Bank of England

Writing the Path Back to Target

A speech given by Mark Carney, Governor, Bank of England
At the University of Sheffield Advanced Manufacturing Research Centre, Sheffield

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Richard Caborn: Well I was going to say good morning - it's good afternoon, and welcome to the University of Sheffield Advanced Manufacturing Research Centre. And, Governor, it's a great pleasure to have you here. We do welcome you to the AMRC and hope you're going to give us an interesting speech a little later on. But thank you very much.

And also, can I say, Governor, thanks for discussing some of the issues - big issues that are facing business here in Yorkshire this morning. I think it's time really well spent; I hope that was the same from yourself.

We're also very proud of what we've been able to achieve on this site over the last ten years, and that's why I want to thank Juliette - Juliette Healey, the Adviser to the Bank, for helping to bring you, Governor, and indeed your colleagues here today to see exactly what we're doing.

Can I also say thanks to Julia, the staff here - and Chris and the whole team that's put this together. I must admit putting a meeting together of this nature has not been easy. We've had a few health and safety issues, I can assure you. That's why we've got a big aisle down the middle here, but that's that.

Well, as I say, we were celebrating the tenth anniversary of this site last year. Unfortunately, Governor, you weren't able to be with us that time. But we have been able to hold back what we would have produced then. We've held that back for today's meeting - Building Futures, Advanced Manufacturing. And really it's an history of the AMRC. And I hope with your intro into that, Governor, it'll be a best seller as well.

But, you know, who would have thought - ten years, believing that such a transformation could have taken place on this site, the Orgreave site, the end of the miners' strike 30 years ago as of this year, and the Orgreave coking plant that was there at the heart of this site and played such a decisive part in the outcome of a bitterly fought industrial dispute. And then to the extraction of seven million open casting, of seven million tonnes of coal in the late '90s, and indeed, at the turn of the twentieth century it was able to return this site to economic development.

To this building where we are today, Governor, the Nuclear AMRC, whose life began with the Queen actually doing the dig in November 2010, the virtual dig of the sod that started this building going. And indeed, I think you see the role that this place will play in - I hope the not too distant future - of the development of the new era of nuclear power plants - the small module reactor.

But when I tell you what they can tell you just over ten years ago - there was one person that didn't believe - I think there were many people that didn't believe what we were going to do on this site. And I can remember when Keith and Adrian and myself were digging that first sod just over ten years ago, and we were being filmed for the television, and I shall never forget what the cameraman said. I think the cameraman reflected what a lot of people were saying, because I turned to camera and said - this is going to be the future of engineering; this is going to be a site where Brearley invented stainless steel just over 100 years ago. And he said - I shall never forget - in his usual Yorkshire way, as they do these cameramen, working I think for ITV at that time. He says - Tha must be bloody joking, Dick. It's a slagheap.

And I'm talking about a world-beating engineering centre. Ten years ago. Look what we've got now. Well, we weren't kidding, and that following ten years, with the inspiration of Keith Ridgway and his team, his very talented team, we've actually delivered something I think this nation can be proud of. Brings together academia and the private sector, not only to work in partnership, to benefit their own companies and that is right, but also to start something else - to start addressing one of the major fault lines, Governor, that we believe we've got in our economy - that's our competitiveness.

How do we take ideas through innovation, development and then to market? How do we make those things in this country that people want to buy worldwide at the right price? Well, this book I think tells you just ten short years of the AMRC, the journey that we've gone through. It also describes how we can start to achieve a more competitive Britain. How we can, as you have said many times, Governor, how can we address the underlying cause of the lack of manufacturing competitiveness? How can we grow the manufacturing sector to contribute considerably more than the 11% of GDP that it is at the moment and become more competitive with the major countries?

And also - not only were we looking at how we could drive the competitive stuff, but also how we could address the weakness of our manufacturing base, but also how we can repatriate the manufacturing supply chain. And I think one of the great successes of this site, as you look across the way - I think you were referring this morning, Governor, to Rolls Royce investment into one of the leading edge technology companies in terms of airspace blades. And that announcement to investment by Rolls Royce - what, two or three years ago - actually was welcomed here in this city with a great load of acclamation.

But I tell you it lasted about 48 hours because then people were saying - well, where's the skilled labour going to come from? Where are we going to get the next generation? Well, we said - the answer is there. We didn't look at the problems, we said - what are the solutions? And in January 2014 the AMRC opened the first apprentice training centre for

250 apprentices which was owned and run by a red brick university - the first we believe in this country. Thanks to the team here, led by John Baragwanath, and the support let me say - a very active support of our Vice-Chancellor, Keith Burnett - we built and delivered possibly one of the country's bet engineer apprentice centres, but with a major difference - and I think this is a major difference, Governor - not only were these young people, some of them from the east end of the city, going into that apprentice training and come out as first class artisans, but they would also be given the opportunity to go on, and who knows, kid off the manor might come through our apprenticeship trainingship and get a doctorate in engineering. That is social mobility without the cost of fees at the end of it as well, which is very attractive indeed.

