

On research, technology and innovation: some facts and ideas

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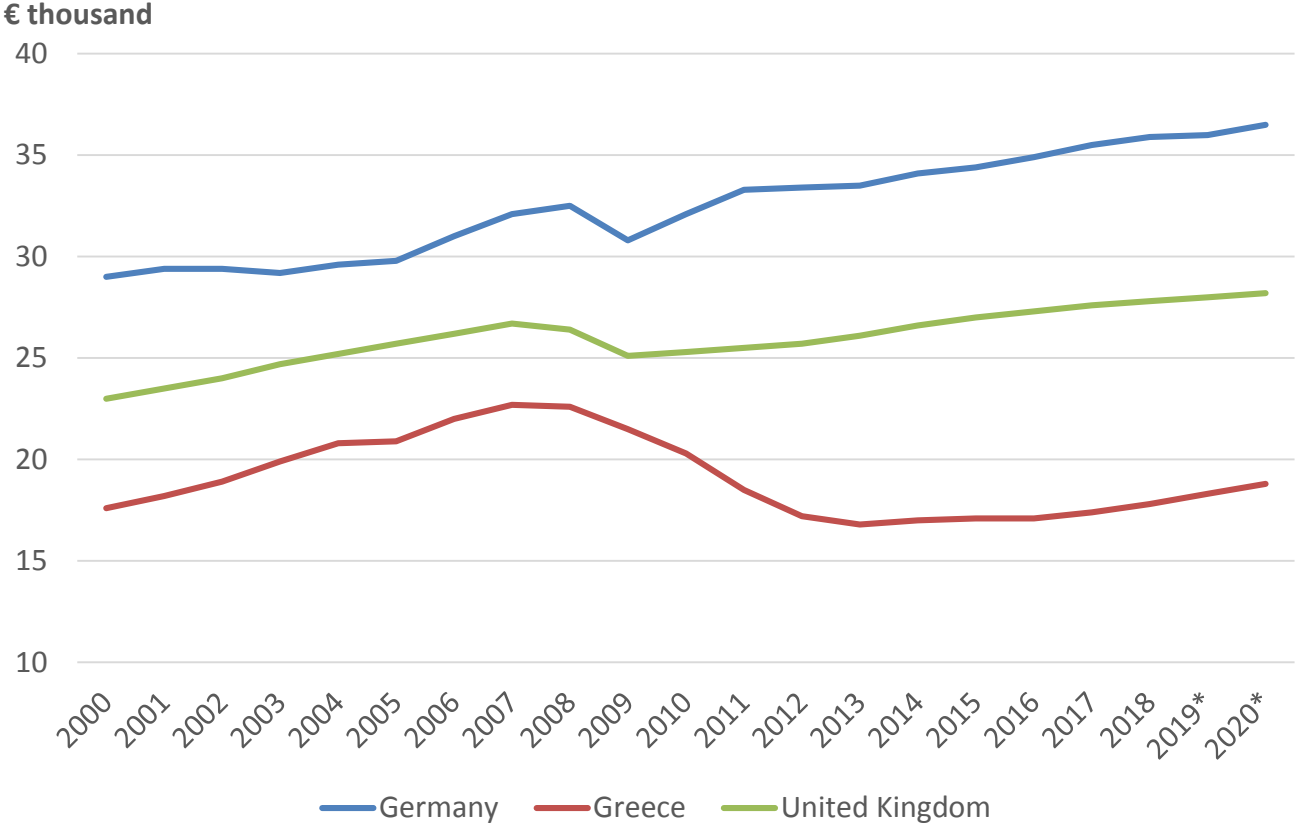
Research & Technology

Pushing the frontiers of applied knowledge. What are the critical factors for broadening its base in Greece and lessons from the UK

Nafplion, 19 October 2019

Where we are: the economy

GDP per capita (constant 2010 prices)

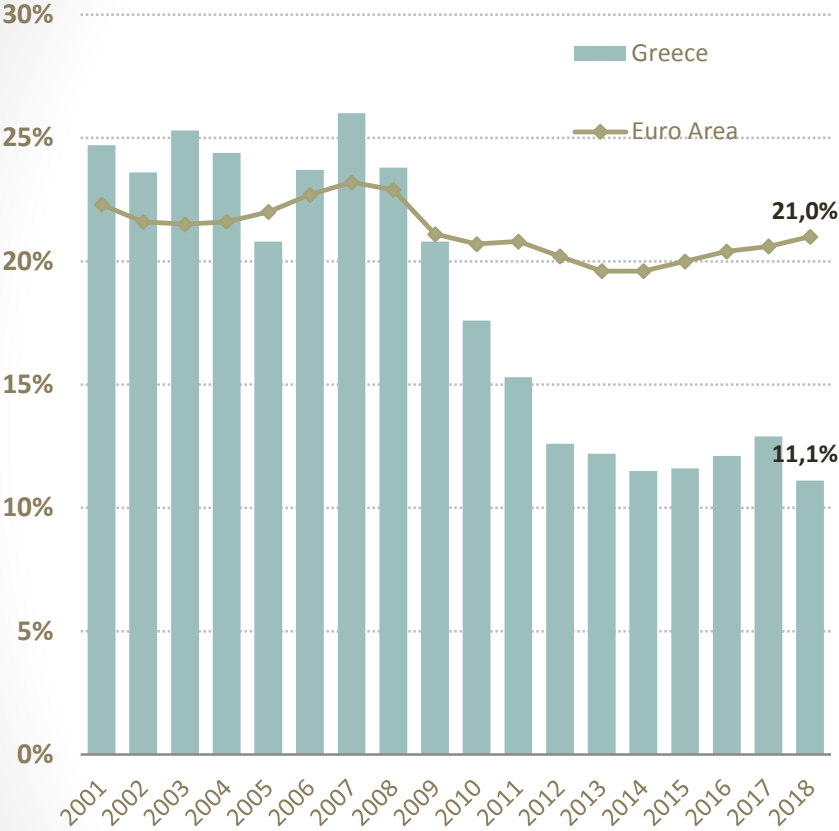


* projections

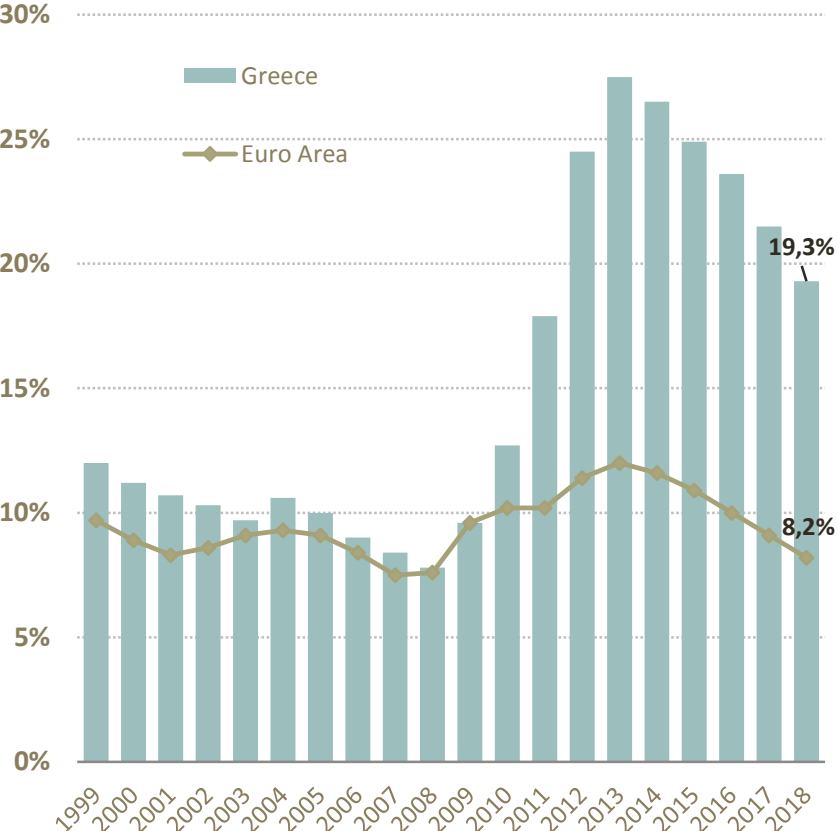
Source: Eurostat

Greece: Investments extremely low, unemployment extremely high

Fixed Investments (% of GDP)



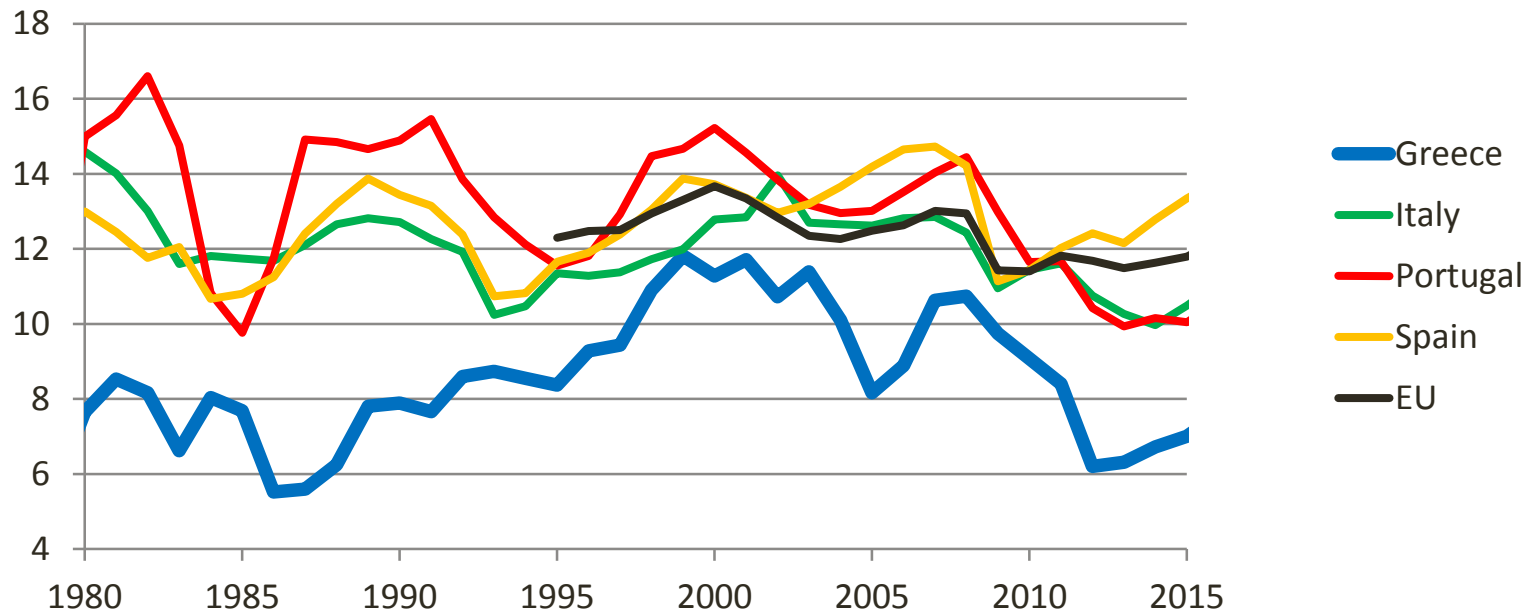
Unemployment Rate (% of labour force)



