A prosperous future for a market reformed higher education sector

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There is no sector of the economy that will offer better long-term employment prospects than higher education. As technological progress drives advances in robotics, software, and artificial intelligence, human beings will be replaced in most current occupations. Scholarship – the researching, development, and establishing of new knowledge – the type of work distinctive to the academic community – is one of the few activities where computers will remain uncompetitive and humans secure in their role.

While the activities associated with acquiring new knowledge will grow in importance in the future, to meet the need to stay ahead of the machine, it is not necessarily the case that current institutional forms associated with that endeavour will thrive. Computerisation accelerates research and has bred alternatives to the lecture hall. Those organisations that exploit the related efficiencies as they arise will gain at the expense of those that do not use them to adapt to the changing needs of society.

In particular, in relation to the role that higher education institutions (HEIs) have in preparing students for the workplace, they are likely to have to reimagine the service they offer. Rather than offering only the standard three-year, on-site, full-time undergraduate 'product', the value of which will erode quickly, they should become educational 'utilities' – providing learning 'on tap' over the working lives of their customers. They must re-orient themselves to meet the

needs and aspirations of those who are only once a student, but who will often need to refresh their knowledge and skills to sustain their employability throughout their careers.

For HEIs to adjust their offering and remain relevant they must be freed to experiment and offered appropriate incentives. This requires the elimination of much regulation, especially that which constrains the product that is offered and the price that is charged. To ensure that quality and relevance for employability are prioritised, and access, in spite of different fee levels, is maintained, the only workable solution is a market reform based on risk-sharing.

In this approach, the institution has a contractual relationship with its students based on their paying a share of their future earnings to compensate it for the degree-level education and subsequent support they received. This means access for all without students having to pay up front. It also ensures equitable fees — all pay in proportion to the benefit they gain. And it aligns the interests of graduates and HEIs for the long term, encouraging support for graduates as they progress through their careers. The Government's alternative, a statist, heavy handed, interference in HEIs' pricing, course design and customer profile, will prevent adaptation and erode the status and relevance of those that remain subject to it.

The impact of automation

A substantial work was published in 2013¹ which estimated that 47 per cent of total US employment is at risk of displacement by computerisation within the next two decades. Given that the present generation of students, with retirement at 67 or later, will have working lives spanning more than four decades, by extension it is highly likely that the vast majority

¹ C. Frey and M. Osborne, 'The future of employment: how susceptible are jobs to computerisation?', 17th September 2013. Available at http://www.oxfordmartin.ox.ac.uk/downloads/academic/The Future of Employment.pdf (accessed 16th June 2016).

of them will find that whatever career path they choose at the beginning will not stand them in good stead till the end.

The paper demonstrated that computerisation has extended beyond basic manual and administrative tasks to reach into the professions. In health care, it gave as an example the use of IBM's Watson, a technology platform that uses natural language processing and machine learning to reveal insights from large amounts of unstructured data, to provide chronic cancer treatment and care diagnostics. The computer can utilise data from 600,000 medical evidence reports, 1.5 million patient records and clinical trials, and two million pages of text from medical journals. With this wealth of information, far more than any human can absorb. Watson can compare each patient's individual symptoms, genetics, family and medication history to its database to diagnose and develop a treatment plan with the highest probability of success. In some tests it achieved 90 per cent accuracy of diagnosis versus 50 per cent for the human

Some of the tasks historically performed by contract and patent lawyers are now tackled by sophisticated software programs. Computers can quickly scan thousands of legal briefs and precedents to assist in pre-trial research, something beyond human abilities. An example is Symantec's Clearwell system, which uses language analysis to identify general concepts in documents and which on one occasion analysed and sorted more than 570,000 documents in two days. Computers are not just competitive with human professionals, they outclass them. Remus and Levy² concluded that: 'automation is having a significant impact on the labour market for lawyers and that impact will increase over time'.

² D. Remus and F. Levy, 'Can Robots be Lawyers? Computers, lawyers, and the practice of law', 30th December 2015. Available at http://papers.ssrn.com/sol3/papers. cfm?abstract_id=2701092 (accessed 16th June 2016).

