



Science and Technology Select Committee

Corrected oral evidence: Science research funding in universities

Tuesday 11 June 2019

11.30 am

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Members present: Lord Patel (Chairman); Lord Borwick; Lord Kakkar; Lord Mair; Baroness Manningham-Buller; Lord Maxton; Baroness Morgan of Huyton; Baroness Neville-Jones; Lord Oxburgh; Lord Renfrew of Kaimsthorn; Baroness Young of Old Scone.

Evidence Session No. 6

Heard in Public

Questions 38 - 45

Witnesses

Dr Tim Bradshaw, CEO, Russell Group; The Rt Hon Lord Willetts, Executive Chair of the Resolution Foundation, King's College, London and former Minister of State (Department for Business, Innovation and Skills) (Universities and Science) 2010-14; Professor Peter Bruce FRS, Physical Secretary and Vice-President, Royal Society.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witnesses

Dr Tim Bradshaw, The Rt Hon Lord Willetts and Professor Peter Bruce FRS.

Q38 **The Chairman:** Good morning, gentlemen. Thank you for coming today to help us with our inquiry. The main aspects of it are university funding for research and the various avenues that are possible. We are livestreaming on the internet, so I ask you, to introduce yourselves from my left, so that we get you on the record. If any of you want to make an opening statement, please feel free to do so before we get on to questioning.

Dr Tim Bradshaw: I am the chief executive of the Russell Group of universities. I represent 24 research-intensive universities in the UK.

Lord Willetts: I am a Member of the House of Lords. I should register that I am a visiting professor at King's College London, chancellor of the University of Leicester, and an honorary fellow of Nuffield College, Oxford. I also have a post on the board of UKRI, which is relevant to this Committee's investigations. I hope I will be able to speak in a personal capacity. I am not going to go directly against UKRI, but what I say should not be taken as necessarily the view of UKRI.

The Chairman: Feel free to speak against UKRI.

Professor Peter Bruce: I am the physical secretary and vice-president of the Royal Society. I have two other hats to wear. That is the main one for today but, so you understand my context, I was also one of the founding members of the Faraday Institution for energy storage research, which was one of the first projects funded by the Industrial Strategy Challenge Fund. I have had direct experience of how to at least attempt to implement that strategy. My third hat, my day job, is as Wolfson professor of materials at Oxford.

Q39 **The Chairman:** I will ask the first question, which has to be about the Augar review. I would like to ask you about two key components of that review. One is that the fees will be reduced to £7,500. What will be the effect of that on universities, particularly in developing and supporting research? The second question on the recommendations of the Augar review relates to adjusting the teaching grant related to different subjects. How will that affect universities and their responsibilities for developing and supporting research?

Dr Tim Bradshaw: We have said this at other points, but we have looked at the Augar review in terms of its impact on universities and students. For me, there were three key tests: does it supply sustainable funding for universities? Is it fair for students? Will it support the broad range of disciplines that currently we are able to teach? The answer on all those is probably no. In terms of the actual impact, if it went through to £7,500 fees, that is about a £1.8 billion a year cut to universities across the UK. It will be about a £547 million cut just to the Russell Group of universities. That is not only in England; that would also affect those in Wales and Scotland and Northern Ireland, in the knock-on consequences

of students not being able to pay full fees in those areas. That matters to us because that is a huge shortfall.

Where do we make up the money from if we are faced with that? We would have to look very hard at what we do in relation to the priorities we have in terms of what we fund and transfer money from some of our other income streams: from philanthropy and investment income and, in particular, from international students. At the moment, we are able to make some money out of international students. It is an international market. We can charge the going rate for fees. That allows us to cross-subsidise research, in effect. By and large, teaching just about breaks even across all our disciplines in the UK. The additional money we get from international students goes to fund research. If we have a huge hole in our teaching budget, we would not be able to use that money twice. We would have to think very carefully about where that money is used. I think you would see quite quickly a tangible and direct impact on not just teaching but research.

Professor Peter Bruce: "Disaster" is an often-overused word, but I think it would be pretty close to disaster if the shortfall was not made up in another way. It varies from institution from institution, but it is certainly true in some of our institutions that the increase in the number of students over the last few decades has helped fund the overall ambitions of universities in research and in teaching. A cut of the magnitude that is proposed would have a devastating effect on research, especially because it cuts the block grant, effectively, that the universities have to operate with, which is already being eroded. I am sure we will come on to QR and other issues later, but that is already being eroded. This would be another major erosion.

Lord Willetts: On making up the shortfall, the theory of Augar is that the loss of the fee income is made up by grant. My concern is that I do not personally think that higher education is ever a high priority for public spending. That is the evidence of the past 20 years. If I was worried about FE, as Augar is, I would not turn up at the Treasury asking for £1.5 billion of HE grant to compensate for lower fees. I would ask for money for FE. Pushing up public spending on higher education is a very difficult ask. Even if it appeared in the first year or two, I would doubt whether it was a reliable source of income in the long run.

Overall, setting aside the grant compensation for the loss of fee income, Augar's model is proposing reductions in the real resources available to universities for teaching. That is the model: bringing down the fee level, freezing it. He explicitly says that his aim is to bring down the unit of resource for teaching. The anxiety about using income from overseas students to cross-subsidise teaching when, at the moment, it is probably cross-subsidising research is a very understandable concern in the higher education sector.

