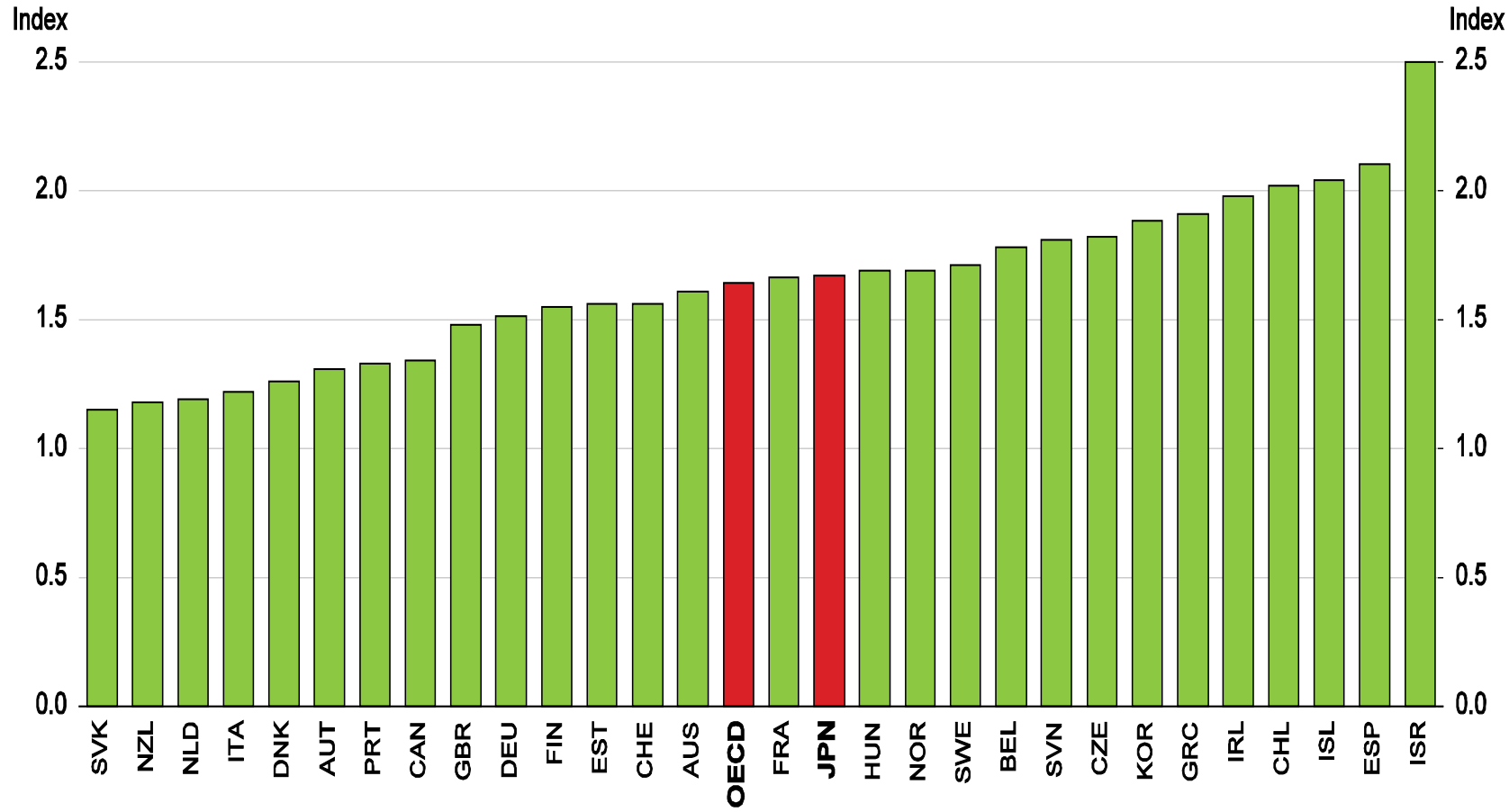
Policies shape the diffusion of new innovations from the global frontier

Estimated frontier spillover (% pa) associated with a 2% point increase in MFP growth at the global productivity frontier



Source: Saia, A., D. Andrews and S. Albrizio (2015), "Public Policy and Spillovers From the Global Productivity Frontier: Industry Level Evidence", *OECD Economics Department Working Papers*, No, 1238.

