HOUSE OF LORDS

Science and Technology Select Committee

Corrected oral evidence: Science research funding in universities

Tuesday 11 June 2019

10.20 am

Watch the meeting

Members present: Lord Patel (The 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; Lord Vallance of Tummel; Baroness Young of Old Scone.

Evidence Session No. 5 Heard in Public Questions 31 - 37

Witnesses

Professor David Lomas, Academy of Medical Sciences; Professor Mark Smith, Vice-Chancellor, Lancaster University; Professor Dame Ann Dowling, OM DBE FREng FRS, President, Royal Academy of Engineering.

USE OF THE TRANSCRIPT

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

Examination of witnesses

Professor David Lomas, Professor Mark Smith and Professor Dame Ann Dowling.

Q31 **The Chairman:** Thank you for coming to help us with our inquiry. Your evidence is important. Before we start, please introduce yourselves from my left so that we can get you on the record. If you want to make an opening statement, feel free to do so. We are livestreaming on the internet.

Professor David Lomas: Good morning. Thank you for the invitation to present to this Committee. I am an elected member of the council of the Academy of Medical Sciences, which I am representing today. In my day job, I am the vice provost (health) at University College London. I am head of the School of Life and Medical Sciences and head of the Medical School. That means that I look after the largest group of biomedical scientists in Europe. I am also academic director of the UCLPartners Academic Health Science Centre. Lord Kakkar is my boss as the chair of UCLPartners.

The Chairman: Do not be frightened by that.

Professor David Lomas: It is terrifying at the best of times! In the past I have served as deputy chief executive of the Medical Research Council. I will make a couple of comments about what I am going to say on behalf of the academy and where I will stray on to my role at UCL. There are issues where the academy has yet to form an opinion that I would like to clarify. The academy remit does not extend to undergraduate students and, therefore, we have not publicly commented on the Augar recommendations. The academy did, however, write to Sir Philip and said that we did not want the recommendations to in any way impact on the pipeline of talent in the STEM subjects or in medicine. The academy also has no formal position on student undergraduate fees so long as any changes that are introduced do not impact on sustainability of research in UK universities.

Professor Dame Ann Dowling: It is a pleasure to be here. I am president of the Royal Academy of Engineering and a deputy vice-chancellor and professor of mechanical engineering at the University of Cambridge.

Professor Mark Smith: I am vice-chancellor of Lancaster University. There are three other interests I should declare that are relevant to today, though I am not speaking on behalf of those organisations. For a couple of years, I have been chair of the Financial Sustainability Strategy Group, which has looked at the issues that you are looking at here. I am a council member of the Engineering and Physical Sciences Research Council and chair of the research committee of the Higher Education Funding Council for Wales, which is called Research Wales.

I have two or three points by way of introduction, although I am sure your questions will follow up on this. I have listened to the evidence that you have heard so far. You have heard from some very experienced and well thought of vice-chancellors. They have described very well the use of

QR, which is a key element of your inquiry. To make that real from my perspective, first, to be fair to the Government and Research England, QR has remained relatively buoyant but it has remained relatively flat compared with the increases.

The Chairman: We will come to that, so you can elaborate at that stage.

Professor Mark Smith: Okay, fine. Very good. Secondly, much of the discussion of QR has lumped research in as a monolithic whole, which is understandable, but the way that the TRAC data breaks things down is that the different elements of research—research students, research councils, et cetera—are not equally well funded. One of the other key things that this inquiry needs to look at is the decreasing recovery of research funding for PhD students. This is important because of the pipeline of those qualified individuals that this country needs.

Q32 **The Chairman:** That is an important point. Thank you. That leads me to the first question, which relates to the Augar review and its recommendations. There are two key points that I would like to pick up on. The first is the reduction in the fees to £7,500. What impact do you think that will have on universities' finances, particularly their ability to deliver on research? Secondly, the report also recommends that the government teaching grant that should fill this gap should be adjusted to the subjects. What are the implications of doing so for the universities managing the finances, particularly related to research?

Professor David Lomas: From a UCL perspective, it is important that the Government fill the gap that will be introduced by the cut in fees from £9,250 to £7,500. To give you some idea of what it would mean for our institution if we do not fill that funding gap, UCL would lose £40 million a year. That is the equivalent of 19% of our teaching income. The way you run a research-intensive university is cross-subsidy and, in my world, home UK students just about cover their costs, with a slight deficit. We lose money on research and we gain money on overseas students. You bring that mix together in order to fund a large school and hence to fund a large university. If we lose a whole slice of that income, we cannot do the cross-subsidy for research. We need to recognise that we have cross-subsidised research for many years and many policy statements have recognised that, but a cut in the fees without government funding would make things hugely worse.

