Andrew G Haldane: The corridor of uncertainty

Speech by Mr Andrew G Haldane, Chief Economist and Executive Director, Monetary Analysis and Statistics, Bank of England, at the Scarborough Business Ambassadors' Dinner, Scarborough, 18 June 2014.

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It is wonderful to be back in Scarborough. I say back because many of my earliest and fondest childhood memories were of summer holidays spent here. Being a cricket fan, the Scarborough Festival – the cricketing jamboree held at the end of August each year since 1876 – has always held a place in my imagination. Alas I have never been, but am hoping one day to break my duck.

I want to discuss the economy and the role of monetary policy in supporting it. And with apologies to the non-cricketers in the audience, to do so I will borrow a cricketing metaphor – the "corridor of uncertainty". The corridor of uncertainty is every bowler's dream and every batter's nightmare. It refers to a ball which pitches in such a position – the corridor – that the batter does not know whether to be playing off the back foot or the front foot.

This, I will argue, is similar to the dilemma facing monetary policymakers on the Bank's Monetary Policy Committee (MPC) today. Should monetary policy hold back until key sources of uncertainty about the economy have been resolved? Or instead push forward to prevent leaving it too late?

Playing off the back foot

Let's start with where we have been. Since 2007, the UK and global economy has faced a barrage of financial bouncers of frightening pace and ferocity. The economy was on the back foot for much of this period. Output growth in the UK fell short of the Bank's, and other mainstream forecasters', expectations between 2008 and 2012. By the end of 2012, output in the economy was still 3% below its 2007 level. This was indeed a Great Recession.

With the economy falling well short of expectations, monetary policy was required to shore up its defences, to prevent recession morphing into depression. That meant interest rates falling to unprecedentedly low levels, in the UK and globally – indeed, the lowest levels in the Bank of England's 320-year history. This monetary medicine was then augmented with £375 billion of asset purchases by the Bank from 2009 onwards, known colloquially as Quantitative Easing or QE.

It is impossible to know for sure how the economy would have performed without this extra-ordinary monetary medicine. But the Bank's estimates suggest it may have been more than 6% smaller than it is today. In money terms, we as a nation would have been between £80–100 billion poorer – roughly, the GDP of Yorkshire and Humberside. As defensive measures go, then, UK monetary policy for the past few years has been positively Boycott-ian.[1]

Since the start of 2013, the economy has begun to respond to the medicine. UK output is estimated to have grown by over 3% in the past year – that is, at the top of the league table

[1] Again for the uninitiated, Geoff Boycott was a famous Yorkshire and England batsmen venerated for his defensive technique.

among the G7 nations. And growth this year and next is forecast by the Bank to remain around 3%, again at or close to the top of the G7 league table. Output is now just about back to its pre-crisis levels.

The employment picture has been even more positive. Over 1.5 million jobs have been created in less than three years. Unemployment has fallen from a peak of 8.4% in 2011 to 6.6% today. It is expected to fall further, to below 6% by 2017. Over the same period, inflationary pressures have abated, with inflation falling from a peak of 5.2% in 2011 to 1.5% today, below the Bank's 2% inflation target. The Bank's forecasts suggest it is likely to hover around that target in the period ahead.

This turnaround in the economy has prompted an active debate about when the Bank's monetary policy stance should be shifted from back foot to front – in other words, whether and when UK interest rates might rise. Market expectations of future interest rates have already adjusted since the economy began growing. In January 2013, the first rise in UK interest rates was expected in the third quarter of 2015. Now, it is expected by the end of this year.

This prospect has sent shivers down some spines. But some context is important here. When the first rate rise does come, it will be because the economy has recovered sufficiently to thrive on smaller doses of monetary medicine. A normalisation of interest rates would signal the economy having returned to the hospital ward, after six years in intensive care. The economy would be switching channels, from ER to Casualty. That is something to welcome, not fear.

At the same time, the Bank's policy guidance was introduced in August last year in part to prevent interest rate expectations getting ahead of themselves and derailing recovery. From our survey evidence, it appears that businesses listened and took heed. Investment rose 8.5% during 2013. This has meant the UK's recovery has not just been healthy but reasonably balanced, with both households and companies contributing.

Today's uncertainties

None of this leaves the job of judging the future path of monetary policy an easy one. As it emerges from its most severe set-back since the 1930s the economy remains, to quote Churchill from the 1930s, a riddle wrapped inside a mystery inside an enigma.[2] Let me give examples of each.