Barriers to entrepreneurship in Japan are close to the OECD average



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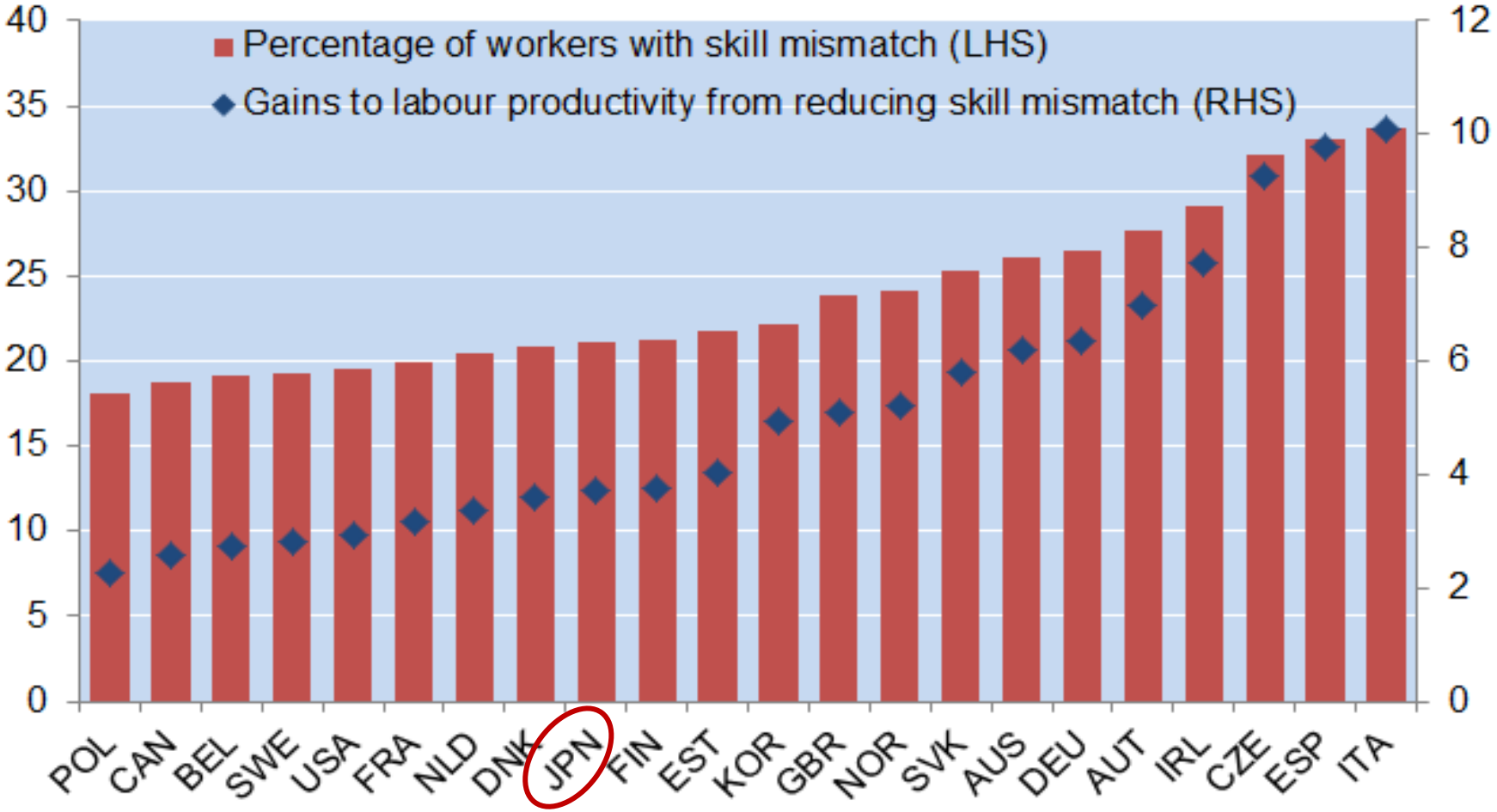
Source: OECD Product Market Regulation database and Koske et al. (2015).