Professor Dame Ann Dowling: To comment from an engineering point of view, engineering courses cost between £12,000 and £15,000 a year to put on so if the Government did not match that difference, the danger is that universities would cut provision in the most expensive courses and, despite the country needing more engineers, it could have an adverse effect. Augar makes a comment about reducing the cost of courses and if that happens in engineering the danger is that the things that would get cut would be the most expensive elements of the provision, which is the hands-on practical experience, such as doing experiments and running projects. These things cost money but are essential to turn out the trained people that industry needs. It is that practical hands-on experience that stops it being just a study of science but is really a study of engineering.

If we cut that, not only do we not turn out people who meet the needs of industry but we lose the elements that are so important for motivation of the students and which encourages them to develop their creativity. This will make courses less attractive exactly at a time when we are trying to get more youngsters into engineering in particular, and physical sciences. The danger is that if we play with the system and stop this transfer from the cheaper-to-deliver courses to the more expensive ones, we put elements of the system at risk.

It is not in your remit, but Augar has some fantastic things to say about further education and investing both in capital and in people to deliver further education. There are some great recommendations, but the university side gives us cause for concern.

Professor Mark Smith: I will not repeat what you have heard from Professor Lomas, but the key point is that Augar does present it as a package in the sense that, if we cut the fee, the differential needs to be made up by a block grant and, of course, we assume that will happen. Nevertheless, the key thing to understand is that university finance is complex in the following sense. All these monies flow across the institution. In the centre of the university you do not worry about the details as long as when you add it all up it makes sense.

The problem is that we rely on some of the other subjects being able to generate surplus both in their home fee but also in their overseas fee, which the Committee has heard a lot about already. One question you might ask is: why should an English student effectively subsidise a student in engineering? I have always been very open with my undergraduates that this happens. I have not tried to hide it or disguise it. I have said, "You are coming to a university. You are coming to an institution where you are mixing with people from all those different disciplines and, therefore, as a community you should be contributing to the health of the community and not just your discipline. If you want to just study English, go to a specialist English academy". The point is that the dynamics that make a university depend on the mix of people that you have and, therefore, looking at it from a community perspective, that is important.

The Financial Sustainability Strategy Group wrote an extensive report—because we predicted that this sort of thing might come out of Augar—called the cross-flows report. If you have not seen that, I will be happy to send you a copy. The point it makes is that the cross-flows going from an institution such as UCL to Cambridge to Lancaster will not be the same. They will be different because of the cost base of those subjects that will be taught in those different institutions. There is not a fixed price for English at Cambridge, UCL or Lancaster and therefore it is difficult to say that this is the right price for a particular course because it is very institution-dependent.

Baroness Young of Old Scone: To take up this issue of the cross-subsidy, I have always felt that it was a blessing that the whole thing was a bit amorphous and beneath the surface because it gave flexibility to the institutions but avoided some of the heartache, particularly for overseas students who could see that they were paying a hell of a lot more than local students. Augar appears to be trying to get universities to be more precise and specific course by course and activity by activity about how they spend the money. Do you think that is a good thing or a bad thing?

Professor Mark Smith: It is one of those yes/no answers. In principle it is a good thing, but I agree with your opening comments.

Baroness Young of Old Scone: Why is it a good thing? I have not been able to find any reasons.

Professor Mark Smith: It goes back to the point I have made. If everyone knew precisely what everything was costing you would get into local arguments about "This part of my course cost that and that part of my course cost the other". It is the overall experience we are trying to sell. At the end of the day, it is the value for money that you are getting, not that it cost this much to use the library or that much to use the mental health services, et cetera. It is the overall experience. Making it much more detailed in the breakdown makes it much more likely that you get a consumerist attitude in the student body.

I am not saying that we should not have to justify the value for money to both Government and student. I think we should. If you look, however, at what the TRAC(T) data tells you, which Professor Lomas has already alluded to, at aggregate level across England teaching of home students breaks even. You could say that the argument is whether you could do it more cheaply, but the question is what would have to give. My feeling is that we offer efficient services and good value for money, so something would have to give.

Professor Dame Ann Dowling: I cannot see where it would be a good thing. It does not help the system to work smoothly to try to break it down. All subjects these days rely on interdisciplinarity and there are all sorts of benefits across departments that span cost boundaries. It is education as a whole and that emphasis on opportunities which are university-wide that matter.

Professor David Lomas: I absolutely agree with that. You come to UCL as an 11-faculty comprehensive university that spans law, arts, humanities, architecture and medicine. One thing that the university does well is that interdisciplinarity. Different groups work together. If you are an arts and humanities student, you benefit from having access to some of the best hospitals in the country. If you are a law student, you have access to some of the best architecture in the country and so on. The experience of being an undergraduate is that of a comprehensive university. It is not just in a silo.

There is one area in which I would ask for more transparency and that is about research funding. The problem, which is central to the Committee's questioning, is that, ultimately, we are having to subsidise research funding from our education. That transparency would be helpful going forward.

