



HOUSE OF LORDS

Revised transcript of evidence taken before

The Select Committee on Science and Technology

Inquiry on

EU MEMBERSHIP AND UK SCIENCE FOLLOW-UP

Evidence Session No. 3

Heard in Public

Questions 20 - 34

TUESDAY 13 SEPTEMBER 2016

10.20 am

Witnesses: Professor Sir David Greenaway, Professor David Phoenix OBE

and Dr Patrick Vallance

USE OF THE TRANSCRIPT

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Members present

Earl of Selborne (Chairman)
 Lord Borwick
 Lord Cameron of Dillington
 Lord Hennessy of Nympsfield
 Lord Mair
 Lord Maxton
 Baroness Morgan of Huyton
 Baroness Neville-Jones
 Lord Oxburgh
 Lord Vallance of Tummel
 Baroness Young of Old Scone

Examination of Witnesses

Professor Sir David Greenaway, Chair, the Russell group, and Vice-Chancellor, University of Nottingham; **Professor David Phoenix OBE**, Chair, MillionPlus, and Vice-Chancellor, London South Bank University; and **Dr Patrick Vallance**, President, Pharmaceuticals R&D, GlaxoSmithKline (GSK)

Q20 The Chairman: Good morning, gentlemen. Thank you for joining us today. We are most grateful. As you know, we are conducting a short inquiry as a follow-up to our earlier report on EU membership and UK science, in the light of the Brexit decision. I should warn you that we are being televised. Would you like to introduce yourselves for the record?

Professor David Phoenix: I am Dave Phoenix. I am vice-chancellor at London South Bank University and chair of MillionPlus.

The Chairman: If you would like to make any opening statement as you introduce yourself, please feel free to do so.

Professor David Phoenix: I think any comments I make will come out during the questioning.

Dr Patrick Vallance: I am Patrick Vallance. I head research and development for GlaxoSmithKline and, in a previous life, was an academic at UCL.

Professor Sir David Greenaway: Good morning, your Lordships. I am David Greenaway. I am here as chair of the Russell group universities and my day job is as vice-chancellor of the University of Nottingham.

Q21 The Chairman: Unless you would like to make any further opening statement, we will go straight into some of the questions. I am absolutely certain that we will have difficulty in asking all the questions we want to in the allotted time of one hour. Let me start with a very general question. In the light of the decision to leave the European Union, how would you see the opportunities and threats for UK science and research? To what extent have your views of what Brexit means for UK science and research changed since the referendum?

Professor David Phoenix: From my perspective—and, from discussion with colleagues, their perspective—after the initial decision about Brexit, my main change is looking at the more global opportunities that could exist, so focusing on what we need to do to manage Brexit and also to look at the other opportunities that sit alongside a Brexit decision. For me, as we go through the questions, it falls under three headings: how that decision affects productivity and the roles that universities play in support of UK-based productivity at a regional level, not just a macro level; how we support the stability of universities through that transition into the future; and, as part of that, how we encourage the exchange of ideas and maintain our global position in the new world.

Dr Patrick Vallance: We were clear before that Brexit would not have a material impact on the overall performance of the company, but we were concerned about the uncertainty that would come with it. The uncertainty remains a concern, but we absolutely see some opportunities, which I will come to. The issues for us from a science base are very much around talent. It is critically important that we can attract and retain talent into our business. We are a global science business with a very large UK base, so the attraction of talent remains a priority for us. The science environment in which we operate in the UK is critical, so a company such as ours with a big R&D organisation needs to be sure that the science base continues to get funded—not just the applied science base but the fundamental science base across disciplines from chemistry, biology, physics, engineering and mathematics, and the integration of those.

I believe there is an opportunity there in relation to what UKRI might do in allowing a focus on interdisciplinary research and ensuring that we keep that research base vibrant in the UK. From a regulatory point of view, simple harmonised regulation is important for us, so having to make multiple different regulatory submissions adds a burden and adds complexity, so in general we look for harmonisation and, therefore, a retreat from that, if that is what happens with the EU, would be undesirable.

On the other side, we recognise there are some opportunities to make bespoke pathways and make fast the linkages between what can happen between the science base and clinical trials and so on in the UK. It is obviously important that we exist in an environment where innovation is funded adequately regarding the incentives for risk-taking and we see some opportunities there, particularly in the creation of science clusters. Uncertainty remains and those are the areas we are particularly focused on.

The Chairman: That is helpful. Sir David.

Professor Sir David Greenaway: Chairman, I would pick out three threats which are relatively high-risk, a couple which are lower-risk and then two opportunities. The threats which are relatively high-risk are, first, talent development, which is partly about the students we attract. If you look across the 24 Russell group universities, there are 57,000 students from other EU member states at the moment, and they add a great deal to our university communities and to our communities more broadly, so some part of that would be at risk. There is also talent in the faculty that we attract—20% of the faculty at Russell group universities are from other EU member states—and they are skewed towards STEM and early-career researchers; that is, people who are in one of the most productive periods of their careers with great energy, who are multilingual and super-networkers, and we rely very heavily on other EU member states to supply that pipeline, which is so important to the science base.