But I think it's also important that the lessons we've learnt from the AMRC model, we're taking that into other areas to address both our competitiveness and indeed our wealth creation in this part of the country. And one is to deliver the Olympic legacy park physical wellbeing, Advanced Wellbeing Research Centre, which will be commissioned in the next 12 months.

Plans are also in hand to develop and build the hospital of the future with the partnership of our two universities and teaching hospital and yes, indeed, the private sector as well. This emerging innovation district, taking our traditional skills and knowledge and putting them into a modern setting. And this is now linking with Manchester, with Leeds and ourselves, and we are now becoming the heart of that Northern Powerhouse that many are referring to now.

So it is a great privilege again, Governor, to have you here. I think to just explain to you how where we've come in this last ten years - it's all documented there. And if you don't think we've got a great belief in this area, well I can tell you some in this room know we have a great ambition, we have a great dream and that's to get Sheffield United playing Manchester United in the Premier League in the not too distant future. Thank you very much for coming, Governor. Juliette.

Applause

Juliette Healey: Thank you, Richard. So I'm Juliette Healey; I'm the Bank of England agent for Yorkshire and the Humber. And I'd like to thank the Advanced Manufacturing Research Centre and the University of Sheffield for working with us to host this event. Now as you can see, this isn't a usual event - a usual venue for a speech, but it is an inspirational one. Not just the building where we sit now, but the whole of the Advanced Manufacturing Park. And as a lot of you are aware, every year here the frontier of science and technology is pushed further out. And it's those developments which support the UK's ability to compete with the rest of the world. So it's fantastic for us to be here right at the heart of all that innovation.

Now before I introduce the Governor, I should explain - particularly for those of you who've not come across a Bank of England agent before - what Bank of England agents do and why we have something in common with the Advanced Manufacturing Park. We're a network of 12 agencies that span the UK, and our job is to be the ears, the eyes and the voice of Bank of England policy makers across the nation.

We spend most of our time talking to individual businesses face to face. I can see quite a few of you in this room. Why? Because that way the intelligence that we gather is timely, it's forward-looking, we can explore puzzles in official data, and we can understand how behaviour is changing. It's always been a crucial element of Bank of England policy making, but it's even more important as the world changes and economic models based on historic data are less of a guide to the future.

So like the Advanced Manufacturing Park, we really value the partnership with business. We recognise that there is no substitute for getting the news about the real economy first hand from firms. So I'd like to take this opportunity to say thank you to all of you who take the time to share your experiences and how your businesses are responding with us. We really appreciate it.

So thank you very much, and now I would like to introduce our speaker, the Governor of the Bank of England, Mark Carney.

Applause

Mark Carney: Thank you very much, Juliette. Good afternoon, everyone. Thank you, Richard, for those great remarks, important remarks. One of the many things I took from them is - this man is an optimist. Sheffield United beating Man U in the Premiership - it starts there. More importantly, more to the point, you along with Keith and Adrian, ten years ago, and Keith, turning a slagheap, as you say, into this state of the art facility that is absolutely essential for the competitiveness of UK manufacturing and shows the way for UK manufacturing.

And the third way you demonstrated your optimism is - you said you hoped that I was going to give an interesting speech. I am a governor of a central bank [laughter], so I hope you're sitting comfortably.

I am going to talk about, I think, some important issues though, some important issues that impinge on competitiveness and our long-term prosperity, from the perspective of the Bank of England. And obviously we'll have a chance to have some questions and responses at the end to get to the heart of your issues.

It is a great pleasure for me to be here and to be in Sheffield to honour both the role the City of Steel had historically in forging the industrial foundations of modern Britain, and its current leadership in promoting advanced manufacturing for the post-industrial age. This city has been at the forefront of innovation for hundreds of years, as you know. In the 18th century, Sheffield revolutionised steelmaking with the discovery of the crucible steel process, and stainless steel subsequently. By the mid-19th century, the city represented almost half of Europe's steel output. And since then, Sheffield has remained fleet of foot through hard work and crucially innovation.

