

PRODUCTIVITY AND GROWTH ACCOUNTING

Economic growth can be increased either by raising the labour and capital inputs used in production, or by greater overall efficiency in how these inputs are used together, i.e. higher multi-factor productivity (MFP). Growth accounting involves breaking down GDP growth into the contribution of labour inputs, capital inputs and MFP growth.

Definition

Growth accounting explains output growth by the rates of change of labour and capital inputs and by MFP growth, computed as a residual. In these calculations, the contribution of labour (capital) to GDP growth is measured as the speed with which labour (capital) input grows, multiplied by the share of labour (capital) in total costs.

In the tables and graphs, the contribution of capital to GDP growth is broken down into Information and Communication Technologies (ICT) capital (which includes hardware, communication and software) and non-ICT capital (transport equipment and non-residential construction; products of agriculture, metal products and machinery other than hardware and communication equipment; and other products of non-residential gross fixed capital formation).

Overview

From 1985 to 2010, GDP growth in most OECD countries was for a large part driven by growth in capital and MFP. In many countries, growth in capital input accounted for around one third of GDP growth from 1985 to 2010. ICT capital services represented between 0.2 and 0.6 percentage points of growth in GDP, with largest contribution in Sweden, Denmark, the United Kingdom, Australia and the United States, and smallest in Ireland and Finland. Growth in labour input was important for a few countries over 1985-2010, notably Australia, Spain, and Canada, while Japan, Finland and Germany experienced negative GDP contributions from labour inputs. Over the same period, MFP growth was a significant source of GDP growth in Korea, Ireland and Finland, while MFP growth was very weak in Italy, Canada and Spain.

Averages for the period 1985-2010 mask volatility in growth drivers over time, though. For instance, the contribution of ICT capital slowed in the 2000s compared to the 1990s in all countries for which data are available, and MFP growth also slowed in most countries, with the Austria, Belgium, Japan, the Netherlands, Sweden, and the United States being noticeable exceptions.

Comparability

The appropriate measure for capital input in the growth accounting framework is the flow of productive services that can be drawn from the cumulative stock of past investments in capital assets. These services are estimated by the OECD using the rate of change of the “productive capital stock”. This measure takes into account wear and tear and retirements, i.e., reductions in the productive capacity of the fixed assets. The price of capital services for each type of asset is measured as their rental price. In principle, the latter could be directly observed if markets existed for capital services. In practice, however, rental prices have to be imputed for most assets, using the implicit rent that capital goods’ owners “pay” themselves (or “user costs of capital”). There are differences in how countries deal with quality adjustment with possible consequences for the international comparability of price and volume measures of ICT investment. The OECD uses a set of “harmonised” deflators assuming that the ratios between ICT and non-ICT asset prices evolve in a similar manner across countries, using the United States as the benchmark.

Note: 1985-2007 for Denmark, the Netherlands and the United Kingdom, 1985-2008 for Australia and Japan, 1985-2009 for France and Sweden, 1991-2010 for Germany, 1995-2010 for Switzerland, 1995-2007 for Austria.

Sources

- OECD (2012), OECD Productivity Statistics (database).

Further information

Analytical publications

- OECD (2011), *OECD Science, Technology and Industry Scoreboard 2011*, OECD Publishing.
- OECD (2011), *Public Servants as Partners for Growth, Toward a Stronger, Leaner and More Equitable Workforce*, OECD Publishing.
- OECD (2004), *Understanding Economic Growth: A Macro-level, Industry-level, and Firm-level Perspective*, OECD Publishing.
- OECD (2003), *The Sources of Economic Growth in OECD Countries*, OECD Publishing.

Methodological publications

- OECD (2001), *Measuring Productivity – OECD Manual: Measurement of Aggregate and Industry-level Productivity Growth*, OECD Publishing.
- Schreyer, P. (2004), “Capital Stocks, Capital Services and Multi-factor Productivity Measures”, *OECD Economic Studies*, Vol. 2003/2.

Websites

- OECD Compendium of Productivity Indicators, www.oecd.org/statistics/productivity/compendium.
- OECD Productivity, www.oecd.org/statistics/productivity.