The second risk is around collaboration in general; not so much with other universities because I think we will find ways of making that happen, but the big partnerships also involve businesses, which are funded under things such as the JTI, the Clean Sky Initiative, the rail initiative et cetera, which are quite high-risk.

The other one which is relatively high-risk is access to funding. At the moment, about £600 million a year comes to Russell group universities through Horizon 2020/the European Research Council. Depending on what our Government negotiate for the terms of exit, some part of that will surely be at risk.

There are two other smaller risks I am not so worried about. The first is access to capital where there is some nervousness around EIB, but in fact the capital markets are pretty deep and, if universities need to raise finance, there is a lot of support in the bond markets with the banks. I am less worried about mobility. We have 8,000 students out on Erasmus+ programmes, which is great and we will find ways of continuing to support mobility.

I would pick out two opportunities. There is a real opportunity to rethink, redefine and rearticulate many of our relationships with other European partners because—Brexit or not—we will still culturally and geographically be part of that broader European space and we will find ways of developing maybe more strategic partnerships than transactional partnerships. The other big opportunity for university science in general is to be at the very heart of maybe the biggest challenge that our new Government faces, which is the productivity challenge. If we cannot find ways of accelerating productivity growth, we will not find ways of accelerating economic growth or creating the resources we need to meet other challenges—funding healthcare, schooling, care of the elderly et cetera. Right at the heart of that challenge is science and innovation, not just what happens in universities but what happens in companies such as GSK and Rolls-Royce. There is a big challenge before Government to look at how we, as a nation, can find ways of investing more in research and innovation. We are somewhat below the OECD average. I know that your counterparts in the Commons have set a target of 3% of GDP, which is a bit of a stretch given that the OECD average is 2.4%, but at 1.7% we have a way to go. It is a real opportunity for universities working with partners such as GSK to explain how we are part of the solution as we develop new trade and investment relationships and as we rearticulate our place in the post-Brexit world.

The Chairman: Could I come back to Dr Vallance? We very much take on board your point about the need to make sure that regulations are harmonised, particularly for companies such as yours dealing around the world. In our earlier inquiry, much of the evidence was very much in favour then of remaining in Europe, but nevertheless there was a concern that the balance of regulation had tipped far too much in favour of precaution rather than there being a balance of precaution and proportion. It has been put to us in some of the written evidence since that maybe now we have an opportunity in the United Kingdom to become a regulatory sandbox, a place for trying new approaches that will prevent this bias which has been seen in some ways to be unhelpful. Would you like to comment on that?

Dr Patrick Vallance: There definitely are bits which are too precautionary and are not prepared to make the appropriate level of adjustment for the regulation versus the risk it is facing, but it is very helpful for a global company to have standardised regulation, so the trade-off there is quite important. For example, in the case of antibiotics where there is an urgent need to get more medicines out, we are pushing very hard for a single global

approach to that so that you do not end up with fragmentation, which is going to make clinical trials and development easier, so in general harmonisation is better. A good point is that, if we are not absolutely part of the EU regulatory system going forward, we need to be more radical in asking what we could do to make the UK somewhere that is really pro-innovation in thinking not only about the regulatory aspect but the link through into the NHS and the ability to get new treatments out. The first point, though, is that harmonisation definitely makes life much better and it has been much easier since we have had an EU-wide regulatory process without having to go to 50 countries separately to get approvals for medicines.

The Chairman: Thank you. Lord Mair.

Q22 Lord Mair: Chairman, I should start by declaring an interest. I lead a large research team at Cambridge in the Engineering Department and I am a fellow of the Royal Academy of Engineering and fellow of the Royal Society. Many of my research staff are EU nationals. Sir David, I want to follow up your very important point about talent. Clearly, researcher mobility between the UK and EU members is key to our future excellence. On collaboration, something like 60% of the UK's internationally co-authored research papers are with EU partners, so it is vital that that continues. Are the Government saying enough and doing enough, or what do you think is required?

Professor Sir David Greenaway: That is a good question. I understand the position the Government are in: we have to pause and think very carefully about when to trigger Article 50 and exactly what we want for our country after that. There have been some helpful moves thus far. One is the early statement with regard to the position of students from other EU member states entering in 2016. I hope the Government can follow up quickly on that with running it into 2017 and, in particular, with regard to their funding because that recruitment season has already begun. The Government have been very helpful through the Chancellor in making a commitment to underpin any Structural Fund applications through ESIF and Horizon 2020 up to the Autumn Statement. I hope that they review the position after the Autumn Statement and consider whether that underpinning can hold for any longer ahead of any resolution of what our role and position will be in that European research area. With research staff, the Government could very helpfully clarify the position now of those staff and their families going forward so that they have a degree of certainty with regard to their medium-term and maybe even long-term future. That is one of the things I hear from my own staff most of all and we are trying to provide them with support regarding indefinite leave to remain, or maybe dual nationality if they want it et cetera, but an early statement from the Government that their resident and employment rights will be maintained would be really helpful to the existing workforce.