Source: Eurostat/ELSTAT

Unemployment has decreased, but remains at very high levels

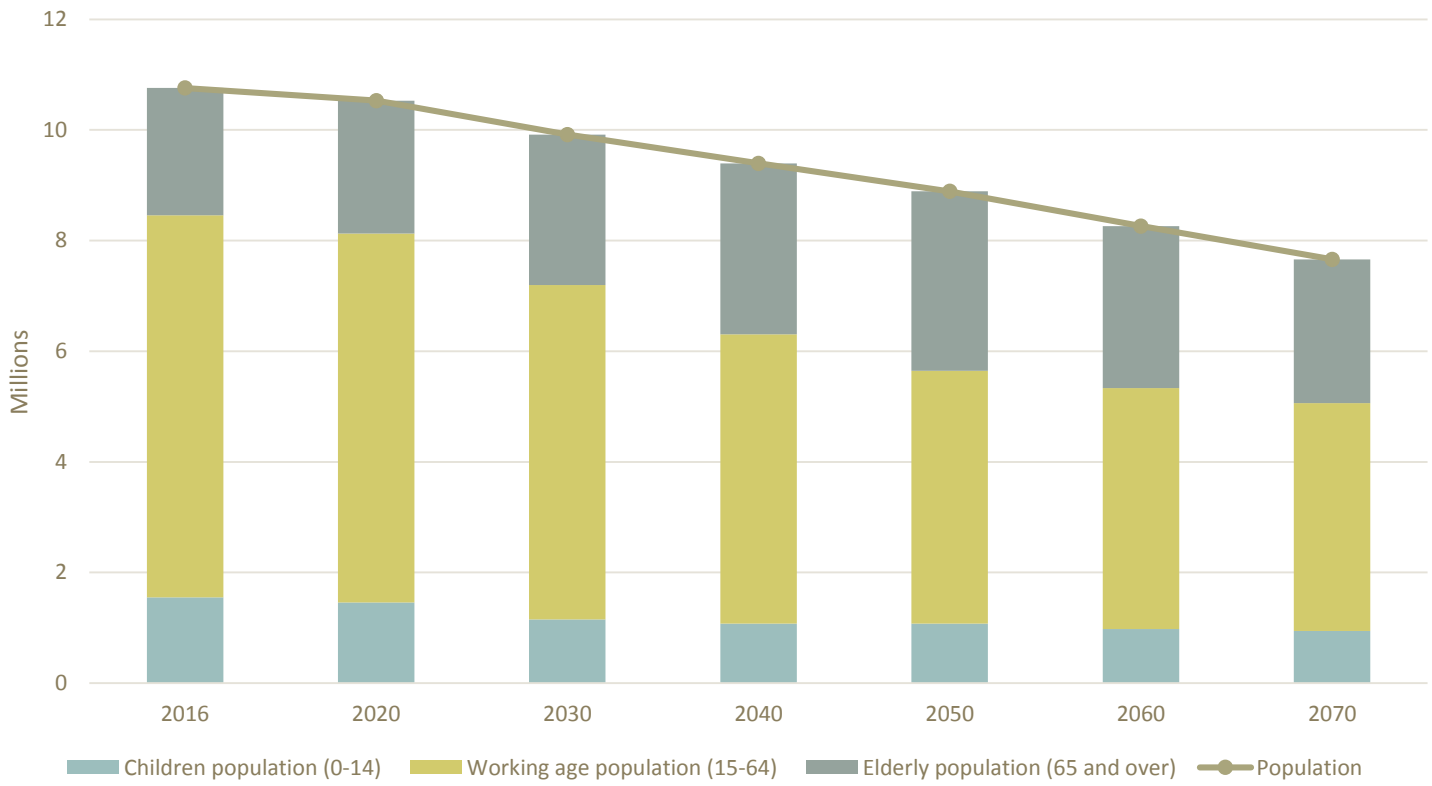
Corporate investment systematically is a low % of GDP



- It rose significantly in the run-up to Euro entry, and after, but dropped again during the crisis.

Where we are: demographics

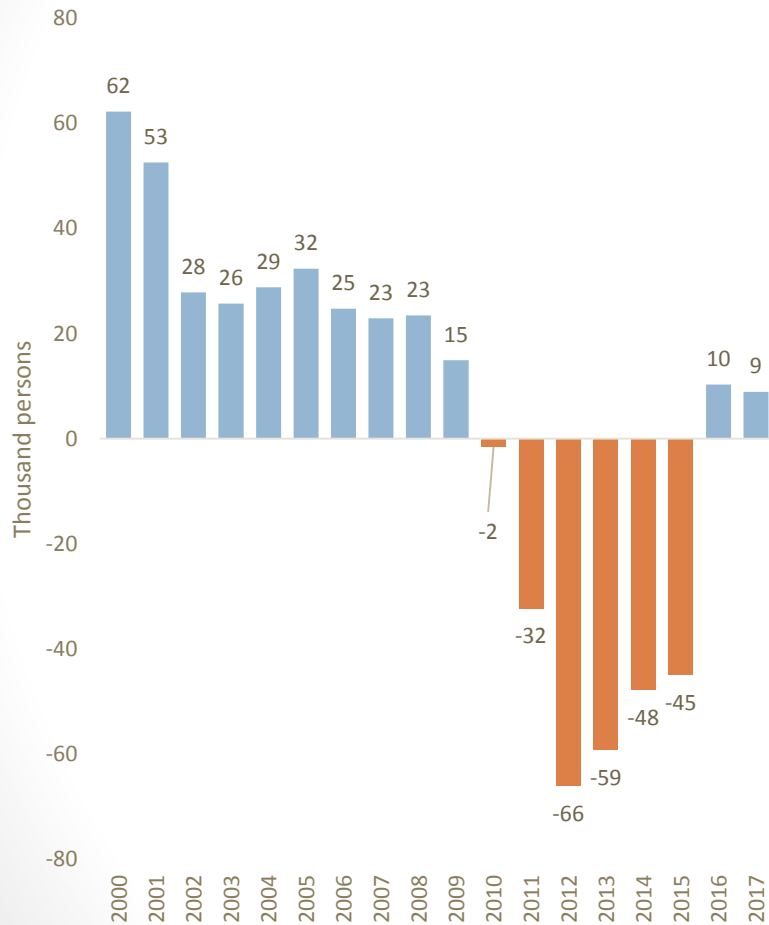
Greece's population is projected to decline significantly, with the elderly outnumbering the children population



Source: European Commission. EPC (AWG) 2018 projections

Net migration has fallen sharply during the crisis

Net migration in Greece, 2000-2017



Source: ELSTAT

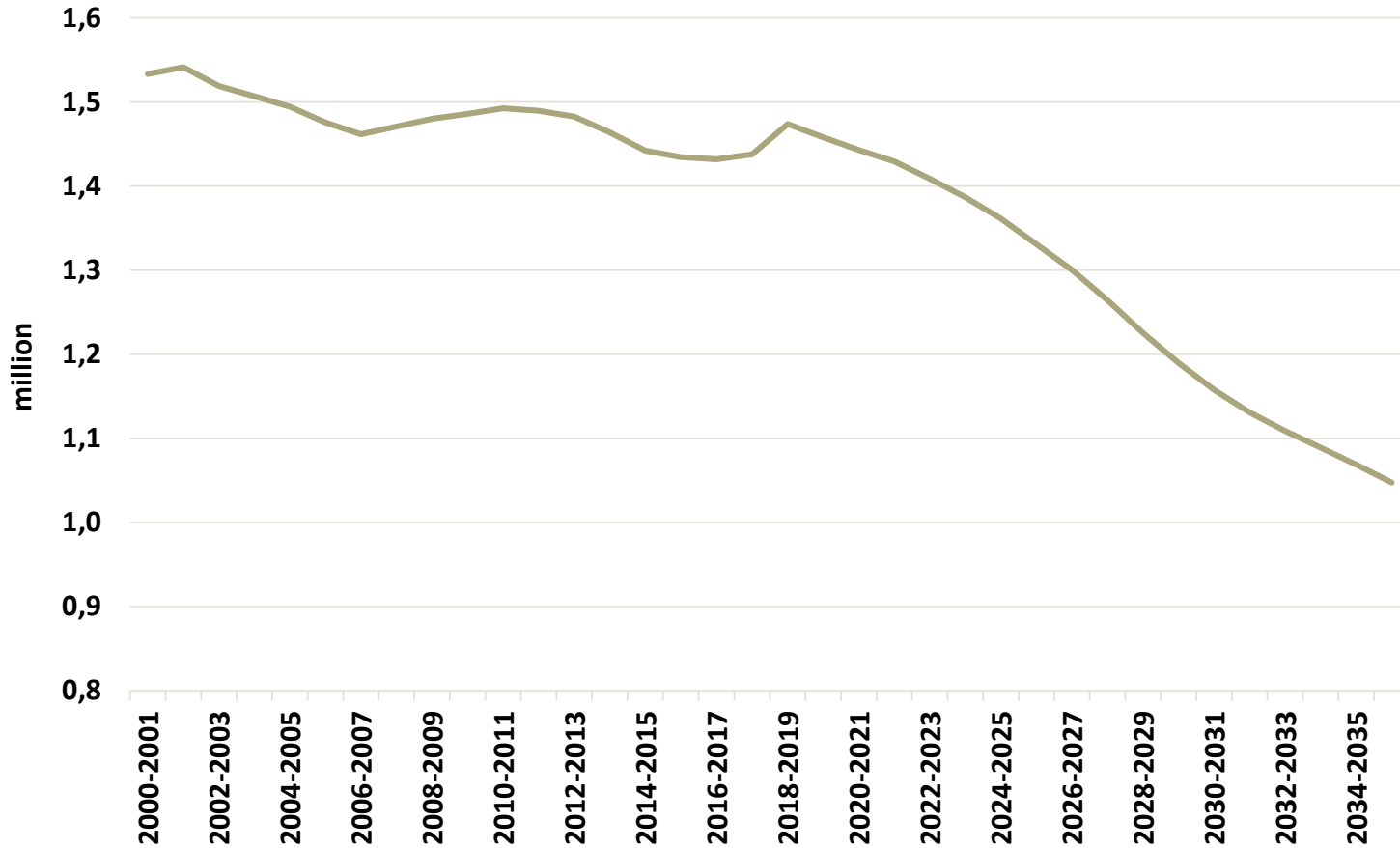
Net Migration % of population- GR
Net Migration % of population- EU28



