

Education and Economic Growth

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Discussion

- (Very brief) insights from the macro and micro literature on the relationship between education and growth
- A few findings from 'Tertiary Education Systems and Labour Markets'. (Machin and McNally). Commissioned by OECD. January 2007

Macro literature

- 1) Solow (or neo-classical model)
- 2) New Growth theories, two ways of thinking about human capital: (a) flow of human capital matters for growth and may generate externalities; (b) stock of human capital matters either because it is assumed to directly produce new knowledge/technology or because it is an essential input into a research sector which generates new knowledge/technology.

Empirical literature: cross-country regressions where a measure of productivity (e.g. GDP per capita) is related to various inputs

Macro literature (2)

Plenty of analyses showing positive relationships between both the change and the level of education and economic growth.

However, substantial methodological difficulties, especially related to data quality.

Also, problems of reverse causality: Is growth made possible because of a more educated workforce or does structural change induce more people to achieve higher educational standards?

Micro literature

- Estimates of individual earnings equations.

The wage (a measure of the marginal productivity of labour) is related to education, among other inputs.

- Disadvantage: cannot consider externalities in this framework
- Advantage: much better data quality than in empirical macro; can get over 'endogeneity' problem (e.g. through natural experiments).
- Very high estimates of private return to education

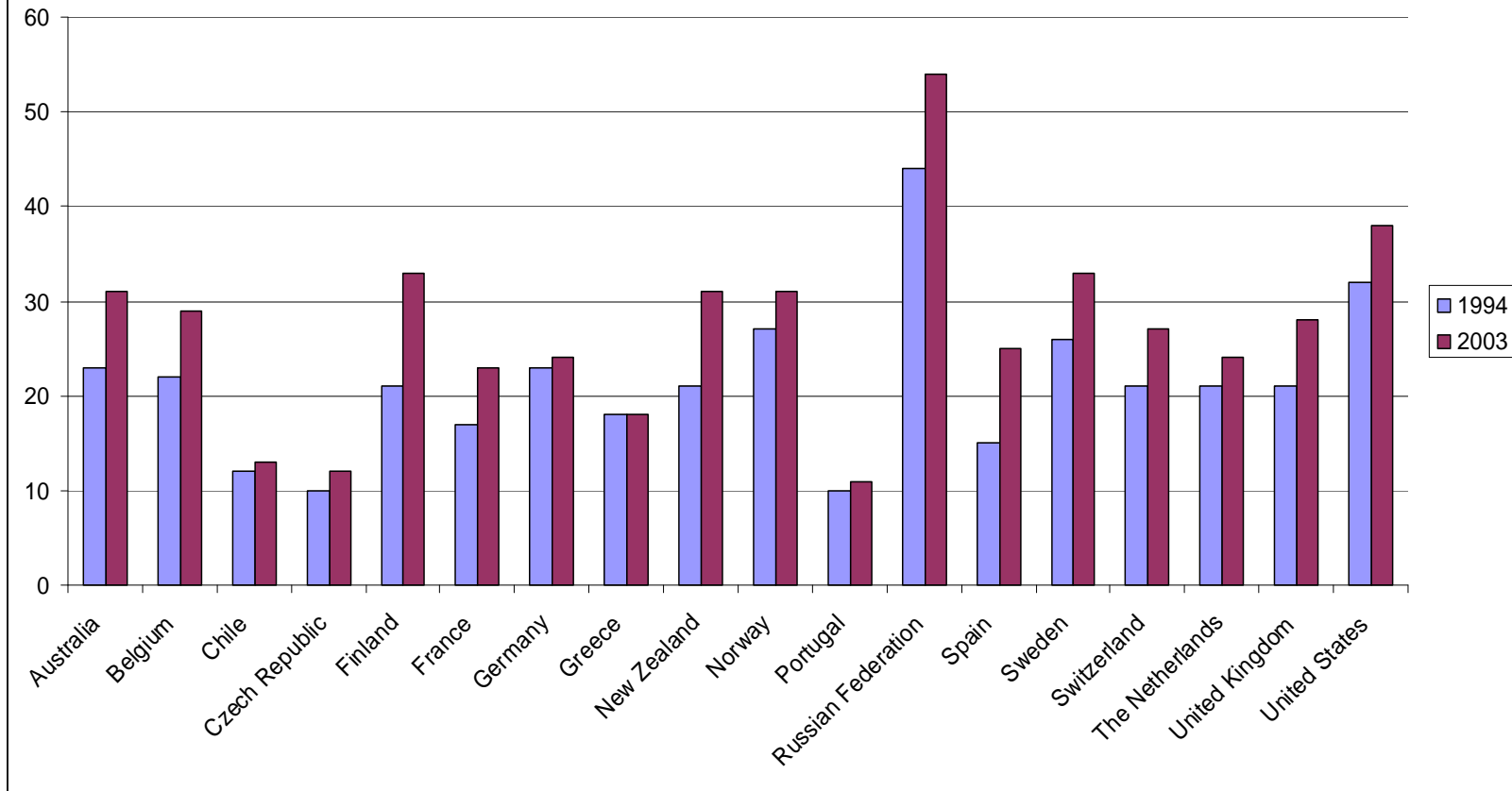
What has happened over time?