First, the riddle. Data on the economy is riddled with uncertainties and beset by revisions. A few weeks ago, we awoke to discover that we as a nation were £65 billion better off than we had thought, courtesy of the Office for National Statistics. Alas, my excitement soon gave way to mixed emotions: this windfall was in part the fruits of charitable, drugs and prostitution-related activities, previously under-recorded. What a party that must have been.

A further set of systematic revisions to existing estimates of the National Accounts data is planned later this year. It is well-known, and entirely understandable, that these data are subject to revisions which are to some extent predictable. That is why, before the Bank even starts forecasting the future of the economy, we begin by backcasting and nowcasting the past and the present.

To give a current example, although the estimate of first quarter GDP growth is 0.8%, the Bank expects the final estimate to be 0.9% given the strength of business surveys. The 90% confidence interval around this estimate is 0.4% to 1.4%. Put differently, we can be 90% confident that annual growth in the UK economy lies somewhere between 5.4% (a raging boom) and 1.4% (an anaemic recovery). Hence the riddle.

[2] Churchill's quote was in the context of Russia which gives it an extra poignancy today.

Second, the mystery. Productivity in the UK – output per worker – is around 15% lower than its pre-crisis trend and 4% lower than its peak in 2007. The fall has been greater, and the recovery more protracted, than any post-war recession. Despite picking up since 2013, productivity growth is almost a percentage point lower than the Bank expected last August. The Bank has consistently over-predicted productivity growth since 2007.

This has been termed the "productivity puzzle". There is no shortage of candidate explanations, some temporary, others more durable. They include output mis-measurement, labour hoarding, the slowing of labour-saving technological investment, resource misallocation and lender forbearance.[3] Doubtless there are elements of each. Whether, collectively, they fully account for the productivity gap is more questionable.

The resolution of this mystery has an important bearing on the economy's future fortunes. Without a pick-up in productivity, any rise in demand in the economy risks bumping up against a supply constraint sooner rather than later. This would likely put upward pressure on wages and prices, imperilling the inflation target. That is why, when issuing its further policy guidance earlier this year, the Bank focussed on measures of slack in the economy. But, to be clear, without a clear explanation for productivity's earlier weakness, it is difficult to predict with any accuracy its likely recovery. Hence the mystery.

Third, the enigma. Having never previously been this low, it is inevitably uncertain how the economy will respond when interest rates do begin to rise. Various surveys have sought to shed light on how UK homeowners may fare. For example, the Bank's NMG survey from 2012 found that a one percentage point rise in interest rates could result in almost half a million households with a mortgage needing to take corrective measures. This rises to a million households for a two percentage point rise.

A more timely guide may come from recent US experience. In the middle of last year, long-term US interest rates rose by around one percentage point on the expectation of a tapering in US monetary policy – the so-called "taper tantrum". This had a striking impact on the US housing market, with housing sales 7% lower than a year ago and residential investment falling in each of the last few quarters. This raises the possibility of borrowers reacting more sharply to rate rises now than in the past. Hence the enigma.

Tackling uncertainty

Although it is a touch depressing that our knowledge of the economy is this imperfect, the Bank is making a renewed investment in research and data which will, over time, hopefully help to reduce these uncertainties.

Back in 1987, Michael Fish famously failed to forewarn about an incoming storm, which then caused havoc in parts of Southern England. The finger of blame was pointed squarely at the UK Meteorological Office. In response, the Met Office made huge efforts to improve their data capture and computing power as a basis for improving their weather forecasting. The results have been dramatic.

Over the past 30 years, the Met Office's forecasts have improved significantly. Their 4-day-ahead forecasts are now as accurate as their 1-day-ahead forecasts were 30 years ago. These are improvements on a scale economic forecasters would give their left arm for (unless, like me, it was their bowling arm). It suggests improved data can pay real dividends.

To that end, the Bank is investing in improving its own data architecture and analytics. Perhaps a more timely reading of the economic and financial tea leaves can be found by scraping the web or by semantic search on social media sites? Recent research has

[3] Barnett et al (2014)

suggested just that.[4] These are the sorts of question the Bank's rocket scientists can help us answer.

Uncertainties are no less acute when it comes to modelling the economy. Unlike rocket science, economics has few, if any, physical constants or fixed laws of motion. Like cricket, economics is a game largely played in the head; nine parts psychology to one part physics. Understanding and modelling the brain has so far eluded neuroscientists, but this has not stopped them trying.[5] Economists are in the same boat, just with bigger holes.

