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Higher education and the labour market



Higher education around the world has expanded rapidly in recent years, yet graduates continue to command a wage premium in the labour market. So, as **Stephen Machin** and **Sandra McNally** show, there are no problems of 'over-supply' or 'over-qualification' – rather there are 'shortages' in some fields, which further expansion could alleviate.

In recent decades, there has been rapid expansion of higher ('tertiary-level') education across many countries. This has had important and profound effects on labour markets and the way in which employers use highly educated labour.

These expansions have, for the most part, been predicated on the assumption that more education is good for individuals and for society as a whole, not only in terms of economic outcomes like wages or employment, but also for a wide range of social outcomes like improved health, reduced crime and higher well-being.

But along with expansion of the system has come a range of new questions that have emerged as a consequence of there being many more graduates. Is there now 'over-supply' of graduates? Is there evidence of 'over-qualification' and skill mismatch? Are students studying the 'right type' of subjects? And is there a shortage of science and technology graduates in particular?

In a recent report, we review the evidence on these questions. The report offers some conclusions about the way in which the expansion of higher education has had important effects on economic outcomes – and draws policy implications for the future.

The increasing supply of graduates

The labour market consequences of increasing supply can be considered within a simple demand and supply framework. Starting from a position where the demand for and supply of graduates are in balance, a boost in the supply of graduates should, other things being equal, lead to a reduction in the wage premium because employers have a wider range of similarly qualified people to

choose from. But if, for whatever reason, employers demand more graduates, then the wage premium may not fall.

The wage premium depends on the interaction of demand and supply. In recent decades, there has been a big increase in both the demand for and supply of graduates. It is the fact that demand has outstripped supply that has given rise to an increasing wage premium for a university degree. There is much controversy about the reasons for increasing demand for graduates, but the predominant view is that 'skill-biased technological change' is a major contributory factor.

In most countries, there has been continued expansion of higher education in the last decade. But the wage premium attached to higher education has increased in most of them. The exceptions are Spain and New Zealand – two countries with particularly large expansion of higher education in the last 10 years – and Korea, where the wage premium declined markedly between 1974 and 1990, a period of industrialisation when there was massive growth in higher education.

But even in these three countries, there is still a positive return to higher education. Thus, it makes little sense to speak of 'over-supply' of higher education. The strong, positive and (often) increasing

return to higher education suggests that 'under-supply' is more of an issue and that continued expansion is justified. In terms of employability, in many countries, there has been some catch-up of less educated groups over the last decade, but graduates continue to have a much higher probability of being in a job.

Mismatches and shortages

Nevertheless, it sometimes takes a long time for some (usually less well performing) graduates to find jobs after leaving higher education and even then, some are not in jobs that appear to be well matched to their qualifications. At the same time, there are shortages in certain sectors: this is evident in employer surveys and in some data analysis that shows a negative wage premium associated with 'skill mismatch'.

A body of research has attempted to measure these outcomes, and the (sometimes misused) terms of 'over-education' and 'under-education' have emerged: the former arises if an individual holds higher qualifications than required by his or her job whereas the opposite applies for the 'under-educated'. But statistics on over- and under-education are difficult to interpret as workers are matched to jobs based on a range of characteristics and not just their education

Concerns about the 'over-supply' and/or 'over-qualification' of graduates are misplaced

level. What's more, apparent mismatch may be a temporary phenomenon.

The extent to which such problems are seen as temporary varies across studies and countries. But one generalisation that can be made is that the fact of observing 'over-qualified' individuals in the workforce does not mean that there is over-supply of graduates. If there were over-supply, relative wages and employment probabilities would fall to the level of their closest substitutes – and this has not happened.

The indications are that skill mismatch (or inadequate levels of skill) is more of a problem than over-qualification. In some countries, there is a need to improve the content and accreditation of vocational qualifications so that they provide what employers need and are recognised to do so.

This is not to say that higher education should be geared to providing highly specific skills that are currently needed by employers. Some studies suggest that general education and skills are more valuable because they enable workers to respond to shocks to the economy (for example, those that require sectoral change) and advances in technology.

Degree subjects

One hypothesis put forward to explain skill shortages is that individuals are not choosing the right type of graduate studies (whether this education is general/academic or vocational). In other words, the choice of higher education made by individuals does not correspond to the needs of the labour market in terms of field of study.

As yet, there are relatively few studies that estimate returns to higher education by subject of degree – especially when we are most interested in change over time. One study looks at changes in returns to subject of degree over time in Britain, Germany, France and the United States, and finds that a return to an arts degree had the lowest relative return within all countries, for two time periods (the early 1990s and 2000) and for both men and women.