The Chairman: That is a very good answer. What effect would the teaching grant being adjusted to the different subjects have?

Dr Tim Bradshaw: To give you context for the situation at the moment, the Government tops up teaching grants for some subjects: STEM

subjects, medicine in particular, and a few others. Across the middle group of band B subjects—most of science, technology and engineering—we think in our peer group of universities, the Russell Group and a few others, we make a loss of about £1,400 per student in those areas even with the current government top-up grant. If you cut the fee again, that puts an even bigger hole in the teaching of STEM subjects. The top-up grants that you would need from Augar are substantially more than just the gap from £9,250 down to £7,500. They would need to make up the additional deficit that we are already carrying on those subjects.

One of our challenges is the £7,500 figure that is in Augar's report. You may have seen that, at the same time, the Government commissioned a piece of work from KPMG looking at an alternative view of how much it costs to teach various subjects. I think the lowest-cost band of subjects that it looked at was English, law and modern languages. The average fee that it came up with that would be needed in that area was £8,801. Even that is well above what Augar was suggesting.

Lord Willetts: There would be some significant distributional shifts between universities. If you accept Augar's claims and say that there would be more money for physics and less for history and economics, and more money if you take disadvantaged students and less if you do not, the LSE, for example, would be very badly hit in this model. Your Committee has to take a view about how it interprets the word "science" in your remit. If "science" includes social sciences, universities that focus on those disciplines will have a very significant hit.

There is a deeper question here about how you think a university works. The Augar view is that these grants from government are precision weapons, targeted missiles that you can send in and ensure that that is an extra thousand pounds that goes into the physics lab. Indeed, that is his view of tuition fees: that tuition fees go directly to a subject. I have a list of regrets from my time as Minister. One of my regrets is that we are stuck with the language of "tuition fees" rather than "university fees". These are fees that include mental health services—an increasing issue in education—sports facilities and the access spend. The fees are not intended quite as narrowly as he implies.

At the other end of the spectrum, an alternative view of university is if you are running a university with a budget of £250 million or £500 million or £1 billion, in some cases, you have money coming in from all places, and you are trying to run it as a coherent entity, as a grown-up autonomous body. The more people try to tell you, you have this jam jar and that jam jar, the harder it is to run it overall as a holistic entity. There is obviously a spectrum there, but Augar goes too far in thinking that you can attach precise purposes to specific bits of money rather than regarding university as an overall institution that has to be well run by its academic community and its vice-chancellor.

Baroness Neville-Jones: Interdisciplinarity, which is growing, also complicates that picture, surely.

Lord Willetts: Yes. Good point.

Professor Peter Bruce: Perhaps I can pick up on what David said. I think we are all in agreement that research challenges of the future are multidisciplinary and go across the arts, humanities and sciences. It is important to have a balance, but there is another key dimension, especially in science research. If we are going to meet the ambition of 2.4% and, ultimately, 3%, we will have to see an increase of 50% in active researchers in the UK. That means we will have to attract more people into STEM subjects. In all these considerations about Augar, et cetera, we have to be mindful of how we incentivise more school students to move into STEM subjects in universities. If we do not do that, it will not sustain the research excellence that we have currently, and it certainly will not deliver on the 2.4% agenda. There is a difficult balance to be struck here. I am not disagreeing with my colleagues, but there is a long-term problem of needing more students in STEM subjects.

Lord Kakkar: In that regard, has the Augar review been sufficiently sensitive to other areas of government policy, such as the emphasis on promoting research and development in our country and therefore the need first to have more undergraduate students and then more researchers?

Professor Peter Bruce: I do not think it has. It has looked—perhaps understandably so—at the teaching agenda across the whole of higher and further education. Many of the things it says about further education are very good, but I think there is a casualty in all this. The casualty potentially is research excellence in the UK. We have to remember the context. The UK punches well above its weight in research. It is one of the things that we do really well. Internationally, we are recognised to be right up there. We have several universities that are in the top 10. Our competitors are investing more and more every year. Germany will put 3% per annum more into its research base until 2030. If we do not do that, we will lose our leading position.

Lord Willetts: If I may say so, I think your question gets to the heart of a tension in public policy. Responsibility for universities is divided between two different departments, one covering teaching and the other covering research. It is clear that the Augar agenda—who knows to what extent it is the DfE agenda—is to reduce teaching funding and reduce the unit of resource going into universities. The BEIS agenda is to grow R&D spend. So you have one department with its foot on the brake and one department with its foot on the accelerator. This is all the same institution, as I said earlier, and it is a very peculiar way of going about things.

I completely agree with what Professor Bruce said. If you need more graduates in STEM, and in a wider range of disciplines as well, it will probably require the growth of universities and more people going to university. If they are more marginal students, teaching them will be tougher. The idea you can sit in one department and try to shrink them and sit in another department and try to grow them is an issue that I hope this Committee will resolve for the benefit of government as a whole.

The Chairman: To resolve it, somebody has to listen.

Baroness Neville-Jones: The car stalls when that happens if you have a brake and accelerator.