Even for the natural sciences, dealing with physical constants and fixed laws of motion, the voyage of discovery can sometimes be a lengthy one. It took a century before estimates of the speed of light had converged to its true value. For much of this period, not only were best-estimates biased but the estimated confidence intervals around them often did not encompass the true value.[6] Modelling complex, adaptive, socio-economic systems would make these estimation problems pale by significance.

It is for these reasons that the Bank is also investing in its research capacity. For example, in our quarterly *Inflation Report* the Bank now shows alternative scenarios for inflation and output under different assumptions about how the world works. Alongside this, the Bank is putting greater effort into developing a pluralist set of approaches to model-building, drawing on other disciplines.

Operating in the corridor

In time, these investments in data and research will narrow the corridor of uncertainty. But for now, the key public policy question is what to do when operating in it? Rocket-scientists, of the real rather than metaphorical kind, have a clear answer to this question: avoid really bad outcomes.[7] This is sometimes called a "minimax" strategy – the aim being to minimise the chances of the maximum possible loss. It is the policymakers' equivalent of the Hippocratic oath – "do no harm".

So what, then, are these avoidable-at-all-cost scenarios? Let me consider three from a potentially long list. They are chosen not because they are probable outcomes, but precisely because they are improbable contingencies against which it would be useful to safeguard, consistent with the Hippocratic oath.

One adverse scenario is that the economy could stall in its recovery, deflationary forces could set in and monetary policy could be trapped for a protracted period at the zero lower bound. This is not so much secular stagnation as secular deflation. And you do not have to look too hard to find real-world examples.

The most widely studied is, of course, the Japanese experience since the bursting of its bubble in the early 1990s. In the quarter-century since, nominal GDP in Japan has barely budged. And while real GDP growth in Japan has averaged 0.7% per year since 1997, this has been offset by a persistent fall in prices of, on average, over 1% per year. Similar deflationary concerns, albeit on a lesser scale, have been voiced recently in the euro-area.

So how great are these risks in the UK today? At least to my ear, the mood music is different. From its trough, real GDP in the UK has risen by 7% and nominal GDP by 19%. UK real GDP has risen at or above trend for each of the past four quarters. It is expected to continue

[4] Varian (2014), Tuckett et al (2014).

[5] For example, the Blue Brain project is setting out to reconstruct the brain piece by piece by building a virtual version in a supercomputer (see http://bluebrain.epfl.ch/page-52063.html).

[6] Farmer and Hepburn (2014).

[7] Hansen and Sargent (2010).

doing so for the next 12 quarters. Japan has had no equivalent period of sustained growth at or above its pre-crisis rate in the past 25 years.

As for deflationary threats, one guide is found in market measures of medium-term inflation expectations. At the 3–5 year horizon, consensus inflation expectations in Japan have averaged around 1% over the past 15 years. In the euro-area, inflation expectations have recently fallen to around 1.8% on deflationary fears. In the UK, meanwhile, inflation expectations have remained relatively stable at around the 2% target throughout the crisis period. Financial markets, at least, do not appear to be fearful of deflationary ghosts in the UK.

A second uncomfortable scenario, the flip-side of the first, would be if inflationary pressures instead took hold. Again, it is important not to dismiss this risk out of hand. Monetary policy is in unknown territory. The most extraordinary dose of monetary medicine perhaps ever-witnessed has been administered to a patient now whistling their way around the hospital ward. An over-reaction to the drugs cannot be ruled out.

There are already some signs of the economy's pulse quickening. The confidence fairy is back, after six years in rehab. Levels of consumer confidence are now above 2007 levels, retail spending is rising at its most rapid rate since 2004 and levels of job security are at their highest since at least the 1990s. This feel-good factor is adding momentum to the UK housing market.

Businesses, too, have rediscovered their mojo. Surveys of output intentions are close to record highs. Quarterly employment growth is running at its fastest rate since the series began. Surveys of skills shortages point to the possibility of upwards, if localised, wage pressures. Output growth in 2014 Q1 is nearly 1% higher, and unemployment rate close to 1 percentage point lower, than the Bank expected last August. If history is any guide, these errors tend to be positively correlated, upside as well as down.

Yet at the same time, the inflationary risks posed by such a scenario should not be over-stated. As output and unemployment have surprised on the upside by 1%, average wages and inflation have surprised by the same amount on the downside. Real wage growth has been positive in only six months in the past six years. And inflation expectations remain well anchored to the inflation target. Inflationary ghosts are hard to find.