In financial markets, artificial intelligence algorithms can utilise a mass of real-time information (company announcements, statistical releases, price moves, etc.); apply an unbiased rule-set based on patterns that have generated good returns in the past; and then act on the logical conclusion instantly while the human trader is still reading the first piece of news. 'Smart beta' funds use software to mimic the strategy of a hedge fund or traditional manager at a fraction of the cost and are growing rapidly in popularity. 'Robo advisors' are undercutting human financial experts.

Since 2011, when the first Stanford MOOCs³ were launched, the delivery of content through the medium of the internet has shown that elements of the service provided by HEIs can also be executed more efficiently with computerisation. By 2015, the number of people signing up to complete at least one MOOC course had soared to 35 million, more than the total of the previous three years. Around 1,800 new courses were announced last year, taking the total number of courses to over 4,000. Courses cover all disciplines – from the humanities and art & design, through the social sciences, education, and medicine to science, engineering and business.⁴ Much of the development of MOOCs is taking place in the US and appears remote. But many of the courses are available to UK students and the internet shrinks distance.

With so many high skill occupations already seeing work leech away to machines, what will be left for humans? Frey and Osborne⁵ established that, the higher the level of education required for an occupation, the lower was the risk of computerisation. They concluded that, in particular, 'it

³ Massive Open Online Course. For further information, see the Wikipedia entry at https://en.wikipedia.org/wiki/Massive_open_online_course (accessed 16th June 2016).

⁴ D. Shah, 'By the numbers: MOOCs in 2015: how has the MOOC space grown this year?', 21st December 2015. Available at https://www.class-central.com/report/moocs-2015-stats/ (accessed 16th June 2016).

⁵ Frey and Osborne, 'The Future of Employment', op. cit.

seems unlikely that occupations requiring a high degree of creative intelligence will be automated in the next decades'.

The trends implied by Frey and Osborne's analysis of the US labour market are apparent in shifts in the occupational structure of employment in the UK. 'Working Futures 2014-2024', a publication of the UK Commission for employment and skills, confirms a continuing change in favour of white collar and higher skilled jobs, suggesting significant employment growth for more senior occupations such as managers and most professional and associate professional and technical jobs – careers which require a higher level of education.⁶

HEIs are thus faced with both a significant opportunity and a real threat. On the one hand there will be growing demand for ever higher levels of education to develop an individual's creative intelligence. On the other, as MOOCs improve, without evidence that the vastly greater cost of a traditional university experience has an adequate payback, an increasing number of students will find other routes to educational attainment.

Evidence of the deteriorating cost—benefit payback of a degree

A recent study led by the Institute for Fiscal Studies which, uniquely, had access to individual HMRC earnings reports, concluded that, at 23 out of 175 UK Universities, half of male graduates were earning less than non-graduates ten years after graduation. For women, this was the case for graduates of nine institutions. Data from the Office for National

⁶ R. Wilson, N. Sofroniou, R. Beaven, M. May-Gillings, S. Perkins, M. Lee, P. Glover, H. Limmer, A. Leach, 'Working Futures 2014-2024', UK Commission for Employment and Skills (UKCES) Evidence Report 100 (April 2016). Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/513801/Working_Futures_final_evidence_report.pdf (accessed 16th June 2016).

⁷ J. Britton, L. Dearden, N. Shephard, A. Vignoles 'How English domiciled graduate earnings vary with gender, institution attended, subject and socio-economic background', IFS Working Paper W16/06 (2016). Available at http://www.ifs.org.uk/uploads/publications/wps/wp201606.pdf (accessed 16th June 2016).

Statistics show that more than one third of graduates are still in non-graduate level employment five years after completing their studies.

While the 'graduate premium'⁸ is still relied on by government as the justification for encouraging more 18-year-olds to attend university, and the UCAS website advises them that 'undergraduate higher education is a world of fascinating subjects that can help you reach new careers and higher earnings', ⁹ outcomes are in practice extremely varied. The IFS study commented: 'What is perhaps most interesting is the sheer quantity of variation in graduates' earnings within an institution.'¹⁰ There is also significant variation between institutions so that, for a given individual, there is, in practice, no certainty that a degree will result in earnings greater than would be achieved without a degree, let alone in 'higher earnings'.

