

Which national education systems deliver the best value for money? **Peter Dolton** and colleagues rank 30 of the world's richest countries based on their expenditure on teacher costs (which account for 80% of education budgets) and the pupil outcomes they achieve. Finland, South Korea and the Czech Republic come out top of the list.

# Educational efficiency: value for money in public spending on schools

**A**round 1.3 billion children are enrolled in primary and secondary schools around the world and each year governments spend trillions of dollars to educate them to the highest possible standard. In a recent report, we highlight which countries are using their budgets most effectively to produce the best outcomes for their young people.

Our 'efficiency index' is particularly relevant in the context of economic austerity. In most countries, public expenditure on school education represents a significant share of the total government budget. What's more, the global proportion of public spending on education has, on average, risen for the past 20 years despite competition with other public services, such as health, transport and defence. Yet there are potentially large financial savings to be

made if we can better understand the underlying relationship between resource inputs and pupil performance.

We analyse data from 30 Organisation for Economic Co-operation and Development (OECD) countries to ascertain which inputs funded by governments really do make a difference. We also look at which countries are combining these inputs most effectively to produce the best educational outcomes for each dollar invested.

The results are based on internationally comparable data collected over the last 15 years, using standardised scores from the OECD's Programme for International Student Assessment (PISA). We also have other excellent data from the OECD, which help us to ensure that comparisons of each country's education system are valid, and we test what impact each input has on children's PISA scores.

Only two inputs have a consistent impact on educational outcomes: teachers' pay and pupil-to-teacher ratios

Only two inputs consistently prove to be statistically significant: teachers' pay; and the pupil-to-teacher ratio in the classroom. The implication is that inefficiency in an education system can be a result of both underpaying and overpaying teachers or having class sizes that are too big or too small.

For example, if teachers are underpaid, it may be harder to recruit high-calibre individuals into the profession or to retain them: positive educational outcomes will suffer, which damages efficiency. Conversely, if teachers are overpaid, then it may be better to recruit more lower-paid teachers but spend more on reducing class sizes.

The two most efficient education systems – Finland and South Korea – have the third and fifth largest pupil-to-teacher ratios, which means larger class sizes. Inefficiency can also come as a result of either overpaying teachers – in countries such as Germany and Switzerland – or underpaying teachers – in Indonesia and Brazil. These countries occupy four of the bottom six spots in the overall efficiency rankings.

But our findings also suggest that on average, across all countries, the more money there is available to spend on teachers, the better results will be. This is perhaps not a surprising result as, on average, a country with more highly paid teachers draws their recruits from more educated graduates.

We take the analysis one step further and examine the 'optimal' combination of these two inputs within the available funding envelope: rather than require extra resources, could more be achieved with the same (or less)?

Educational efficiency is not immediately concerned with just raising PISA scores – but rather, as we live in a world of finite resources, with achieving the best educational attainment given a limited budget. With unlimited funding available, much more could be done to increase educational outcomes. But this is unrealistic: government budgets are limited, and spending needs to be prioritised accordingly to deliver value for money.

Our efficiency index is therefore a relative measure. Finland has been calculated to be operating at the notional maximum, but even that system could achieve more with less. For example, each

education system needs to decide how much funding to invest in teaching materials, infrastructure, reducing class sizes or more highly paid teachers.

Our calculations show that Finland strikes the most efficient balance between teacher salaries and class sizes to produce educational outcomes. Using this as our benchmark for 'maximum' efficiency, we are able to calculate how PISA scores can be theoretically raised to Finland's level by adjusting these two inputs – both of

which are within the power of governments. Countries can use different combinations of teacher salary levels and class sizes to improve their educational outcomes.

Table 1 shows the efficiency index rankings by country; and Figure 1 shows the relationship between PISA scores and efficiency, grouping countries into five types by their relative position. We recognise that efficiency may not be the most important factor for some countries.

Table 1:  
Educational efficiency scores by country

Ranking	Country	Efficiency scores	PISA rank (2012 maths)
1	Finland	87.81%	5
2	South Korea	86.66%	1
3	Czech Republic	84.38%	14
4	Hungary	84.08%	24
5	Japan	83.88%	2
6	New Zealand	83.30%	12
7	Slovenia	83.28%	10
8	Australia	81.23%	9
9	Sweden	80.58%	23
10	Iceland	79.39%	17
11	UK	78.71%	16
12	France	78.69%	15
13	Israel	77.84%	25
14	Netherlands	76.80%	4
15	Ireland	76.80%	11
16	Austria	74.68%	8
17	Norway	74.05%	18
18	Belgium	73.52%	6
19	USA	72.66%	22
20	Chile	72.54%	28
21	Turkey	71.44%	27
22	Denmark	70.60%	13
23	Italy	69.81%	20
24	Portugal	68.29%	19
25	Germany	67.01%	7
26	Spain	63.09%	21
27	Greece	60.64%	26
28	Switzerland	59.71%	3
29	Indonesia	51.13%	30
30	Brazil	25.45%	29



Figure 1:  
Educational quality and educational efficiency:  
five groups of countries

### Group 1 Elite performers

There is always room for improvement despite the fact that these countries score well in both efficiency and quality.

1 Finland 2 Japan 3 South Korea

### Group 2 Efficient and effective

These countries are doing relatively well on both efficiency and producing high PISA scores.

14 Australia 15 Czech Republic 20 New Zealand 22 Slovenia

### Group 3 More effective than efficient: overspending or bloated

These countries perform better in quality measures than in terms of efficiency. This may be because they prioritise outcomes over costs; it may be because their system generates other outcomes that aren't captured by PISA rankings; or it may be because the system is over-resourced beyond a threshold required to drive quality increases.

4 Austria 5 Belgium 6 Denmark 7 Germany 8 Ireland 9 Italy 10 Netherlands 11 Portugal 12 Spain 13 Switzerland

### Group 4 More efficient than effective: underspending or underperforming

These countries are more efficient than educationally effective. This could be because of constraints that prevent the system from moving to the next level, for example, low salaries may prevent the teaching profession from being able to recruit highly skilled individuals; or if extensive resources are already being deployed, it could be that there are underlying flaws in the education delivery model the system has the potential to increase outputs for no additional inputs by making policy changes.

16 France 17 Hungary 18 Iceland 19 Israel 21 Norway 23 Sweden 24 UK 25 United States

### Group 5 Inefficient and ineffective

These systems are inefficient and at the same time do not produce comparatively good outcomes.

26 Brazil 27 Chile 28 Greece 29 Indonesia 30 Turkey



Some countries will choose to pursue policies in which improving educational quality rather than educational efficiency is their most important goal.

This is an informed choice: but are the countries that are paying a premium for their education aware of it? If so, the additional benefits should be clearly defined for the taxpayer. If not, improving system efficiency should be of great interest.

Regardless of context, the index sheds light on the effectiveness of the spending choices made by those designing education policy. As governments seek to improve their education systems within financial constraints, we hope to inform debate about which items of educational expenditure are likely to make the greatest impact on the attainment of children.

On average,  
across all  
countries, the  
more money  
there is available  
to spend on  
teachers, the  
better results  
will be

This article summarises 'The Efficiency Index: Which Education Systems Deliver the Best Value for Money?' by Peter Dolton, Oscar Marcenaro-Gutierrez and Adam Still, published by GEMS Education Solutions (<http://www.gemsedsolutions.com/efficiency-index>).

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