The University of Sheffield's Advanced Manufacturing Research Centre is the latest and really the prime example of that. No one knows better than the people in this room, in this facility more broadly, that manufacturing needs to become ever-more productive to prosper in a world of steadily falling prices and relentless international competition. As one example, prices for advanced manufacturing products fell on average by 1 per cent a year in the decade prior to the crisis.

And they've also dropped steadily to the cost of simpler manufacturing products - actually 30 per cent over the course of the last two decades. The ability to do that is a reflection of superior productivity growth. And it's not just your customers, but society as a whole that are the beneficiaries of manufacturing doing much more with less.

The strong recovery of UK manufacturing over the past year - with growth stronger than at any point in the decade - is a testament to this sector's focus on continual improvement.

As you know and as you contribute, manufacturing punches well above its weight in spending on R&D. Manufacturing products R&D has grown by a quarter since the mid-1980s and currently accounts for over two-thirds of the entire UK spending on innovation. Advanced manufacturing sectors, from pharma to auto to aerospace, represent well over half of this amount.

And such contributions are crucial to UK's prosperity because our long-run economic performance hinges on productivity growth. It's productivity that's the ultimate determinant of people's incomes and the capacity of our economy to support health, wealth and happiness.

Now turning to the Bank of England, the best contribution we can make to these goals is to promote monetary and financial stability. And our remit for monetary stability is simple. Our job is to achieve a 2% rate of growth in CPI inflation. We do that by setting Bank Rate, which is the fulcrum around which all interest rates in the economy pivot, and, if necessary, as it sometimes is, by purchasing assets.

We operate under a framework known as Inflation Targeting, and over the course of the past two decades, Inflation Targeting central banks, in the UK and around the world, have established excellent track records of keeping inflation from being too high. It's an approach that in the UK has brought tangible benefits. It's lowered the volatility of both inflation and of income growth.

But now the challenge for those central banks around the world and for the Bank of England is that we're being tested by inflation that is too low. And so what I want to concentrate on today is to discuss the consequences for the UK of persistently low global inflation - why it matters, and what the Bank of England can do about it, in order that businesses and households in Sheffield and beyond can focus on what really matters to them.

And my bottom line is going to be that there is a risk that the combination of persistently low global inflation and the strength of sterling could weigh on prices here for some time. But despite these headwinds, a solid UK expansion, underpinned by strong domestic demand growth, leaves us on track to return inflation to target within the next two years. And to deliver that outcome, a gently rising path for Bank Rate is likely to be required over the next few years.

So I think a fair question is - why do we target low, but positive, inflation - that 2% rate - rather than zero or even negative rate of change in prices? Now the simple answer is - and for my own purposes don't really need to go farther than this - is because it's our job; it's a job given to us by the democratically elected representatives of the British people. We are mandated by Parliament to do that and we have an operational independence in order to accomplish that.

And there's a very good accountability mechanism around this. On those occasions where inflation moves by more than one percentage point away from target, we are required to explain publicly why that happened and what we're going to do about it. And we're required to do that in an open letter from the Governor to the Chancellor.

And in the past there have been 14 of these letters written by my predecessors, in every case because inflation's been too high. Now particularly subdued inflation in January meant that I had to write the first of these letters to explain why inflation was too low. And it's likely that I'll have to write a few more of these over the course of the year. I'll come back to why that's the case and what we're going to do about it in a moment.

But sticking with why we target 2%, this reflects the lessons of the past, particularly of the '70s and '80s, those difficult decades when we had high and volatile inflation as well as the deflationary disasters that have followed past financial crises.

Low, stable and predictable inflation helps to stabilise households' and firms' expectations about future price increases. And that helps them obviously plan their spending, and hiring and investment decisions. In short, the Bank of England worries about inflation so all of you don't have to, except for the time that I'm speaking about it during this speech, when you have to worry about it.

We worry because high inflation damages growth, in part because it tends to be volatile, it generates uncertainty and makes it difficult to make those investment and hiring decisions. In contrast, a little bit of inflation helps grease the wheels of the economy. And an important example of that is in the labour market, where workers usually resist outright reductions in the level of their wages when economic conditions deteriorate. And so a positive inflation rate helps to smooth that adjustment.

A positive inflation rate also gives monetary policy the space it needs to respond to negative shocks by cutting interest rates. And that's because, in normal times, the so-called equilibrium rate of interest, in other words the rate of interest at which the economy would tend to settle without generating inflation, is equal to the underlying rate of growth plus the inflation rate. So the lower the average inflation, the less scope we have to reduce interest rates to respond to shocks before those interest rates approach zero.

And this point about where the equilibrium interest rate is, the rate we would want when the economy is in equilibrium, is so central to monetary policy and certainly to the current circumstances globally, I'm going to come back to it further in a few minutes.