Source: European Commission. EPC (AWG) 2018 projections

The total number of students is expected to fall from 1.5M currently to less than 1.1M by 2035 (almost -30%)

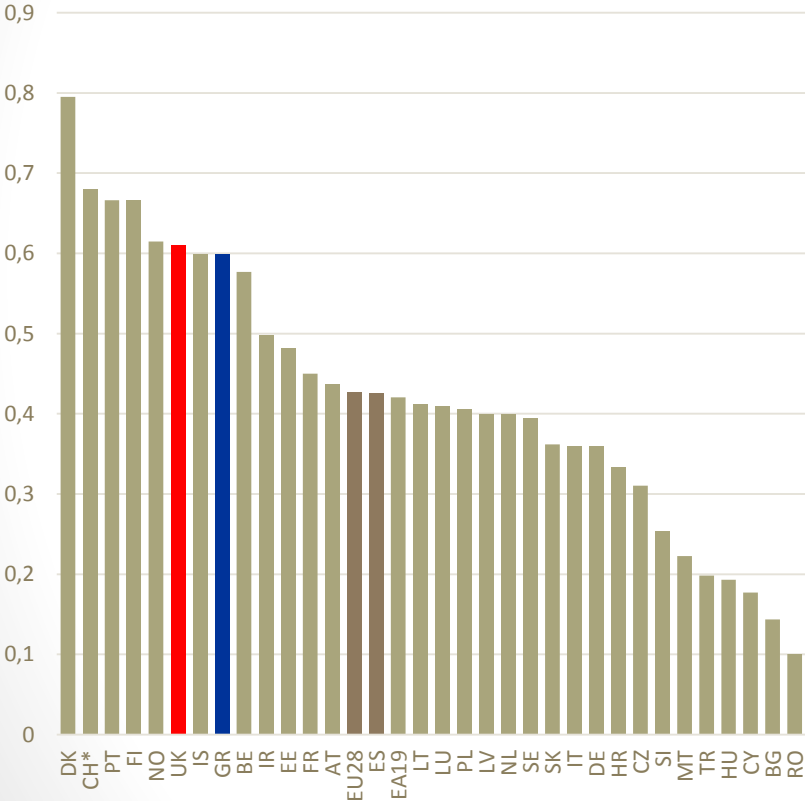
Total number of students (2000-2035)



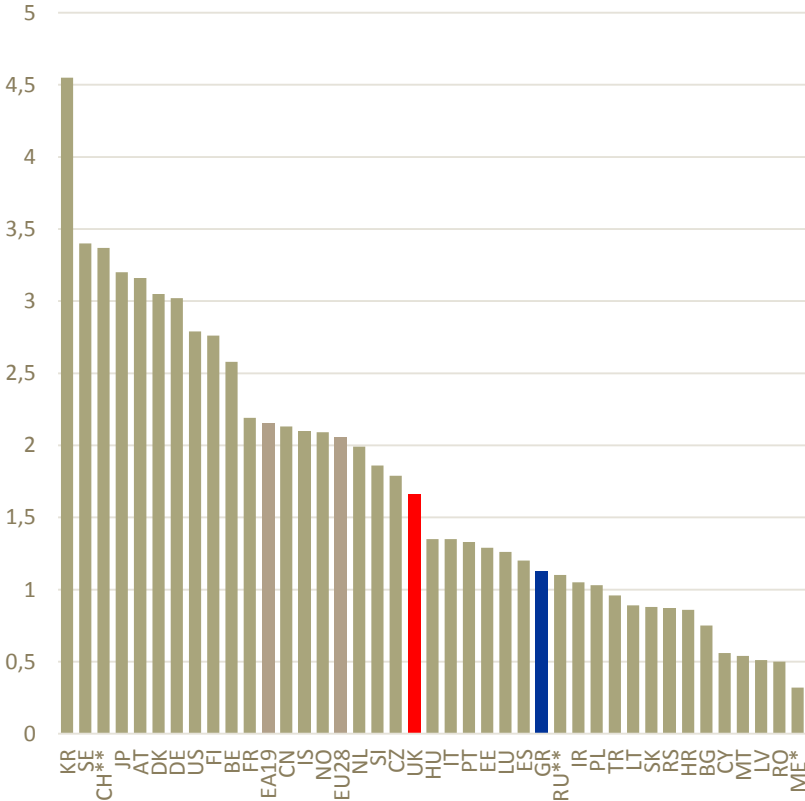
R&D and Innovation: background facts

Greece has one of the highest R&D employment rates in Higher Education Institutions in Europe, but is lagging in R&D spending

Employees in R&D at HEIs as % of total employment, 2017



Intramural R&D expenditure (GERD), % of GDP, all sectors

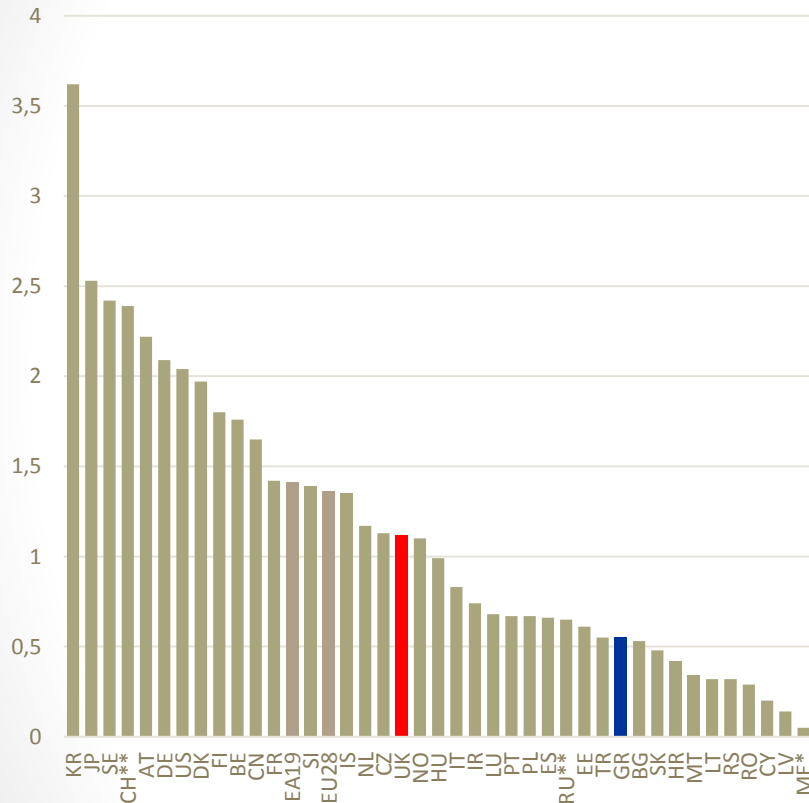


Note: * 2015. The remaining data are for 2017.
Source: Eurostat

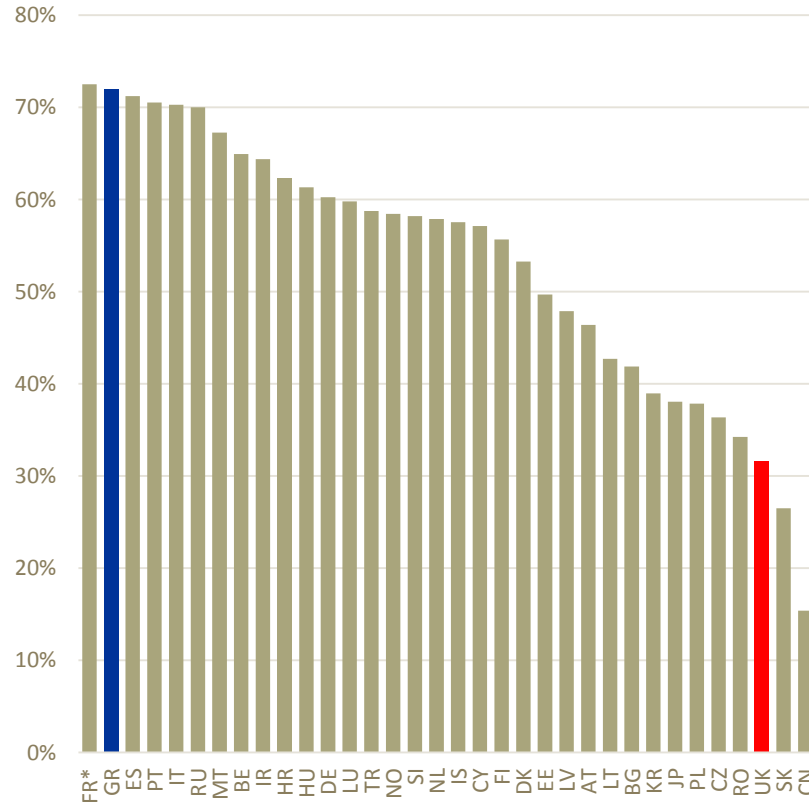
Note: * 2016, ** 2015. The remaining data are for 2017.
Source: Eurostat

The business sector is lagging significantly in R&D spending

Intramural R&D expenditure (GERD), % of GDP, Business enterprise sector, 2017



Share of labour cost in R&D spending at HEIs, 2015



Note: * 2016, ** 2015. The remaining data are for 2017.

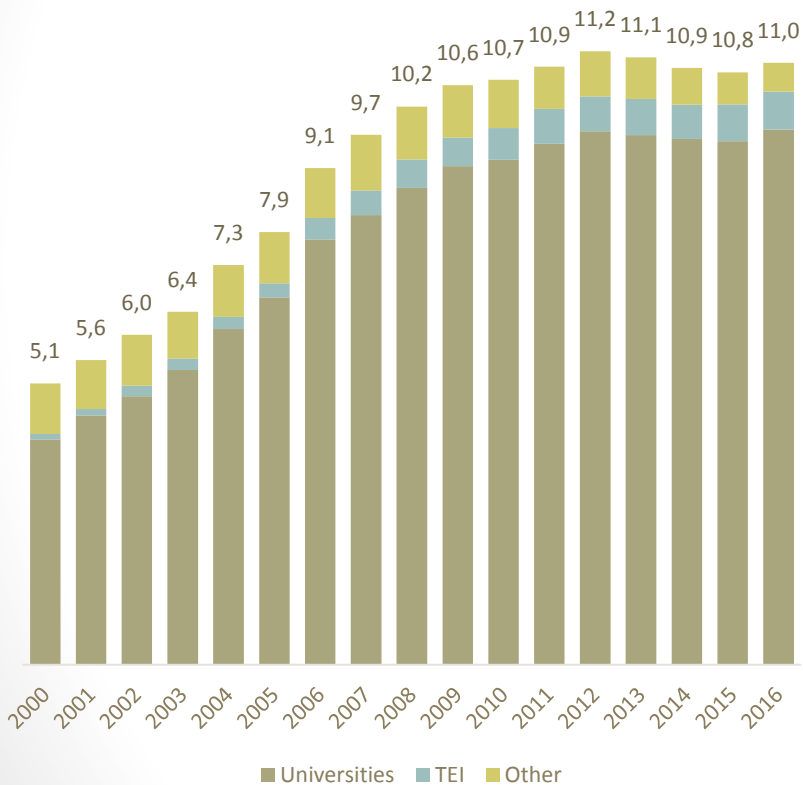
Source: Eurostat, IOBE Estimation

Note: * 2014. The remaining data are for 2015.