Rapid expansion of tertiary education – general phenomenon across OECD countries. Evident for several decades

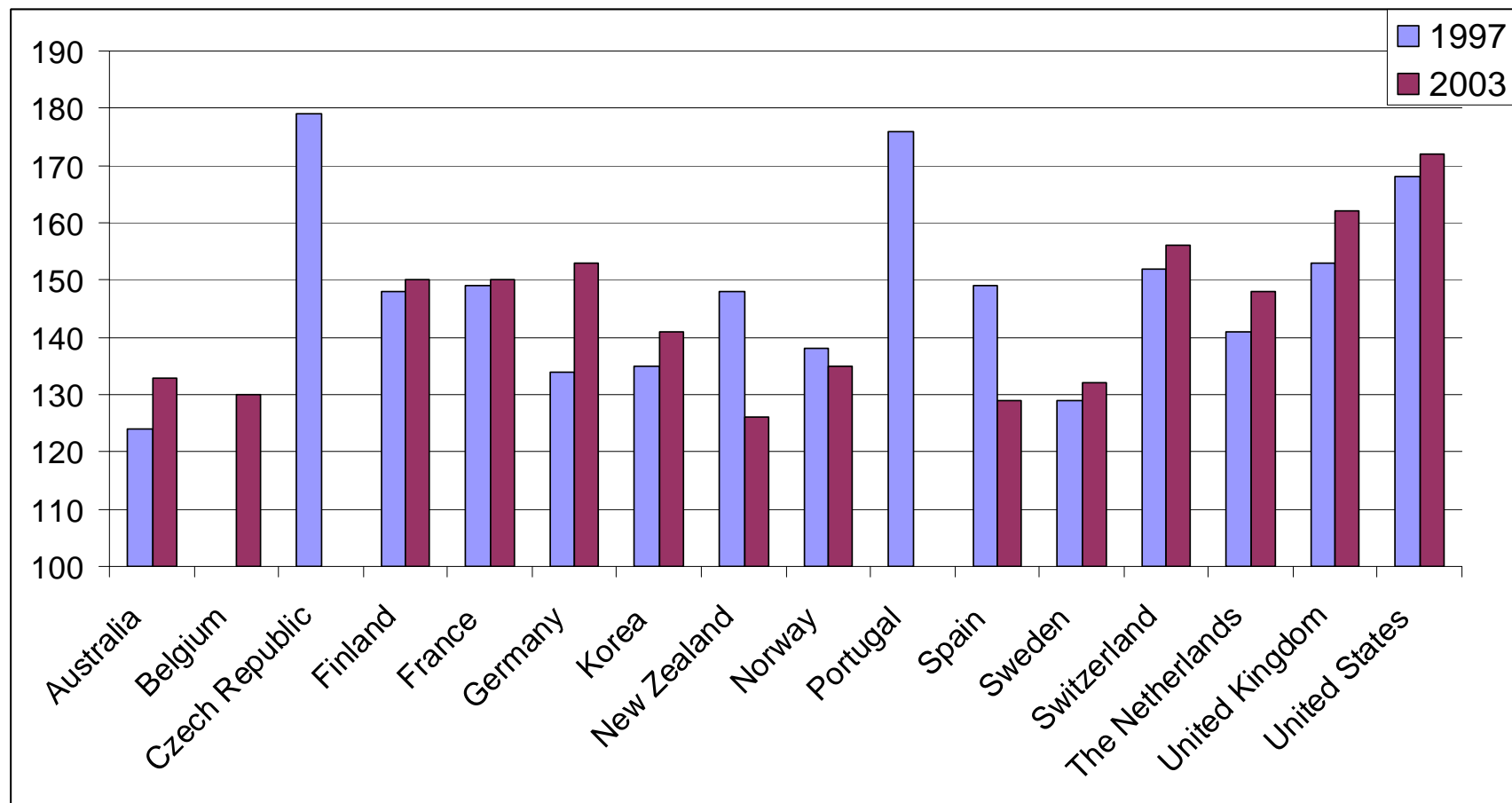
Increase in supply of graduates leads to fall in the wage (everything else constant);