Skill mismatch is a constraint on the growth of innovative firms

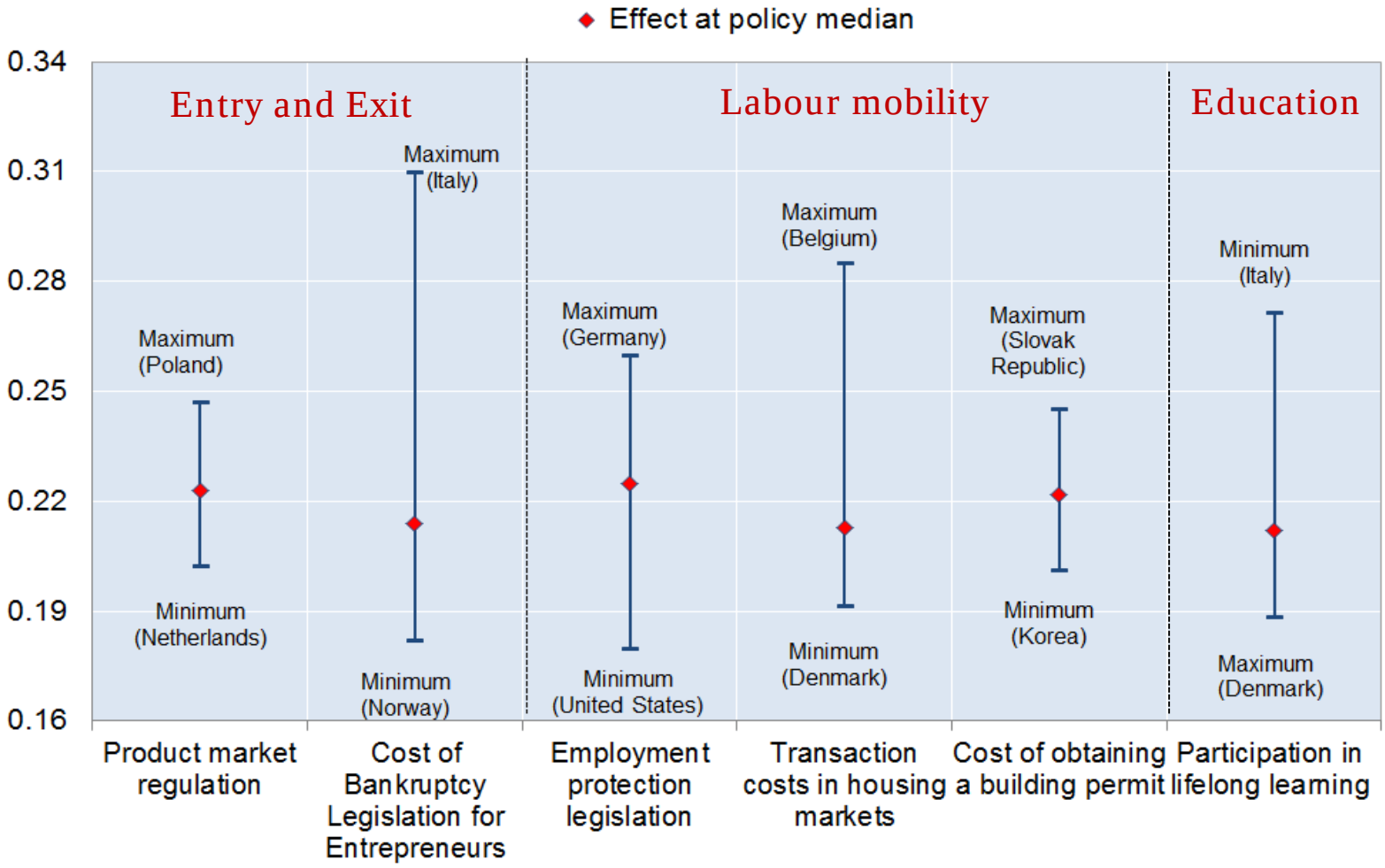


Skill mismatch, particularly over-skilling, is harmful for productivity because it constrains the ability of innovative firms to attract skilled workers and grow.

Source: Adalet McGowan, M and D. Andrews (2015), **"**Labour market mismatch and labour productivity: evidence from PIAAC data**"** *OECD Economics Department Working Paper*, No. 1209.

