# Human capital in the post crisis economy

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Key points

- In the post crisis economy output levels, and possibly growth rates, will be lower
- HC will be instrumental in addressing this challenge
- HC in a broad reform framework
- HC and open markets, trade and HC mobility
- Policy conclusions

Lower potential output levels and growth
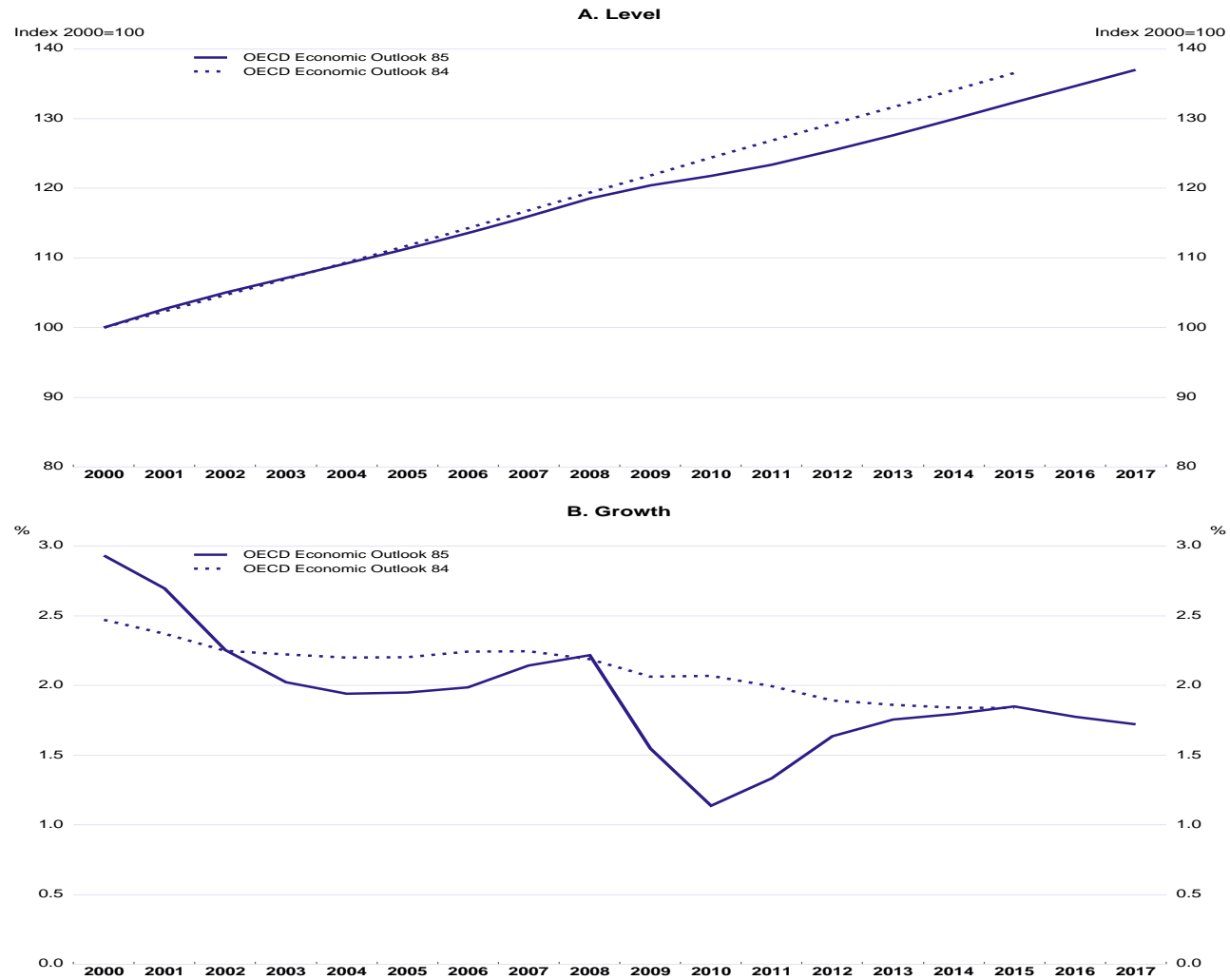
Output levels will be lower especially in OECD
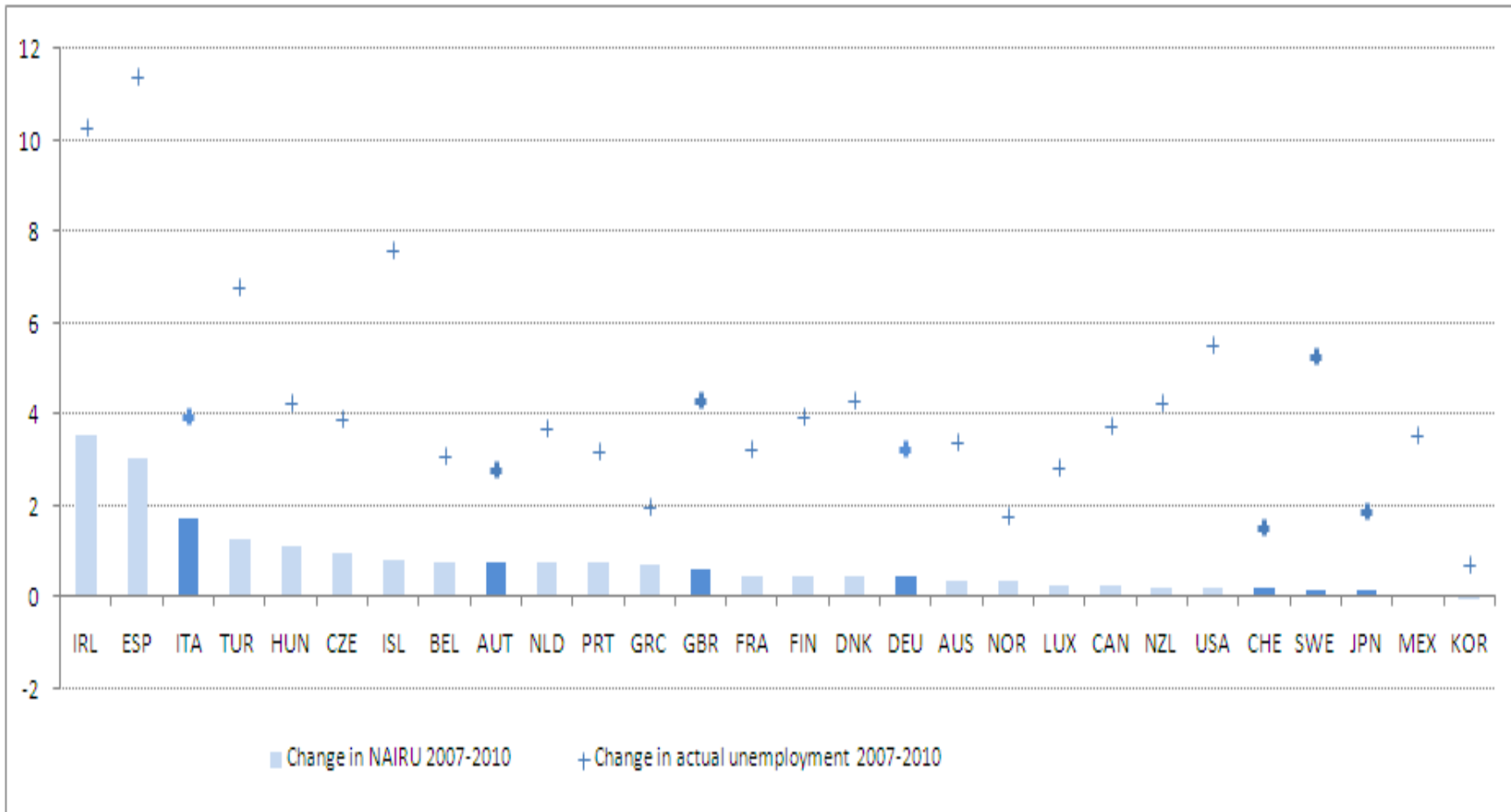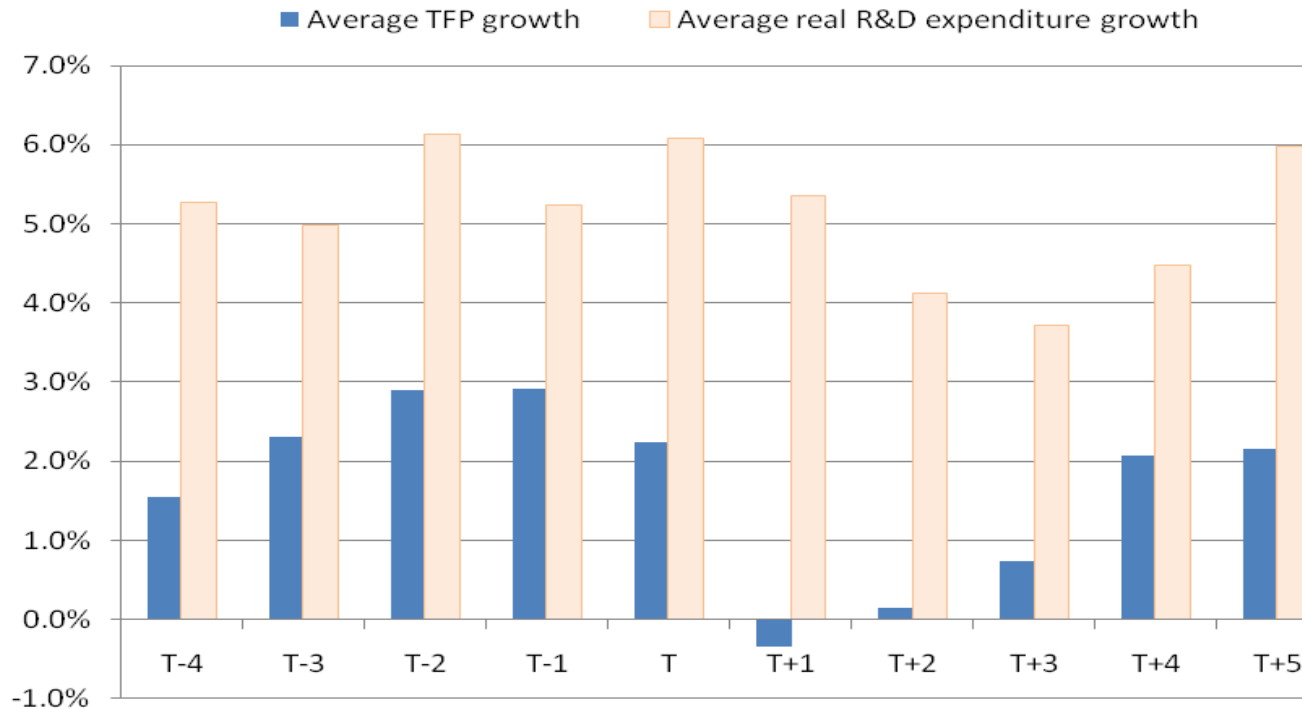