Baroness Morgan of Huyton: What worries me about what you are saying, although I agree with much of it, is that the horse has already bolted and we are seeing a pattern where students are becoming more consumerist whether we like it or not. We have seen a bit of the response to the pension strike last year and general noise around the system. Arguably, the NSS has also increased that effect. How realistic is it to keep selling the community story about explaining cross-subsidies or is it too late for that?

Professor Dame Ann Dowling: Where transparency is most beneficial for students is for them to understand what their courses lead to in terms of career opportunities. So I support the idea of being transparent about the starting salaries of recent graduates. That is not quite the same as negotiating on price with students.

Lord Kakkar: I would like to come back to this point about transparency about research funding. I know it will be a spectrum across different universities, but at somewhere such as UCL, for instance, what proportion of the research base, the infrastructure that allows the institution to be research-intensive, is dependent upon teaching income? We heard that 29% would be lost if the £2,500 is not made up in the reduction of fees in teaching income, but is there a sense in an institution of how much teaching income is required to fundamentally provide a base for research?

Professor David Lomas: I can answer that. I have data from 2016-17 on how much universities had to contribute to each grant that they received from different funding bodies and that tells you about the cross-subsidy. If you have a research council grant, and you are successful in achieving that, the university needs to put 28 pence in for every pound that you win (to clarify this means £28,000 from universities to every £72,000 from the research council). If you have an industry-funded grant, the university needs to put 22 pence in for every pound that you have won from industry. If you have an EU-funded grant, then we have to put 35 pence in for every pound that is won from the EU. If you have a charity-funded grant then we have to put 39 pence in for every pound that is won from charity. Those data illustrate the cross-subsidies in the world we live in. The big research-intensive universities are where they are in the world tables because of research. We must be realistic. Our positions are driven by research and are using teaching to cross-subsidise that research excellence.

Lord Kakkar: For an institution such as UCL, of the 25 to 30 pence for every pound of research comes in, how much is that research income every year?

Professor David Lomas: We have about £430 million a year in research income. My own school, biomedicine, which represents half of the university, has a research income of £320 million a year.

Lord Kakkar: You have to find £100 million-odd of cross-subsidy in a single school.

Professor David Lomas: That is correct.

Professor Dame Ann Dowling: But QR would contribute to some of that. It is not just teaching.

Professor David Lomas: Yes, it would come from a variety of other entities. QR would contribute towards that and other things but that is the amount of money that we have to find for every grant that is funded by research income.

The Chairman: When it comes to the QR question you might give us a figure.

Professor David Lomas: I have a few figures for QR—coming up.

Q33 **Baroness Manningham-Buller:** If the Government do not make up the gap, and we all have different views on the likelihood of that, and even if they do, it is not going to be enough to cover, say, the cost of engineering courses in most universities. We have heard from you that you think that if that happened there would be a danger of the provision of the more expensive courses, such as engineering, being cut, reduced, made less interesting or less attractive. Are there other implications for staffing and for the balance of research and teaching that could follow if this provision is not made up? It is not just potentially the courses but other things as well.

Professor Dame Ann Dowling: The effect that I have described on the courses probably would come through. If you cut the number of staff, they will not be able to do the part of the teaching that is inherently more staff-intensive and that is why the practical project work would suffer. Much of the cost is in people and, by implication, if you cut the support you cut the people.

Professor Mark Smith: All the time you are trying to balance these different things. If a line goes down, the activity that that line supports obviously goes down. I will give you the equivalent numbers for Lancaster that you heard from UCL. The total research cost to Lancaster in 2017-18 was £135.6 million, of which the income covered £79.3 million. You can see that the deficit there is £56.3 million. That is the level of deficit that a medium-sized research-intensive university such as Lancaster is dealing with.

If more pressure comes on those lines, the activity that can be sustained will become more difficult. I do not want to be a doom merchant. It comes back to the cost/value of research. You could say that if you are running a business why would you do this because it is a huge loss. It is the value and it is what universities are about, so of course you do it. But if more pressure comes on that line, all the other things that you do will have to be re-examined. There is a danger of forgetting relatively recent history because when the unit of resource of government funding went down in the early to mid-1990s one of the responses of the research-intensive universities was to cut some of their expensive subjects. There was a whole spate of chemistry departments across the country closing. Lancaster was one of them, though before my time.

The key is that you realise how important that subject is to the balance of the university and you reopen the department. Almost all the chemistry departments that closed in this period have now come back at those universities. Recent history should be looked at about the effect of what happens when the unit of resource goes down. Some of the responses that were in those previous questions do in fact occur, without overselling that as a gloomy outlook.

Professor David Lomas: Research excellence is the most important thing for me. That underpins everything that a university does. It underpins the teaching, the enterprise, our international profile and our philanthropy. Research is it. For me, it is all about research and everything else follows. Anything that impacts on that research will affect our position in the world and our ability to deliver the economic strengths that we have as universities.

