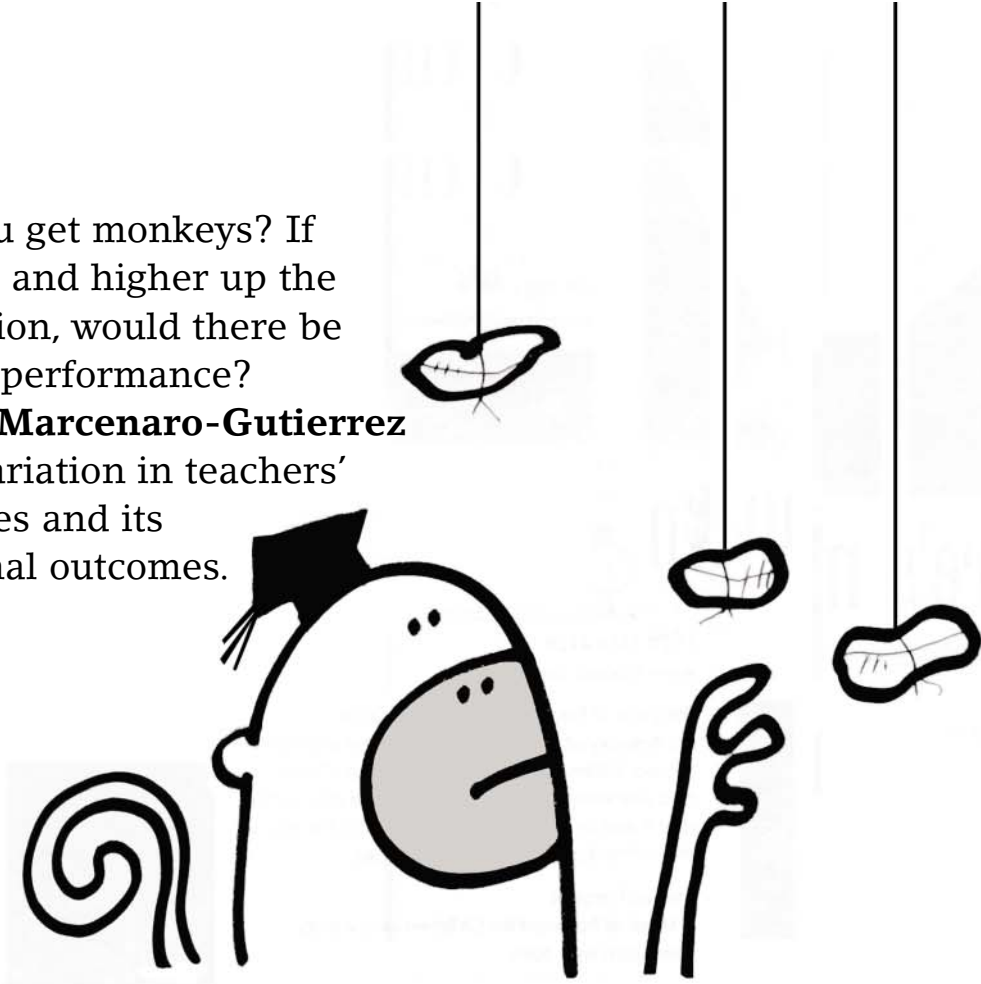


If you pay peanuts, do you get monkeys? If teachers were better paid and higher up the national income distribution, would there be an improvement in pupil performance?

Peter Dolton and Oscar Marcenaro-Gutierrez examine the enormous variation in teachers' pay across OECD countries and its significance for educational outcomes.



