

NZARES Conference

Policy making under uncertainty & risk



29 August 2019, Hamilton
Robin Johnson Memorial Session

Murray Sherwin, CNZM
Chair, New Zealand Productivity Commission

It was a great pleasure to be invited by my former MAF colleague, Phil Journeaux, to deliver this Robin Johnson Memorial session. Robin was one of those ever-present figures around the economics and agriculture policy scene when I first arrived in Wellington in the mid-70s to take up a role at the Reserve Bank.

I quite quickly found myself responsible for the 6 monthly forecasts of exports, undertaken as a part of the wider economic forecasting exercise. The Reserve Bank was using its first econometric model, but exports was one sector that the econometricians had not managed to satisfactorily model. So I did my thing, manually, and with lots of interrogation of those in the export business, especially those in the primary industries, and people like Robin, then at the Department of Agriculture.

Robin was a member of a Lincoln mafia which had significant influence around Wellington at the time. This group of Lincoln graduates occupied key roles at the Reserve Bank, the Treasury, Dairy Board, Meat Board, Wool Board, Labour Department, and the Department of Agriculture. They had a reputation for being good analysts, straight-talking and pragmatic. Many had been influenced substantially by the teaching of Bryan Philpott. Most were of farming stock – had grown up on farms around the country and, like their parents, were not given to vague policy waffle.

I reckon a bit of that well-trained, straight-talking, pragmatic Lincoln influence might be useful around Wellington these days.

Which brings me to the irony of the Robin Johnson Memorial session being devoted to policy uncertainty. I don't recall Robin being much bothered by uncertainty.

So let's turn to uncertainty in policy making. In doing so, I will draw on some quite diverse experiences over my years in Wellington at the Reserve Bank and MAF. I will also draw on more recent work at the Productivity Commission where we are generally tossed some big and knotty issues to address. Inevitably, they are replete with uncertainty – which is what makes them so knotty.

Uncertainty is an ever-present challenge in policy making and implementation – in both the public and private sectors. We all have to grapple with a future that we can't predict, with evidence that is incomplete or of uneven quality, with linkages or interactions between policy actions and outcomes that are unstable and/or poorly understood, and with impacts that are uneven across the target population or market. Such is life.

We do our best to reduce the uncertainties where we can, to better understand the territory we are working in, the likely impacts of our decisions and actions, and to mitigate the risks of bad outcomes. I will discuss some of the techniques that can be employed to make the uncertainties less of an obstacle.

In thinking about this presentation, and experiences that illustrate the challenge of risk and uncertainty, I found myself reflecting on a few of the major decisions that I have been associated with over the years.

The first, and probably the most consequential of those was the 1985 float of the exchange rate. It was consequential because it completely changed our macro-policy framework. It gave us, for the first time, the capacity to operate an independent monetary policy, to determine our own inflation rate, to open capital markets after decades of tight exchange controls and to free the Government from the risks associated with fixing the exchange rate.

Some, probably most, believed that floating meant the end of New Zealand's perennial current account deficit. They were wrong, largely because of an under-appreciation of the role of private capital flows in liberalized markets. But that's a whole other story.

We began working on the float immediately after the 1984 election in the aftermath of the currency run. Within a couple of weeks of the election, then Deputy Governor, Lindsay Knight and I were dispatched to Sydney to meet with the RBA and pick their brains. The RBA was, as usual, completely open and supportive. We had full access to the RBA's planning and operational documents from the float of the Australian dollar in December of 1983. In subsequent months, members of our staff spent time in the RBA's trading room and in the dealing rooms of commercial banks, getting to understand the environment of a floating exchange rate.

With that preparation behind us, we knew what to do to float the kiwi. What we didn't know was how well it might work in a market as small as New Zealand's. Would we be subject to destructive volatility or speculative gaming? To counter that risk, we worked at building the number of licensed dealers in the NZ market and, in effect, expanding the risk-taking capacity in the NZ currency market.