OECD

Non-OECD[1]

Causes of lower output levels, and growth rates

- Higher structural unemployment
- Lower risk taking and innovation
- Tighter finance
- HC depreciation

Higher structural and actual unemployment

Change in NAIRU 2007-2010   + Change in actual unemployment 2007-2010

TFP and R&D fall in deep recessions

Average TFP growth ▪ Average real R&D expenditure growth

* Average growth in TFP and real R&D expenditures are calculated over 44 episodes of deep recession across 20 OECD countries. Deep recessions are identified as those where the cumulative output gap exceeded 4 percentage points, where period T is defined as the year of the previous peak in output gap preceding the downturn.

HC depreciates in the recession. But HC is key in exiting the crisis

- Experience from previous recessions: many **skilled workers will remain unemployed even after growth resumes**.

- **HC will depreciate if the downturn is protracted**. However, it could contribute to a new wave of innovative entrepreneurship if the recession is not too protracted.

- In recessions, budget constraints (in government, households and businesses) could lead to reduced expenditure on **education and training**.

- But, also due to rising unemployment, **demand for training increases**. Spending for education and training can help displaced workers find new job opportunities and support the restructuring process.

The Policy Response

- The challenge going forward. How to move **from stimulus driven** (exit strategies) to **self sustained expansion** (growth strategies).

- Governments are concerned about preserving HC. Invest in education and research.

- HC policy can be: a) more effective on its own right and b) contribute to other growth strategies, including more market openness.

Composition of stimulus packages

Table 1. Financial weights of selected, long-term policies in OECD country stimulus packages, May 2009

	Infrastructure	Science, R&D and innovation	Education	Green technology
Australia	AUD 9.7 billion	AUD 2.9 billion	AUD 15.7-17 billion	AUD 5.7 billion
% of GDP	0.82%	0.25%	up to 1.4%	0.48%
Canada	CAD 20.3 billion	CAD 800 million	1.9 billion	CAD 2.8 billion
% of GDP	1.27%	0.05%	0.12%	0.18%
Chile	USD 700 million	USD 8.8 million	USD 147 million	USD 0
% of GDP	0.50%	0.01%	0.10%	0%
Finland	EUR 910 million	EUR 25 million[1]	EUR 30 million	EUR 38 million
% of GDP	0.48%	0.01%	0.02%	0.02%
France	EUR 4.7 billion	EUR 46 million[2]	EUR 731 million	EUR 30 million
% of GDP	0.24%	0.00%	0.04%	0.00%
Germany[3]	EUR 11.5 billion[4]	EUR 1.4 billion	EUR 14.5 billion[5]	EUR 5.7 billion
% of GDP	0.5%	0.1%	0.6%	0.2%
Korea	KRW 50 trillion (USD 36 billion) of green investments (5.14% of GDP) – distributed throughout these categories although a detailed break-down is not yet available.			
Norway	NOK 3.8 billion	NOK 170 million[2]	NOK 270 million	NOK 1.6 billion
% of GDP	0.16%	0.01%	0.01%	0.06%
Sweden	SEK 8.6 billion	SEK 9 billion	SEK 500 million	SEK 2 billion
% of GDP	0.27%	0.29%	0.016%	0.06%
Poland	PLN 91,3 billion	PLN 16,8 billion	n.a.	PLN 2.5 billion
% of GDP	0.072%	0.013%	n.a.	0.002%
Portugal	EUR 50 million	EUR 224 million	EUR 682 million[6]	EUR 260 million
% of GDP	0.03%	0,13%	0.41%	0.16%
USA	USD 100 billion	USD 16 billion	USD 83 bill	USD 59 billion
% of GDP	0.70%	0.11%	0.58%	0.41%