In relation to costs, the first cohort to face the £9,000 tuition fee scheme is now in the workplace and, as the repayments become a reality, is starting to complain. A fundamental problem that the government faces is with its description of the funding mechanism as a loan when in fact, as David Willetts, author of the £9,000 tuition fee, has stated, it should be characterised as a 'capped graduate tax'. The expression 'loan' was used, Willetts explains, 11 because it was familiar terminology. That is a problematic argument where the promotion of a financial arrangement is concerned and accurate descriptions of a product are required to avoid misleading the customer.

⁸ The 'graduate premium' is the additional earnings of graduates by comparison with equivalent non-graduates.

⁹ See the UCAS web page at https://www.ucas.com/ucas/undergraduate/getting-started/undergraduate-experience.

¹⁰ Op. cit., p. 35.

¹¹ D. Willetts, 'Issues and ideas on higher education: Who benefits? Who pays?', London, The Policy Institute at King's College London, June 2015. Available at http://www.kcl.ac.uk/sspp/policy-institute/publications/Issuesandideas-higher-education-funding.pdf (accessed 16th June 2016).

There are two key elements of the tuition fee scheme that demonstrate that the 'loans' are instead a tax: 1) the government has reserved the right to vary the terms at any time; and 2) the interest rates charged are arbitrary, leading to them being misleading and unfair. In particular, the charging of a higher rate of interest to higher earners, who are the better credits, may be consistent with progressive tax policy, but it is contrary to the logic of lending. Both aspects are now being challenged.

An engineering student at Durham University, Alex True, recently started an online petition objecting to the government's decision to freeze the £21,000 repayment threshold, above which 9 per cent of earnings must be paid (thus eroding its real level). True complained that it was not fair to make a retrospective change to an agreement the student had entered into three years earlier. His perception of the scheme as an 'agreement' is consistent with the terminology of a loan, in which the borrower's obligations are clearly set out and cannot be changed by the lender.

The government, however, wants to change the threshold to reduce likely future write-offs, currently estimated to cost the taxpayer up to 45 per cent of the value of the monies advanced to HEIs.¹² As the 'agreement' is not a loan they gave themselves the power to do that. It may not be so easy. At the time of writing, True's petition had reached more than 120,000 signatures in just a few days, above the level that can lead to a debate in parliament about the issue.

Another student, Simon Crowther, posted on Facebook a letter he had sent to his local MP, alongside a statement he received from the Student Loans Company showing a large rise in his

¹² House of Commons, *Student Loans: Third Report of Session 2014-15*, HC 558, 22nd July 2014 (London: The Stationery Office Limited, 2014). Available at http://www.publications.parliament.uk/pa/cm201415/cmselect/cmbis/558/558.pdf (accessed 16th June 2016).

debt while he was at University. As the state charges interest at 3.9 per cent up until the April after students graduate, they are seeing their debts rise by as much as £180 a month even while they are not earning. Crowther spoke of his inexperience when he signed up for the tuition fee scheme and that he felt he had been misled. He had not expected the debt to increase so much before he started work. His letter immediately went viral on social media.¹³

It will not be long before some of the 2012 cohort are earning £41,000 and seeing that their ability to repay the 'loan' is being severely hampered by the imposition of a 3 per cent spread over RPI, while peers who earn less are charged a lower rate, and those who earn more pay the same. If they are engaged in the financial sector they will know that the 3 per cent bears no relation to fair market rates, is arguably an unfair term of the contract, and may be open to challenge. As they will also be facing a marginal rate of income tax 9 per cent higher than their non-graduate peers, it is probable that their expressed views about the true financial costs of the tuition fee scheme will discourage prospective students.

Businesses also feel that the state-regulated higher education sector is underperforming private providers where they can be compared. The CBI/Pearson education and skills survey 2015 reports that, in relation to training programmes, 'Private sector training providers outperform FE colleges and universities on every satisfaction measure.'

As the data used in the IFS Study becomes more widely available, prospective students will learn of the highly

¹³ H. Osborne, 'Graduate whose loan grew by £1,800 in one year says students were misled', *The Guardian*, 25th May 2016. Available at http://www.theguardian.com/education/2016/may/25/simon-crowther-loan-grew-by-1800-a-year-says-government-misled-students (accessed 16th June 2016).