Reducing skill mismatch requires a range of policies

The probability of skill mismatch and public policies



Source: Adalet McGowan, M and D. Andrews (2015), **"**Skill mismatch and public policy in OECD countries**"** *OECD Economics Department Working Paper*, No. 1210.

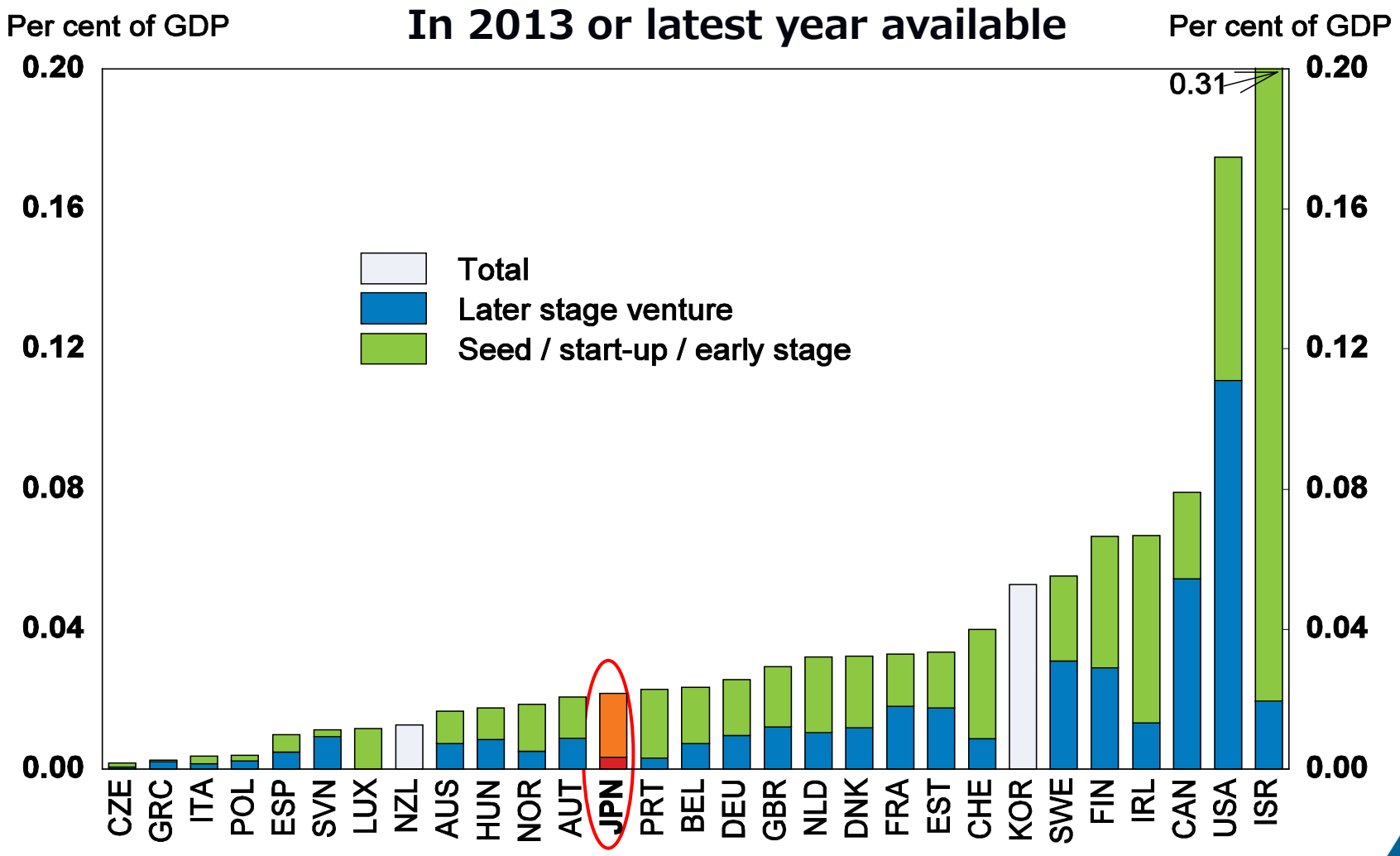
Policies to support efficient resource allocation