Lord Willetts: Or goes around in circles.

Lord Kakkar: So we are clear, would the sensible approach be to unite those two elements of supervision for the university and higher education sector and bring them into a single government department of responsibility?

Dr Tim Bradshaw: As long as it is a coherent approach. I do not want to sit and judge and say it should be in one department or another, or the Cabinet Office, which was often thought would be a good place to put it in the past. It needs to be coherent and joined up, so you have the DfE and BEIS working together. It is the other departments as well. The Home Office is another key one in this in terms of the international talent that we attract: students, researchers and other academics. At the moment, the three are not working together. It is not only about the money; it is about the other regulatory environments that we operate in and whether they are working for the benefit of the whole of the UK.

I would like to pick up on something David said, around his jam jar analogy. The autonomy that we have in our universities is not talked about enough. It is not complete outright autonomy. It is sensible autonomy. It is regulated. There are controls and checks and balances. That is what makes the UK so good internationally. We can bring in the best talent. We can decide to prioritise one thing over another. We can explore things that the research councils will not fund yet but we think are important. Particularly with Augar, it feels as if there is another chip away at the autonomy. We have had a reduction in QR funding over the last 10 years or so.

The Chairman: We will come to that.

Dr Tim Bradshaw: Yes. It feels like another instance of government trying to control every little bit of what we do without understanding that universities are good because they can do things in their own autonomous way.

The Chairman: Lord Willetts, with your experience in the past, what do you think about this suggestion of integrating the departments?

Lord Willetts: In my view, although at the time some universities thought it was barbarism that they were part of the business department, at least the business department dealt with independent organisations; we did not try to run British business. If you go back to Robbins, Robbins did not want universities in the education department. He envisaged a kind of culture department not unlike DCMS, where he saw universities alongside museums and art galleries. Having universities in a department that does not run things but deals with autonomous agencies is culturally a better fit than a department that has had decades of frustration with performance of primary and secondary schools and believes in intervention. We now have this divide. In the current dispensation, it puts

a very heavy responsibility on the individual Minister, who is the one person in the entire system who straddles these two perspectives. I have enormous admiration for Chris Skidmore, Minister for Universities, and, indeed, his predecessors, Sam Gyimah and Jo Johnson. They have a particularly difficult job moving between two different departments and as the one person in the system who has the overview of university as a whole institution.

Q40 Baroness Manningham-Buller: Tim, assuming you are right that this is not sustainable—and David says that this is not always attracting the right degree of funds anyway, as history shows us—we have heard from one witness that what will happen is that more expensive courses will be cut. I am not asking for an apocalyptic vision, but what will be the consequences if the grant is not made up to the size we expect? What distortions might occur?

Dr Tim Bradshaw: The obvious thing is that there is only so much we can afford to teach at a loss. If the grants are not made up, ultimately there will be a cap on numbers of students. The Government may not impose a cap, but there is a de facto cap because it becomes a loss-making activity. We will try to limit that as much as possible, but that is the ultimate reality. There will be fewer places for students at UK universities.

Baroness Manningham-Buller: Will there be a reduction in the number of courses offered?

Dr Tim Bradshaw: You can imagine that. You can imagine each university will be scenario planning this: what do you cut first? I imagine there will be things that are nice to have that go first. Some of the outreach and community work that universities do might suffer. You can imagine the work they do with museums and galleries is a nice to have. The work they do to support UK Sport might be seen as a nice to have by some universities. That could get cut. You start going down the list.

Universities will probably delay maintenance work on various buildings that probably should be upgraded. We have seen that happen in the past. Then you get down to individual courses. A lot of university courses nowadays, particularly when you get to your second and third years, have lots of module choices you can do, as well as very attractive and interesting bits of fieldwork or lab study. Those could all end up being squeezed. You see a catalogue of things that universities will go through. Which bits get cut first will depend on how much top-up they get. Ultimately, the student experience will suffer.

Lord Willetts: When you say, “if the grant is not replaced”, Philip Augar would say that his proposals stack up only if the grant is fully replaced. You then have to look at distribution impact. Behind that, even if that happens, the Augar plan is one in which the real resource for university students is reduced steadily over time. We know from the history of universities, through until the Blair fees first came in, what happens in those circumstances. It is hard to be precise about exactly what happens, but labs do not get upgraded. Marginal students, who tend to require

more attention and come with a higher cost, are the ones you do not wish to recruit, so it undermines your access agenda. The market for leading academics is now a global one. Leading academics can command high salaries. When you are competing with universities around the world for a big name professor, will you be able to get him or her to come to the UK? After 10 or 15 years of growth would come to a halt and it would be, sadly, a period of constraint and decline.

Professor Peter Bruce: That was the point I was going to make. I will amplify one or two things. It is not just the salary issue. If you are going to attract someone in the experimental sciences, it will typically cost you between £3 million and £6 million to set them up. If you do not have those resources, you will not attract the best people. The infrastructure will also suffer, not just building new labs. There is a lot of equipment universities have to buy that they will not get from the research councils because they are too generic for any particular project. It is very hard to get funding for those sorts of things. The concept of the "well-found laboratory" is a phrase that was used 20 or 30 years ago, when the balance between the so-called block grant and the grant that comes through projects was the inverse of what it is now. It is now 80:20 in favour of the projects. If you go back a few decades, it was 80:20 in favour of the block grant. That would have a massive impact on the infrastructure. The concept of a well-found laboratory would decline further.