Enhancing HC. A key reform priority

- Beyond stimulus packages. Prioritizing reforms (also given the need to move towards fiscal sustainability)
- How to prioritize? Assess the impact of structural reforms on growth
- The OECD *Going for Growth* framework

Going for Growth and HC

- Policy determines the steady-state level of labour productivity in a number of ways.

- Some policies (e.g. product market regulations) have *direct* effects on the level of labour productivity through TFP.

- Some policies have an *indirect* effect on the long-run level of productivity (e.g. effect on physical and human capital accumulation), or on *intermediate* variables, (e.g. R&D), that in turn affect TFP.

Going for Growth and HC

- **Labour productivity** depends on **investment in HC**, proxied by the average number of years of schooling,

- The average number of years of **schooling** of the current cohort of students is assumed to be controlled directly by policies.

- Reforms generate a permanent shift towards more years of schooling of those of school age.

- The **quality of schooling** as measured by PISA scores is also assumed to be determined by policy and to have an additional effect on the quality of those currently of school age
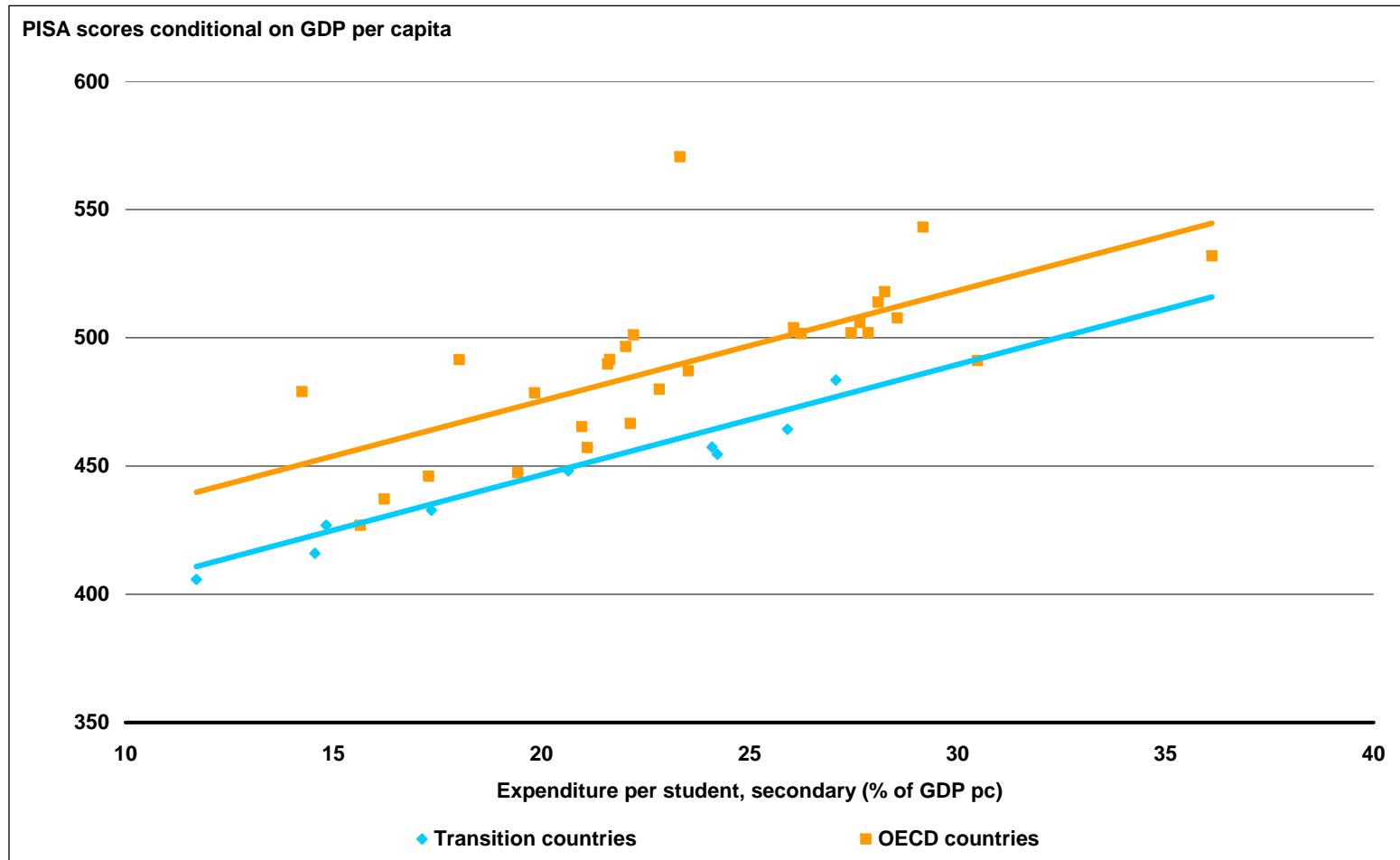
Real GDP per capita growth and average PISA 2006 test scores (source, Aghion 2009)
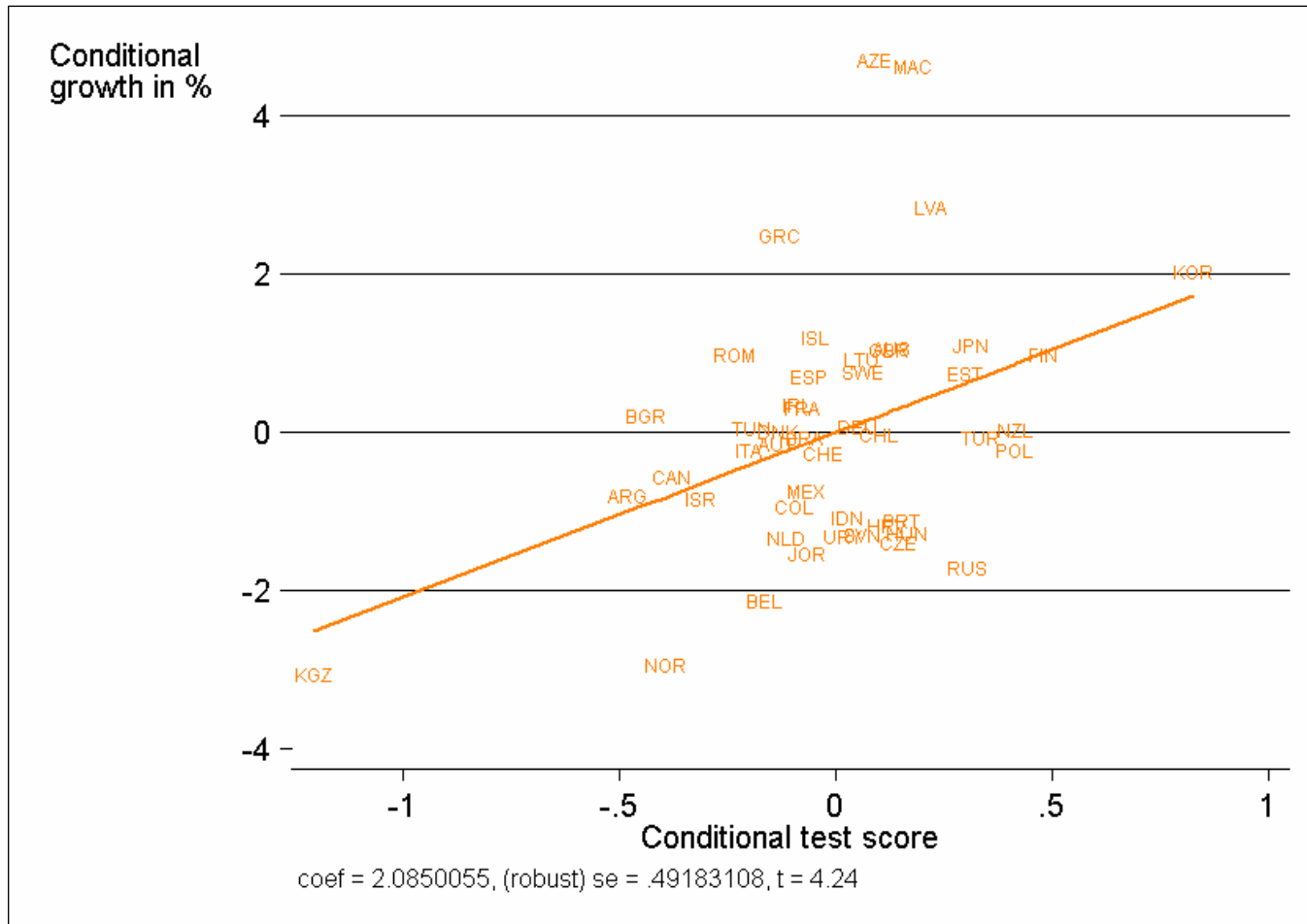
Expenditure per student in secondary education and PISA outcomes (source, Aghion 2009)

PISA scores conditional on GDP per capita

Expenditure per student, secondary (% of GDP pc)