Now persistently low inflation can be difficult because it undermines these dynamics. But proper deflation - outright deflation - by which I mean persistent, not temporary, but persistent and generalised falls in in prices, is potentially dangerous.

During the Great Depression, sharp falls in prices reinforced collapsing output and skyrocketing unemployment. And to consider how susceptible we might be here in the UK to deflation, it's helpful to review why deflation is potentially dangerous.

Now the most commonly cited reason is that falling prices may prompt households to delay their purchases or businesses to delay investment. And that creates a negative feedback loop where there's a fall in demand as a consequence, which leads to further falls in prices and higher unemployment. And of course that higher unemployment further reduces incomes and spending, and draws the economy into a vortex.

But the relevance of this story depends on households' willingness and ability to delay consumption. There are certain goods for which households can't delay consumption - food, education, others. On top of that, the psychology of instant gratification - the tendency of all of us to discount the future heavily relative to the present - mutes our willingness to wait for lower prices. And it's fair to say - I'll give the stats in a moment - there's little evidence of delayed gratification yet taking hold in the United Kingdom.

There would, however, be a more clear and present danger arising from the balance sheets of households and firms, should deflation persist. And this is now the concern across the advanced world, including here in the UK, where private debt levels remain very high relative to history.

As you know when a household takes out a mortgage or a firm takes out a loan, the amount owed is denominated in cash terms - in other words, not adjusted for inflation. And so if there's unexpected or generalised falls in prices that means the real value of that debt increases: the same amount of money is owed, but that money now buys more goods and services. And as a result, more consumption and investment needs to be foregone in order to service that debt. And it's that negative feedback loop, that vortex, that debt-deflation dynamic that was at the core of the Great Depression and at the core of the Japanese malaise following the collapse of the asset bubbles there in the 1980s.

And this dynamic is of particular concern if the pace of wage growth were to follow prices down. Now again, there is no evidence of that currently in the UK, where wage growth has picked up over the course of the last six months. More broadly, since the 2008 crisis, in many respects debt deflation has been the dog that hasn’t barked - we would have expected much more of this globally than we've actually seen.

But we shouldn’t rest too easy - there are several reasons why that dog might just be sleeping, and central banks need to be vigilant to ensure that the recent low inflation doesn't begin to stir that dog from its slumber.

Now low global inflation matters for the UK because we're an open economy - this facility is a testament to that. Around one-third of goods and services consumed in the United Kingdom are imported from abroad, and that creates a direct channel from lower foreign prices here to prices in the UK. In addition, we export around 30% of our GDP, and that creates an indirect channel because that changes the balance of supply and demand for labour and other inputs, again which has an impact on inflation here.

Now the importance of these channels has waxed and waned over decades, with the changes both to the degree of global integration and how monetary policy has been conducted. So under the old Bretton Woods system, which went from after the Second World War until the early 1970s, there was a system of fixed exchange rates and relatively closed international financial and goods markets. At that time, there was relatively low correlation between inflation abroad, inflation in the UK, inflation between various countries.

And that situation changed with the collapse of Bretton Woods in the early 1970s. And so throughout the '70s and '80s and the difficult years then, and the challenges on this site in the early 1980s - 1984 that Dick, you mentioned, we had a situation of high volatile inflation and also inflation that was highly correlated around the world, particularly across the advanced world. And you had central banks who lacked an anchor, a nominal anchor, to guide policy, to manage global shocks and to achieve the necessary reduction in inflation.

And it wasn't until the early 1990s when the era of Inflation Targeting was ushered in, led by very much the Bank of England, that things changed. From that point on, central banks took much greater, although not total, mastery over their monetary destinies. At the same time, there has been from that period increased integration of global financial markets - goods markets, to some extent labour markets with technology. And that's been a countervailing force to the power of Inflation Targeting.

So we have a situation where you have better monetary policy, but you have a more integrated global economy. It's meant that it's far superior - we have control over inflation in our own economy relative to those difficult years of the '70s and '80s, but not to the same extent when we had effectively a closed economy under Bretton Woods in the immediate post-war period.

And what's happened since the financial crisis is that the correlations between inflation rates in the major advanced economies has picked up. So we have to recognise that as we're writing our monetary scripts, at the very least we have an editor. And if we're not careful, we as central banks could become ghostwriters.

So why is inflation low globally? Well, the obvious and the most important fact right now is, with me, is that there has been a sharp fall in the price of oil, as we all know. In our view at the Bank of England, that sharp fall in the price of oil has largely been driven by positive supply developments as opposed to weaker demand developments. And that means it's good news for the global economy and it's unambiguously good news for the UK economy. We estimate that lower oil prices will boost the level of UK-weighted global GDP - so the bit of the globe that matters most for us - by a little under one percentage point over the next three years. And that means a direct boost in demand for our exports of around two and a half percentage points.