A third uncertainty concerns the financial side of the economy. Global appetite for risk is, at present, voracious. Measures of financial market uncertainty are at or below pre-crisis levels across a range of asset classes. Many asset prices have rocketed and spreads plummeted. Two years ago, yields on Italian and Spanish debt were around five percentage points above US Treasuries. Today, they are 30–40 basis points below. Yields on corporate bonds, both high and low grade, are close to all-time lows.

In short, the search for yield has broadened and deepened. We have, in one sense, been here before. Pre-crisis, low volatility justified high prices and high prices low volatility. The constellation of asset prices appeared consistent. Larry Summers famously commented that finance theory tells us how to price two bottles of ketchup, assuming you know the price of one bottle.[8] Pre-crisis, the second bottle of ketchup looked fairly-valued relative to the first.

But even if asset prices are consistent among themselves, this need not imply they are consistent with reality. So it was pre-crisis, as the price of risk became far too cheap relative to fundamentals. With the first bottle of ketchup woefully over-priced, finance theory ensured that the second bottle was similarly marked up. In this way, the seeds of the crisis were sown.

[8] Summers (1985)[9] Stein (2014)

The risk of this cognitive dissonance is once again rising. Low volatilities are being used to justify high valuations and vice-versa. The ketchup bottle looks fairly valued relative to other sauces. But what about the price of ketchup relative to fundamentals? Is the price of risk again becoming too low? Or is it the price of safety which this time is too cheap? I do not have clear answers, but I do know these are serious questions.

In one sense, rising risk-taking is evidence of the monetary medicine working. If there are adverse side-effects, then an alternative drug can be called upon – macro-prudential policies. These are an important new addition to the central bank armoury. When risks are localised – say in the UK housing market – macro-prudential measures can act like a targeted lightning strike. The Bank's Financial Policy Committee (FPC) is discussing these risks. I will not, tonight, steal their lightning.

But if risk-taking becomes broadly-based, a broadly-based response may at some stage be appropriate – a rumble of thunder rather than a strike of lightning. The case for doing so is stronger, the greater the chances of an asymmetric asset price response – a sharp snap-back in volatility and asset prices – which could imperil recovery.[9] The MPC's guidance gives monetary policy a role as a last line of defence if macro-prudential actions cannot contain these risks. As they evolve, the MPC and FPC will need to assess these risks carefully.

The monetary policy stance

Faced with these uncertainties, what would be a prudent course for monetary policy in the period ahead? The first thing to say is that there is consensus across the MPC on three key elements of our monetary strategy: that any rate rise need not be immediate, that when rate rises come they are intended to be gradual and that interest rates in the medium-term are likely to be somewhat lower than their historical average.

This message appears to have largely been understood by financial markets. Despite the upwards revision to growth, financial markets' best guess of how rapidly the first percentage point of tightening will take place is essentially unchanged over the past year – around 20 basis points per quarter. So too is their best guess of where interest rates may settle in the medium run – around 2–3%.

Views may in time differ across the MPC on the preferred lift-off date for interest rates, as you would expect at a difficult-to-predict turning point in the cycle. These will reflect individual members' different reading of the runes, not their individual preferences. That is a real benefit of the MPC's committee-based structure, with individual member accountability.

It is not difficult to see why this choice over timing is a difficult one. The policymaker in this situation faces the self-same dilemma as the batsmen facing a ball pitching in the corridor of uncertainty. In that situation, the coaching manual no longer offers a clear guide. Two strategies are equally justifiable.

The first is to stay on the back foot and play late. This has the advantage of giving the batsmen more time to get a read on the trajectory of the ball as it swings and darts around. It avoids the risk of lurching forward and then needing hurriedly to reverse course if the first movement is misjudged. This is the way, Joe Root, the Yorkshire and England batsmen, plays his cricket. If he were on the MPC, he'd be called a dove.

But this strategy is not riskless. Playing late relies on having an uncannily good eye and strong nerve. It runs the risk of having to react fast and furiously to avoid missing the ball entirely. An earlier front foot movement would avoid that risk, allowing a more gradual movement forward. This is the way Ian Bell, the Warwickshire and England batsman, plays his cricket. If he were on the MPC, he'd be called a hawk.

[9] Stein (2014)

So which is the better strategy? Benjamin Disraeli told us there are lies, damned lies and statistics. Here my analogy between cricket and the economy breaks down. Economic statistics, as we know, do sometimes lie. Cricket statistics, typically, do not. They tell us that Joe Root averages 43 in test matches to Ian Bell's 45. In other words, it is a close run thing with the odds at present slightly favouring the front foot. But a good run of scores from either player could easily tilt the balance. That, in a nutshell, is where the MPC finds itself today.

Thank you.

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