Lord Mair: At Nottingham and, Professor Phoenix, at your university, have you experienced already a reluctance of EU nationals to join your research groups or to come to your universities?

Professor Sir David Greenaway: There is only one case, my Lord, which was of a particular individual we were trying to recruit from Max Planck in Germany for a chair in metabolic engineering, which did not work out, despite the pretty attractive package that we had on the table, and one of the factors cited was the uncertainty at the moment around the UK's position in the European research area going forward, but that is an exception and I do not have any more to cite.

Professor David Phoenix: Similarly, I know of one case at LSBU, but there is a danger in the discussion around both applications for European grants and the exchange of staff where we talk ourselves into a position or let the media push us into a position without having a strong evidence base, because there are one or two examples around the sector, but not enough to be clear on.

From my perspective, I would make two points which are similar to David's, but from the modern university sector. The universities have seen significant growth over recent years, as I am sure you are aware, in the research activity that is undertaken, especially at an international level. In the UK, the challenge around funding is such that there is a degree of hyperconcentration, which means that, if you look at the money that is drawn from the EU, although about 14% of the money coming to the UK is from Europe for research, when you look at the modern sector, nearer to 20% to 25% of the income that they generate in proportion is from the EU. For us, in maintaining that research growth, productivity and engagement, both internationally and locally, the EU sources of funding are extremely important to enable us to have a platform where we can compete and continue to expand. Certainty around how we can support that research activity, not just while we are in the EU but looking at the amount of GDP that is being made available to research is absolutely essential because we cannot squeeze further those institutions which are already very strong on research, and we have to make sure that those universities developing that research base continue to do so. Moving to the 3% investment level is important as well as looking at the expansion of HEIF and the way we can underpin the conversion of that research into application, and providing a fund for innovation which is not just targeted at the EU, but also at other overseas countries where we are supporting bilateral and multilateral arrangements, would be really important. Although, as you rightly say, about 50% of our papers in the UK are internationally co-authored, about half of that number are from the EU and the other half are from elsewhere, with big growth in China, America, Canada and elsewhere.

Q23 Baroness Neville-Jones: I declare an interest as a member of the Engineering and Physical Sciences Research Council, the Foundation for Science and Technology and the Quantum Technology Strategic Advisory Board. I want to follow up on something Sir David Greenaway said. You mentioned developing more strategic relationships and, the inference is, with other European institutions. Is that right?

Professor Sir David Greenaway: Yes.

Baroness Neville-Jones: Could you expand a bit on that thought; how your thinking is developing and how it might differ from now?

Professor Sir David Greenaway: Many of the relationships all of us have with other European partners tend to be built around some of the collaborating agreements and some of those may endure beyond a particular initiative on a particular programme. At the moment we are looking at building longer-term, deeper relationships with a smaller number of partners in other EU member states so that we can build, first and foremost for our own university, mobility programmes and joint research programmes where we can partner for proposals to EPSRC or other research councils and to other European windows of funding and provide opportunities for exchange of postdoctoral research, fellows et cetera. The point is that it is forcing us to think, if the world is going to change, how we change with it. Universities are pretty adaptable organisations; they would not have been around so long

were that not the case. It is just an example of thinking now, even before we know the rules of the new game, how we can lay down foundations to ensure that we can succeed, whatever the rules are.

Baroness Neville-Jones: Do you think that might help compensate for some of the potential disadvantages of Brexit?

Professor Sir David Greenaway: I think it will and there is an appetite through our European partners. We should not forget that we have many universities which are attractive to our partners in other parts of Europe and that will not change post-Brexit because the excellence of Cambridge will not change fundamentally post-Brexit and there will still be a demand to work with the researchers at that and other universities. Certainly it was very noticeable to me in the initial weeks after the referendum the number of leaders of other universities in other parts of Europe and other university leaders who were writing to me to say, "We value the relationships that we have. We will continue to work with you to ensure these relationships endure for the mutual benefit, whatever the outcome once Article 50 is triggered".

Baroness Neville-Jones: Thank you.

Q24 Lord Hennessy of Nympsfield: I have listened to your answers so far and I sympathise with you. You sound like sculptors seeing a shape in a piece of marble, but you cannot be precise with the multiple uncertainties. We all have a certain idea of Brexit and we all have this problem, but I wonder if you could sharpen it up a bit. If I could ask you to think of three tests that the post-Brexit settlement for science, R&D and technology in this country should meet in 10 years' time if we are to be where we are, what would those three tests be?