Lower oil prices will also boost UK domestic demand directly as households spend the windfall that they get at the petrol pump. Our forecast conservatively assumes that they actually save about 50 pence in the pound of that amount that they're saving at the pump. And on balance, there's likely upside risk to growth and inflation from that assumption. But it's important to recognise - and the reason I'm talking about global inflation is that oil isn't the whole story. Measures of inflation globally that strip out volatile factors, such as energy and food, other commodities, have been trending down as well.

And currently - and this is so-called core inflation - and currently core inflation in the UK is running at about 1.4%, and it is likely to decline further in coming months, reflecting in part sterling's past strength and muted domestic cost growth.

The weakness in core inflation globally reflects a shortfall of global demand relative to global supply. And in addition, in some major economies there are some powerful additional disinflationary forces. For example, in the euro area, a series of necessary internal devaluations are weighing on wages and prices. And in China, a rebalancing of investment and consumption risks creating further disinflation. In fact, in China the producer price inflation rate has been negative for 35 months in a row, reflecting long-standing overcapacity in industries such as concrete and steel, as we'd know, while the more recent weakness in the Chinese property market could further increase excess capacity in related sectors, such as construction.

All of this suggests that a persistent period of low inflation globally is a possibility. And as I mentioned a few moments ago, this could itself create a self-fulfilling fear of a bad outcome. The dynamic is that concerns that household and government debt will weigh on demand and that that could cause firms to delay further their already weak investment spending - and I'm speaking globally at the moment.

Such a rational corporate caution is consistent with the behaviour of many financial asset prices at the moment, which appear to be pricing in a possibility of material downside risks, such as that that economic weakness and persistently low global inflation could become mutually reinforcing.

So what if inflation is slow to return to target abroad? What does it mean for us? Well, obviously it will heighten the challenge of returning inflation quickly to target here in the United Kingdom, not just because of the direct impacts of low global inflation, but because weak global conditions tend to push down on that equilibrium interest rate that I mentioned earlier, that rate that's necessary to maintain the balance between supply and demand in the economy and to keep inflation at its target.

And that interest rate has been falling for the last three decades. It likely turned negative during the downturn, which is why steps such as quantitative easing were necessary, why central banks had to turn to unconventional tools.

In the case of the UK and the US, measures such as large-scale asset purchases have been effective in supporting domestically generated inflation. So we're in a situation where that negative equilibrium interest rate might be turning positive here in the UK as domestic headwinds have abated. Now it’s still likely negative in other major economies such as Europe, reflecting an excess of savings over investment.

And it's in that regard, that the ECB’s recent moves to reduce its deposit facility rate to–0.2%, and to commence large-scale asset purchases, are both timely and welcome.

However, in an environment of low rates everywhere, and in some cases negative rates in many places, even the Bank Rate of the Bank of England of 0.5% might begin to look high-yielding. And the fear of a bad outcome abroad could trigger safe-haven flows into the UK that could push sterling higher, making exports more challenging and with knock-on impacts for wages and prices here at home.

Further moves would come against the backdrop of a 5.5% sterling appreciation on a trade-weighted basis in the last year, and that move extended the currency's appreciation to around 17% since its trough after the crisis two years ago. These moves are reinforcing the disinflationary impulse from abroad, and they could take a while to pass through to sterling prices in the shops.

All of this puts - all of these global developments and the stance of sterling - puts a premium on generating the domestic inflation necessary to return inflation to target. And the good news is we're on track to do just that. The UK economy is performing well. UK growth is solid, unemployment is coming down, with over 600,000 jobs created in the past year. Wage growth is showing signs of picking up, not slowing down. Wage growth in fact rose to 3.3% in the private sector at the end of last year. Averages hours worked continue to recover on a strong upward trend. And consumer confidence and retail sales are at their highest levels in over a decade. And similarly real income growth is on course to be its strongest in a decade. Firms' investment intentions are robust and surveys point to consistent solid growth above its trend rate.

So as I said before, there is little evidence of that deflationary mind-set setting in in the United Kingdom. In fact, with domestic demand growing at around 3% in 2014, again the fastest rate in a decade, all of these factors should underpin the momentum needed to bring domestic cost growth back up to a rate that's consistent with the inflation target.

The fall in inflation that we're experiencing now, the reason I have to write these letters, is in large part due to the fall in energy prices. It is not generalised deflation proper. The proportion of prices that are actually falling is absolutely consistent with the average over the course of the past decade.