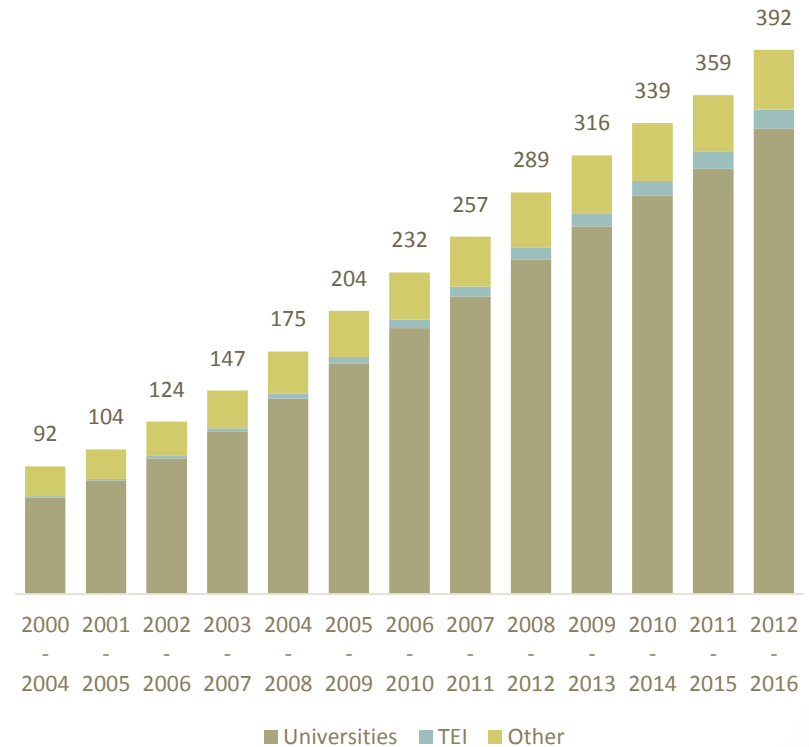
Increased share of labour cost in R&D spending in Greek HEIs

The rise of publications has been decelerating during the economic crisis, but the number of citations is still increasing

Publications in International Journals
(thousand)



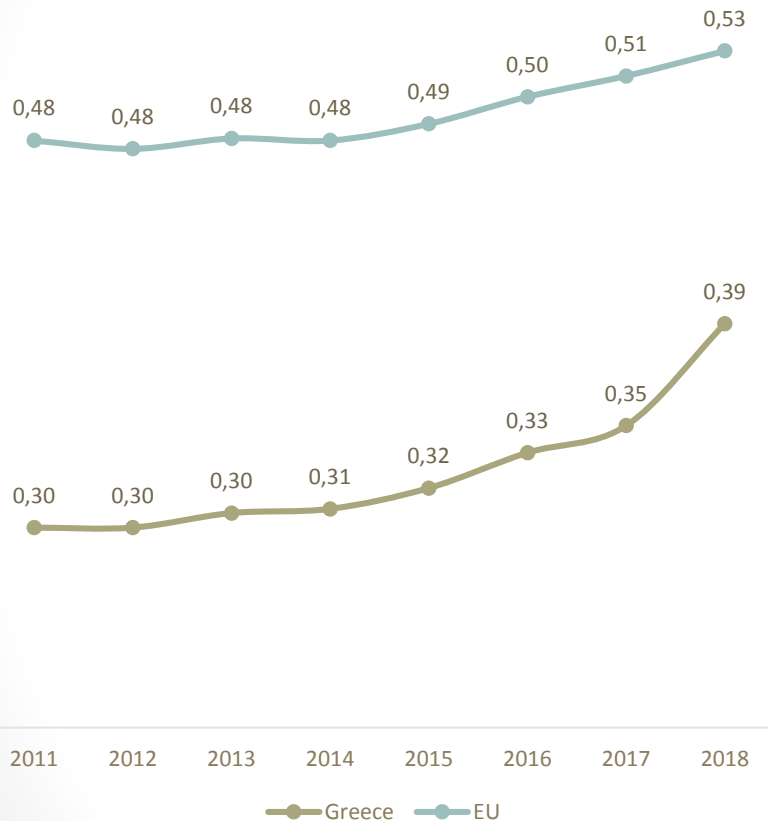
Number of citations to Greek publications
(thousand)



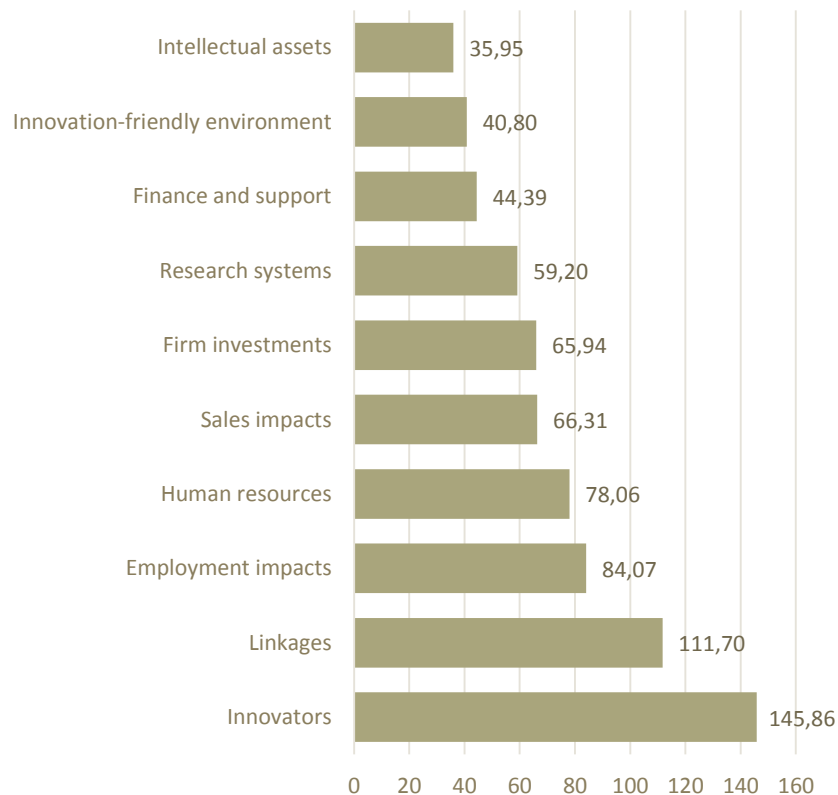
Source: National Documentation Centre

Despite the size and quality of the research workforce and output, the innovation level is relatively low

Summary Innovation Index



Greece's performance on innovation indicators, 2015 (100=EE)