Professor Sir David Greenaway: One would be whether we have been able to manage in one way or another the likely gap in funding, because it is a big number. That is not me saying that I just expect Mr Johnson to turn round and say, "Okay, we'll write a cheque for the remainder of that". We have to make the case for why investment in science continues to be a priority to build relationships with business, with other European partners and indeed more globally, so the first is the funding position.

The second is whether we are still attracting undergraduate and postgraduate students from other EU member states at scale. As I said earlier, Lord Hennessy, we have 57,000 students at the moment in Russell group universities and they are great people to have. Will we still have 20% of our academic staff? That is my second test. The third test would be whether we have used the opportunity to persuade not just the Government but the wider public of the crucial role that universities have in driving economic well-being through the productivity agenda, because I am not sure we have done the best job we could on that front yet.

The Chairman: Professor Phoenix, did you want to add anything?

Professor David Phoenix: Rather than repeating what Sir David said, the points I made at the start around productivity and stability and the staff and student mobility are key. The only added dimension is that, when we are talking about productivity, looking at the impact of Brexit at a regional level as well as a national level is absolutely essential because, if you look at the distribution, for example, of EU student numbers that we currently get, they provide a major source of income not just to universities but to local economies in jobs created and indirect spend across the country, especially in the northern regions and regions where

there are a range of challenges. Similarly, with productivity, the Horizon 2020 funding and the funding that comes into those regions is really important to enable both the moderns and the research-intensives to engage with the research agenda, which also provides an infrastructure that allows especially moderns to really engage with SMEs. When you are talking about productivity and Brexit, one of the tests is looking at the regional impact and being aware that the Brexit decision impacts on other activities around innovation and engagement with other bodies because of the capacity that is being built through things such as Horizon 2020.

The Chairman: Dr Vallance, did you want to add anything?

Dr Patrick Vallance: I completely support the idea that we need to look at science funding as a key measure here. Are we still attracting funding not just from what comes in the UK but our ability to attract it from overseas as well, which has always been, and will remain, a source? There is also a need to look at the ability to attract inward investment for growth of translational activities, biotech start-up, tech start-up and so on, and that will be a critical measure because, if we get the regulatory bit right, the talent right and the science base right, we should see continued upward investment there. If we get it wrong, it will be an early indicator that we have lost an attractiveness, so we absolutely need to find ways of measuring that carefully and looking at it as an early barometer of things not being as attractive as they were. We will be more attractive if we can get it right.

Q25 Baroness Morgan of Huyton: Can we move on to the implications on the people issue, both students and faculty? I would like to ask you particularly about visas. We have obviously had a good look at this at various points as a Committee, including a detailed report in 2014. Can you spell out for us a bit how the current tier 2 and tier 4 system works for you and what would be the implications if the current system for non-EU students were extended to current EU students and faculty? What are the implications for research-intensive industries, and not just for universities but for you as well, Dr Vallance?

Professor David Phoenix: I would be concerned if we applied the same visa regulatory regime to EU students. The current regime has led to a drop of 2% in international student recruitment at our universities in recent years at a time when some of our major competitors are expanding their activity. We are not seen as an attractive place. On the Hobsons survey recently, 80% of the students who were interviewed indicated that the Brexit decision may well make the UK a less attractive, rather than more attractive, place.

Baroness Morgan of Huyton: Is that undergraduate and postgraduate?

Professor David Phoenix: Across the two. Both are extremely important because, from a university perspective, especially in some of the areas of STEM, that combination of UK and international students is what allows us to maintain a strong, viable population across a range of courses. I would be worried, in short terms, one, about the added level of bureaucracy and, two, about the barriers and disincentives that we put into the sector, and that would be at a micro level and would not be evenly distributed, so you would really start to see regional impacts and impacts across individual institutions where the EU numbers are the only numbers that are currently growing for us in maintaining growth. Finally, the visa system struggles with current numbers. If you bring in the volume of EU numbers, which is knocking on 300,000 if you include both undergraduates and postgraduates, I really think it would struggle to manage that.

The Chairman: Sir David, did you want to add anything from your perspective?

Professor Sir David Greenaway: A couple of points, if I may. Again, I understand the issue that the Government are grappling with on migration, but I do not think that students are really the issue, given what they bring to our universities and our local economies. An easy solution, which I am sure the Committee has discussed before, is to take them out of the net migration target, but I am not sure that will happen any time soon, so I would like to see us move to a more risk-based compliance both for international students and, if they were brought into this frame, EU students. I am bound to say that, if students from other EU member states were subject to the same arrangements as current international students more generally, we would see some fall-off in numbers. That will be amplified by the fact that those students presumably would no longer be able to access loans from the Student Loan Company, so any fees that they were liable for would be up-front fees as opposed to deferred payments, and that is a very different calculation for a potential student to make. On the employment side, tier 2 is already oversubscribed. About 20-25% of those whom many of us would hire under tier 2 as postdoctoral researchers would not make the £30,000 salary cut-off at the moment.