¹⁴ CBI, 'Inspiring Growth: CBI/Pearson education and skills survey 2015'. Available at http://news.cbi.org.uk/business-issues/education-and-skills/gateway-to-growth-cbi-pearson-education-and-skills-survey-2015/ (accessed 16th June 2016).

uncertain value of a traditional university education. They will at the same time be hearing more from the post-2012 cohorts about the hardship caused by the 9 per cent marginal rate of tax. Internet savvy, they will experiment with MOOCs and will be solicited by private providers of training who can point to their stronger reputation with business. Unless traditional universities can put forward a competitive proposition they face the likelihood that prospective students, having considered the risk:return trade-off, will desert them in large numbers.

The 'Teaching Excellence Framework'

The government appears to recognise that many students are not getting value from their investment in a university education. Its response, a White Paper entitled, 'Success as a Knowledge Economy',¹⁵ seeks to tie the sector up in even more red tape rather than set it free to apply the academic process of experimentation and learning to the complex problem of how to deliver employability in a rapidly changing workplace.

It is beyond the scope of this essay to critique each of the measures the government proposes to use to assess 'Teaching Excellence', but one example stands out as illustrative of how trying to turn arbitrary notions of quality into targets has damaging effects. The government proposes to count the hours of 'contact time' that a student has with teaching staff as an indication of quality.

First, this is a measure of quantity not quality. It is like measuring the productivity of a business by counting the number of workers rather than the output per worker. With

¹⁵ Department of Business Innovation and Skills (BIS), 'Success as a Knowledge Economy: Teaching Excellence, Social Mobility and Student Choice', Cm 9258 (May 2016). Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/523396/bis-16-265-success-as-a-knowledge-economy.pdf (accessed 15th June 2016).

online learning improving and becoming steadily more accessible, in relation to both the opportunity of enhancing students' creative intelligence, and in terms of efficiency, the smart thing for an HEI to do would be to automate much of its tuition and reduce contact time, but employ more highly paid, and effective, lecturers to deliver it. Counting contact hours will instead encourage them to employ an army of low skilled and relatively low paid teaching staff. Contact hours will go up, but educational quality will go down.

The proposed regulation of teaching embedded in the 'Teaching Excellence Framework' is but the final nail in the coffin of HEIs' freedom of operation, where pricing, course design and customer selection are already subject to heavy interference. The capping of tuition fees at £9,000 per annum effectively marked the introduction of price controls. Course design is subject to approval by the Quality Assurance Agency for Higher Education (QAA). The Office for Fair Access (OFFA) oversees student recruitment policy.

When Ed Miliband said that he would control energy prices he was ridiculed and, in due course, the oil price tumbled, proving the error in his logic. The White Paper's continuation of price fixing will similarly be undone by market forces. The £9,000 tuition fee is already draining away a growing proportion of internationally minded students who are choosing to study abroad and is deterring 'working class' white males. Technological change in the form of ever-improving online courses is the shale oil of higher education and will gradually erode demand for what, for many, is an over-priced luxury.

Perhaps the oddest suggestion in the White Paper is that the sector's deficiencies are due to a lack of competition. With over 150 institutions offering degree-level courses, all promoting themselves enthusiastically, there are no grounds for believing that a few more providers will somehow create

competition and desirable behaviour change. A more astute observation would be that it is impossible to compete when the state has all but eliminated the scope for experimentation and differentiation through its restrictive regulatory approach to all aspects of HEIs' activities.

In the same way, the White Paper's assumption that better 'information' about quality is the key to improvement is misplaced. It always sounds good to have 'more information' but, as Havek explained, in complex systems the information that would be relevant can't be accessed and those measures that are available may be misleading, and can have potentially damaging unintended consequences. For example, it is proposed to use past graduate earnings outcomes both to 'inform' prospective students and to determine allowed fee levels. Apart from the fact that the very historic nature of this data will be misleading – as in finance – the past is not necessarily a guide to the future – it could be especially damaging to HEIs in the North. These may very well suffer a drop in applications from students misled into thinking the institutions are doing a poor job. when in fact earnings are lower simply because their alumni live predominantly in the North where the cost of living and incomes are generally below the more expensive South. Given the North's cost advantage it would be better to expand provision there, whereas the effect of the White Paper proposals will be to shift demand to the South.