Some of the universities around the country—I will not go into names—are stopping academics applying for certain grants because the overheads and the recoveries are not high enough to cover the central costs. My view at UCL and running schools is that I have never done that and will never do that because it is so opposed to my values and to what I think is important. Other major universities that you will have heard of have asked their academics to stop applying for certain funding streams. I think that is dangerous for this country.

Lord Oxburgh: If you were sitting on the Augar review considering funding for universities, would you have done anything like what is proposed today?

Professor David Lomas: I think that Ann is right. There are things in the Augar review that are very positive and progressive, but we are not going to get past the fees because that is the issue that everyone is focused on. I understand the driver for those fees and the political pressures for why those numbers have come out and the requirements to do so. I suspect that Augar did not have any option except to follow that path. That may be fine.

I grew up in a world where I paid no fees. I went to medical school and paid no fees at all. I went through university on a full grant and had no debt when I left. For my whole life, I have committed my life to the NHS. The current group of students come out with debts of between £40,000 and £60,000. Medical students are leaving with huge debts, which means that they are different. They do not have the same commitment to the NHS that I have had. Of all doctors, 20% who qualify after year 2 have a gap year, where they travel. They come back into the system, but they do not have the loyalty to the NHS that someone of my generation does because the system paid for me to do it. Those students are asking what they are getting for their £9,250. The political pressure is such that that had to be reduced. Augar did exactly what Augar had to do. We now need to deal with the consequences of Augar and make sure that the universities are not hit and that we do not damage our vital universities and particularly the research base that underpins everything that we do.

Professor Dame Ann Dowling: Augar has been clear that it has considered a real-system view of higher education and funding. That is the right way and I hope that I would be party to wanting to view the whole system. The danger is that it is very hard to tinker with little bits and not break the system. The big question is: would government make up the shortfall? By not having any power to address that, it more or less kicks the tin down the road. It all hinges on how that shortfall, which is what we have been talking about and how concerning it is, would be addressed. Augar is not answering that.

Professor Mark Smith: It was a tricky mission to take on in the first place but, given that it had to be taken on, there are lots of good things in the report. It does say that it is a package and it is well aware that previous significant reviews of higher education have turned from being a package to a pick and mix. It gets its retaliation in first by saying that it is not a pick and mix—but Ministers choose, do they not?

The key point is that one of the things that needed to be explained more clearly was why £7,500 is the right amount because it seems to me that it is a number and, particularly from what we said in some of our earlier evidence, the acknowledgement of the dynamic flow of funding through the universities and how that could be damaged by a flat £7,500. That is hinted at in the report but it needs to be more explicit when the implementation is thought about.

Q34 **Baroness Morgan of Huyton:** Professor Smith, you wanted to kick off on this at the beginning so here is your opportunity. Is the current system working? I think I can guess your answer to that. We have heard specifically that QR funding is falling as a proportion of research council funding and that universities are having to somehow make up the difference. Some are fortunate enough to be able to use endowments and philanthropy but not everyone can do that. In your cases how do you make up the shortfall and what level of problem is this? Does the relative reduction in QR funding affect your ability in a more wide-scale way to, for example, maintain infrastructure or the strength of the general research delivery?

Baroness Neville-Jones: Can I add to that question? Can you also go on doing the make-up in the future that you do now?

Professor Mark Smith: This is the heart of the matter. It is interesting to compare and contrast across different systems in the world because our dual support system is unique and the envy of universities, particularly in North America, including Canada, and Australia because of the flexibility it gives universities to do new things. It is a very important funding stream for us and is one of the advantages of the UK system. Although it has created some issues, the upside of having QR should not be underestimated. There is a reason why this inquiry is timely. I will quote you the last six years of total research recovery at Lancaster, going from 2012-13 to 2017-18: 75%, 70%, 69%, 67%, 59% and 58%. My point is that the trajectory is in only one direction—and that is pre-Augar.

You have heard from previous witnesses, and it is absolutely correct, that QR has gone up slightly if you look at the last 10-year period. However, it has not kept pace with inflation. In particular, you talked about equipment. The inflation on leading-edge equipment is very much higher than normal RPI, for example. It is in the tens of per cent, not a few per cent. The second point is that the announcements from Industrial Strategy Challenge Fund and the Global Challenges Research Fund have all been very welcome increases in the funding of research but none of them comes through to the universities as 100% FEC. You have a relatively slowly growing amount of QR with an increasing amount of work-to-service and the gap is widening from both sides. It is a real issue. One of the things it would be very interesting to know when the Treasury makes the decisions is, yes, the Industrial Strategy Challenge Fund is great, but what effect are we having on the sustainability of the system and not that it is just nice to pump research money at, which is welcome to us?