Baroness Morgan of Huyton: So we are already losing?

Professor Sir David Greenaway: I think so.

Dr Patrick Vallance: About 10% to 15% of our UK-based workforce are EU nationals. It is less of an issue for us and we certainly have not had any concerns expressed about what happens afterwards, so I have not picked that up inside industry in quite the same way that I have in funding for academic areas.

Baroness Morgan of Huyton: Is that because your salary levels are higher?

Dr Patrick Vallance: It is probably that.

Baroness Morgan of Huyton: So they get the visa through?

Dr Patrick Vallance: Yes. From a student perspective, obviously our numbers are very much fewer but we recruit quite heavily and have joint student schemes from Europe, so we have a very big connection with France on chemistry and, frankly, we have outstanding students coming across, which has created a very vibrant culture within our organisation. Little barriers can go quite a long way to destroying that, so I do not know what impact it would have, but it is certainly an area I would want to make sure we preserve.

Baroness Morgan of Huyton: Thank you.

Lord Cameron of Dillington: Are we supposed to declare our interests?

Baroness Morgan of Huyton: Sorry, I should have declared an interest.

The Chairman: I think most of us declared our interests on an earlier occasion.

Q26 Lord Cameron of Dillington: Thank you. My question is very much a follow-on from the last one because the Government seem to insist on including students as immigrants and they are committed, seemingly, to reducing immigration and, at the same time, they are committed to increasing overseas students. I was wondering how they are going to match those two policies vis-à-vis STEM students at UK universities?

Professor Sir David Greenaway: With some difficulty.

Lord Cameron of Dillington: What are the answers?

Professor Sir David Greenaway: The overarching objective of increasing the number of international students has to be the right thing, I think, for our universities and for the economy more generally. The numbers that we look at in the Russell group suggest that those 24 universities bring in directly and indirectly about £4 billion in exports per annum on the current platform and that is a significant contribution to export earnings, quite aside from the echo effect you get thereafter. These are people who overwhelmingly go back to their own countries and get into positions of power, influence, business and government and think very highly of the United Kingdom, which helps in building trade and investment relationships in the future. As I said earlier, the really easy way of dealing with this is to take international students out of the net migration target. I understand that is politically sensitive and, that being the case, we need to do two things: one is to signal very loudly that the UK genuinely is a place that wants to welcome international students. I travel widely and there are some parts of the world where that is not the message they get, which is very much the case, for instance, in India. The second is to see if we can find ways of making compliance a bit less bureaucratic and a bit more straightforward than at present.

Professor David Phoenix: That soft power argument is very strong, but there is a discussion that has had limited airing which is around the fact that UK students, if they go to a university, expect nowadays it to be a multicultural experience; they expect to engage with people from different backgrounds, and the way that helps people to think differently and broadens their horizons is absolutely essential to the experience. The obvious answer is to take students out of the target. Given that is unlikely to happen, there needs to be some review as a halfway house, if we cannot go that far, to try to look at whether or not there could be key countries where different approaches could be articulated. That is not just on current engagement, so we know that, as I said with Canada, Australia and America, there are a lot of countries we have very strong links with where we could ease relationships, but also future partners, such as China. India has seen over a 50% fall in students coming to the UK in recent years and, as somebody who has done a lot of work in India, I find that really disappointing with the potential talent and entrepreneurial spirit they have in India around biomedicine, enterprise and STEM.

Lord Maxton: Where are they going?

Professor Sir David Greenaway: To the USA.

Professor David Phoenix: To a lot of our competitors. As Sir David said, international students attract around £9 billion to the UK economy, and European students about £3 billion. The return is far greater from EU students and international students to the UK than the return on the research, which is different, in the local economy, yet students are now applying for 2017-18 with no certainty about what the fees are, no certainty about the funding that will be available. If you honestly think we will be able to maintain numbers, unless we can at least tell them what they will be paying over the next three years, I am afraid it does not make sense.

Lord Cameron of Dillington: There seems to be a slight muddle in the figures. You were talking about £9 billion per annum and Sir David was talking about £24 billion from your Russell group—

Professor Sir David Greenaway: No, £4 billion.

Professor David Phoenix: I am using the UK base.

Q27 Baroness Neville-Jones: Do you think there will be an effect from the possibility that the Government will lift the £9,000 cap on undergraduates and what effect do you think it will have on attitudes? Is it again a problem of uncertainty or is it a problem of the absolute amounts that the fees might rise to?

Professor Sir David Greenaway: Do you mean more students from other EU member states?

Baroness Neville-Jones: Yes.

Professor Sir David Greenaway: First, for students from other EU member states, I would be more concerned about access to funding than to what might happen to the fee itself because, whether it goes from £9,000 to £10,000 £11,000 or whatever. If they become up-front fees, as opposed to a student from another EU member state being able to access funding through the Student Loan Company and repaying after he or she graduates once they are earning beyond a certain point, that is a very different proposition from having the entire resources up-front. I am less concerned about the fact that we might see more fee differentiation than I am about access to funding for those students.