Increase in demand for graduates leads to a rise in the wage (everything else constant).

Percentage of population (aged 25-64) that has attained tertiary education - changes over time



Wage Differentials: Tertiary versus Upper Secondary or Post Secondary (= 100)
For most countries here, relative wage in 1997 and/or 2002/03



Source: OECD Education at a Glance

Evidence from the literature

- In general, the wage premium to tertiary education has increased or remained stable, despite expansion of tertiary education.
- Demand has been increasing faster than supply – the only way to rationalise stable or increasing wage premium to tertiary education
- Why has demand been increasing so fast?

Weight of evidence is behind ‘skill biased technology change’ explanation: introduction of new technologies that are biased in favour of skilled workers.

Evidence of 'over-supply'?

- No. Plenty of scope for tertiary education to keep on expanding.
- As more people obtain a tertiary education, greater variation in the earnings of graduates.
- Explanations:
 - Variation in personal characteristics of graduates;
 - Graduates studying wider range of subjects and attending larger number of institutions.

What type of education?

- Trade-off between highly specialised education and more general education programmes.
- Some evidence to suggest that the latter makes workers more adaptable to economic shocks. This affects their wages and ultimately economic growth.
- Raises a question about whole education system; not just tertiary education.
- Is early stratification into a general (academic) route and a vocational route damaging to young people and ultimately to economies?

Are graduates studying the 'right' subjects?

- Few academic studies estimate returns to higher education by subject of degree, especially if we want to compare countries and consider changes over time.
- Machin and Puhani (2006) estimate returns by degree subject in Britain, France, Germany and the US using a consistent framework

Estimated Return to Degree Subject – Men

	Britain		France		Germany		United States	
	1993	2000	1993	2000	1993	2000	1993	2003
Arts	--	--	--	--	--	--	--	--
Science/Engineering /Technology	0.18	0.25	0.31	0.20	0.19	0.25	0.34	0.35
Social Science	0.12	0.21	0.37	0.18	0.15	0.20	0.30	0.34
Rest/Combined (incl. Medicine, education)	0.17	0.17	0.40	0.24	0.18	0.20	0.17	0.16

Source: Machin and Puhani (2006)

Estimated Return to Degree Subject – Women

	Britain		France		Germany		United States	
	1993	2000	1993	2000	1993	2000	1993	2003
Arts	--	--	--	--	--	--	--	--
Science/Engineering /Technology	0.02	0.16	0.21	0.12	0.09	0.09	0.21	0.18
Social Science	0.02	0.10	0.22	0.08	0.07	0.05	0.17	0.14
Rest/Combined (incl. Medicine, education)	0.08	0.18	0.20	0.14	0.14	0.07	0.06	0.02

Source: Machin and Puhani (2006)