Q41 **Lord Mair:** We have heard a lot about the target of increasing the R&D spend to 2.4%. The Universities Minister has rightly identified that will need a very large number of researchers. The figure of 260,000 has been stated. I am not sure how accurate that is, but a very large number of new researchers will have to be found. What needs to be done to achieve that? How will we increase the number of researchers to these large figures?

Professor Peter Bruce: I touched on this before. We have to encourage more people into STEM subjects so that we ultimately feed our homegrown talent. We are not going to do this unless we take a very different approach to immigration. We need talent from outside the UK if we are going to meet the 2.4% target. It may not be 230,000, but it is a large number. It is a huge increase. Even if you encourage people to go into STEM subjects, it is four years until they graduate and another three or four years until they get a PhD. That is beyond the horizon of the 2.4%. We absolutely have to take a more positive approach to immigration. Currently, if you are a student and you want to come and do a PhD in the UK, the initial cost of a visa to do that is around £1,200. For our competitors, it is about £300. There is a huge disparity in the attractiveness of the UK. We need to bring these talents in to support our research activities and we need to retain them in our system, both in our universities and in our industries.

Dr Tim Bradshaw: I want to add to that around the EU dimension. We have got half an hour into this without mentioning Brexit, but somebody had to mention it at some point. EU students are about 8% of our total

student population. There are about 51,000 EU students at Russell Group universities. On the postgraduate research side, it is about 15%. They are a key pipeline for us to get through to the next stage to early-career researchers, proper research academic careers and research careers with business and elsewhere. When we look at particular disciplines, such as computer science and maths, it is well over 20%. We become very reliant on certain nationalities to come through because of their culture and history and their own education and what they choose to study. Certain nationalities are more interested in different areas. That becomes very difficult. If we do not have a visa and immigration system that is supportive of them—obviously, we have free movement at the moment—we could have real holes in particular subjects going forward.

Lord Willetts: With a distinguished representative of the Russell Group beside me, when you look at the kind of growth that is involved in 2.4%, it cannot just be delivered through our most prestigious universities. Thinking of how the research engine would work in the UK at 2.4%, if you are going to have more STEM students, you need more teachers teaching STEM subjects. Universities that deliver teacher training have a role. If we are going to have more kit and it will be used effectively, we need more technicians. Technicians often have a university education, but not necessarily at a Russell Group university. The whole system has to function at a higher volume. Again, I detect in the tone of some of the Augar review, and even some of the comments of Ministers, the sense that, "There is a group of good, prestigious universities that we will look after, and the rest can manage on smaller rations". You would not get an efficiently performing R&D ecosystem on that model.

Dr Tim Bradshaw: We would not want that either. We collaborate and work with universities across the UK, many outside the Russell Group. It is about maintaining a thriving ecosystem in the UK. We do well with the diversity we have at the moment.

Q42 **Lord Kakkar:** Turning to the role that UKRI can play in funding research studentships, first, is it taking the right approach with the schemes it has available to meet what is essentially a massive requirement for growth in PhD studentships and so on? Secondly, is the approach right in terms of the funding of these? We understand that there is a substantial lack of capacity to recover full costs for PhD studentships at the moment.

Lord Willetts: That is a UKRI question. You can always argue that we should do more. Wearing my UKRI hat, we have just announced the Future Leaders programme, which is an extension of the capacity. As UKRI, we absolutely understand we have to fund these. At any one time, we fund about 52,000 researchers, including 20,000 PhD students.

On the particular point you raise about co-funding, as the Minister, when I was involved in this, I did promote co-funding. The idea was that Centres for Doctoral Training, for example, should go out and find business and industrial partners that they would work with so that we could leverage public spending by Centres for Doctoral Training partnering with external partners and, often, those external partners advising students on doctoral subjects they might study that were hot

topics for the industrial sector involved. That cannot be a funding model for every PhD. There are exciting examples of what can happen when GSK gets involved with funding, such as people doing doctorates in biological sciences researching a hot topic for GSK and going on and getting a job there. Co-funding is a useful way of growing doctorates, but there will be some disciplines where it is harder to secure co-funding than others.

Professor Peter Bruce: I confess that I am not a massive fan of the Centres for Doctoral Training model. In some cases, perhaps many—and all these things are generalisations—they work well. The problem is this. A group of universities get together. They have to bid for a Centre for Doctoral Training on a particular topic. They put together a nice course. They get a bunch of industries involved. These are all good things—nothing wrong with them—but there is no mechanism for ensuring the students are necessarily working in the best research labs. In some cases, they are. In some cases, everything is aligned, but there is no necessary correlation in that process between where the most exciting and best research is happening and where the Centres for Doctoral Training may exist. As I said, I am not saying the Doctoral Training model is universally bad. It can work well, but I have seen enough examples where there is a disconnect between the formal training, which may be very good, and the opportunity to work in labs that are really at the cutting edge internationally of research in that area.