Lord Maxton: In Scotland, of course, the universities do not charge fees at all and, as far as I know, they do not charge fees for European students at the present time.

Baroness Neville-Jones: No, they do not.

Lord Maxton: They do for English students but they do not for students from other European countries. Will that make a difference to the Scottish universities?

Professor Sir David Greenaway: It is a really good question. At the moment, there is a notional fee of £500 a year, so £2,000 for a four-year programme, which goes into a government endowment, so to speak. I think there is some threat to longer-term sustainability associated with that. At some point, whatever the shape of any post-Brexit resolution for the United Kingdom as a whole and Scotland in particular, very politically sensitive in Scotland is the issue that a bigger contribution from students will have to come on to the agenda, in my view.

Dr Patrick Vallance: One other thing to add to the issue of the undergraduate numbers is the knock-on consequences for postgraduates as well, which is important, and high-quality postgraduate training is clearly essential for industry. There is a risk that, as fees get to the stage where people find it difficult, the postgraduate population begins to suffer as well or people go elsewhere, so that is something to watch.

Baroness Neville-Jones: Are you saying there is a danger that the UK will price itself out of the international market?

Dr Patrick Vallance: Yes, for postgraduates; that you have a consequence where people say, "I can't take the hit of the initial cost and then do my postgraduate as well, so I don't do postgraduate training, I do something else instead". That is the risk.

Professor David Phoenix: It is worth being aware of the number of EU countries that are increasing the number of courses taught in English to attract an increased number of students both from the EU and overseas at much-reduced fees. It would be very difficult, as has been said, to compete with such subsidies if we do not have some flexibility in maintaining the fee level and support. It is not just about the support we are giving; many of

the European countries that allow students to travel to the UK also provide support in mobility or support allowances.

Professor Sir David Greenaway: Chairman, could I add a small point to Dr Vallance's point? Around 25% of the current postgraduate research students in the UK in mathematics are from other EU countries and about 20% of those in computer science are from other EU member states. That makes the point that, especially in the STEM area, there is a risk here to the postgraduate pipeline.

Q28 Lord Vallance of Tummel: My question is about the relationship between the Government and business. We do not know what kind of Brexit we are going to have, but let us assume for the moment that we leave the single market and we do not join the European Economic Area. If that were the case, a lot of the constraints involved in membership of the EU would fall away, such as constraints on state aid and the regulations you were talking about earlier. If that were the case, would there be an opportunity for changing the relationship between government and business in some way, perhaps through the industrial strategy? If that were the case, too, what would be the ingredients of such a change in relationship that you think would be important?

Dr Patrick Vallance: The answer is yes, there must be opportunities there, and I know the Life Sciences Transition group is looking at this, so there is already a close join-up. There are opportunities in a number of areas. One of them would certainly be around how we fund innovation and give incentives for innovation, so building on some of the mechanisms that are already in place, such as the Patent Box and so on. There are opportunities to think about whether you can enhance cluster development with some sort of incentive there to allow the industry-academic-biotech-tech clusters to really start to have some sort of aid and strategy behind them, and there is an opportunity, despite what I said about regulatory harmonisation, to think about whether there are regulations that could be eased to give a path through. The NHS can also be part of this. We have two things to think about there: one is that we have a lot of data in this country from long-term collections of genetics, from patient populations and from other areas, which, if we can join that up properly across the NHS, academia and repositories of data, is a huge resource which becomes a magnet. Focusing on some areas such as that becomes incredibly important for what comes next in terms of an innovation culture in the UK, so there definitely are opportunities to go after there with a strategy.

Lord Vallance of Tummel: Are the constraints on that now a feature of being part of the European Union?

Dr Patrick Vallance: Not all, no. There are some in the regulations. There is also an opportunity to ask whether, in whatever funding opportunities emerge, we want to be more directed towards growing that sort of national resource in some of the funding rather than the EU putting a big brake on it.

Q29 Baroness Young of Old Scone: The rumours are that one of the ways of getting out of the uncertainty on regulatory frameworks in the immediate future is just to agree that everything currently in place will continue until it does not. Have you any worries about what happens to the subsequent negotiating process when we could see a war of ideologies between the deregulation lobby and the harmonisation lobby?

Dr Patrick Vallance: Yes, regulation seldom gets less. There is a danger that this leads, in all sorts of dimensions, to an increase in regulation. If you look at the current regulatory system, and I do not know how this will be dealt with, in the EU system for medicines the MHRA, our national regulator, takes a high proportion of so-called rapporteur positions when judging the medicines. That will go, and that leads to potentially a very different system emerging in Europe, where we have much less influence. Conversely, we may end up with a different system in the UK leading potentially to a faster system in the UK, but that is of limited global value if it is not linked to the ability to get the same approvals elsewhere. There is risk in this negotiation on how we settle the regulatory framework and I do not think those discussions have started in earnest yet. The simplest answer is: you adopt all the European regulations and accept you have no influence on it. I do not think that is a great outcome.