◆ Transition countries   ■ OECD countries

Going for Growth helps determine reform priorities

- Going forward, beyond exit strategies, we will need reforms to sustain growth and have less resources due to pressures on fiscal sustainability
- Prioritizing reforms will be even more important

Going for Growth. The impact of reforms on pc gdp

Table 2. Average effects of ten percent reform on GDP per capita

Average across OECD countries

	After 10 years	Steady-State
Labour market policies		
Average replacement rate	1.3	2.0
Employment protection legislation (EPL)	0.1	0.1
Maternal leave weeks	0.0	0.0
Childcare benefits	0.0	0.0
Childcare support	0.0	0.0
Standard retirement age	1.0	1.8
Implicit tax on continued work	0.1	0.1
Average weekly normal hours and overtime	0.4	0.4
Taxation		
Average tax wedge	1.0	1.7
Marginal tax	0.4	0.4
Product Market Regulation - REGREF		
Gas	0.4	0.3
Electricity	0.1	0.2
Road	0.2	0.1
Rail	0.3	0.3
Air	0.3	0.2
Post	0.3	0.3
Telecommunications	0.2	0.2
Overall	1.9	1.6
Openness		
FDI restrictions	0.0	0.0
Tariff barriers	0.0	0.0
R&D incentives		
R&D tax subsidies	0.0	0.0
R&D direct subsidies	0.0	0.0
Human capital		
PISA score	0.7	9.5
Average years of schooling (16-24 cohort)	0.6	8.1

Open markets and HC

- Keeping markets open (for trade and investment) is key to support growth

- So far no signs of (significant) protectionist reactions (OECD WTO report for G20)

- Investment in HC can enhance the benefits of open markets. However channels of transmission need to be better understood

Open markets and HC. A simple multicountry model (Guerrieri, Maggi, and Padoan 2009)

Output

$DlogY = f1(T, Sh, Sm, K, L)$

Domestic Services

$DlogSh = f2(Y, T, STR, ICT, REG)$

Imported Services

$Dlog\, Sm = f3(Y, T, STR, ICT, REG)$

Technology

$Dlog\, T = f4\,(\mathbf{HK}, \mathbf{HKR}, Sh, Sm, Y, dist)$

A simple multicountry model

- **Output growth** is a function of (exogenous) labor and capital accumulation and (endogenous) accumulation of technology and business services.

- **Business services** (communication, financial services and insurance) domestic and imported, grow with output and technology. Services and ICT interact. Provision of services is independent from proximity to the final user.

- **Market openness.** Technological accumulation also depends on trade of services, a channel of knowledge diffusion.

- **Market competition.** Heavy regulation depresses the production of services. Uniform (and low) levels of regulation across countries favor production and trade of services.

A simple multicountry model

Technology accumulation (measured by patents) is equal to domestic and (part of) foreign technology that flows from other countries (a 3 country example). HC investment contributes to a **global knowledge pool**

$$Tt1 = Tt\text{-}11 + Pat11 + Pat21 + Pat31$$

$$Tt2 = Tt\text{-}12 + Pat12 + Pat22 + Pat32$$

$$Tt3 = Tt\text{-}13 + Pat13 + Pat23 + Pat33$$

$$DlogPat\ ij = f5\ (\textbf{HK, HKR}, Sh, Sm, Y, dist)$$

HC and global knowledge pools

- **A global knowledge pool.** Domestic technology grows with output, services and, through diffusion, with foreign technology.

- **Domestic HC** raises domestic knowledge and also the absorption of foreign knowledge (which grows with **foreign HC**).

- The amount of foreign technology that can be used domestically is limited by distance and **absorption capacity** proxied by **human capital**.

Which policies are most effective?

Policy Simulations

a) elimination of the impact of regulation on services;

b) deeper integration in the international market for services;

c) doubling of ICT spending;

d) halving of diffusion costs as represented by distance;

e) increase in the level of human capital in both receiving and sending countries;

f) a combination of c) and e);

g) a combination of a), c), and d)

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Policy Simulations. Results

- **Lower regulation on services** produces a positive and persistent effect on the rate of growth

- A persistent and significant impact on output is obtained through **integration in the international market for services (more trade in services)**, halving of diffusion costs.

- A higher amount of **human capital**, in the receiving and sending country raises output growth through the effect on technology accumulation and diffusion. **HC enhances the benefits of more trade integration**

- This effect is significantly higher when combined with a higher **ICT spending.**

- If **ICT is endogenous more human capital** is the single, most effective measure in boosting ICT and hence growth, followed by R&D, and elimination of administrative burdens on start ups.

International mobility of HC

- **Mobile HC complements the transfer of knowledge through flows of goods and capital across borders**. The effects considered in the previous section are amplified.

- A global knowledge pool is enhanced by HC mobility, given its contribution to the creation and diffusion of knowledge, both codified and tacit.