The Reserve Bank and the Treasury had done extensive analysis and had worked for months to prepare for the "go" decision. But on this, as with the earlier decision to scrap exchange controls, usually confident and assured thinkers on both sides of The Terrace found themselves grappling with uncertainty and swapping sides in their recommendations. We had done all we could to prepare ourselves and the market for a float. But we simply did not know, and could not predict with confidence, just how a float would pan out.

Well, sometimes it is just not possible to remove the uncertainties. In this case, it became a political decision – the potential benefits of getting the Crown off the hook of a fixed exchange rate and getting the Crown off the hook of endless foreign currency borrowing to fund the current account deficit, versus the risks of market volatility and instability. As we rehearsed, yet again, the pros and cons in Roger Douglas's office one Saturday morning, it was Richard Prebble who finally stepped up and said something like: "We can debate this for ever, but there is only one way we will find out for sure – that's by doing it". Decision made. Float announced the following day.

A decade or more later, as Deputy Governor of the Reserve Bank, I found myself in the role of Chairing the Monetary Policy Committee. Don Brash was Governor, and sole decision-maker on monetary policy. Don preferred to leave me to facilitate the process while he listened to the debate and considered his decision. Monetary policy has spawned a complete literature on the art and science of decision making under uncertainty. Many techniques are employed to reduce the uncertainty. There is a heavy emphasis on data collection and analysis, close engagement with decision-makers in the business community to get a sense of what they are experiencing in their markets and, of course, a very heavy emphasis on econometric modelling and forecasting.

At that time, we asked members of the MPC to write up their own analysis and recommendations for the policy decision. One initiative was to go outside the MPC members and ask a small group of economists not otherwise engaged in the process to also write up their analysis and

recommendation, but we asked them to take a black hat/white hat approach – to take the data and analysis and stretch it towards a tightening recommendation or an easing recommendation while remaining within the bounds of credibility. The objective was to explore how the current data and settings could look through different lenses and to uncover different perspectives and insights.

These days, a similar role is played by having outsiders appointed to the Monetary Policy Committee, also to bring different perspectives and alternative views to the table.

Let me reflect on another, very different but substantial policy challenge and how our politicians dealt with it.

I made the transition to MAF in late 2001 and arrived to discover that we had a biosecurity incursion on our hands that was causing considerable grief. This was the Painted Apple Moth – an Aussie invader that had become established in the West Auckland area. The biosecurity team dealing with this was not in good shape and was struggling to agree on a viable response. Work was underway to survey the extent of the spread of the moth and to understand more about the established population and its distribution.

There was a general election due in July 2002. Helen Clark was PM and the moth was established within her Mt Eden Electorate and surrounding territory. The advice we put to Cabinet in early 2002 contained a range of options from doing nothing – just accepting that the moth was here – to a couple of levels of control, slowing the spread as best we could. The final option was to attempt eradication.

We estimated the cost of eradication, including by an extensive aerial spray programme, at around \$70 million over 3 or 4 years – plus a high level of community stress (these numbers are from memory – but the rough orders of magnitude are about right). We estimated a chance of failure with the eradication option at between 20% and 40%.

Our advice to Cabinet was that the eradication option was too expensive and had too high a chance of failure. As CEO, I was not confident that MAF was capable of running a programme of that scale and complexity. There was also the question of whether this was our highest biosecurity priority – if we had an additional \$70 million available to us, would this be the highest value spending option?

We recommended one of the containment options, with investment in further science to develop cost-effective control for the future.

The Cabinet Committee where this was discussed was a fascinating example of decision making under uncertainty. A senior minister went straight to the question we had been pondering – was this the best investment we could make in biosecurity? The PM effectively ruled that question out of order – I think she felt that it opened the consideration so wide that they would struggle to reach a conclusion. She then queried the 20% to 40% chance of failure we had placed on the eradication option. Her response – “That sounds to me like a 60% to 80% chance of success – I’m not going to pass that up”.