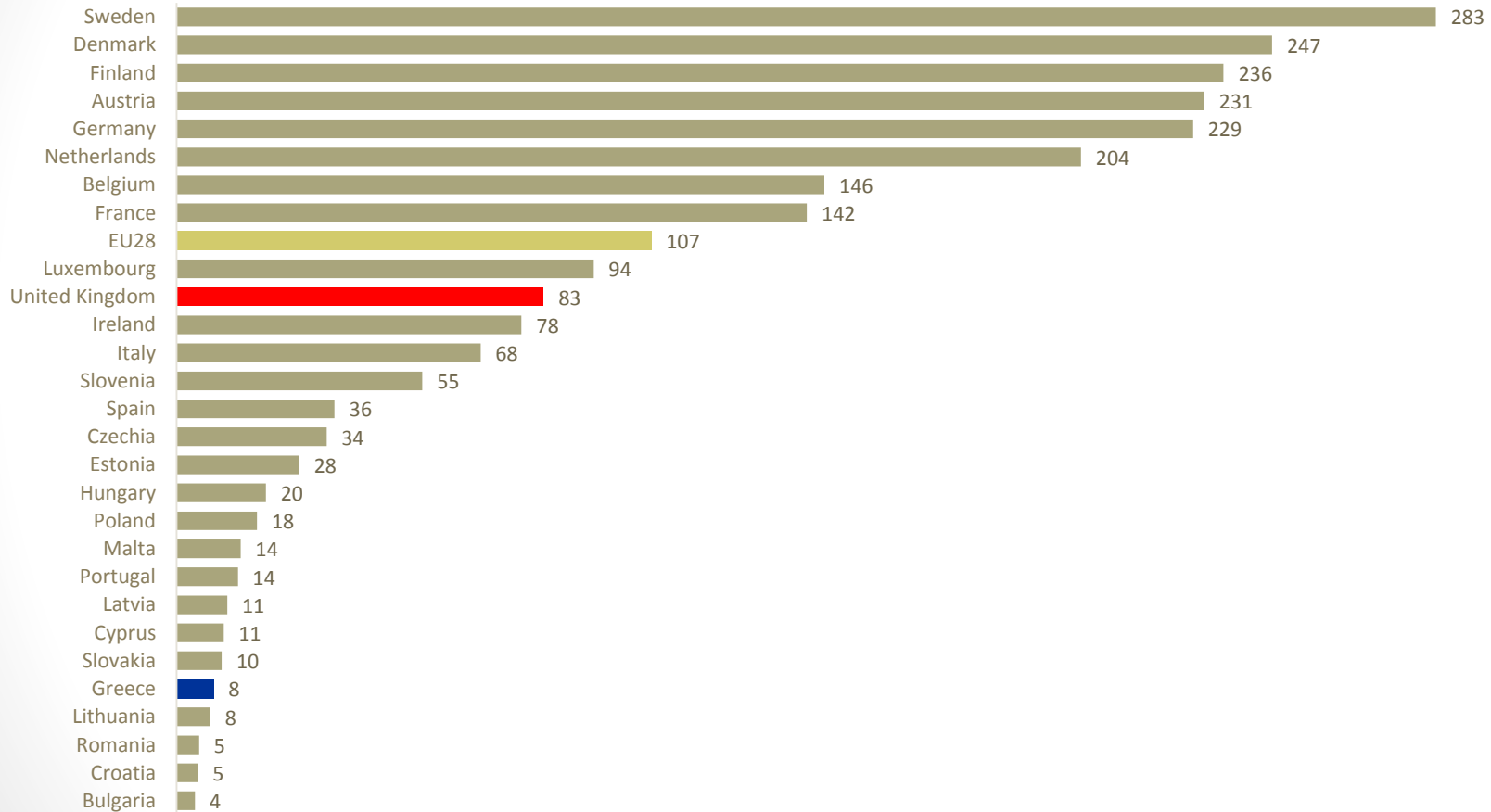


Source: European Innovation Scoreboard Database 2019

Greece is behind EU for 8 to 10 innovation indicators

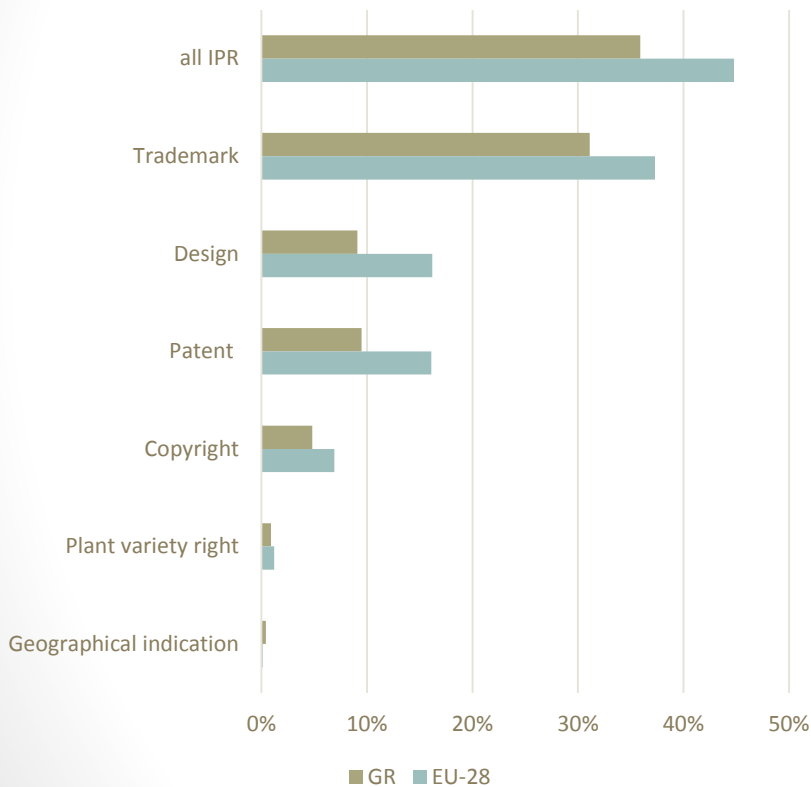
Moreover, the commercialization of the research output is low relating to the R&D performance

Patent applications per million inhabitants at the European Patent Office, 2017

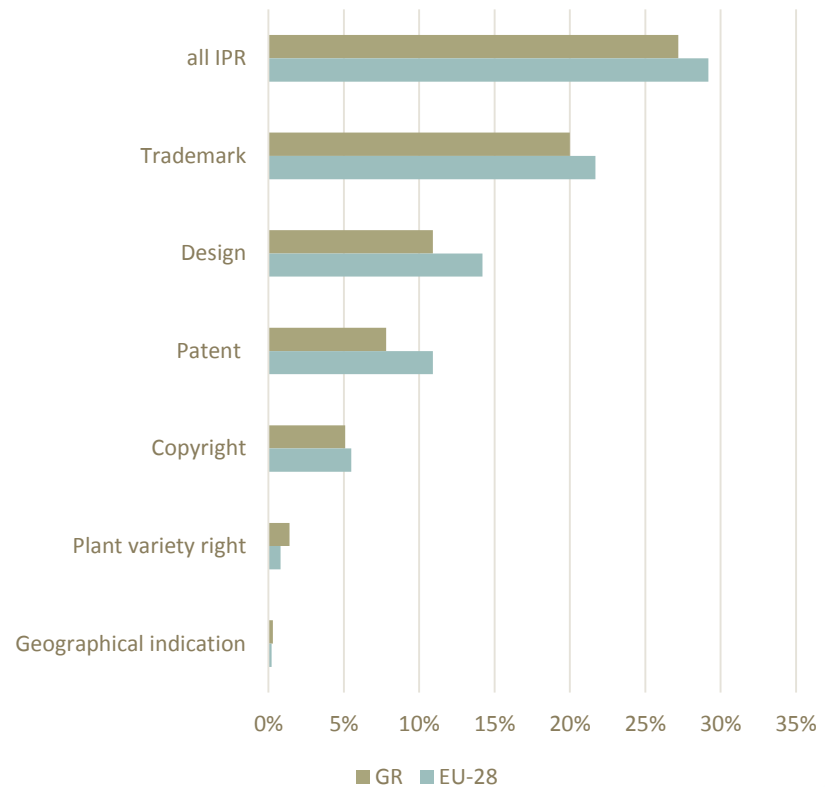


The contribution of Intellectual Property Rights (IPRs) Intensive industries to GDP and employment is below the EU-28 level for most of the industries

IPR- Intensive Industries contribution to GDP, 2014-2016



IPR- Intensive Industries contribution to Employment, 2014-2016



Source: EUIPO, 2019

However, there is an increasing trend to international patenting relatively to the EU-28

Triadic Patent Applications
2008=100



Patent Applications, European Patent Office
2008=100



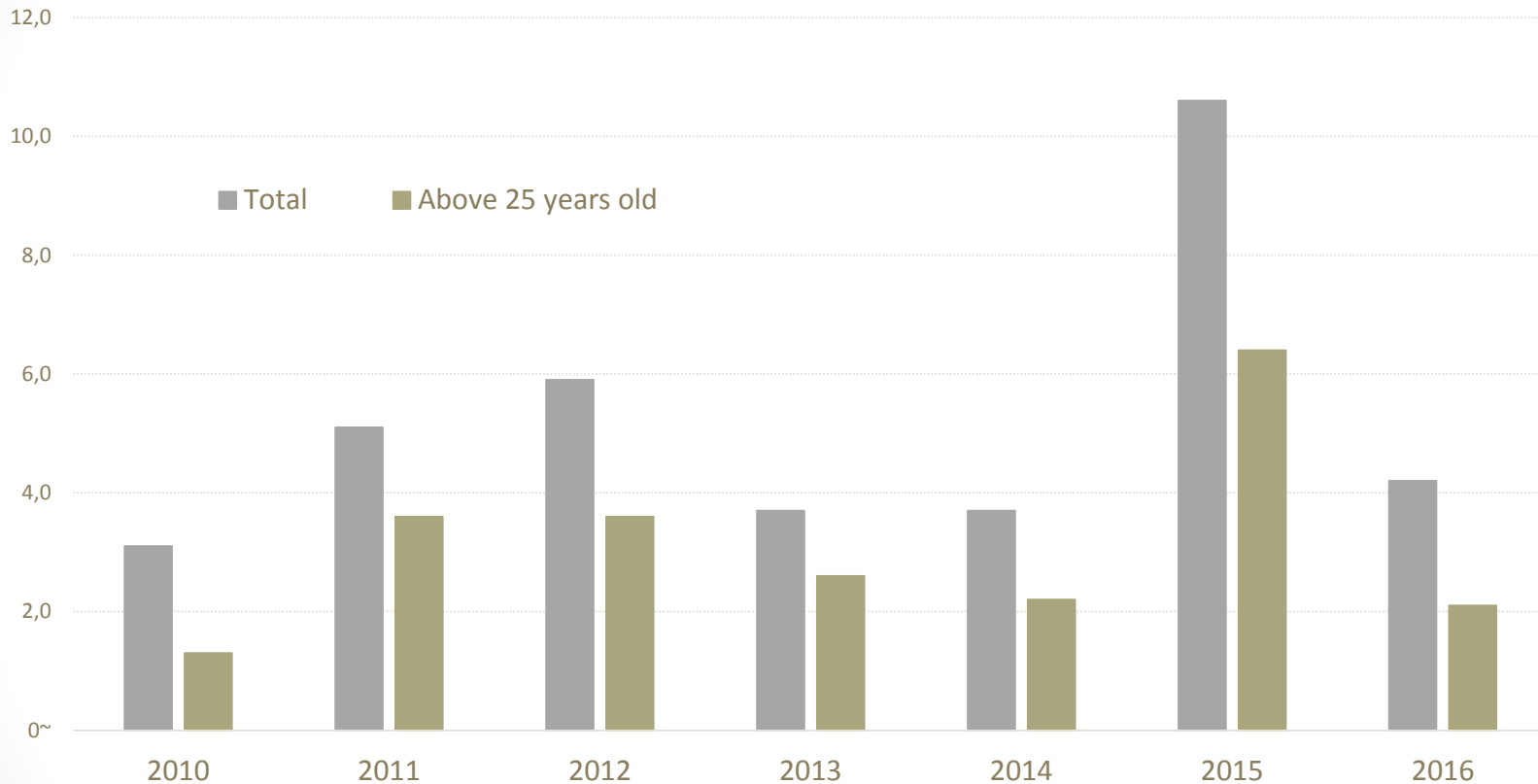
Source: OECD

Source: Eurostat

Triadic patent families are patent families filed at the European Patent Office (EPO), the United States Patent and Trademark Office (USPTO) and the Japan Patent Office (JPO).