Baroness Morgan of Huyton: Can I take you back briefly to the Augar review? I have been listening to what you said, and I am struck that, as a Committee, we have an opportunity—in a sense, a responsibility—to shine a light very clearly on this before anything moves forward. I do not want to put words in your mouth, but is it fair that the review was set up to find a way to cut the up-front level of student fee funding, so what students themselves pay? That is why it was set up, and it has stumbled into a review of the wholesale funding of universities without quite realising it has done that, nor with the parameters set out correctly around the report.

Dr Tim Bradshaw: That is absolutely right. To give you one bit of evidence on the fact that it has not done it properly, the Augar report is 218 pages long—David has a copy here; he will tell you—and I think there is one line in the entire report on research¹.

Baroness Neville-Jones: That speaks volumes, frankly.

Lord Willetts: The trouble with Augar is it has two conflicting objectives. One objective, which I very strongly support, is to offer a better deal to the 50% of people who do not go to university, which means a better deal for FE. If one imagined there was a CSR negotiation going on, funding FE and those routes better is a priority use of public expenditure. Separately, there must have been a steer to bring down university fees. When Augar looked at the evidence, he realised that bringing down university fees basically means cutting the unit of resource for educating

¹ There is one sentence on page 93 and a small pull out box next to this.

the other 50% of people. As we know from the evidence, it is not the money that is wasted at the moment.

He then has to come up with this rather elaborate mechanism for compensating for the fee cut. That, in turn, means he now has a public expenditure bid for higher education. If one tries to think what the conversation with the Chancellor is, the Chancellor says, "Right, you want £1.5 billion off me to compensate the loss of fees, and you want a billion off me for FE". Trying to bring it all together has created an unnecessarily conflicted agenda. As we know, students do not pay fees up-front; 9% of your earnings above the threshold is the relevant figure. It is entirely an optical point, but it has real-world costs.

Q43 **Baroness Neville-Jones:** Turning to the question of QR and the effect on research activity, we have heard—and it does appear to be the case—that QR, as a proportion of research funding, is already declining. There does seem to be a trend there. What is the effect of Augar on that? In future, how do universities, which increasingly have to find other resources—either their own or they have to go out and get them—make up the difference? What is the effect, generally, on the future of research? It is a big question. It seems to me that you cannot duck the relationship between these two, which Augar does not deal with.

Professor Peter Bruce: The biggest challenge that we face in research in the UK over the next 10 to 15 years is how we effectively implement the increase in research funding of 2.4% to 3%. Most people understand that this is taxpayers' money. Government and taxpayers want to see tangible benefit from research in the economy, in jobs and in healthcare. That is perfectly reasonable, it speaks to a strategically directed "Let's decide where the research money should be spent" top-down agenda. However, the quality of our research and the reason it is world class, is because it is driven bottom-up. Science is not a mechanical process; it is a creative thinking process. Our talented research leaders are the ones who know where the best and most important research challenges are and how to address them.

Therefore, our challenge in the future is how we marry the top down strategic view, which is understandable and inevitable—and we are not going to remove that, because it is taxpayers' money—with the creative talent bottom-up approach. If we do not get this right, the 2.4% will be wasted. If we get it right, there is a great prize to be had. That is the big challenge. We need to set large-scale strategic goals, e.g. addressing cancer or Alzheimer's, but what we must not do is tell researchers what type of research needs to be done to solve these problems. This, in part, brings us back to QR and the erosion of the FEC costs. One of the places that the focus on underlying talent can occur is with the money that universities can spend in attracting high-quality people, which we touched on before. If they do not have the resource to do that and everything is highly directed, there is a danger of killing the creativity that drives the quality of the research that we do in the UK.

Baroness Neville-Jones: Frankly, that is directed at another bit of government policy. It is not so much Augar as the whole tendency now.

Professor Peter Bruce: It has to be seen in the bigger context of Augar and the effects on these funding streams.

Lord Willetts: The original model for QR funding was compensating British universities for not having American-style endowments. The idea was that it provided us with income under their control similar to an endowment. If you were trying to make the way things play out sound as rational as one could manage, it would go like this. You would say it is the kind of fixed baseline, so it tends to be fixed at the big CSRs every few years and in the seven-yearly REF cycle. Historically, Governments have tended not to adjust the REF—the basic QR funding—much from CSR to CSR.

There is indeed a real-world reduction and it tends to be the case that, between CSRs, Ministers go to the Treasury, which is a recent pattern, and Governments do extras, which tend to be more specific, “Here is this pot for the Industrial Strategy Challenge Fund. I have extra money for capital; extra money within ODA rules”. Over that four- or five-year period, the baseline tends to shrink relative to many exciting added initiatives, which makes the next CSR very important—and the timing of this inquiry is very topical—because the CSR is the opportunity to turn attention away from the specific announcement the Chancellor wants in a Budget back towards the basic underlying capacity of the system and decide what the QR level should be for the next few years.

Dr Tim Bradshaw: QR helps us backfill some of the holes in other areas of government funding. We get about 50% full economic costs on research council PhD studentships, so that is a huge area we have to backfill. For the research councils overall, it is about 72% of full economic costing. Again, we are asked to make up the difference there. There is a little bit of extra money that comes in for charities, but it is similar at 60% or so and we have to make up the difference there when we are working with Wellcome or other charities.