International mobility of HC. Receiving countries

- The inflow of talent has positive effects, (increased R&D and economic activity thanks to additional skills).

- Mobility can increase access by domestic firms to foreign knowledge and to stimulate spillovers from foreign R&D to local R&D units.

- Most **OECD countries are net beneficiaries**, with inflows exceeding outflows.

Figure shows foreign born highly-skilled people in select OECD countries (By country of birth and country of residence, 2001, thousands)
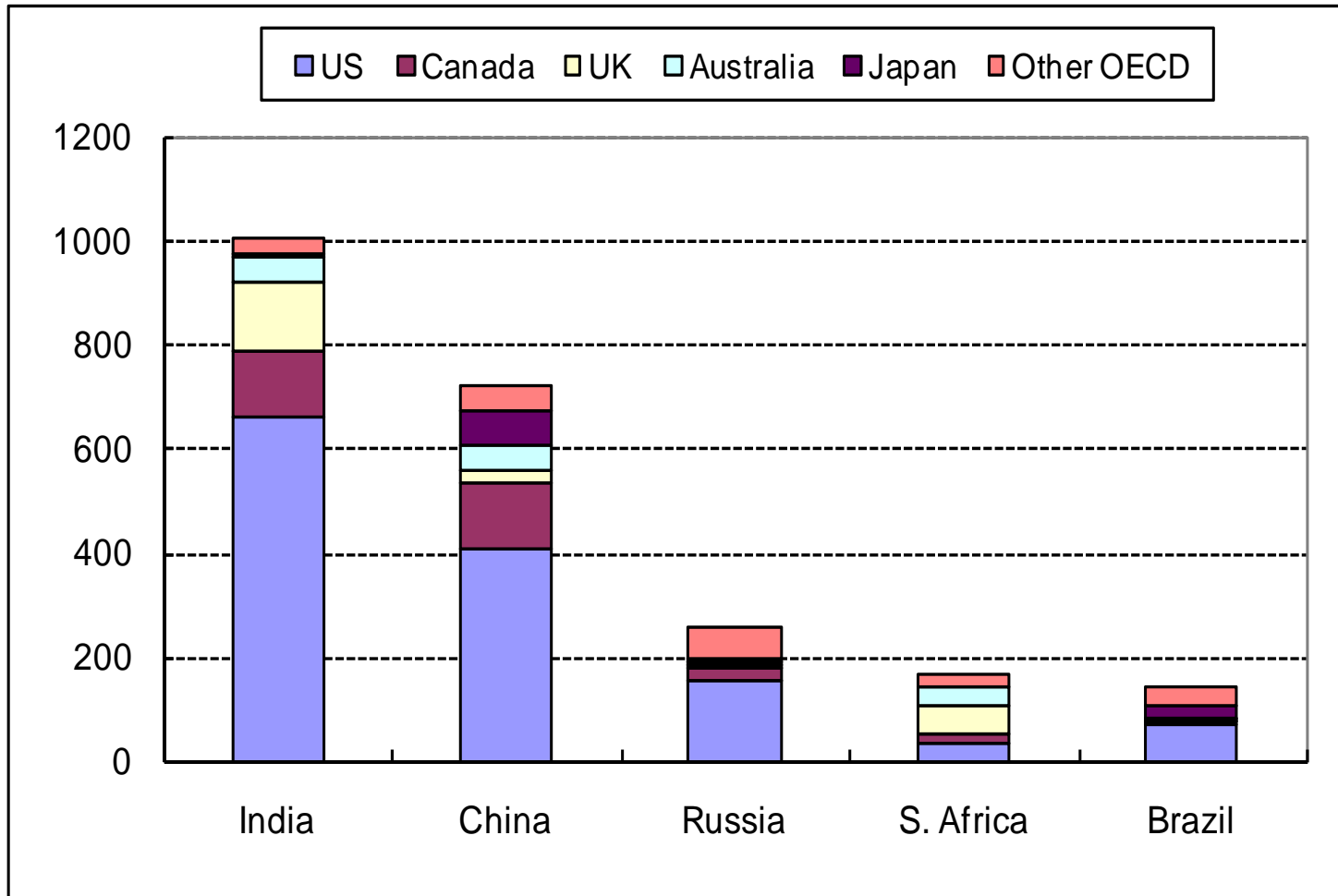
HC mobility. Sending countries

- **Remittances** are an important source of income for many low- and middle-income households in developing countries.

- **Brain drain concerns** centre on the loss of productive labour and output, the fiscal cost of educating workers who move abroad, and the potential impact on institutional development and structural change.

- However, these concerns must be balanced against the question of whether these researchers and scientists could have found productive employment at home.