The sizable immigration by Greeks to the UK intensified during the crisis

**Immigration flows from Greece to the UK
(in thousand persons)**



Source: Estimates by the UK Office of National Statistics, Migration Statistics Unit

Risk: Brexit may negatively affect the size of Greek labor flows towards the UK

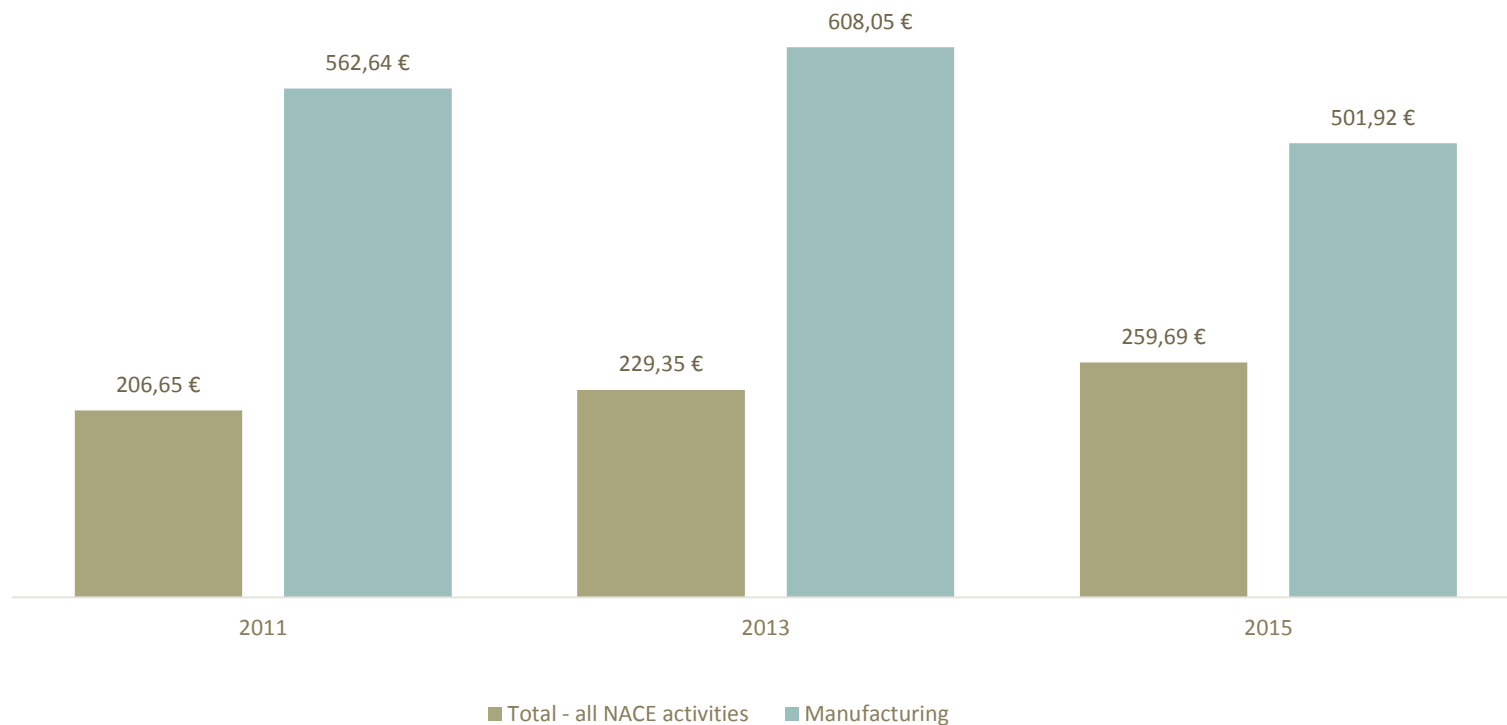
Factors

1. Manufacturing
2. Education
3. Openness
4. Attitudes towards risk
5. Competition
6. Planning horizon
7. Geography and clusters

Manufacturing

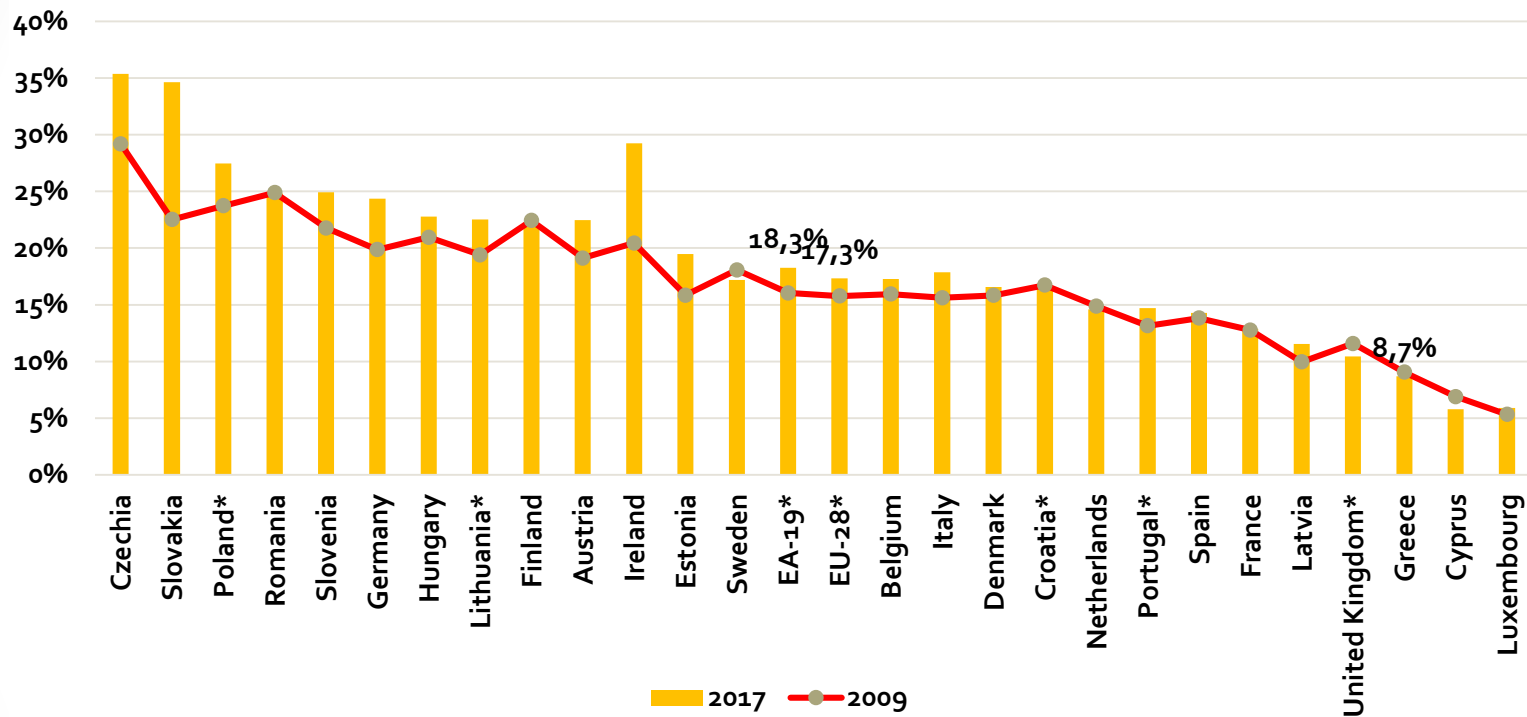
Manufacturing BERD per persons employed is higher than the total of all industries

Business Expenditures on R&D per persons employed



Source: Eurostat

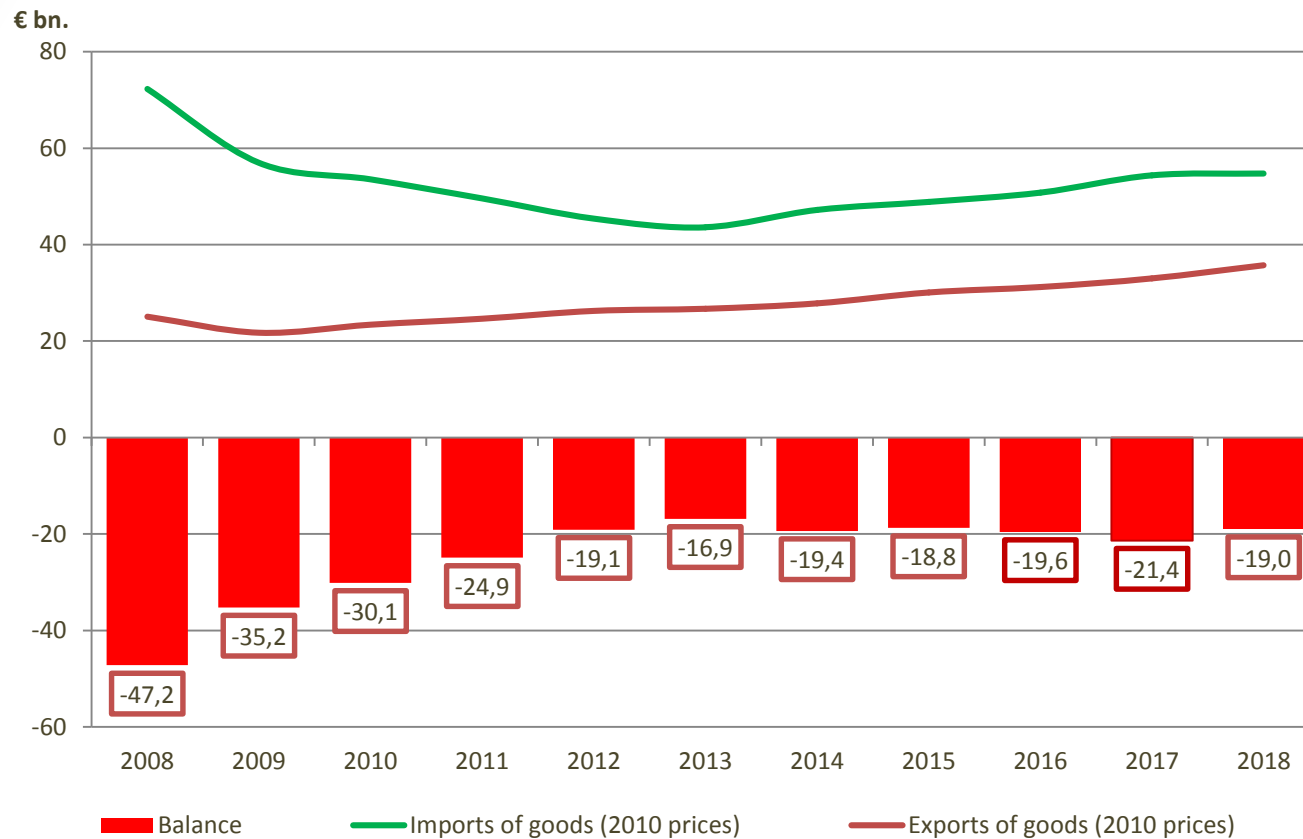
Small share of Manufacturing to GDP: 8.7% in 2017



* Data for 2016
Source: Eurostat-National Accounts

Share increase in Greece from 2015 onwards

Trade balance (goods)