Professor Dame Ann Dowling: I do not think there is much to add. QR plays such an important role. It allows universities to make long-term strategic investments in their research base as well as contributing to the real cost of research. In my mind I ask why, when we have additional funds around the Industrial Strategy Challenge Fund, that pays the same level of FEC as normal strategic research council funding? You might think it would be reasonable to have a different level for this extra uplift which is trying to crowd in industry funding. It has a different aim. It does not necessarily mean because of the universities meeting costs there that you should automatically increase QR. You probably need to look at the whole system and at what the aims of the uplift in R&D funding have been, which are to increase the productivity of the country. The way of addressing the fact that universities are not covering their full economic costs on that is not necessarily extra QR, which the universities have absolute freedom in how to use. There could be another balance struck. It needs a proper look at.

Professor David Lomas: On the statistics—13% reduction in real-terms QR funding from 2010-11 to 2017-18—we have taken out the QR on the Global Challenge Research Fund so that we can match like for like. You heard this number previously, but the research council funding increased during that period and the ratio of Research England to research council funding declined significantly from 1.8 in 2010-11 to 1.1 in 2016-17. That is what has happened in the university sector over that period. The way that we make up the deficit is by postgraduate taught education. We can have unregulated fees, in reality. The undergraduate fee is £9,250, which is fixed, and we can have unregulated fees for postgraduates and we can increase our number of overseas students. The figure off the top of my head for UCL is that 30% of international students pay 50% of the bills.

Lord Vallance of Tummel: If the Government are committing themselves to make up the shortfall and you have a fixed capped teaching fee which bears little or no relation to cost, either in total or by department, you have to ask yourself: why bother with the fee system at all? Either you have no cap on fees, as you have on the international side, and you go into a market set-up, or you abandon fees, which are a nonsense if they are in that ballpark, and you go back to grants. As far as the Government's finances are concerned, it is a matter of indifference because they do not get the loans back anyway. Are we not missing perhaps the biggest trick of all?

Professor Mark Smith: Shall I have a go at that? You are hearing evidence later from Lord Willetts, who is the architect of the current system, and he will be able to defend it robustly. My understanding is that the reason it was originally introduced was to be able to get the loan back. You say that you do not get much of it back but one of the surprises of the Augar review—although much of it was leaked—was the extension of the payment period to 40 years. The key point there is to address the point that you have just made that the calculation on that is that you get a lot more of it back once you have gone to 40 years. That is one of the things that came in under the radar. The Augar review would see significantly higher returns on the loan book and, therefore, it seeks to address that part of the equation. You are right, currently 40%-plus is written off but that is with a 30-year repayment. They are also reducing the payment threshold. Those two things together make significant differences on the amount the Treasury can get back.

Baroness Neville-Jones: As Professor Smith has said, this is a core issue. If the trend is decreasing recovery, is it realistic to suppose, as Dame Ann Dowling suggested, you can get it back from a contribution from industry or charitable funding? Where is the money in the system on the basis that this line is doing that? Nothing in Augar suggests that that is going to be changed. Are we inevitably faced, in that case, as Professor Lomas said, with the danger that some universities will go out of the game? Does that matter?

Professor David Lomas: Universities are about research. It is always about research. It is what drives the economy. The big research-intensive universities are clearly about research and that drives the basis of what we do, it drives the teaching, it drives the enterprise and it drives the international engagement.

Baroness Neville-Jones: It drives reputation.

Professor David Lomas: Yes, it drives reputation. We are very proud of where we are in the world rankings and we are where we are because of our research output. That is the reality. Anything that endangers that is potentially very difficult. The gap is made up from postgraduate taught education and industry. Bringing in industry money with full economic costing is very powerful. We are getting better at spinning things out in terms of companies. In my experience that is good for the companies. Not much tends to flow back to the universities.

We floated five big companies on the NASDAQ or received significant Series B investment this year to huge acclaim. That is terrific, but I am still waiting for the money to flow back into my school's accounts. I am promised that it will happen at some stage. By the time it gets diluted to inventors and to the business community and so on it is not quite the big numbers that universities need to operate but it does help.

I will say a word about philanthropy. Only two universities in this country have significant endowments and that is because they are very old. We are only 200 years old and our endowment is tiny by comparison. You eat what you kill in this world. We cannot fall back on debt. We have not got the reserves. We have to balance the budget every year or make a surplus otherwise we cannot run the university. That is a reality. I do not think you can ask philanthropists to fill that gap. Philanthropists do things because they want to improve situations, they want to invest in studentships or in professorships or in buildings that they want to name. You cannot say, "We would like the money please because we would like to fill the funding gap to keep the university afloat".

Lord Borwick: My question is about philanthropy and the changes that are coming as a result of this. Are you increasing your fundraising side? Particularly for Professor Smith, for a smaller university, have you got a flourishing philanthropy fundraising side and what changes are coming to it as a result of this?

Professor Mark Smith: If you look at North America it is a very important funding stream into their universities and what makes places that are even more research-intensive than our leading universities viable is the big philanthropy lines that they get. For small and medium-sized universities such as Lancaster it is increasingly important to us and is an area that we have invested in. It has been relatively easy for us to get money to support student hardship and the development of student activities but more and more now we are going out and looking to generate direct money to help part-subsidise research projects.