Then there is the dynamic of academics going from grant to grant. There are often gaps between grants. QR can be used to maintain a research group while it moves on and gets its next grant. That is important for retaining talent and making sure that you can build groups. It allows investment in new and emerging areas that no one else is funding, perhaps because they are too risky. It allows money from industry to be leveraged in.

A good example would be the development that Nottingham has done with its zero-carbon laboratory where it is working with GSK. It put QR money into that, which helped to leverage RPIF money and leverage even more money from industry. It has a fantastic catalysing effect for a lot more than you would think. Sometimes you have to pay more to get key individuals from around the globe to establish a research group or become a world leader, which costs money. QR gives you that flexibility to bring in some high-quality people.

Baroness Neville-Jones: What is the longer-term effect of this declining level of recovery on research costs overall, of which QR is part, but it serves other forms of research funding?

Dr Tim Bradshaw: Ultimately, it puts more emphasis on other income streams to backfill the gaps that QR can no longer do. We are putting a huge amount of extra effort into philanthropy and we do very well with that, but are nowhere near as good as the Americans seem to be at it. It puts the emphasis on international students who are not cash cows and are not there to make money for other areas. We bring them in because they are some of the best and most engaged students that we have often.

Baroness Neville-Jones: PhD students are cash cows, are they not?

Dr Tim Bradshaw: No. Taught postgraduates is where you can make some money in some areas, but not in every area. Ultimately, it puts even more pressure on whether you can recruit more international students and push the envelope of what you can charge them, but that is not fair to the students either.

Lord Borwick: Lord Willetts mentioned the enormous difference between American endowments and Dr Bradshaw mentioned the increase in work on philanthropy. Are the smaller universities working as hard as the Russell Group to improve their philanthropy income and the start of bigger endowments for the future?

Dr Tim Bradshaw: I am sure they are all working very hard to do that, but it is a time-consuming and expensive business to raise money. Using our networks internationally to try to bring in money from overseas is one of the key things that universities are looking at. Only a couple of members in the Russell Group have endowments like an American university might have.

Lord Willetts: There is an important cultural difference. American universities have been working much harder for longer at keeping in touch with all their graduates. British universities are still struggling to do that. There was the great observation about Osama bin Laden that if he had been to Harvard Business School, the Americans would have found him within a week as they are so good at tracking down their graduates. They follow their graduates and track them in a way we do not. However, it must be said—and there is a scandal about this in America at the moment—part of what you get in return for giving money to your university is priority for your kids in the application process. That is an explicit part of the deal and would not be acceptable in the British system. The Americans use it to manage their recruitment in a way that would not be acceptable for us.

Lord Borwick: You say that the work is increasing, but I get the impression that we have known about this difference for more than 20 years and everybody says they have to do something about changing the attitude, yet the progress in increasing philanthropy does not appear to be very large.

Dr Tim Bradshaw: Part of it is the difference in culture in the UK and America. We may not have a very good philanthropic culture with regard to universities in the UK, but individuals give a huge amount more to charities such as Cancer Research UK or others.

Lord Borwick: Is it not up to the universities to change that culture? I thought that was one of the things that universities do.

Dr Tim Bradshaw: We are investing to try to maximise what we can from philanthropy.

Professor Peter Bruce: I will not name names but one example is a vice-chancellor in the UK who looked around the council members and said, "Well, so what are you going to do for this university?" and they all looked horror-struck. If that was said in a US university, they reach for their chequebooks. It is a very different culture and a hard thing to change. I am not here to represent the universities, but they have tried very hard and are trying very hard to raise philanthropic funds. To change culture is the hardest thing of all.

Lord Willetts: Because of the pressures on things such as capital, British universities, if they do get some money, tend to use it straightaway to build something which is needed. Putting it into an endowment for a financial investment that yields an income for the future tends not to be as high a priority as working through the next three buildings that you think your campus needs. Because of the long-standing backlog of work, the money that is raised often gets spent straightaway.

Baroness Neville-Jones: What will happen to some of the big infrastructure?

Professor Peter Bruce: It will be a slow, gradual decline. We will go back to what it was like about 20 or 30 years ago when we had very old laboratories and equipment that was kept running well past its proper usable dates.

Lord Willetts: Only if certain things happen. We must not be too pessimistic. We do not know

is going to happen. To be fair to the Government, there was very significant investment of about an extra £2 billion when UKRI was created and the productivity fund is partly being used to fund some of this. One of my responsibilities on the UKRI board is supervising the work that staff are doing on infrastructure mapping, and the aim is—if I may give it a plug—to have a full audit of the capital equipment we have across the university and research sector and to identify where there are gaps and shortfalls that need to be made up. There is a budget of about £1 billion a year for investing in capital. There are nightmare scenarios where there is a future squeeze on universities, but with fees now increased to £9,250 and with the UKRI budget, we must not give up yet, as a lot will depend on the next CSR and there is a public commitment of 2.4%.