Now all that said, we will be vigilant in monitoring people's expectations of inflation to ensure that there aren't these second round effects. But on balance, those inflation expectations remain broadly consistent with our 2% target, and as we noted in our February Report, in any event we retain considerable policy options should any downside risks materialise.

So let me conclude, and we'll get to questions. The Bank of England cares as much about inflation that's below target as it does above. With inflation below target and unemployment still above its long-run sustainable rate, we're looking to return inflation to target within the course of the next two years.

In our most recent forecast, we expect exactly that to happen. Consistent with limited and gradual increases in Bank Rate over the course of the next three years in order to bring inflation not just back to target, but to bring it back to target in a sustainable manner.

The pace and the degree of these rate increases will be affected by a variety of factors, including, as I've been discussing, the evolution of foreign prices and our exchange rate, as well as domestic cost pressures. While the Bank can be expected to look through one-off shocks, it may be appropriate for us to take into account persistent external deflationary forces arising from the combination of continued foreign inflation and the protracted effects of sterling’s strength on consumer prices, particularly if these forces were to intensify.

Now Sheffield has shown that in a rapidly changing global economic landscape, hard work, clarity of purpose, and fleetness of foot give manufacturing the freedom to write its own future. And we have the example in your booklet.

The Bank also faces global risks as it seeks to return inflation to target. But we remain the author of our nominal destiny. We have the responsibility to return inflation to target over the course of the next two years, to do so in a timely manner, and we will write the next chapter that seeks to do so.

With that, I thank you for your attention and look forward to your questions. Thank you very much.

Applause

Q&A

Mark Abrahams, Fenner: Governor, you've spent quite a lot of time talking about the dangers of deflation, but we have been running for quite a considerable period of time with very low interest rates and indeed negative real interest rates.

What do you see the dangers of such a policy for such a prolonged period of time, particularly with regard to attitudes to investment and the almost intractable high level of debt that we seem to be running with?

Mark Carney: It's a great question. And this is something that we at the Bank of England spend a tremendous amount of time thinking about. Because one of the strengths of the new structure of the Bank of England - I'm going to make a slightly tortured analogy, but just as this institute brings together academia, business, researchers from around, in a partnership, the new Bank of England brings together not just the monetary side, which I concentrated on today, keeping inflation on target, but the supervision of the financial system - safety and soundness of our banks, and some of them are here today; thank you for coming, Chris - and the so-called macroprudential side, so exactly what you're worried about. What your question points to is - how sustainable are the debt levels in our economy, both on the household basis and in the financial markets? And so those are brought together, and our job is to co-ordinate policies in a way that's consistent.

So we need to, as I've been arguing, we need to provide appropriate stimulus to the economy to bring inflation back up to target. And for the avoidance of doubt, as I said in the speech, that's consistent with, we think, a gently rising path of interest rates over the next few years. But rates will still be relatively low and they will have been low for a long time - to your question.

So the question is - what else can we do to address the potential risks that are caused by these? And there's two classes - I would say there's two classes of risk. The most important risk in terms of our long-term future are centred in the household sector. Potential excessive borrowing, particularly on the mortgage side - for mortgage debt.

And we put in place some measures last spring to take out insurance against that risk. Effectively what we did, and financial institutions have complied with this, is we said - we want to limit the proportion of highly levered mortgages that are given, and we gave specific parameters. Because it's fair if you're a first time buyer or you have certain characteristics - there's a place for these types of highly geared mortgages, but not for everybody. So we didn't want the entire housing market to adjust upwards, because we've seen far too many times in the past - when I lived here in the late '80s and '90s and saw that experience where originally responsible underwriting standards turned to reckless. And so we tried to prevent that. So we put that in place. We put in income tests and other things in place, and that's helped stabilise that market, stabilise the underwriting standards and promote good behaviour. So that's one way we addressed the risk for our most important sector.

And we're reinforcing in that regard a dynamic that is relatively unique to the UK globally, which is that household debt here has actually been coming down. Really it's just in the US and the UK are the major economies where that's been the case. It's come down by about 20 percentage points relative to income. It's still a bit too high, but it's at least heading in the right direction. That's the first class.

The second class, and the much more difficult class of risk to address, are in financial markets, because they're global and we have influence over sterling markets, but we can't dictate standards globally.

We can negotiate standards globally, which is part of what we've been doing. So standards for much higher capital in banks globally; reorganising how derivatives and other markets are structured, so that if one institution fails, the whole market doesn't fail; and changing the way that liquidity is provided to the system by the Bank - so-called plumbing of the system. So we're doing this series of measures like that to make the system more resilient.