OECD research shows that efficient resource allocation is promoted by:

- Low administrative burdens on start-up firms
- Less stringent employment protection legislation
- Bankruptcy legislation that does not excessively penalise business failure
- Availability of seed and early stage financing

III.D How to Revive Productivity? Encouraging Risk-taking

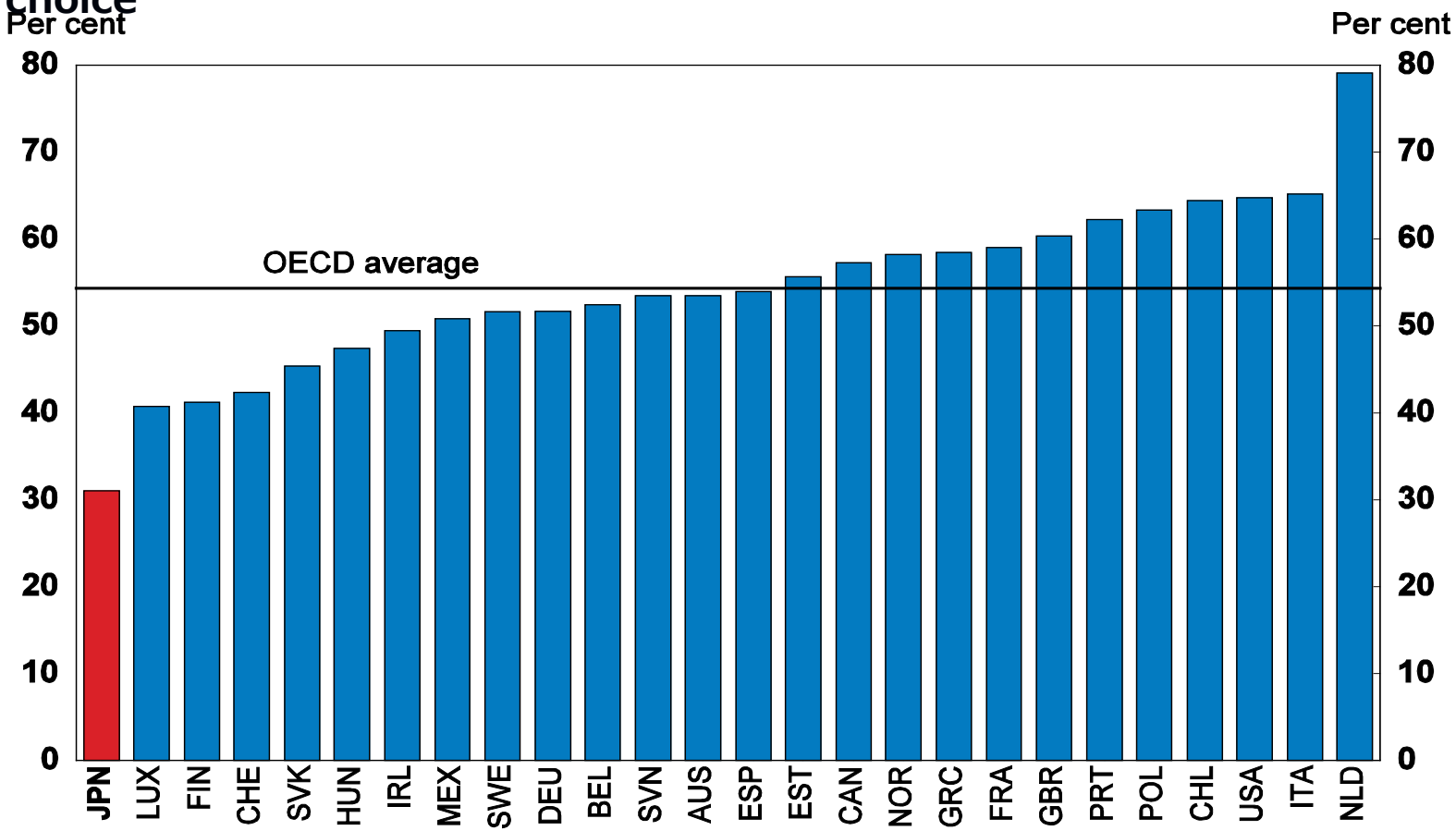
The role of venture capital in Japan is small