Q44 **Lord Renfrew of Kaimsthorn:** We have heard that opportunities for researchers to participate in international networks is of great importance. Does the present system encourage that? In the future, what needs to be done to facilitate researcher mobility for overseas workers to come and participate in research in the United Kingdom, particularly after Brexit, and vice versa?

Professor Peter Bruce: The people issue is one of the biggest problems that we face with Brexit. I go back to what I said at the beginning: it is people who make research happen. Around 33% of our UK publications are co-authored with other European countries and only 17% with the US. That illustrates how much research is taking place with our European partners. The difficulty is if you do not put the money in at the top of the system you cannot collaborate effectively. In other words, if you say simply, "Well, it's all right, we're going to give you the money that we used to contribute to the EU back within a domestic context but you can still play in a collaborative environment", it will not work. You have to be able to move the money across borders otherwise you cannot move the people, and if you cannot move the people it is not collaboration.

Currently, if I have a European grant, I can send a postdoc for six months to work in a French lab or use facilities that they may have in Germany that we do not have in the UK. It is entirely seamless and there are no barriers to doing this. You can do that only if you are fully participating in the European programmes. If we end up not being able to do so, it will have a significant detrimental effect on our collaborative research.

Dr Tim Bradshaw: We were looking at the number of international publications that we have and around 50% of all Russell Group publications are done with an international author. Of those, around 60% are with EU authors. This activity is massively internationalised and absolutely right in terms of access to European funding in the future. That will be key for us. If we were asking for three things we would like to see with Brexit, one is a proper government commitment to sign up to Horizon Europe. Second would be to make sure that we have a world-leading post-study work offer to attract and retain international students. The third would be an overall visa system to allow as close as possible the free movement of researchers that we have at the moment. Elsevier did a piece of work some time ago showing the UK ranked second globally for researcher mobility, with about 72% of active researchers being globally mobile, having moved in and out of the country over the period between 1996 and 2015. That is what makes the UK a world-leading destination at the moment and we need to try to keep as much of that, if not grow it.

Lord Willetts: I agree very much with what has been said, but there is one other angle. When you talk to these young researchers from Germany, Spain or Italy who you find in British research labs and universities and ask them why they are with us, one reason that comes up over and over again is, "If I'd stayed in Germany or Italy, I would have to spend 20 years working for Herr Doktor or Professor who would shape the research programme and I would have no capacity for doing things independently, but in the British model, there is a greater chance that I will be able to pursue my research interests and get funded for them".

A really important performance indicator is the age distribution of people winning PI grants. A system that works on the basis where people in their 30s can get PI grants, and where they know they can and the determination of getting the grant is a ruthless assessment of the quality and interest of what you are going to do next, not your historic distinction

and your previous publications, would remain a very powerful magnet for younger researchers from around the world.

Lord Renfrew of Kaimsthorn: The UK currently has that reputation, does it?

Lord Willetts: Absolutely.

Lord Renfrew of Kaimsthorn: That is very encouraging to hear.

Dr Tim Bradshaw: Around 20,000 EU academics form about 23% of our academic workforce, so we are very attractive to them. In particular, over 40% of our academics in economics and econometrics are from the EU, 37% of modern languages, 34% of our IT and computer scientists, 31% of our maths academics and between 25% and 27% of our chemists, physicists and bioscientists. These are people who doing both research and teaching. It is not just the research that is at stake here but teaching the next generation who will come in the pipeline.

Professor Peter Bruce: What Lord Willetts has said is true for young academics in the UK system. We have a very open system and that is very healthy. I would point out that the ERC model, which applies across the whole of the EU, does give all young European academics access to funding largely free from patronage. However, I would really like to make a point that comes directly from my own experience. I have been carrying out research for 30 years. Only in the last two years have I found when advertising for postdocs that I received no applicants from the main European countries e.g. Spain, France and Germany.

Lord Renfrew of Kaimsthorn: That is not encouraging, is it?

Professor Peter Bruce: It is not encouraging. It tells you how we are now seen by those young people who have just graduated with PhDs and are thinking about where to go and do postdocs.

Lord Renfrew of Kaimsthorn: That is disquieting.

Professor Peter Bruce: They do not want to come to the UK in the way that they did before.

The Chairman: The comments you made, Lord Willetts, are absolutely correct. From my own experience, it is exactly that. They have a greater opportunity in our universities to pursue their own research, and we may lose that.

Q45 **Baroness Morgan of Huyton:** I think part of this has already been answered. I want to ask you about EU funding. Dr Bradshaw, you have taken us through where you think EU funding and EU research is most valuable. Louise Richardson told us she thought it funded early-career researchers, curiosity-driven research, humanities and social sciences. You have covered some of that. Are there any other specific areas of research beyond the ones that Dr Bradshaw talked about that we should be focusing on? Is there capacity in the current system to continue supporting these areas of research if we lose access to EU funding or if we do not buy into Horizon?

Professor Peter Bruce: That was the ERC point I was touching on. It speaks to another important issue. I talked about trying to balance the strategic top-down from the creative bottom-up. The ERC looks only at the quality of the science. There is no strategic element in this. There is a real concern among the research community about how we preserve and grow so-called discovery, curiosity-driven, blue-sky—whatever you want to call it—research, both within the UK funding system and if we were to lose access to the ERC. If we lost the ERC access that would be one of the biggest casualties. If we do lose the ERC access—and I sincerely hope we do not—we need to replicate it with a UK funding council which is driven by the discovery agenda and not by a strategic agenda.