I would say that work is not yet completely done, but it is - there's a clear agenda there that has improved the core of the system. And thus far, it'll end here, thus far when we've had shocks in that system, such as when the Swiss franc moved, or in October of last year when there was a big shock in the US treasury market, or 18 months ago when the so-called taper tantrum happened, the core of the system has absolutely held up and not amplified the shock. And the great tragedy of the crisis is when we had the shock, the core of the system collapsed and amplified it all the way down to the shop floor around the country.

So your question's on point, but part of what we can do as a bank is be co-ordinated so we can provide the stimulus that's necessary for the economy while at the same time protecting it against these risks. Thank you.

Wayne Bowser, Beal Homes: Clearly, you mentioned within your speech our relationship with Europe, which will remain important before, during and after the election. And you referred to the fact that the ECB had determined to acquire assets recently, and I think you said it was both timely and appropriate.

There are others of course who might say it's long overdue, and I just wondered the extent that the Bank of England can and does seek to influence what goes on, say, with a partner as closely linked to us as Europe.

Mark Carney: Sorry, Wayne, I didn't quite capture the last bit of your question.

Wayne Bowser, Beal Homes: I just wondered what was the Bank's ability to influence such as the ECB in those decisions, given the nature of the relationship between us.

Mark Carney: I see. Yeah. Well, it's we have a close relationship with the major central banks, as you would expect us to. Not just the ECB, the Fed, but the major emerging market central banks. And we're in regular contact with them. I met with all the governors of all the major - the top 14 central banks - on Sunday - Sunday and Monday. I speak regularly to the President of the ECB. My colleagues speak to his colleagues as well.

And we do that for several reasons. First and foremost is to understand each other, because we're in an integrated world and the stance of their policy affects not just their economic outlook, but prices of assets and potentially how we would react. Secondly, to the extent possible, to try to co-ordinate on things such as financial reform. Thirdly, to share experiences of what works and what doesn't, because we are

- let's be clear - in some respects we have been in extraordinary times since the crisis. The good news for the UK is that we're on a path - and we want to stay on that path - but we're on a path to exit from those extraordinary times and start to normalise policy when appropriate.

But for the ECB they're entering something that we entered several years ago. So we've shared perspective with the ECB on how we conducted QE, what we thought worked, what didn’t. How we constructed various facilities that provided liquidity to banks - again what worked, what didn't. And shared experience and, you know, I think on the margin - one would hope on the margin helped formulate their policies which are tailored obviously to their structure.

Let me say one last thing about the ECB and their steps on QE. One of the most important things about that programme is the fact that the existence of the programme, the validity of undertaking asset purchases, was unanimously agreed by the Governing Council of the ECB. So all central banks represented, all members of the Governing council, agreed that this is an appropriate tool in the central bank toolkit.

Now some members thought that maybe now wasn't the time or the size of the programme wasn't exactly the right thing, but the important thing is that now the ECB is in a position that is analogous to the Bank of England, to the Fed, other major central banks in that it has a full toolkit and it can respond to eventualities as needed.

And reasonable people can disagree about the actual amounts and the timing, etc., but it's crucial and it's particularly important in an environment where there inevitably will be shocks. And in Europe, as they go through a period of continued integration, having a full toolkit could prove quite valuable. Thank you.

David Child, Chair of Chamber of Commerce Council, Sheffield: Great to see you here. My question's about peer funding and crowd funding - peer lending, crowd funding. Because in the Victorian era there were 40 odd regional stock exchanges outside London, and the LSE gradually closed them down. And I see peer lending and crowd funding in a sense as a modern day version of that. But I feel there might be a danger of over-kindness with over-regulation, which might kill it. What's your view on those two forms of investment and participation and about regulating them?

Mark Carney: Yes. I think one of the - let me speak in general terms first, and then I'll get to your question. The first thing is that we have adopted a stance in terms of regulation of the traditional core of the financial system - banks and building societies, one that encourages new entry. And so we have streamlined the entry procedures. They're still, you know, they're still robust, as you would expect, but we've streamlined entry procedures, we've lowered capital requirements; we've had transition paths for new challenger banks. And we've set up the conditions, we think, that we're in a much better position to resolve institutions that might not succeed, just like any business doesn't succeed.

The more confidence we have in that, the more confidence we have that new banks, building societies or other financial institutions can die as well as be born in a way that doesn't affect the broader system.

The more competition, the more entry, the more access to finance the system will have. So the end of the life is as important as the start. And we've made a lot of progress on both ends, I think.