Q30 Lord Oxburgh: One of the important planks in the European research policy has been collaboration. How do you see that changing and what should we be doing to minimise the consequences, provided we think it is a good idea?

Professor Sir David Greenaway: I think collaboration is a great idea. I think all our universities are very well connected globally, not just in the European arena. There is a risk that some of those collaborations will be compromised by the fact that the funding may not be there to support research and mobility, or to support some of the big infrastructure facilities, which is why at this stage we are all spending less time trying to second-guess what the outcome of the settlement might be in three years' time and finding ways to ensure the foundations are there to sustain collaborations, not just with other partners in the European Union but more globally. My own university is making use of the two campuses we have in China and Malaysia, to build out from there to other universities in south-east Asia and in China. Other universities are reviewing their position because ideas are no respecters of borders or territories, and collaborative instincts are very much in the DNA of most academics. Funding makes it easier—there is no question about that—but the instincts will still be there and the willingness will still be there. We have to make sure we find ways of funding ourselves or persuading governments it is worth funding.

Dr Patrick Vallance: I agree with that. Collaboration is not going to go away; scientists absolutely look for it to answer questions, so that is going to stay. The question is whether the barrier gets higher, and there is no doubt in my mind that the EU grant system fostered collaboration that otherwise would not have happened, and often pulled it quite hard, because people—and having been an academic I can say this—chase the money and the money did make a difference. From our perspective, we would continue to fund EU schemes and we could do so, as indeed do US companies. The worry I have is if UK investigators cannot really lead those, because so much of the great science is here.

Professor David Phoenix: The research funding will carry on; there will still be opportunity for exchange collaboration. The area where I have concern, and this is perhaps different from David's comments at the start, is on some of the student exchange programmes. Certainly at London South Bank, we put funds aside to support international travel because we believe it is absolutely vital for broadening students' experience. With the number of pressures on universities now in terms of additional support—we are having to take on supporting students with disabilities; we are taking on student costs on mobility; we have had to bed in additional cost savings—there is a danger as you start prioritising you end up

with a system where people's background, economic and social situation affects their ability to engage on exchange programmes and universities are not able to take on that funding. Why is that important? It is not just about mobility for those individuals but for the future generation of researchers and the future leaders of our industry—those who have been overseas gain so much. It is the same with our students. If you bring a student from China, they have travelled to a different country, they have learned a different language and they are often leading the way on volunteering. Those students, when finished and having tried all those things, when applying for jobs, are the global graduates that our graduates have to compete with, not just UK-based ones. I worry that without the Erasmus schemes for those staff and student exchanges for early career undergraduates and postgraduates, it will have a medium-term impact on our status and productivity.

Lord Oxburgh: Do you think we need to be proactive now in planning for schemes which will meet these problems?

Professor David Phoenix: Yes, maybe on a reciprocal basis with bilateral schemes with different countries that look at exchanges two ways, because we are seeing a growth in UK students going overseas. It is still less than the number of students who visit the UK but it is growing rapidly, as UK students see the benefits of those overseas placements. I speak as somebody whose son is abroad for a year at the moment.

Dr Patrick Vallance: We can look beyond Europe in that, as was said earlier.

Professor Sir David Greenaway: I would be fairly optimistic, Lord Oxburgh. One of the things that ought to be easier to secure in any negotiations is continued participation in Erasmus because of the attractiveness of the UK as a destination and because other non-EU member states participate in Erasmus anyway.

Q31 Lord Hennessy of Nympsfield: Can you put a figure, at current prices, on the gap the Government would have to fill if EU collaborative money disappeared? It is a lot of money, is it not?

Professor Sir David Greenaway: About £900 million.

Lord Hennessy of Nympsfield: A year?

Professor Sir David Greenaway: Yes.

Lord Cameron of Dillington: When trying to replace that, some 65% of current funding for R&D in the UK comes from the private sector. What can the Government do to try to crowd in more private sector funding to help replace some of that missing funding?

Professor Sir David Greenaway: The Government have done quite a lot in that regard in the last five to 10 years when you look at structural funding for things such as the Research Partnership Infrastructure Fund. Indeed Patrick's boss, Sir Andrew Witty, is presently in Nottingham opening a building which benefited from that scheme. The Higher Education Funding Council for England put some funding in but on a 1:2 basis matched through private sector and other funding. It is also the case that the research councils, whether for doctoral training centre programmes or big collaborative grants, put universities on notice that they have to be seen to bring in matched funding from the private sector. We are part of a new initiative called the energy research accelerator, which has been funded by Innovate UK and six universities in the Midlands. Innovate UK is investing £60 million in that and we have had to draw down £120 million of private sector match. So there is quite a bit of activity and this

is a good thing rather than a bad thing because it is promoting closer collaboration between universities and business, and I think we will see more of that. However, I think the Government will still have to look at the priority it gives to science relative to other investments going forward.