Dr Tim Bradshaw: The UK does better out of the ERC than any other European country. In fact, our 24 universities do better than any other individual country. I am slightly at odds with what you have just said. I do not think the UK could ever genuinely replicate the ERC as a UK-only fund. It is not only the money, it is the international reputation that you get with the ERC. That is intangible to put your fingers on, but that makes a real difference. That is what makes it attractive. You know you are being judged purely on excellence and internationally. You cannot replicate that within the UK.

Lord Willetts: Within the current mechanism of UKRI funding, there is responsive-mode funding. Although the extra money has been associated with things such as the industrial strategy, it is absolutely right, and UKRI recognises that, that we do not try to shape everything around some strategy. We have to respond to bids from people with fantastic research projects nobody would have planned.

Going back to the experience of the referendum, the EU is a massive net source of revenues for the UK science community. Judging from the vote, the Brexiteers responded to the argument of, “We get money from it”, by saying, “Well, whatever money you get, we will compensate you for”. But as well as the money, there is the ability to shape much bigger programmes. This is another crucial difference between the EU relationship and the US relationship. In the US relationship, it is almost always they are 80% and we are 20%. They tend to be the people who shape the core research programme and we have incredibly good opportunities to join in something that they are designing.

One of the things that we have done in the last 20 years in Europe is we have shaped Europe-wide research programmes. Things have been happening in the Karolinska Institute or in universities and research institutes across the continent where British academics have played a crucial role in designing a Europe-wide research programme, and some of the resources are not coming into the UK. It is that ability to shape big research programmes that no one country can do on its own, which, academically, we have done fantastically at. That is also in jeopardy, not just the money.

Professor Peter Bruce: Just to be clear, I was not suggesting UKRI does not do discovery science. That was not my point. I was trying to say that there is a great opportunity—and UKRI, is grasping the opportunity

through initiatives, such as the Industrial Strategy Challenge Fund, to set the broad challenges that matter for the UK, but let the creative scientists within the country deliver it. I call it mission-inspired. That is what I have always done. I have never been constrained in my own research by working on grand challenges and from doing creative science. I think UKRI is doing well in that space. It also supports truly unfettered discovery science, but we must recognise that the UK science base gets half a billion pounds a year from the ERC to support non-strategic discovery science, in addition to the budget that UKRI has. That is the danger. If we lose that the ERC, we lose half a billion pounds of investment in that area.

Lord Willetts: There is quite a delicate Treasury issue. My understanding of the Treasury's current position is that it thinks it will compensate to the amount that we put in, not the amount we get out. To simplify, if we put in a billion pounds and get out £1.5 billion, I think the current Treasury position is the science community will get £1 billion, you will not get an extra half as well.

Baroness Young of Old Scone: I have one follow-up point on ERC funding. A previous witness said that one of the benefits was that researchers from elsewhere in Europe could come with their ERC funding in their sticky little hands and collaborate with people in the UK. It was a very fluid system and that was often the attraction, that they could import their ERC funding with them. How big an issue is that?

Dr Tim Bradshaw: That is huge because it works the other way. They could take their ERC money away with them. If the UK is no longer a hospitable environment, it is underinvesting in facilities and equipment and teaching, the likelihood is they will pick up their ERC money and move it back to Germany or Denmark. It is particularly key for us because I think around 50% of ERC grant holders in the UK are non-UK nationals. They do not necessarily have a location in the UK where they have come from. They could easily go back to their home country. That is a huge risk.

The Chairman: Thank you very much. Before I ask the last question, I thank you all for an exceptionally interesting session. It has been very useful, and I thank you on behalf of the whole Committee for coming to give evidence today. My last question is to each of you individually. If you were sitting in our seats, what would you recommend?

Dr Tim Bradshaw: Do not do Augar. The dangers are too great. We have discussed all those. Do associate to Horizon Europe. Make sure we have the best visa and immigration system for the UK, both for students and the talent that universities and industry need for the future.

Lord Willetts: I agree. A lot of the Augar proposals on HE are creating unnecessary problems: having to ask for public spending when we have and should have a proper system in which graduate repayments funds university teaching. A grey area that I worry about is the boundary between teaching and research. I think it was Baroness Morgan who referred to master's courses, which are often somewhere between teaching and research. Looking at the flow of people coming through the

system, if you have a low income and your family has a low income, it is probably the master's course where there is the greatest constraint, where it is hardest for people with modest incomes even if they are smart and have something to offer. There is also a baton there that has to be passed from the OfS to UKRI. It would be a priority to make sure that the talent flow of graduates to research is working properly and is properly funded. Oddly enough, Augar does not really engage with that. I think it requires some fresh thinking.

Professor Peter Bruce: The danger with Augar is the law of unintended consequences for research. We need to restore the balance of the QR so that we do not have the 12.8% shortfall and restore the full economic cost to 80%, not the current 70%. That would go a long way to addressing the challenges that universities face in maintaining research excellence in the UK.

The Chairman: Thank you very much indeed.