Teachers' pay and pupil performance

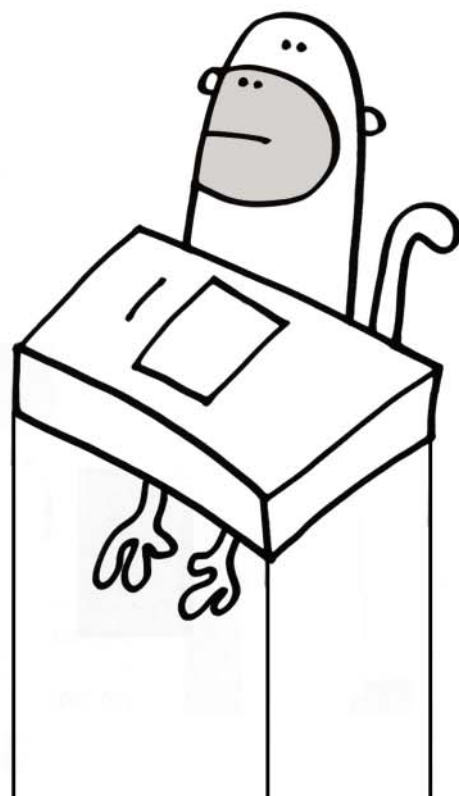
Why do teachers in Switzerland earn four times what teachers in Israel earn? Why are teachers in South Korea paid at the 78th percentile of their country's income distribution whereas those in United States are paid at only the 49th percentile? And do these massive variations in the way different countries treat their teachers matter for the outcomes of their pupils?

Answers to these questions are at the heart of the educational policy debate and we can learn a lot about the relationship between teacher quality and pupil outcomes from cross-national comparisons. The issue is especially relevant in the context of pressures to reduce public spending. Most countries devote a sizeable proportion of their budgets to education – and around 70% of that money goes on teacher salaries.

Our research considers the determinants of teacher salaries across OECD countries and examines the relationship between the real and relative levels of teacher remuneration and the measured performance of secondary school pupils over the last 15 years.

There are two potential explanations as to why teachers' pay may be causally linked to pupil outcomes. The first is that higher pay will attract more able graduates into the profession. As the potential supply of teachers rises because of the higher pay on offer, entry into teaching as a profession will become more competitive. This in turn will mean that the average ability of those entering the job will rise. Once recruited, higher relative pay and/or more performance-related pay may provide teachers with stronger incentives to improve their pupils' educational outcomes.

The second mechanism is more subtle



Better pay for teachers will attract higher quality graduates into the profession and improve pupil performance

– namely that improving teachers' pay improves their standing in a country's income distribution and hence the national status of teaching as a profession. As a result of this higher status, more young people will want to become teachers. This in turn makes teaching a more selective profession and hence facilitates the recruitment of more able individuals.

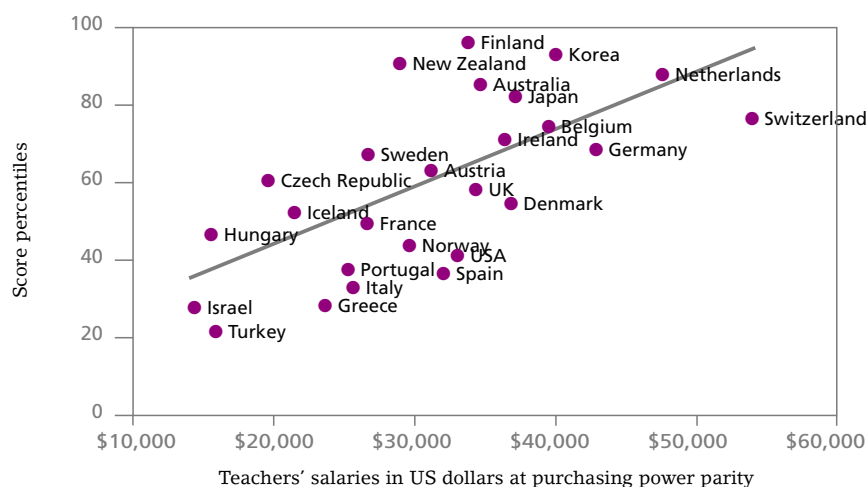
Higher status and higher pay are invariably linked but the two can provide separate driving forces to engineer better recruits to the profession. The key hypothesis is that better pay for teachers will attract higher quality graduates into the profession and that this will improve pupil performance.