The decision at the time was that there should be no decision ahead of the election – a reasonable and principled call I thought given the timing. MAF was directed to run a containment programme in the meantime and to return after the election with further development of its options and recommendations.

In the event, in the succeeding months, we were able to build a more robust operational programme and I gained a lot more confidence in our capacity to do the job. We returned to Cabinet post election recommending the eradication option. The government accepted the

recommendation and we were ultimately successful in achieving eradication. That was no small feat given the circumstances.

There is a great deal that could be said about that programme in the context of policy uncertainty. A huge effort was put into identifying, understanding and managing risks and uncertainties. A key consideration was how to manage community relationships and to ensure effective information flows both ways. Much of that was based on a hefty investment in science that gave us reliable indications of moth population distribution and trends, essential to guiding the evolving strategy.

We had to work with health professionals to manage human responses to the repeated aerial spraying – made more complicated by the fact that the spray used is not covered by patent protections. Rather, the manufacturers hold the composition of the spray as a trade secret, which meant we were unable to tell the community, with any specificity, just what they were being sprayed with. Not easy, and not a programme that I would wish to run again.

Another biosecurity example also highlights the use of science and statistical analysis in dealing with uncertainty in policy making. New Zealand's pork industry has been free of a rather nasty disease of pigs – PRRS or porcine reproductive and respiratory syndrome. Historically, we had allowed raw pork into New Zealand, including from countries which were known to have PRRS. This was based on a scientific understanding that PRRS could not be transmitted from infected meat to live pigs – transmission was only by pig-to-pig contact or via aerosols from respiration.

In 2001, a scientific paper emerged that indicated that transmission of PRRS via feeding of infected meat to pigs had been observed. As a consequence, imports of pork from countries with the infection was suspended.

Several pork exporting countries, but most notably the EU, felt that this ban was an over-reaction and that imports of pork from infected countries could be undertaken with negligible risk of spreading PRRS to the New Zealand pig population. Not too surprisingly, the local pork industry did not see the risk as negligible and saw no reason to test the proposition.

So how to resolve this difference of perspective? The standard MPI import risk analysis process is intended to examine risks, propose risk mitigation processes and ultimately come to a judgement about the conditions under which a risk good, in this case raw pork from a PRRS infected country, could be imported. I won't go through the whole process – it was exhaustive, involved most of the world's recognized experts on PRRS and extensive legal process. Ultimately, imports of raw pork were permitted under conditions which were judged to reduce the risks to that negligible level.

Why bother? Why not simply say "we don't need to accept any risk" and ban imports? Two main reasons. Firstly, under the WTO rules, members are entitled to apply restraints on imports to protect themselves from new pests and diseases, but only in a manner which is least trade distorting. That's a provision that NZ refers to often when making the case for why our animal and plant products should be allowed into other markets. To be credible, we need to demonstrate that we also work to the same standards.

Secondly, and highlighting that point, we were at around that time making the case for why NZ apples should be permitted to enter the Australian market, despite the fact that we have a disease in our orchards that they do not. Our argument was that the risk of fireblight becoming established in Australia as a result of NZ apple imports was negligible. It's a case that ultimately went to the WTO where NZ won. Apples do cross the Tasman these days, but not in large quantities.

My point about these biosecurity cases is that their resolution is deeply dependent on data, evidence, significant scientific opinion and serious peer review. In other words, it is the evidence and science that helps reduce the uncertainty which would otherwise plague these sorts of cases –

cases where there are very strong incentives for one or both sides of the debate to exaggerate the risks and minimize the likely effectiveness of risk management measures.

Let me jump to recent and current Productivity Commission work.