There will be an announcement later this year about a new institute that we are going to form about future cities and that will be jointly funded by Malaysian philanthropists. QR would have been where we would have looked in the past to kick-start that activity but we decided that because of the scale of the activity we wanted to start that we should not do it all from QR and we pitched a particular project. We would not have done this three or four years ago, but it is becoming more normal for a university such as ours to think that way.

Lord Borwick: Does this mean that you are increasing your cost of philanthropy, your fundraising department, by 5% or by 50%? Are you doubling the size of the fundraising department or are you just carrying on?

Professor Mark Smith: I cannot give you an exact number, but it is a significant investment. We are not trying to do that with the offers we had three or four years ago. We have put significant investment into it because we realise that it is an important funding stream.

Baroness Manningham-Buller: It is not just the numbers, it is the skills. We do not have the skills that American universities have in doing this in a professional way. For too many years it has been done in an amateur way. I am sure that is no longer the case at Lancaster.

Professor Mark Smith: Thank you.

Lord Kakkar: I want to come back to the approach that UKRI takes in terms of the balance between strategic initiatives and grants and maintaining QR funding. Has it got that strategy right in terms of being able to secure the science base in universities?

Professor David Lomas: I do not think that it has. I can see the advantage of bringing the research councils together and, remember, I was deputy chief executive at the MRC. I have a vested interest and I worked in the old regime, so you need to look at my comments in the light of someone who worked in the pre-UKRI regime; I stepped down as soon as the new world started.

There are real advantages to bringing the research councils together. There are real advantages to the added value that we can get and there are some advantages to top-down. The top-down initiatives are around the Global Challenge Research Fund, the Industrial Strategy Challenge Fund, the Strength in Places Fund, the Future Leaders Fund and the new Centres for Doctoral Training. They are powerful. However, my view is that the best research is the bottom-up stuff. It is allowing academics to explore blue-sky research. It is not hypothecating what they should do but allowing them to follow their nose. They end up in the most remarkable places. They spent 20 or 30 years doing nerdy science or exploring rare areas and that is where the gems are. Empowering people's curiosity doing research is the fundamental way to do it.

Have we got the balance right? The way I see it, and I apologise if it is wrong, there is less money going to response-mode funding—blue sky—and there is more top-down funding, which is aligned to government priorities. I personally think that that is probably not correct. The other view is that I do not think that we have got the QR right either. QR has fallen from 28 pence in the pound to 19 pence in the pound. There do not seem to be any plans to reverse it.

Baroness Manningham-Buller: Have the real numbers of response-mode funding gone down? Is it not that the extra money is going into top-down things?

Professor David Lomas: My understanding, and I apologise if this is wrong, is that the amount that each research council has to give has gone down slightly, so they have less to give but the pot is larger, with the extra being in the more strategic initiatives.

Lord Kakkar: Specifically, to come back to this again, the approach to QR funding versus everything else is probably not the most effective way of securing the research base or science base in universities at the moment.

Professor David Lomas: That is right. You have to fund research properly. What that means is that each pot of money that you give for a research project is higher and you give fewer of them. It means that the research is funded properly and then you are not asking a university to cross-subsidise with teaching.

Professor Dame Ann Dowling: There are two parts to this question. One is whether there is enough funding for QR, at least to top up the differential between what research councils fund and real economic cost. Clearly, that is not working so that is not enough.

The other question is whether the balance is right between rather more directed funding and responsive-mode funding. In my view it is important that something different is being done with the uplift in funding that the Government have provided. If the target is to meet 2.4% of R&D investment in the UK, we have to crowd in more business funding. On the uplift of funds, we need to have funds that can attract a higher percentage of co-investment from businesses. If we simply do the same as we have always done—disburse it across the research councils—and do not do more strategic things, I guess that we would get the same percentage of business funding that we have always had. We need to do something different to get that uplift and that is why having the additional money applied in more strategic ways is a good idea in support of the industrial strategy.

The Chairman: There are lots of hands going up.

Lord Mair: On the subject of UKRI and on research and people and PhD students, I would like to hear what you all think. The current situation is that the research councils do not fund PhD students except in Centres for Doctoral Training—CDTs. That is great for those who are fortunate enough to have those CDTs but there is quite a problem in getting funding from UKRI for PhD students. Would you agree with that?

Professor Mark Smith: It is an important area to fix on because it is the lowest recovery area of any of the main funding streams. It is just a touch above 50%. From a university sustainability point of view, it is one of the most difficult areas.

The second point is that the CDTs are one of the sources, but the universities do get a block grant from research councils to fund doctorates. There are two big blocks, which are the CDTs, if you can get one competitively, and there is one based on your overall grant portfolio, so you take those two things together. It is very tricky but universities themselves are the third biggest funder of research students in the country. You have got those two big blocks. Many disciplines find it difficult to get any money for research students and that is something we fund out of things such as QR or overseas student fees. The research students are a very important part of the dynamic environment that is a research university. They are very important to us. If you look at the industrial strategy targets for the number of trained people, they are a key element and we probably will not meet those targets unless there is more money. The problem is that even the money that goes in does not recover very well.