The most comprehensive sources of comparative information about teachers in different countries are the OECD's annual 'Education at a Glance' reports. These publications provide information on starting salaries, salaries after 15 years of teaching experience and salaries at the top of the profession.

The relative supply of teachers in a country is measured by the number of teachers as a fraction of the labour force and the pupil/teacher ratio in the education system. An additional supply factor relates to the proportion of the stock of teachers who are women. We also control for the number of teaching hours supplied, since having a lower number of teachers can be compensated for by them working more hours.

We measure the nature of a country's investment in education by the level of educational expenditure as a fraction of GDP, controlling for the rate at which a country is growing, since clearly this will constrain its possible investments in education. The changing nature of the

Figure 1:
Pupil score percentile as a function of teacher salaries after 15 years of experience



A 5% increase in the relative position of teachers in the income distribution would increase pupil performance by around 5-10%

demand for teacher services is measured by the demographic growth in the size of the population of school age.

To examine the relationship between teacher remuneration and educational attainment, we use the internationally comparable results from the OECD Programme for International Student Assessment (2000, 2003 and 2006) and Trends in International Mathematics and Science Study (1995, 1999 and 2003).

Figure 1 provides an insight into the relationship between teacher salaries and pupil outcomes, showing a clear statistical association between higher relative teachers' pay and higher standardised pupil scores across countries.

Our research with aggregate country data supports the hypothesis that higher pay leads to improved pupil performance. As an indication of the relative size of this effect, we find that a 10% increase in teachers' pay would give rise to a 5-10%

increase in pupil performance. Likewise, a 5% increase in the relative position of teachers in the income distribution would increase pupil performance by around 5-10%.

What are the policy implications of these findings? Most obviously, if a government is concerned with educational outcomes, then it should be aware that the quality of its teachers is of fundamental importance. We suggest that the route to hiring teachers from higher up the ability distribution is to pay them at a higher point in the country's income distribution.

How could this be achieved? A country with a stock of low quality teachers cannot simply raise the pay of all teachers immediately and expect the quality of teaching to improve. The existing stock of teachers would clearly have an incentive to appropriate these economic rents with no responsibility to

become better teachers. And while the quality of new recruits to the profession would rise as a result of this upward shift in relative pay, it would take a long time – 30 or so years – to change the quality of the whole stock of teachers.

The answer then must be to consider how teacher quality can be raised gradually. If the government were to ratchet up starting pay, this would secure better quality new teachers. But improving the stock of existing teachers would require continued professional development and in-service training and/or attempting to fire the worst teachers.

Such policy measures are not within the scope of this study, but there is a wealth of research evidence about them as possible remedies to improve the existing stock of teachers. One solution is to provide an incentive mechanism for existing teachers to improve quality by paying them according to the percentile performance (in value added terms) of their pupils. Another possible solution is to increase the rate at which teachers' pay rises with their level of experience.

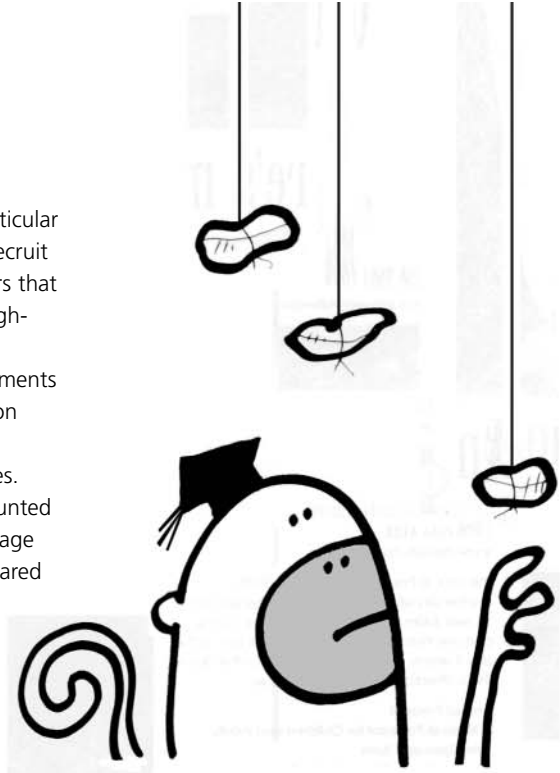
Another dimension of the problem is the time scale over which any improvement in pupil outcomes is sought. If replacing existing teachers with ones of higher quality would take too long, then a quicker fix might be to reduce the pupil/teacher ratio or increase pupil contact hours by simply employing more teachers from the pool of inactive teachers.