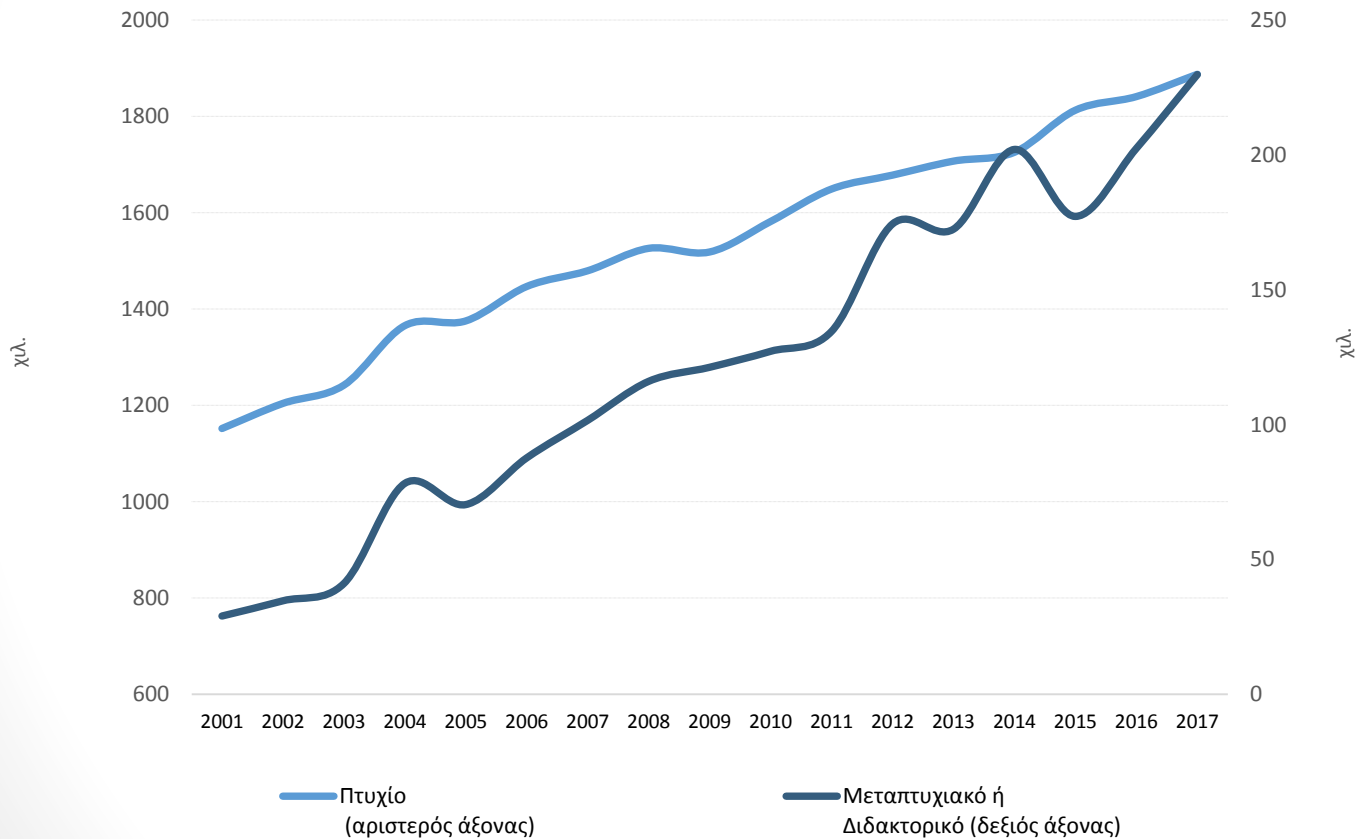


*European Economic Forecast, spring 2019, European Commission
Source: ELSTAT

Education

Number of Greeks with a higher education degree have almost doubled since 2000

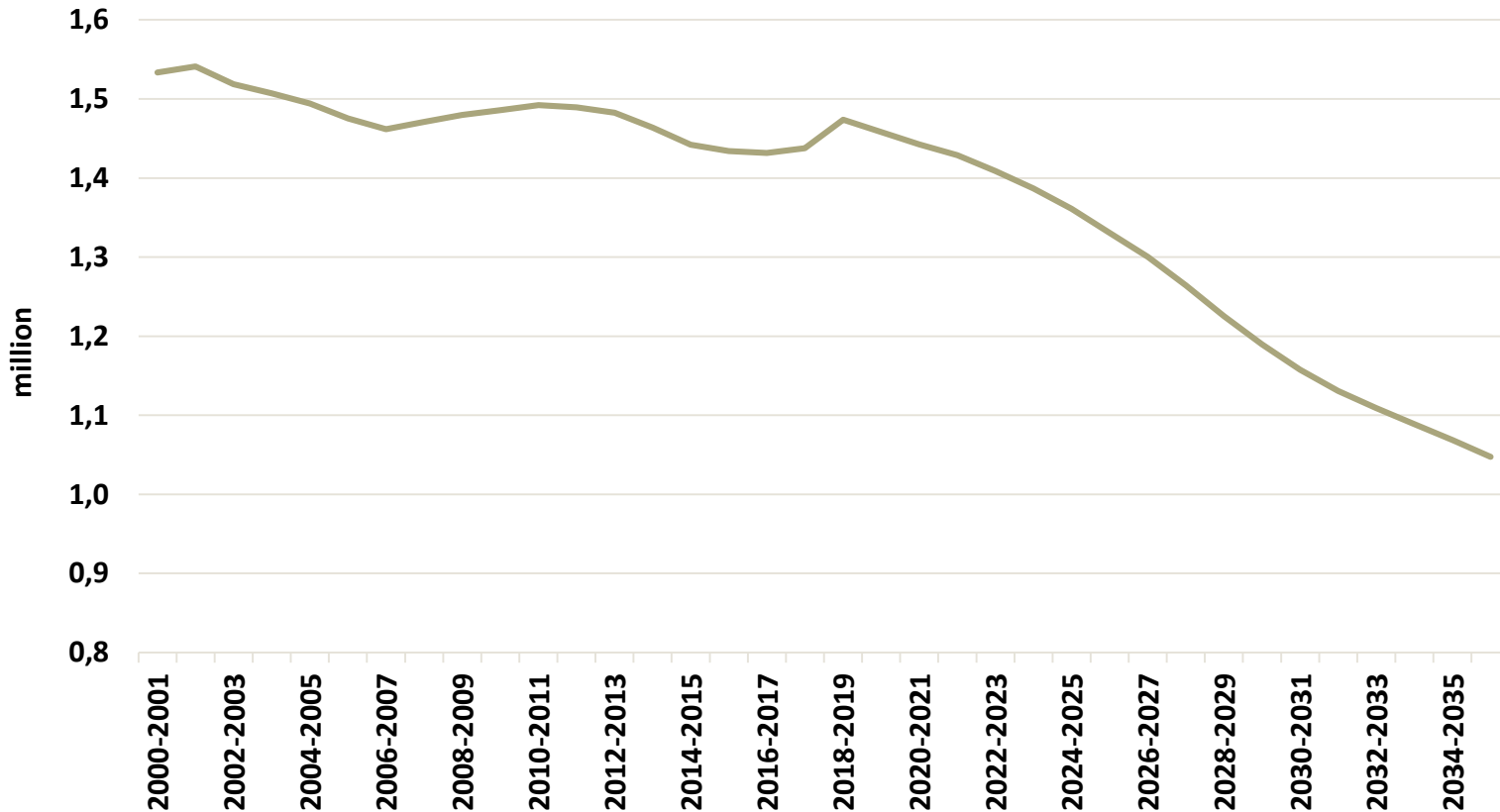
Population with higher education, 2001-2017



Πηγή: ΕΛΣΤΑΤ Επεξεργασία στοιχείων: ΙΟΒΕ

The total number of students is expected to fall from 1.5M currently to less than 1.1M by 2035 (almost -30%)

Total number of students (2000-2035)



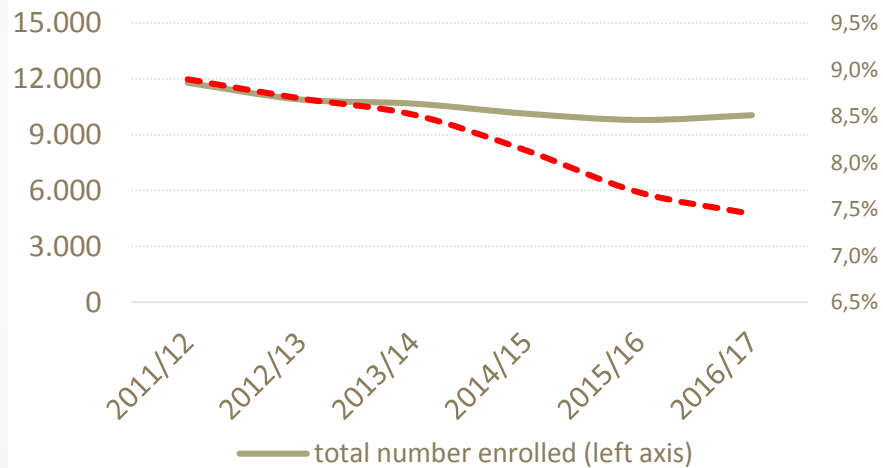
Source: IOBE Analysis

UK higher education attracts large Greek interest

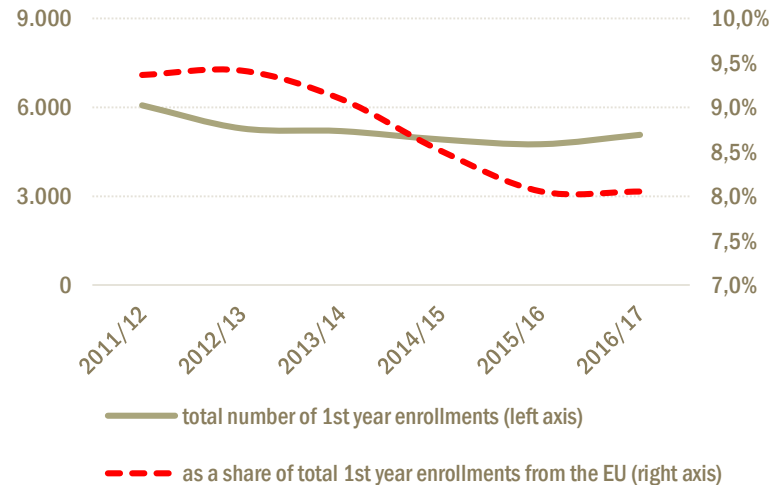
In 2016/17, Greek students enrolled in UK universities...