Professor Dame Ann Dowling: On that question, I was a member of the EPSRC's council when it decided that it would not allow individual students to be funded on responsive mode grants. It is correct not to do that. You would have a grant that had a student tagged on it and I think we have a duty to ensure that the environment that PhD students go to is able to properly train them. The CDTs and the block grant look at the institution as a whole and whether it can provide the educational support that students need. If you do it in an ad hoc way by just having one student allocated to one principal investigator and not a part where there is a cohort that leads to proper training and research, it is not good for the individuals involved. We need to be more strategic in the way that we train PhD students. The CDTs do that, although we are not going to produce the targets needed for the increased R&D without more PhD students. Having a more strategic way of funding that increase in PhD students is important rather than extra students tagged to ad hoc grants.

Professor David Lomas: To add to that, I have run four PhD students in my time, two from the Wellcome Trust, which was one of the first Wellcome Trust clinical PhD programmes. We have learned along the way that the ad hoc students are a hopeless way of developing the next generation of scientists. Managing them as a group or a cohort is far more effective. They get far more mentoring support, better guidance, second supervisors and oversight committees. The selection process is more open and robust if you have a panel selecting people for a group. I endorse what Ann has said. Training students together as groups is far more effective than training them individually.

Baroness Neville-Jones: To go back to the question about how you try to make up the gap in research funding, business has been mentioned. Is it realistic to think that the sums of money and percentages which the Government appear to envisage are going to be forthcoming to reach this 2.4%? Is that kind of money going to be forthcoming? I thought from what Dame Ann Dowling said that you need a different strategy if you are going to get there. Is that what you are saying? What would it be in order to see a major change in businesses’ attitude to funding research, which they are not doing themselves to a large extent?

Professor Dame Ann Dowling: The industrial strategy is trying to address that as a key part. The idea of having grand challenges in the industrial strategy is one way, but they have to be challenges where business can see an opportunity for the marketplace. My research area is aerospace and we have seen the sector plans in aerospace and in propulsion working well. That depends on businesses within a sector coming together around a long-term strategy and government being willing to engage and co-invest around that.

Baroness Neville-Jones: That has been a feature of that sector in the past. It is not a wholly new way of life for it.

Professor Dame Ann Dowling: We see in European projects that it is not the only sector that has been able to come together in European programmes with its supply chains and make a long-term investment in the future. There are other sectors, construction perhaps being another one, that gain alignment on what is needed to make a transformational change. Historically, the motor industry has also been one. It is looking quite challenged and perhaps not organised enough around future mobility. But there are areas where one could imagine much more drive around a group of businesses willing to move the dial in terms of moving their marketplace forward.

The Chairman: We have three more topical questions to get through and that is a challenge.

Q35 **Lord Kakkar:** I will be quick because some of it has been covered already. To return to the question of the evidence or information that we have previously received from the Universities Minister about these 260,000 extra researchers that are going to be required by 2027 to meet the R&D requirements of the country across the different sectors. Is UKRI doing enough to facilitate that? We have heard on the one hand the question of QR and on the other hand the importance of having these strategic initiatives and this money beyond doing what the research councils did and what QR does. Has UKRI got this right in terms of prioritising research studentships to fill this national need?

Professor Mark Smith: It is on its radar and it is trying to do in the sense that there are these Future Leader Fellows, which is a UKRI-led initiative, which are not PhD level but the next level up. You need those groups to be formed to train the people below them. It is looking at parts of the whole system, but it does need to work out what numbers we need to be putting in. We have not seen any work by it which says, "These are the numbers we need to put in now, particularly at the PhD level, to meet that 2027 target". UKRI might be doing that but I am not aware of it. That is what needs to be done.

Professor Dame Ann Dowling: I do not think you can place all this on UKRI because, if we take engineering, we are not producing enough graduates for businesses. Even the PhD places are competing with our UK industries, which are desperate to employ these people. They have got great offers in front of them. In the longer term, we need to get more youngsters coming into areas where employees are badly needed by our companies, as well as meeting the requirements for more researchers. The increase in R&D does not simply need PhDs, it needs the technicians. In the short term, international mobility is going to be the only way of addressing the people issue because it will take time to change mindsets in schools and that whole pipeline needs to be addressed.

Q36 **Baroness Neville-Jones:** Several witnesses have told us how important the mobility of researchers is, and words such as "crucial" have been used. That has also been related to involvement in European programmes and research networks—people contact and collaboration. We are interested in your view of the relative importance of all of that and the impact and effect of the current system of funding—how crucial it is—on our success in drawing researchers from other countries, which is relative to the competition from elsewhere. How well do we stand out on the existing basis and is our attraction going to be adversely affected by these potential changes in funding? If it is, what do we do about it?