In 2017, the National-led Government asked the Commission to advise on how New Zealand could most efficiently reach the GHG Emissions target that had recently been established under the Paris Agreement. That target was roughly 25 megatons of CO₂ equivalent by 2050, down from current emissions of around 70 megatons pa. A great mandate for the Commission, but one bathed deeply in all manner of uncertainties.

Post the change of Government in late 2017, the incoming Minister for Climate Change, Hon. James Shaw asked us to include in our analysis a target of net zero emissions by 2050.

So how to proceed?

A key tool for us in this work was a form of modeling undertaken by a UK group (Vivid Economics). Vivid has extensive experience in this field, including in New Zealand, from work they had done for the cross-parliamentary group Globe NZ led at the time by Green MP Kennedy Graham. By joining Vivid with Motu – who have extensive land use modeling capability – and Concept Consulting who have extensive energy and transport sector capability, we were able to bring high-quality and broad-based modeling capability to bear on these issues.

We start with a presumption that all modeling is wrong, but some can be useful. We wanted useful. What we chose to explore was a range of scenarios under which emissions reductions could be achieved. It was clear that innovation and technological advances are the essential ingredient for a successful transition to a low emissions economy – in a sense that is true of any transition to a different state. The three scenarios we chose to work on related to:

- a transition with little help from new technology. In this case, the price (of emissions) does most of the heavy lifting;
- a transition in which new technology emerges to help reduce emissions, but where that new technology is disruptive of existing industries;
- a transition in which, again, new technology emerges, but of a sort which is largely supportive of existing industries.

We explored these scenarios for both the 25 megaton and the net zero emissions targets. What we got from this work are estimates of the price of emissions required under the different scenarios over the period to 2050 in order to achieve the target sought.

The modeling work provided real insights for us. The first was that early and credible action, in particular through raising the carbon price, can help avoid large adjustment costs later on. You can think of this as a “least regrets” approach. If emissions-reducing technologies emerge at a fast pace, future governments can slow the pace of carbon price increases and still reach their target. However, if technology is slow to emerge, then early and credible action on prices has already set the economy on the desired path. The trick is to avoid a situation where very costly and disruptive actions are needed late in the adjustment period in order to achieve the target.

The other insight from this work was that there are multiple decision points along the way, not just one. As information improves over time, and uncertainty reduces, governments can change policy settings and adjust the trajectory accordingly.

One of our current inquiries at the Productivity Commission is planted squarely in a bath of uncertainty. We’ve been asked to explore the impact of technological change on the future of work. We’ve been assigned this task because Ministers are genuinely troubled about the potential for emerging technology, especially robotics and artificial intelligence, to replace workers,

undermine the security of work and working conditions, and in doing so, disrupt the labour market and the social order, and undermine wider community wellbeing.

There is certainly no shortage of pundits telling us that most jobs will disappear or change fundamentally and that we should prepare for a very different future of work. So how should a responsible government prepare its people for this very different future?

Our approach is to try to understand what is going on so that we can respond to developments that are real rather than imagined or assumed.

What are the channels by which new technologies enter and diffuse through the New Zealand economy? That will determine when and to what extent the local labour market is disrupted. We know that most new technology (not all, but most) comes from other countries. So the pace of technological change here will largely be determined by the pace and depth of global technological progress. We will get some chance to see it coming.

Diffusion of technology throughout the domestic economy is substantially determined by the vibrancy of the local firms – how quickly will they pick up new technology and adapt it to their needs?

There are lots of uncertainties in here. How fast is the global technological frontier moving? Some argue that it is moving very fast and accelerating. Certainly, in some fields, e.g., artificial intelligence, the evidence points in that direction.

But to what effect? We might expect to see this high pace of innovation being reflected in a very dynamic business and labour market, with high productivity growth, lots of job churn and business start-up activity. And you might expect to see that first in the countries where innovation is concentrated, especially the USA.