Dr Patrick Vallance: Whatever happens with the evolution of UKRI, the key thing to focus on is whether you can make that link such that you can really enhance the inward investment from the private sector as well as enhancing the public funding of science.

Professor David Phoenix: When people ask that question there is a danger that they focus on big industry. Of that £9 billion, about 70% goes to universities, and it is a large—disproportionate—percentage of the moderns' income. A lot of work supported through that activity by SMEs and regions. It is one thing arguing about how you get larger contributions from big business but a lot of our economic growth and interaction is being driven by SMEs, some of the creative industries and multidisciplinary interfaces. That is a much more difficult scenario to plan.

Q32 Baroness Young of Old Scone: Earlier somebody said we needed a barometer on what is happening so we could track trends quickly. There is a lot of either anecdotal evidence or example, depending how you look at it, of the impact of Brexit and there will be even more in the future. How can we do that and what should the Government be doing to track how these impacts run through?

Professor Sir David Greenaway: The Government have been proactive and receptive from the start. Mr Johnson, when he came for a meeting with Russell group vice-chancellors, asked for evidence that the Government could build on to take to Brussels, and all of us through the different mission groups and through Universities UK, have been gathering any evidence we have on appointments not taken up or instances where individuals have been asked to reconsider their position in leading a specific consortium. I must say there is not a lot of it, to be honest, as yet.

Baroness Young of Old Scone: Is that call for evidence sufficient or are there other, more systematic and scientific ways we can track it?

Professor David Phoenix: It would help to break it into two phases. A lot of the challenges we have in the university sector are on transitional arrangements and there is almost a concern that, "We cannot say that because it could affect the negotiating position" or "That might not be true further on". On European student numbers there is no reason why we could not agree a transitional arrangement, so that for students applying for 2017-18 and 2018-19 we would retain the regulations to enable them to continue to the end of their course. You are not then committing to that in the negotiation as the end point but you have given some stability to the sector. Because we have such a seismic change, coupled with the change in the regulatory environment for the sector, one of the key measures is the stability of the sector as a whole and how we are able not only to adapt but to grow, further flourish and prepare ourselves for a new environment.

Q33 Lord Hennessy of Nympsfield: Might it be difficult to measure developments that have occurred because of the stimulus of Brexit? For example, if I was a vice-chancellor—a position to which I have never aspired—I might be interested in furthering this last spasm of British colonialism, which is what you are doing in China, and I think my own college of Queen Mary is doing as well. It is a remarkable phenomenon which nobody has written up; it

is the last throbbing of the British Empire. I might be tempted to do more of that to raise revenue because you do not do it out of altruism, do you?

Professor Sir David Greenaway: I have never thought of it in those terms, I can assure you, nor is it a vehicle for generating short-term margin. If I wanted a rapid route to short-term margin, I would build another hotel in the university park. It is there for long-term value. There are 7,000 students at that campus; it provides great opportunities for student mobility within their own university; it provides great opportunities for diversification of research, for building business-to-business relationships in companies we work with in western Europe that have an interest in Asia, as well as companies in Asia which have an interest in western Europe. There is enormous potential for long-term value in this; it is not about short-term margin.

Q34 Baroness Neville-Jones: What is the evidence, if any, of European universities not being able to participate in, or being rejected by partners for, bidding for future funding for projects which might end before Brexit but quite likely will not end before Brexit takes place? Is there evidence there and how will you try to gather that information? Do you think it a serious threat?

Professor Sir David Greenaway: It is a potential threat, but I do not see a lot of evidence that it has been a real threat in Russell universities.

Baroness Neville-Jones: I have heard of one.

Professor Sir David Greenaway: We hear of the odd instance here and there of an individual being asked, "Do you think you should still lead this?" as opposed to being a partner. We have seen some evidence of that because the consortium is concerned that if it is led by a UK institution, its chances of success may be compromised. Certainly the Commissioner has been very helpfully vocal on that front, but I personally do not have a lot of evidence to report on that.

Dr Patrick Vallance: I hear exactly the same. It is more whether they want a UK academic leading the whole thing in an area of uncertainty and even that has not—

Baroness Neville-Jones: How much of a loss is that?

Dr Patrick Vallance: It is a loss but I am not sure it has even happened; there have just been discussions where people have raised the question. Examples where it has really led to some change are very few and far between and certainly only anecdotal.

The Chairman: I suspect that this is an area where we will need some very hard evidence. Inevitably, after Brexit there was a lot of speculation and we are still waiting for the dust to settle on all this. We are most grateful to you for joining us today. We will be, by the end of October, following up on our report on EU membership and UK science and your contribution today will help us enormously, so very many thanks to Professor Phoenix, Dr Vallance and Sir David Greenaway. Thank you.