Professor David Lomas: As you imply, mobility is critical to the world that we live in and, as Ann has just said, to get the best people we have to have an open system that allows people to come to Britain to work and an opportunity for people from Britain to work around the world.

Baroness Neville-Jones: That is an immigration issue.

Professor David Lomas: Yes, that is right. We will get on to visas and the difficulties and the challenges that we are putting ahead of these brilliant people coming to this country, which makes it more difficult to grow our research base, if I am being entirely honest. That mobility is critical. The EU national issue is huge. Of our academic workforce, 18% is EU excluding the UK, and 13% non-EU. If you look at the EU funding, we do very well. We are second only to Germany in the number of euros that are brought in. We are also a net beneficiary. We always get more back from research than we put into the system.

There is one piece of information that you might find interesting. We do very well with international grants and EU grants but only 25% of the UK's starting grants in 2018 went to UK nationals. Around 70% went to people who were non-EU who won their money from the EU to spend it here, and 5% went to people who won the money in the EU and came to Britain. We are good but the EU nationals who are working here are helping us win the EU money and bring it back. Of course, that is at threat under Brexit.

Professor Dame Ann Dowling: It is hugely important. Engineering relies so much on international researchers. Overseas researchers made up 62% of engineering research staff in higher education institutions in 2017-18. Across all subjects it is 48% but 62% in engineering. We rely so much on overseas talent.

Baroness Neville-Jones: Do you have a view on what might happen to that figure?

Professor David Lomas: We are not looking as attractive as we used to be.

Professor Dame Ann Dowling: The EU element will get more complicated to bring in.

Professor Mark Smith: There are two parts to the equation. There is the attractiveness of the UK as a destination because of immigration policies and there is the attractiveness of the UK in terms of the funding environment. At some point they come together.

Baroness Morgan of Huyton: Is there an issue of people thinking is it worth coming here because they will be able to stay afterwards? We have heard that from somebody.

Professor Mark Smith: It is the whole atmosphere of, "Can I can make my career here or not?" That is an important aspect. They are a very important part of what makes the UK competitive in world league tables. That is why we are able to attract the best. There are some disciplines where it is very difficult to recruit UK academic staff into those disciplines. Not only are they important in sustaining our reputation, we need them to sustain it full stop.

Baroness Neville-Jones: Such as?

Professor Mark Smith: Economics, accounting and finance. It is very difficult to recruit a UK person into those areas.

Q37 **Baroness Young of Old Scone:** If we lose EU funding, it has been expressed to us that the worry would be that it was particularly good for supporting early-career research and curiosity-driven research. Do you share those concerns about that sort of support? Is there any other sort of support that you think EU funding is particularly helpful with? If the Government are going to shell out to replace it—a big if—do you have concerns about what strings they would attach to it and what they would focus it towards?

Professor Dame Ann Dowling: The European Research Council supports this curiosity-driven long-term funding. There is huge support for that, which is seen to be very good at recognising talented people, investing in the long term. That is hugely important, and it is attractive to have people coming to the UK bringing in ERC support that they have won from the EU. There are other elements as well. The European funding for innovation is hugely valued. It is liked by businesses, which see it as being less susceptible to short-term changes than the UK funding. That provides more generous support across the whole innovation pipeline from research, through development, up to demonstrators and scale-ups. That has worked quite well across a wider breadth of sectors and disciplines, helping to encourage collaboration between businesses, their supply chains and the universities on long-term problems, often looking for societal benefits.

There is also the support for SMEs through the SME instrument. That has the ability to give quite large grants to SMEs, much more than UK funding streams. Up to €2 million to a small company can be quite transformational. The SMEs see it as having fewer strings and being easier to win than our own funding available in the UK. The next one is the European Regional Development Fund. Quite a lot of that is spent on research and innovation and competitive SMEs. There is a whole suite of EU programmes that are valuable.

Professor Mark Smith: That is very comprehensive, and I fully endorse that list. I want to give you a concrete example of the difference it has made to a university such as mine. The ERDF—European Regional Development Fund—has been hugely important in creating physical spaces that have allowed us to develop incubators and space for SMEs. There is not any direct equivalent. We are three-quarters of the way through the construction of a new space for health innovation, which has required three big blocks of funding. It has required ERDF funding, UK regional growth funding and the university has put some money in. Without that big block of ERDF funding, it would not have been a viable project for us to consider.

Baroness Young of Old Scone: Have you been consulted on the UK Shared Prosperity Fund, which appears to be neither shared nor prosperous?

Professor Mark Smith: I cannot recall responding to it myself. I cannot say whether the university has but I can check that for you.

The Chairman: Thank you for coming today. It has been a most useful session. I am sorry that it has been a rush—I know you had a lot to say—

but if, on reflection, you feel there are some important issues which you might have dwelled on longer please feel free to write and we will use that as evidence. Thank you very much.