Yet data from across the developed world, including the USA (still), tells the opposite story. Productivity growth is uncommonly sluggish, average job tenure has increased, business start-ups and job churn are down. Is it possible that the future could look a lot like the present – low productivity growth, slow technological diffusion, and slow change in the labour market?

Maybe, but economists such as Chad Syverson and Erik Brynjolfsson – the leading gurus in this field – argue that we are currently in a J curve environment – at the bottom of the J. Lots of firms are making large investments in creating and adapting new technology. These investments are costly, but have yet to bear fruit, hence the fall in productivity growth. Once the new technologies are well embedded, we should see large increases in productivity and accompanying disruption to incumbent business models.

In our analysis, still emerging, we will be incorporating both slow and fast technological change scenarios.

What do we know about the diffusion of technology in the New Zealand economy? Quite a lot, really. And the story is quite grim. With the firm-level analysis we are now able to undertake, we can confirm, as is intuitive, that our generally sub-par productivity performance goes hand in hand with sluggish innovation.

Our best firms have productivity performance that is well short of the levels of firms at the global frontier. Our laggard firms are well behind our best. More particularly, our laggards hold a surprisingly large share of our labour and capital resources, and don't give them up quickly. In small and quite isolated markets, our low productivity firms remain in business for a long time.

Joseph Schumpeter's famous gales of creative destruction – the process by which competition forces out the poor performers, freeing labour and capital to support growth in the innovative and efficient firms – seem to be mere gentle zephyrs in the New Zealand context.

If we are to lift New Zealand's productivity performance and with that, community well-being, we will need to lift our capacity to take up and apply new technology and innovation and learn to deal effectively with the change process.

But that suggests a whole suite of policy initiatives to ensure that we can effectively support people through transitions – income support, retraining support, mobility between cities (which means responsive housing markets as well). These matters will all feature in our forthcoming reports.

To wrap up, what do I take out of all this?

- Uncertainty is inevitable in policy analysis and advice. The question is how we deal with it.
- Assembling the best evidence possible is a great starting point. There is often a wealth of experience and knowledge internationally which we in New Zealand don't pay enough attention to. That said, it's important to ensure that the policy debate reflects, and is grounded in, the realities of New Zealand circumstances. At the NZPC, we start an inquiry by surveying the academic literature and what data sources exist, and what we could possibly conjure up by commissioning data collection and research.
- Scientific method is our friend. Evidence, statistical analysis and testing alternative hypotheses is at the core of policy analysis.
- Consultation, engagement and submissions are hugely important for us. They give us insights, help us to better understand where there are uncertainties and the nature of those uncertainties, give us leads for further research and analysis, and point us to data and literature that we might be unaware of.
- Publishing drafts – which means exposing our analysis, our thinking, our emerging findings and policy recommendations to the wider public audience – is an essential part of our process. Our drafts are subjected to the full submission, engagement, consultation process which provides an essential quality control and reality test opportunity.
- More broadly, assembling the evidence and consulting widely is also important for exposing our analysis to the full range of views, including those that challenge fundamental assumptions.
- There are a range of methods that can be applied to better understand the types, distribution and likely impacts of uncertainty and risk, such as scenario analysis. Modelling can also be helpful, provided you are careful not to place too much weight on quantitative results and are careful to fully understand the embedded assumptions in the models. Any prediction of the future is bound to be incorrect; the point of the exercise is not to land on an 'exact' number, but to better understand the range and scale of impacts.
- Ultimately, politicians make decisions in the face of uncertainties. Sometimes the role of the policy analyst is to ensure that the politicians are, however reluctantly, made alert to the uncertainties associated with decisions they are about to make. Like all of us, politicians may prefer to believe their own instincts and downplay or ignore the uncertainties.
- You can't eliminate uncertainty, and you shouldn't try to. That path leads to paralysis, when action is needed. You can narrow the bounds of uncertainty through careful research and analysis, and manage risks through the application of wisdom, common sense and experience – the very characteristics that Robin Johnson would have brought to his work.