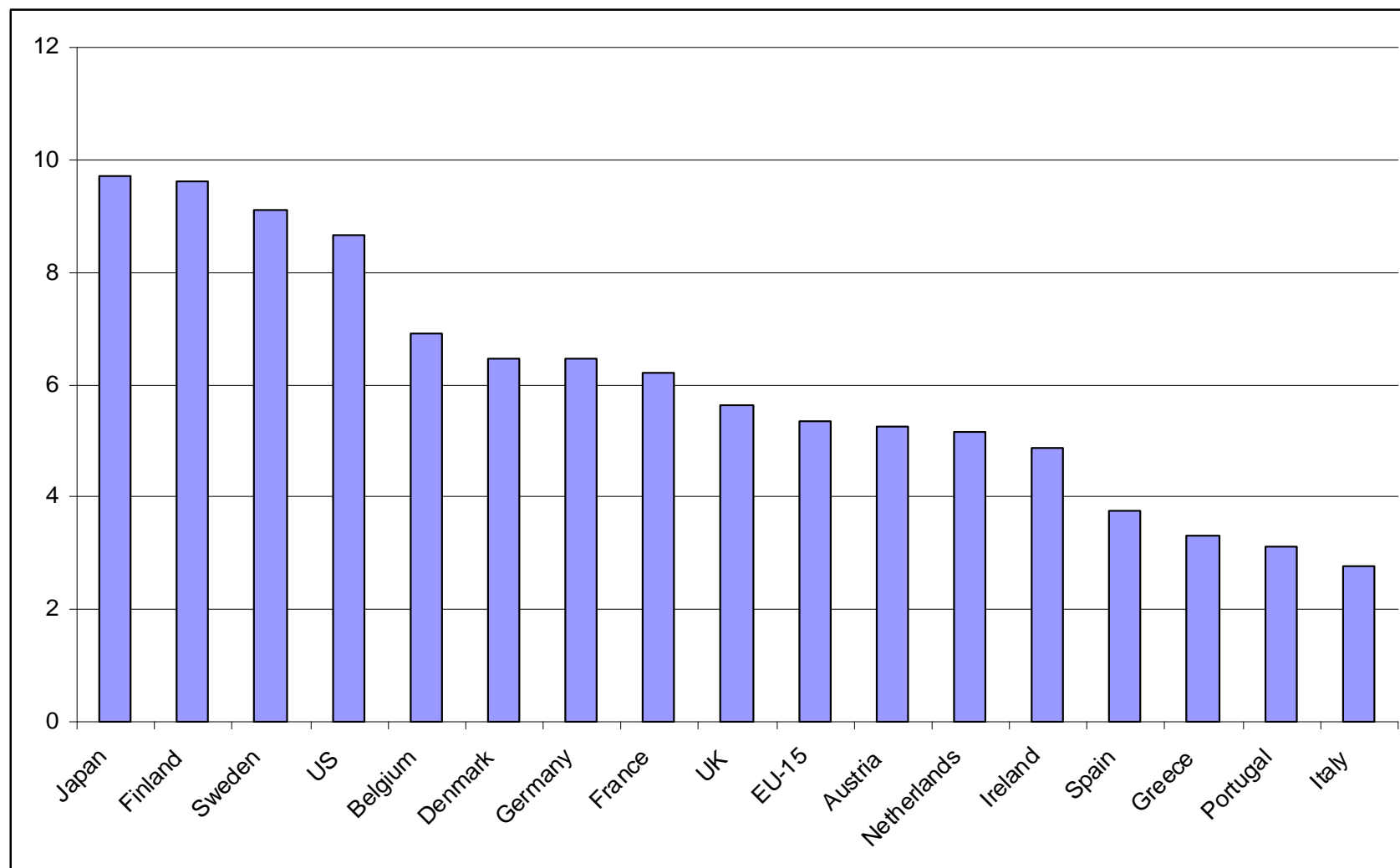
Returns by field of study

- In the four countries considered, returns to a university degree are lowest for Arts subjects whereas they are higher for other subjects – often highest (at least for men) in Science/Engineering/Technology
- Requires much further research for other countries – especially for making comparisons over time and across countries.

Shortage of Science and Technology Graduates?

- Countries differ in relative numbers graduating with an S&T degree; working in the labour market – e.g. US and Europe
- Research on perceived ‘shortage’ in the US and Europe
- Explanation related to international mobility of highly skilled professionals, scientists and engineers.
- Concern about ‘brain drain’ and implications for economic growth

Science and Technology researchers per 1000 labour force (1999)



Further expansion

What barriers are there to tertiary education and what should be the policy response?

- Capacity constraints?: provide more places.
- Credit constraints?: student bursaries
(especially for those from poor socio-economic backgrounds)
- Is sufficient information available to potential students?
- Argument for permitting fees to vary by subject of degree and/or to provide bursaries which are differentiated by subject area

Skill shortage and 'mismatch'

- Problems with graduates not always having the skills required by employers
- Policy response:
 - examine the content and accreditation system of vocational courses. Is it appropriate?
 - what is the balance between employer-provided training and that which is publicly provided?
 - In the public system, what is the balance between general education and vocational education?