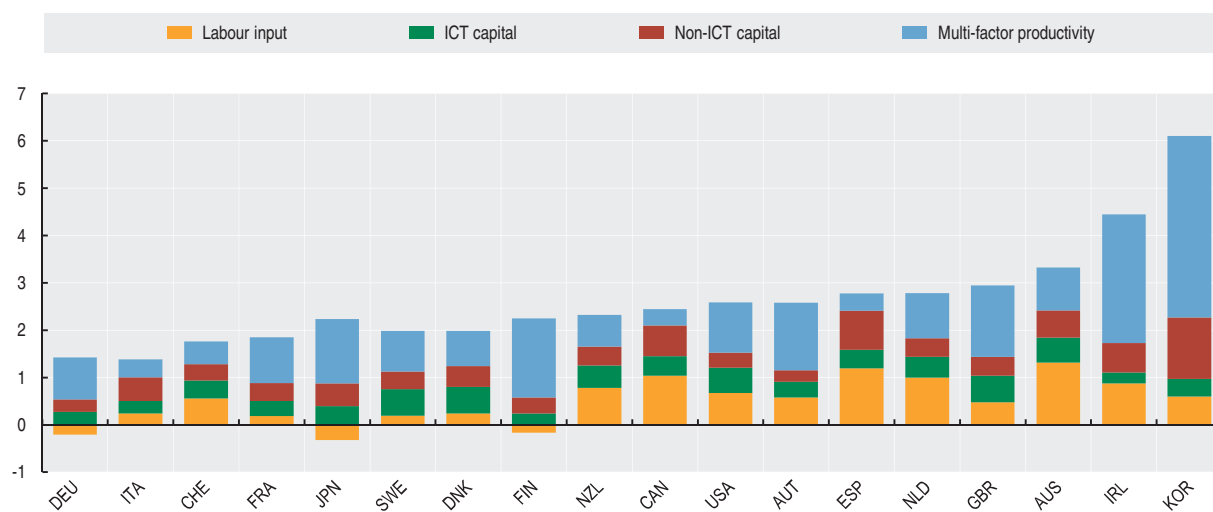
Contributions to GDP growth

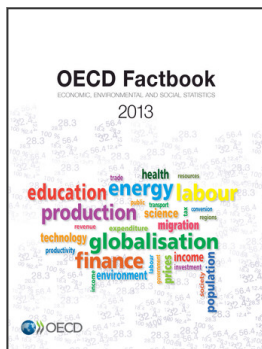
Average annual growth in percentage, 1985-2010 (or closest comparable year)

	Labour input	ICT capital				Non-ICT capital	Multi-factor productivity	GDP growth
		IT equipment	Telecommunication equipment	Software	Total			
Australia	1.35	0.30	0.09	0.14	0.53	0.57	0.87	3.33
Austria	0.58	0.19	0.04	0.10	0.33	0.25	1.43	2.59
Belgium	..	..	..	..	..	..	..	..
Canada	1.04	0.21	0.07	0.13	0.42	0.65	0.35	2.44
Chile	..	..	..	..	..	..	..	..
Czech Republic	..	..	..	..	..	..	..	..
Denmark	0.24	0.35	0.02	0.19	0.56	0.43	0.74	1.99
Estonia	..	..	..	..	..	..	..	..
Finland	-0.17	0.07	0.04	0.13	0.24	0.33	1.67	2.06
France	0.19	0.11	0.05	0.16	0.32	0.38	0.97	1.85
Germany	-0.20	0.15	0.05	0.07	0.27	0.27	0.89	1.22
Greece	..	..	..	..	..	..	..	..
Hungary	..	..	..	..	..	..	..	..
Iceland	..	..	..	..	..	..	..	..
Ireland	0.87	0.12	0.05	0.06	0.23	0.62	2.72	4.43
Israel	..	..	..	..	..	..	..	..
Italy	0.24	0.01	0.18	0.09	0.28	0.50	0.36	1.38
Japan	-0.32	0.22	0.05	0.13	0.40	0.48	1.36	1.91
Korea	0.60	0.11	0.11	0.15	0.37	1.30	3.83	6.07
Luxembourg	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..
Netherlands	1.00	0.23	0.07	0.14	0.44	0.39	0.95	2.78
New Zealand	0.78	0.19	0.14	0.14	0.48	0.40	0.67	2.32
Norway	..	..	..	..	..	..	..	..
Poland	..	..	..	..	..	..	..	..
Portugal	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	..	..	..	..
Slovenia	..	..	..	..	..	..	..	..
Spain	1.20	0.16	0.11	0.12	0.39	0.82	0.36	2.78
Sweden	0.19	0.28	0.04	0.24	0.56	0.37	0.86	1.98
Switzerland	0.56	0.15	0.08	0.15	0.38	0.34	0.48	1.76
Turkey	..	..	..	..	..	..	..	..
United Kingdom	0.47	0.29	0.07	0.20	0.56	0.40	1.51	2.95
United States	0.67	0.25	0.10	0.19	0.53	0.32	1.06	2.58
EU 27	..	..	..	..	..	..	..	..
OECD	..	..	..	..	..	..	..	..
Brazil	..	..	..	..	..	..	..	..
China	..	..	..	..	..	..	..	..
India	..	..	..	..	..	..	..	..
Indonesia	..	..	..	..	..	..	..	..
Russian Federation	..	..	..	..	..	..	..	..
South Africa	..	..	..	..	..	..	..	..

 StatLink  <http://dx.doi.org/10.1787/888932706622>
Contributions to GDP growth

Average annual growth in percentage, 1985-2010 (or closest comparable year)


 StatLink  <http://dx.doi.org/10.1787/888932706641>



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