- were the 5th largest representation from EU countries in terms of total student population
 - 4th in terms of new enrolls
- accounted for 7.4% of total EU students enrolled in the UK universities
- continued to exhibit higher concentration in postgraduate programs

Greek students enrolled in UK universities



Greek students annual inflow in UK universities

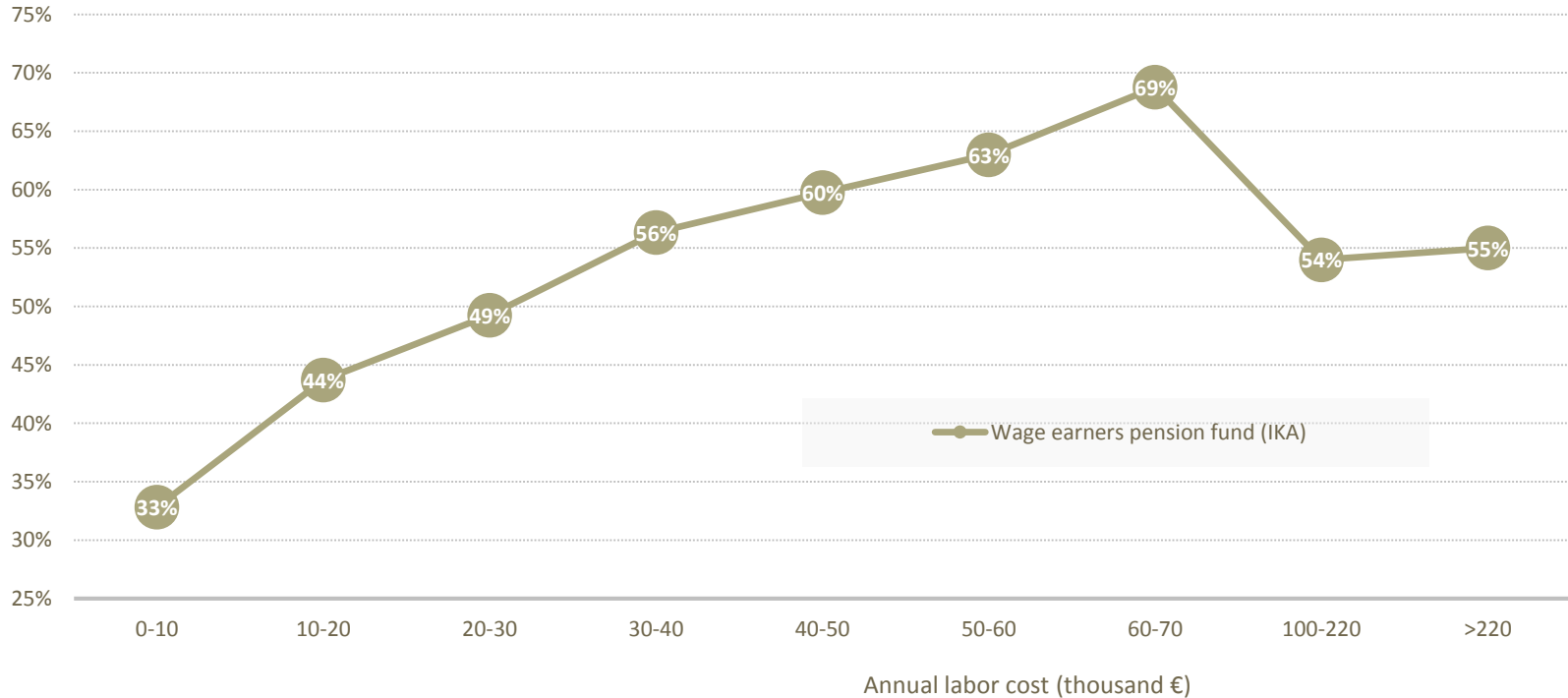


Source: UK Higher Education Statistics Agency (HESA)

Downside risk: Potential tuition fee increase after transition period
Opportunity: Lower £/€ reduces cost of living for overseas students

Extremely high marginal tax rate on gross income, € 40-78 thousand

Marginal scale of tax and contribution

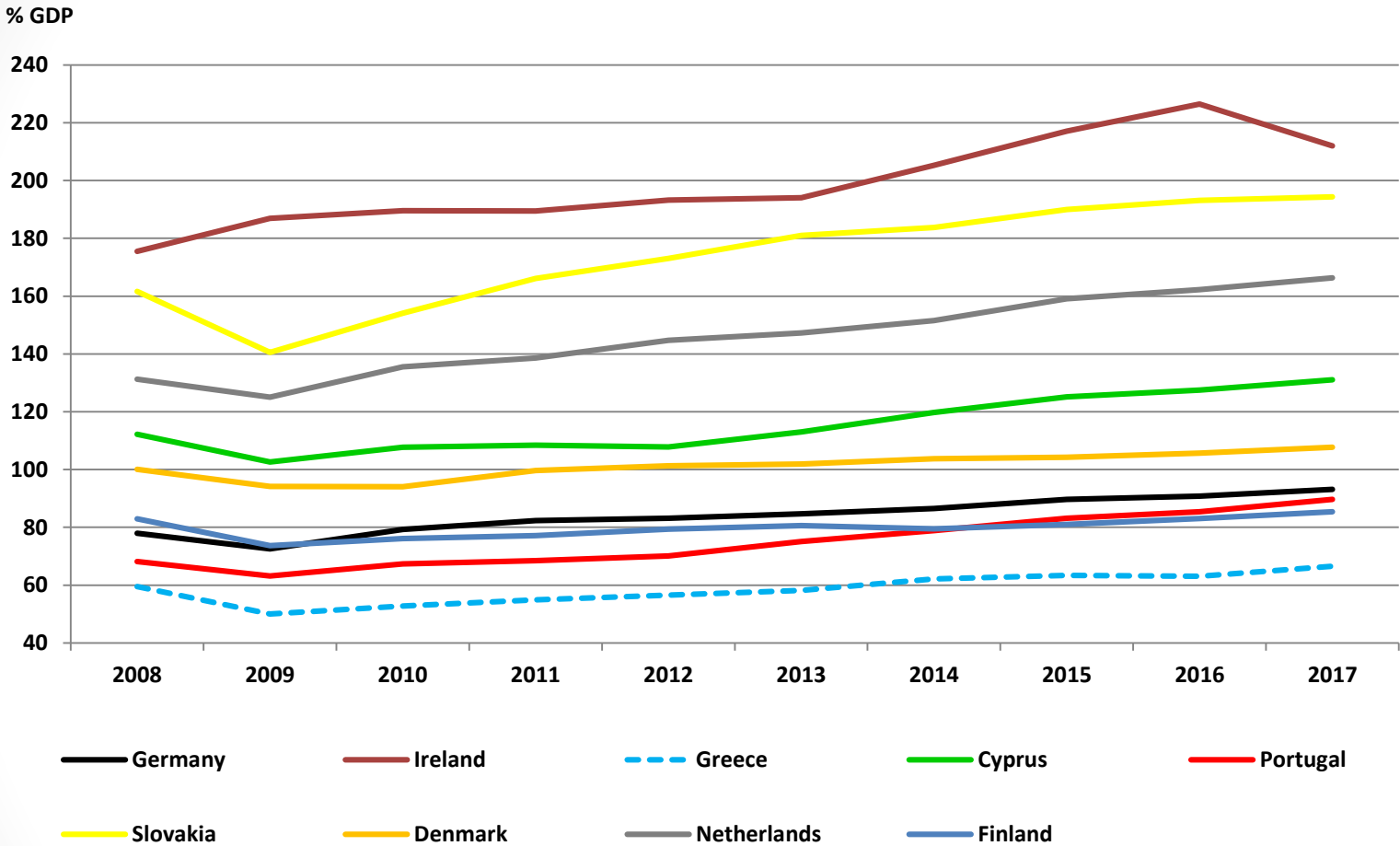


Source: IKA, Analysis: IOBE

High labor cost leads to the migration of highly skilled workers (brain drain)

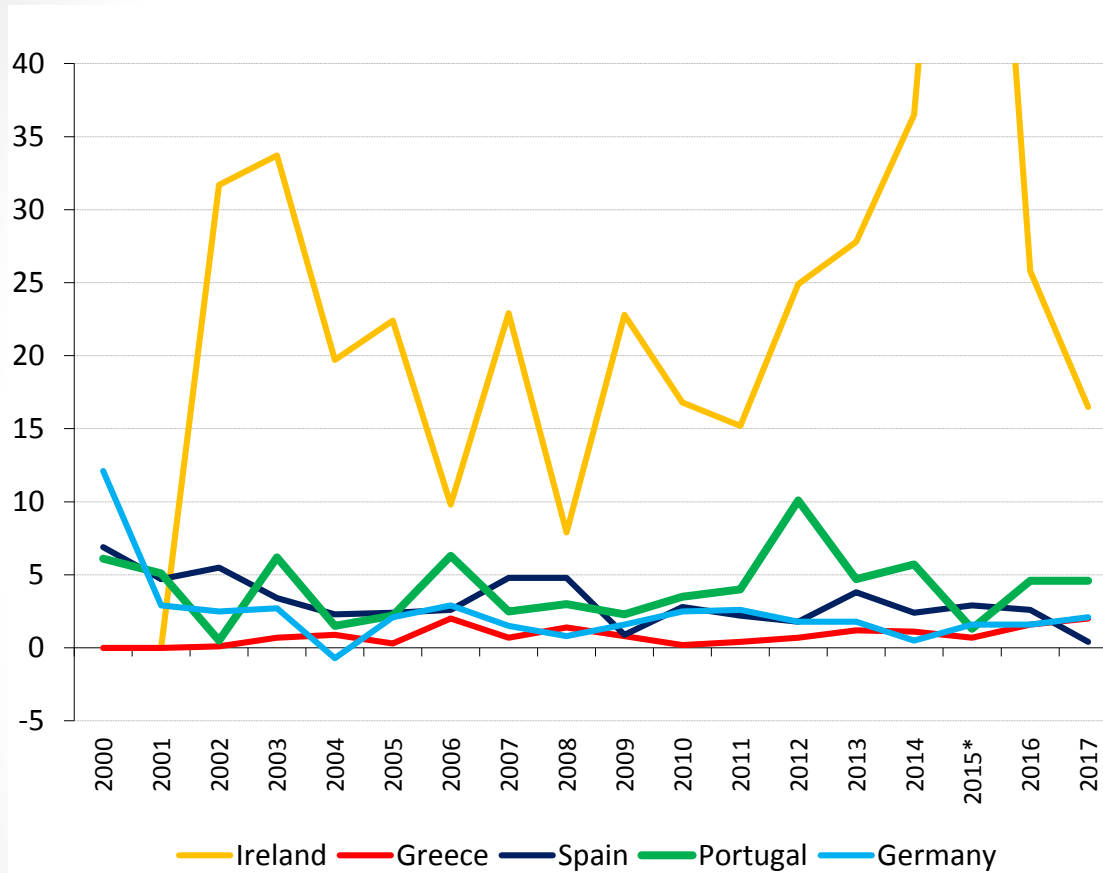
Openness

A relatively closed economy



Source: Eurostat

Foreign Direct Investment (% GDP)



FDI (% GDP)		
	2000-2008	2009-2017
Germany	3.0%	1.8%
Ireland	16.5%	29.8%
Greece	0.7%	1.0%
Spain	4.2%	2.2%
Portugal	3.7%	4.5%

*Ireland: 81.7% of GDP

Source: Eurostat

Attitude towards risks

1. Capital
2. Labor

Competition

1. Low within sectors
2. International

Planning horizon

1. Physical capital
2. Human capital

Geography

1. Clusters
2. Local advantages and opportunities

Conclusions and policy

1. Significant difficulties, also opportunities
2. Incentives for businesses and households