Source: OECD (2014f), *Entrepreneurship at a Glance 2014*, OECD Publishing, Paris.

It is important to improve the perception of entrepreneurship in Japan

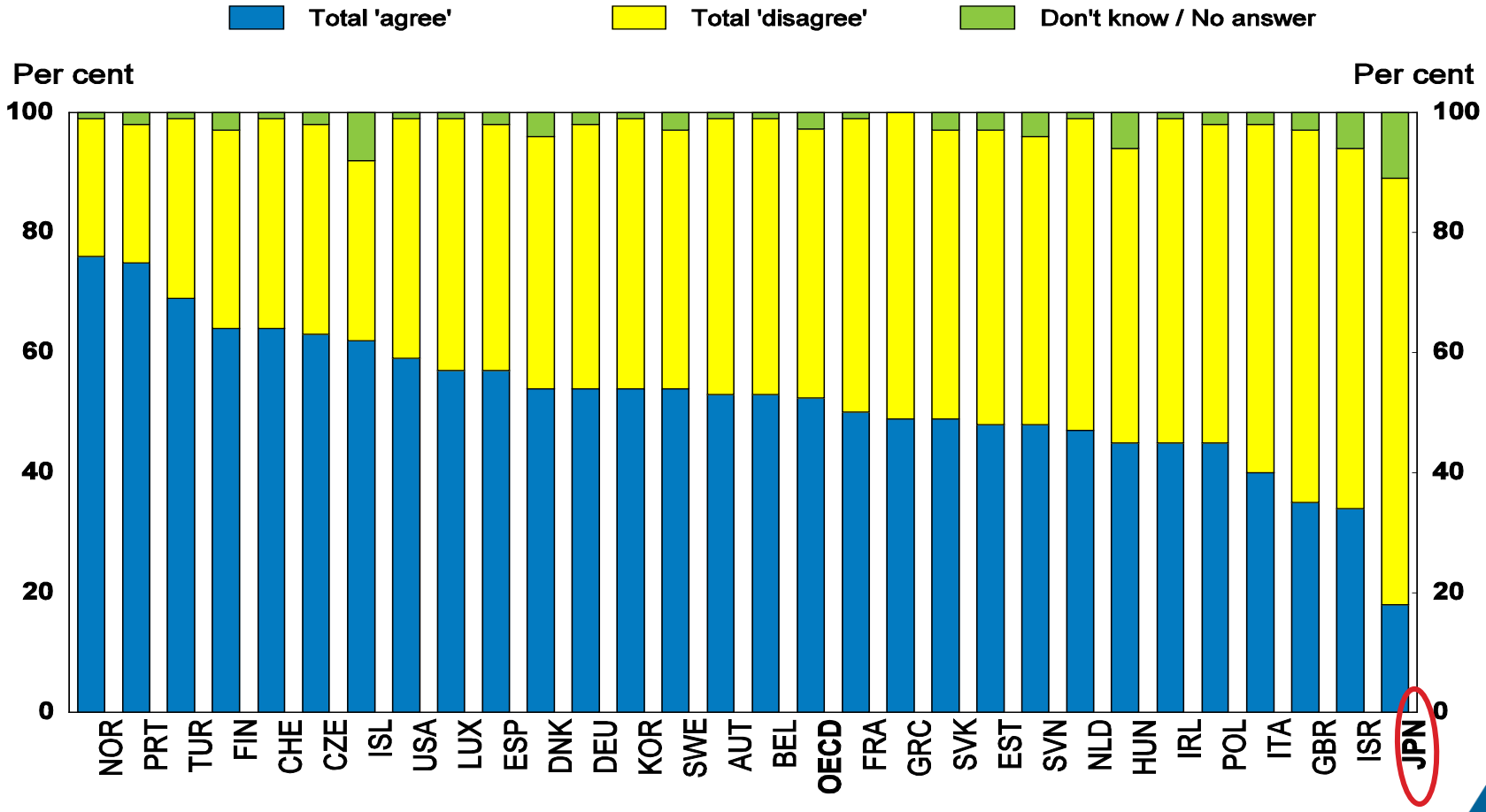
Share of the population that views entrepreneurship as a good career choice