- **Return and circular flows of migrants.** Data show a tendency for many "permanent" or long-term migrants to return to their country of origin

Outward and return migration of Chinese students
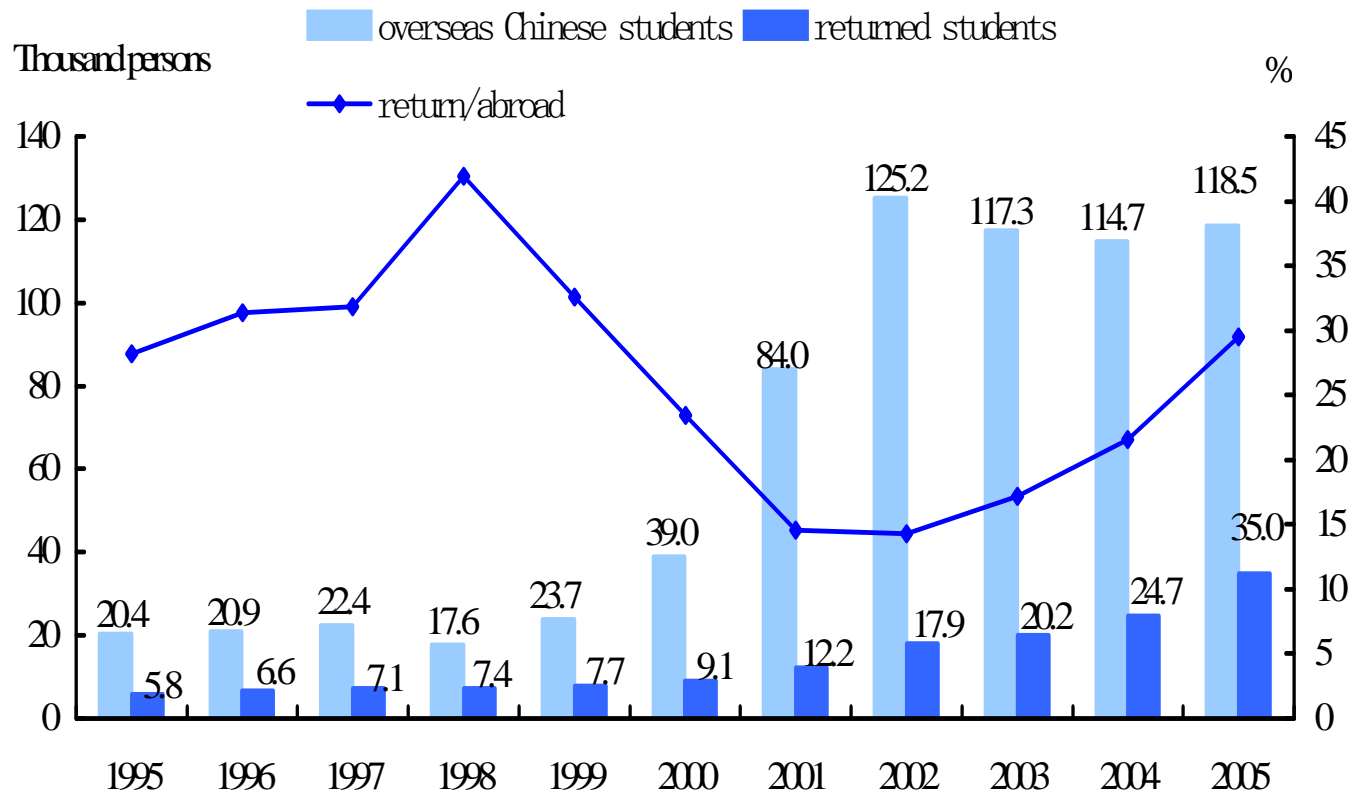
Policies for HC mobility

- Policies to attract and retain talent are **gaining in importance in many OECD countries**. Including incentives to encourage inflows, immigration-oriented assistance, procedures for recognising foreign qualifications, social and cultural support, and support for research abroad.

- Only a **few national policies are part of an explicit mobility strategy**. Generally more support for inflows of researchers and other HC than for outflows.

- Many countries offer **support for mobility, as opposed to permanent migration**. In most cases, national policies do not place restrictions on the country of origin (inward mobility) or of destination (outward mobility).

Policies for HC mobility

- **Policy coherence** is important for all countries:
  - to ensure the co-ordination and coherence of various mobility policies. Including the consequences of mobility for development in sending countries that are the target of development and aid policies.
  - to ensure that mobility policies fit within the broader policy environment for innovation and to create a sound base for innovation and scientific endeavour.

Conclusions

- Potential output and growth after the crisis will be lower (also because of HC deterioration)
- HC can provide a key contribution to new sources of growth
- HC policy is among the most effective reform policies
- HC policy effectiveness can be enhanced by improving the quality of education systems
- HC investment can enhance the benefits of open markets by contributing to global knowledge pools
- HC mobility can benefit both receiving and sending countries
- More policy coherence is needed