In terms of peer to peer and crowd funding, it's not - this isn't direct - these are not banks, they're taking deposits, it's direct channels, and so - nor building societies, nor insurance companies. So therefore they don't fall directly under our regulatory remit. There are conduct issues around in terms of disclosure and, you know, the appropriateness of the investor base, but that's for the Financial Conduct Authority to oversee, which they do.

I would say there's a general disposition that, whether it is in those sectors or in the sectors that - include digital payments, digital currencies as opposed to financial innovation - to as much as possible try to tailor the phasing of regulation and oversight in a way that allows for innovation, while continuing to protect the system.

Because my last point on it is - we have a general principle that we think a more diverse financial system isn't just good for the end user, whether it's the investor or the business or the household, but it's better for the system as a whole, because when you have diversity, you have resilience. So we take a positive attitude - positive but responsible attitude to new entry. Thanks.

Robert Teal, Chamber of Commerce Council Member, Rotherham and Barnsley: You mention, Governor, the long-term competitiveness problems that the UK economy has had. Would you comment in any way about the contribution that openness - especially openness of markets and openness to highly skilled foreign workers being able to come to our country - can contribute to our competitiveness?

Also the new treaty with the United States, which I understand could contribute over 1% to GDP. So openness and the Bank.

Mark Carney: Well, there are a lot of traps in that question for a central banker [laughter]. See how many I fall into.

Let me start at a very high level - above the ceiling - you know, openness is a good thing. This economy is, you know, historically this has been the strength of the UK and it's admired. And as a Canadian, I very much have admired the openness of this economy right down to the openness to have someone like me standing here as the governor of your central bank.

But the openness - I'm not sure I'd put myself in the skilled foreign worker camp - just in the foreign worker camp, by the way.

But the openness to trade, the openness to investment and to the flow of labour and ideas, these are the bedrock of this economy and it is widely and rightly admired around the world. And the more that we reinvest, reinforce and continue those trends, I think, is to the benefit of the United Kingdom.

In terms of human capital, that's probably the right place to leave it, which is that you see it in the AMRC and you see it in the work of the AMRC. You see it in the businesses that are associated. You see it in the University of Sheffield. You know, Keith and I were talking earlier about the very high quality of flow of gifted foreign students who come here, who stay here, who ultimately work here - work alongside people from Sheffield who are building advanced manufacturing and techniques and associated jobs that moves this region and this country forward.

So it's central, but it has to be integrated. And it's integrating those ideas and it's integrating those businesses into the global supply chains, which is one thing we didn't touch on that much in this Q&A and I didn't touch on really at all in my speech. But I tell you, we spent the bulk of our 45 minutes I think - or an hour and a half, I guess 45 minutes of the hour and a half - talking about supply chains and how entities such as this, where the UK fits in and what that means for the future. All of that again underscores - if it's a supply chain, it is almost by definition global, and therefore you need openness to succeed in it.

So thank you, thank you for your question.

Keith Burnett: Well, thank you very much for that really great speech. I just want to thank you all first of all for joining us at the AMRC in the University of Sheffield. This place is playing a really vital role in making sure that supply chain for the nuclear industry can get the business it needs. And the things we talked through, just as you said Mark, were very much about that.

When you look around this facility, if you get a chance to look at it now or at other times, what you'll see is world-leading facilities. This is truly a world-leading manufacturing capability in nuclear. And we've had that reaffirmed by the partners we will see coming in from China, from Japan, but also from UK companies across the board.

You'll see prototyping, design, machining, drilling, forging - all the sort of things we need. And you'll see people - I hope you'll see the real vision it took. And Richard, you talked about that, about the future vision you had to build this with people like Adie and with John and with Keith. And it's something we're deeply and wonderfully proud of. And you've gone on as well to train the people, the skilled people we need. You can see the - I think you may have seen all of the training centre where we're training the people that we need for the future.

But I want to add one thing to it, which we're moving on to do now. You talked about the needs for the supply chain. We know in this region and in the United Kingdom, we have a fabulously powerful but unrealised capability to build much of the UK's infrastructure. We know that's going to take a lot of investment. And what I want to say to you here - watch this space, because we're going to be putting together the sort of structure of private and public - of capability that can attract that investment. Because we're going to build the infrastructure of the United Kingdom; we're going to build those things here in the Sheffield region with partners. And it's the sort of help you're giving in maintaining that stability, giving to the advice that's needed so people can feel precious and comfortable that investing in this place is so important.

So I want to thank you again for coming here. Thank you for supporting the things that are so important to this region and to all the industrial partners we have. And again, thank you all for coming here today to listen to this great speech. Thank you very much, Mark, and thank you very much.

Applause

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