Our analysis finds a clear trade-off between pupil/teacher ratios and teachers' pay across countries – that is, countries do not necessarily have to pay higher salaries to secure better pupil outcomes. But if a country is not prepared to pay teachers relatively well, then it will have to go a long way down the road of reducing class sizes to compensate them – in short, governments and educational administrators need to know that there is 'no free lunch' here.

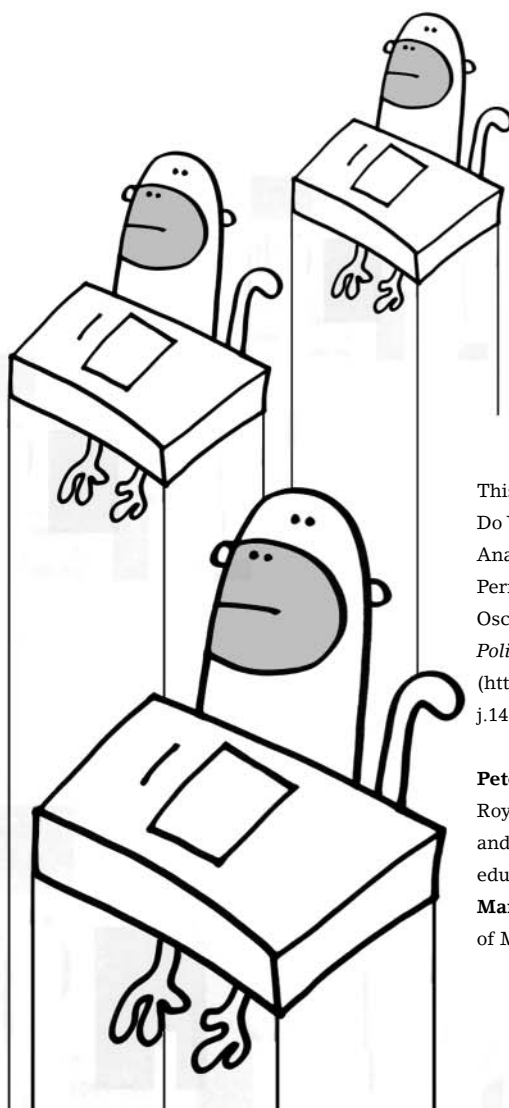
The policy implications of our findings are relevant to the recruitment of teachers and the improvement of educational standards. The link we find between teacher quality and high educational standards has logical implications for any government's commitment to recruit, retain and reward good teachers. In this regard, it seems that increasing teacher salaries (and the speed at which they can

reach higher pay levels within a particular pay structure) will help schools to recruit and retain the higher ability teachers that schools need to offer all pupils a high-quality education.

At a wider policy level, improvements in education appear to be a common factor behind economic growth in recent decades in all OECD countries. The increase in human capital accounted for more than half an extra percentage point of growth in the 1990s compared with the previous decade. One clear way to improve the stock of human capital is to invest in higher quality teachers.



There is a clear trade-off between pupil/teacher ratios and teachers' pay across countries



This article summarises 'If You Pay Peanuts, Do You Get Monkeys? A Cross-country Analysis of Teacher Pay and Pupil Performance' by Peter Dolton and Oscar Marcenaro-Gutierrez, *Economic Policy* 26(65): 5-55, January 2011 (<http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0327.2010.00257.x/full>).

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