In contrast, the returns to degrees in science, engineering and technology are substantial (especially for men). Such findings are broadly consistent with what is found for a number of other countries – science/engineering/technology is often



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among the category of subjects with a relatively high return (along with some social science subjects and professions such as law and medicine) whereas arts and humanities are often among the category of subjects with a relatively low return.

So it may be relevant to talk of graduate over-supply in relation to some subjects of degree. For example, there have been estimates to suggest that the wage return to an arts and humanities degree is zero in Britain.

This raises the question as to why people continue to pursue such qualifications. There are various possible explanations: one is that wages do not capture important aspects of the 'value' of

the degree for individuals – for example, higher education has a 'consumption' value as well as a value in the labour market; and jobs have non-pecuniary aspects that make them attractive to individuals. Second, students may not be well enough informed about the likely returns to subject of degree.

The value of science degrees

The existence of the relatively high wage differential for science/engineering/technology compared with other subjects illustrates the high value placed on the field by employers and indicates high relative demand for graduates with this field of study. This might be interpreted as a 'shortage' of science and technology graduates and would be consistent with some reports of 'shortages' that have appeared in several countries, including Australia, Belgium, Britain and New Zealand.

There are big differences between countries in the proportion of graduates who qualify with a degree in science and technology. Comparing across continents (using data from 2000), Asia has the highest percentage of graduates with science and technology degrees (32%), which is just above Europe (28%) and considerably above North America (18%), South America (22%) and Oceania (22%).

Within Asia, China has a particularly large share of graduates with a degree in science and technology (53%). Even though the EU has a better performance than the United States in terms of producing science and engineering graduates, it lags well behind the United States in terms of the proportion of science and technology researchers in the labour market. Nevertheless, as in other countries, there are claims of a 'shortage' in the United States, which economists have struggled to reconcile with the facts (which belie this concern).

Further analysis suggests that the underlying issue is that the United States maintains an adequate supply of scientists and engineers only because of the sizeable influx of foreign-born students and employees. This could be a risk to US research if there is any interruption of the flow of immigrant scientists and engineers.

The 'brain drain' to the United States is also a concern for other countries. For example, analysis of migration flows in

and out of Europe suggests that Europe has lost out in terms of its own potential supply of 'domestic' graduates and its ability to attract scientists and engineers from other countries. The shortage of personnel in these areas is likely to have costs in terms of innovation and consequent productivity growth.

Conclusions and policy implications

While concerns about over-education are largely misplaced, there do appear to be problems with graduates not always having the skills required by employers. One response to this is to make sure that vocational courses meet the requirements of employers and to ensure that the accreditation system is appropriate.

But it would be unwise to emphasise acquisition of highly specific skills at the expense of general education. This is a challenge for whole educational structures not just higher education since, in many countries, students have to make a decision between general and vocational education long before they reach the stage of entering higher education.

There is also a question of the balance between employer-provided training and education provided by institutions of higher education. Employers have a role in addressing concerns about skill mismatch. And governments have an important role in improving information about training opportunities, setting appropriate legal frameworks and ensuring portability of skills.

Potential policy responses to the variation in returns to higher education by subject include differential fees (or bursaries) by degree subject so that graduates are encouraged to study subjects for which there is high relative demand in the labour market. There may also be a case for the provision of better information to potential students on job prospects and earnings by degree subject.

More generally, given the positive relationship between education and economic growth, and the fact that returns to higher education are strongly positive, there is a good argument for continuing to expand higher education.

This could be achieved by public provision of more places in higher education. Where capacity constraints are not the issue, then an important matter for investigation is why more



In many countries, there is relatively higher demand for graduates in science, engineering and technology

young people do not pursue higher education. One possibility is the cost both in terms of fees and the opportunity cost (the earnings students – and possibly their families – must forgo while in higher education). Where such constraints exist (most likely for students from poor social backgrounds), there is a good case for bursaries.

Another possibility is that there is insufficient information available to potential students about the returns that might be gained from pursuing higher education (or returns in certain subject areas). In this case again, the appropriate policy response would be to provide this information at appropriate stages of an individual's education.

Skill mismatch – or inadequate levels of skill – is more of a problem than over-qualification

The article summarises 'Tertiary Education Systems and Labour Markets' by Stephen Machin and Sandra McNally, a report prepared for the OECD.

The full report is available here: <http://www.oecd.org/dataoecd/55/31/38006954.pdf>

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