The stifling effect of such regulation is likely to set the stateregulated sector at a considerable disadvantage and make it more vulnerable to disruption from alternative private providers making greater use of technology.

Risk-sharing – the practical alternative

If they are to compete, and to thrive, the traditional campusbased HEIs need to offer a proposition that adds value to what a prospective student can learn by studying online. Although many of the internet-based courses create online 'communities', the experience of meeting face to face with one's peers and teachers retains a high value for preparing students for the world of work. But an even stronger suit for such institutions would be to offer a (working) life-long advisory and support service tailored to the needs of the individual. This would offer access to new research and ideas, and train the student in the methods of acquiring new knowledge, both of which are most likely to remain beyond the scope of a standardised and computerised system.

The need for lifelong learning, like exercise, is commonly accepted. The existence of many free online courses means the intellectual 'gym' is there for anybody to use as they wish. The University can be the personal trainer that adds the essential human element to motivate, guide and support the student through the exercises best suited to their needs.

Professor Alison Wolf, author of the Wolf Review of vocational education, highlighted the importance of incentives in educational provision and the malign effects of regulation, explaining:

In post-19 education, we are producing vanishingly small numbers of higher technician level qualifications, while massively increasing the output of generalist bachelor's degrees and low-level vocational qualifications. We are doing so because of the financial incentives and administrative structures that governments themselves have created, not because of labour market demand, and the imbalance looks set to worsen yet further.¹⁶

¹⁶ A. Wolf, 'Heading for the precipice: can further and higher education funding policies be sustained?' London: The Policy Institute at King's College London, June 2015. Available at https://www.kcl.ac.uk/sspp/policy-institute/publications/Issuesandideas-alison-wolfdigital.pdf (accessed 16th June 2016).

No amount of expertly designed metrics can make a system work as intended if the incentives are wrong. Under the current regime, HEIs (which need to generate a surplus over the cost of staff and suppliers like any other corporate entity) are encouraged to charge the maximum fee level of £9,000 and to minimise the cost of provision, subject to satisfaction of the myriad targets and constraints placed upon them. There is no incentive to focus any attention on the long-term employability of their graduates, even though this is the desired outcome of the system.

The obvious way to align incentives so that HEIs have a financial motivation for ensuring long-term employability is simply for graduates' earnings-linked repayments on the tuition fee scheme (which continue for up to 30 years) to be made to the institution they attended rather than to the state. The risk to the institution of having its finances subject to the career success of its alumni is reduced by the portfolio effect. HEIs' exposure is spread over many individuals and economic cycles. Over the long term, however, the better the job it does in improving the employability of its charges, the more financially successful it will be. This is risk-sharing in practice – both parties are partners in the success of the student. 'Quality' regulation would no longer be required as the institution's fate rests on delivering a high value-added service.

If a graduate is at some point unemployed, or in a low-level job, assuming the institution feels that career guidance and/ or training could transform the situation, it will have a cost/ benefit reason for helping. With median full-time earnings at £27,600,¹⁷ for each month an institution can shrink the

¹⁷ Office for National Statistics (ONS), 'Annual Survey of Hours and Earnings: 2015 Provisional Results', Statistical bulletin released 18th November 2015. Available at http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2015provisionalresults#main-points (accessed 16th June 2016).

time out of employment there is a gain of over £2,000 to be shared. If the University's intervention could raise the earnings of the graduate in a low-skill job by just £1,000 per annum for a decade there will be gain of £10,000 to be divided. The University becomes a provider of 'educational insurance' stepping in to update skills when needed. This is something the passive, impersonal, offering of MOOCs cannot compete with.