Source: Global Entrepreneurship Monitor (2015).

Provide skills needed for entrepreneurship in schools

Per cent that agree that school education provided enabling skills and know-how to run a business (2012)



Source: OECD (2013), *Entrepreneurship at a Glance*, OECD Publishing, Paris.

IV. Conclusions

How to revive productivity growth?

Four areas for policy:

1. Enhancing innovation to pushing out the global frontier
2. Strengthening the diffusion machine
3. Improving resource allocation
4. Encouraging risk-taking

Policies to revive productivity growth

Framework policies

1. Pro-competition product market reforms, especially in services
2. Remove entry barriers and promote entrepreneurship
3. Exit matters: bankruptcy legislation that does not excessively penalise failure
4. Avoid policies that inhibit labour and residential mobility
5. Promote international openness by reducing barriers to trade and investment.
6. Education & social policies to help workers adapt to technological change and the costs of reallocation

Innovation policies

1. Public investment in basic research
2. Collaboration between firms and universities

The following reports detail the results:

- OECD (2015), “The Future of Productivity”. OECD, Paris
- Adalet McGowan, M. and D. Andrews (2015a), “Labour Market Mismatch and Labour Productivity: Evidence from PIAAC Data”, *OECD Economics Department Working Papers*, No. 1209.
- Adalet McGowan, M. and D. Andrews (2015b), “Skill Mismatch and Public Policy in OECD Countries”, *OECD Economics Department Working Papers*, No. 1210.
- Andrews, D., C. Criscuolo and P. Gal (2015), “Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries”, *OECD Mimeo,* forthcoming.
- Calvino, F., C. Criscuolo and C. Menon (2015), “Cross-country Evidence of Start-Up Dynamics”, *OECD Science, Technology and Industry Working Paper*.
- Criscuolo, C., P. Gal and C. Menon (2014), “The Dynamics of Employment Growth: New Evidence from 18 Countries”, *OECD Science, Technology and Industry Policy Papers*, No. 14.
- Saia, A., D. Andrews and S. Albrizio (2015), “Public Policy and Spillovers From the Global Productivity Frontier: Industry Level Evidence”, *OECD Economics Department Working Papers*, No. 1238.

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www.oecd.org/eco/surveys/economic-survey-japan.htm

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