If risk-sharing along these lines was introduced over-night, many institutions would immediately become financially unviable due to the weak earnings of their students as set out above. It would be wrong for them to have to face this consequence as their graduates' weak earnings (relative to their level of education) have arisen chiefly as a result of government regulation, as Professor Wolf explained. Consequently, there would need to be a long transition period during which the government would guarantee the minimum fees collected at a percentage of the notional amount charged (currently typically £9,000 p.a.), with the percentage floor declining over time. This long adjustment period, plus developments in technology making physical assets such as historic buildings ever less of an advantage, would make it possible for some less well-known institutions to make their way into the ranks of the best regarded universities.

Eventually, HEIs will adjust to the new incentive structure and, free to determine their own destinies, some will focus on high cost courses associated with high returns, some will opt for low cost/low return, while others will offer a mix. Universities could choose to remain primarily targeted at 18–19-year-olds, or they may discover that those who already have some experience of work can make especially good students. All should pay more attention to post-graduation outcomes. Careers and alumni offices would be expected to grow in

importance as the financial success of the institution thereafter would depend on students' career progression.

It is impossible to know what would be the best strategy in terms of course offering for any given institution. It would not make sense for them simply to focus on subjects associated with historically high-paying careers because, as set out above, even these are at risk of displacement by computer. Also, it is not the case that all students want to be lawyers, doctors or bankers, and if courses to attract the others are not on offer that HEI would lose market share.

Further, businesses 'look first and foremost for graduates with the right attitudes and aptitudes to enable them to be effective in the workplace – nearly nine in ten employers (89%) value these above factors such as degree subject'.18 As Lee Harvey commented: 'Many research studies have revealed a consistent core set of desirable skills, often independent of the degree subject. These consist of interactive attributes – communication skills, interpersonal skills, and team-working – and personal attributes, including intellect and problem-solving, analytic, critical and reflective ability, willingness to learn and continue learning, flexibility and adaptability, risk-taking, and self-skills - in short, attributes that help organisations deal with change.'19 The appropriate response is therefore not to change the range of subjects on offer but to modify course design to ensure that these desirable work skills are developed in the study of the chosen topic.

To take account of the fact that some students are disadvantaged, the government could offer a 'student

¹⁸ Op. cit., p. 8.

¹⁹ L. Harvey, 'Enhancing employability, recognising diversity: making links between higher education and the world of work', Universities UK (2002). Available at http://www.qualityresearchinternational.com/esecttools/relatedpubs/enhancingemployabilityrecdiversity.pdf (accessed 16th June 2016).

premium' along the lines of the 'pupil premium' to make it attractive for HEIs to reach out and offer places to those who otherwise might be side-lined. This is a far more efficient way to achieve the equal access objective than the current bureaucratic controls — and access statements would become a thing of the past.

Conclusion

Stanford was instrumental in getting MOOCs off the ground because it recognised much basic content delivery, work assignment, and assessment could be commoditised and that that was not where its comparative advantage lay. What is developing in the US now is a blended model, where online content is supported with human interaction-based learning. A test by San Jose State and edX found that incorporating content from an online course into a campus-based course increased pass rates to 91% from as low as 55% without the online component.²⁰

Such results threaten disruptive change in higher education. If the UK is to remain competitive in this sector its HEIs need to be relieved of the burden of much present regulation and offered incentives that align their interests with those of their students, so that they can experiment and adapt. Risk-sharing would enable this. It would also make UK academics among the most valued members of society since their application of creative intelligence would be the difference between success or failure in the age of the machine.

²⁰ See the Wikipedia entry at https://en.wikipedia.org/wiki/Massive open online course.

This essay was originally published as part of a collection looking at the UK government's Higher Education and Research Bill 2016, entitled *Steps forward, steps backward:* what to make of the government's plans for higher education reform.

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There has never been a period when higher education has faced so much turbulence and change as it does now, nor one for which both the sector and government is so ill-prepared.

The UK Higher Education sector is regarded as one of the best in the world, but in an increasingly global market-place, many suggest the signs are that it's beginning to look increasingly uncompetitive too. Across the system as a whole,

evidence of flexibility, creativity and sensitivity to consumer demand is patchy.

Policymakers are looking for more efficient, cost-effective ways of delivering higher-quality, and more relevant, higher education, and the English government has recently presented its view of the priorities in a new Higher Education and Research Bill. In this collection of essays, our panel of experts respond.