NEW THINKING IN
Economics
WEALTH OF NOTIONS

WHEN Adam Smith penned his celebrated *Enquiry into the Nature and Causes of the Wealth of Nations* he was fortunate to live in what to our 21st-century eyes appears a more straightforward age. In the town of his youth, nails were still on occasion used as money, factories had yet to suffer the gigantism that would produce Foxconn City, and capitalism knew nothing of the bewilderingly complex financial instruments that centuries later were to career like wrecking balls through the global economy.

In the world around him, Smith caught glimpses of a unified economic system that he painstakingly outlined in his treatise, detecting its imprint in everything from the specialised labour involved in the making of a pin, and statistics on the annual herring catch, to unrest in Britain’s American colonies. The whole of Nature “seems to abound with events which appear solitary and incoherent”, wrote Smith, and it was the purpose of philosophy to discover their “connecting principles”. He argued this in an earlier essay on astronomy, and it is perhaps no accident, given his interest in things celestial, that he should imagine what he termed ‘natural price’ as a centre of gravity around which ‘market prices’ moved, and that it therefore established an equilibrium similar to that found in the solar system. Nor should we be surprised that the man who supplied the germ of Smith’s definition of wealth – François Quesnay – was a physician in the court of Louis XV. Wealth was not to be found in the accumulated gold and silver of a nation, said Quesnay, but in the fruits of production that flowed through society, replenishing it as blood does a corporeal body.

Smith was a Scot living in the 18th century, but in writing what has been called the first great classic of economic theory, he produced a book for the modern world. His great gift was in seeing the systemic reach of economic life, not least its intertwining with other branches of the social sciences, from psychology to law, and from sociology to government.

In both subject and treatment, the articles in this issue of the *Business Review* acknowledge their debt to Smith, while signalling how much more complex the world, and the tools with which to understand it, have become over the intervening 240 years. In tracing the convoluted means by which US monetary policy influences global financial stability, Eric Tong recognises the herd behaviour of asset managers. Ananish Chaudhuri sifts the results of ingenious experimental ‘games’ to measure the importance of perceptions of fairness in business transactions. Susan St John addresses the powerful social consequences of government retirement policy in the face of unyielding demographic change. Francis Bloch, Simona Fabrizi, and Steffen Lippert apply economic theory to the dilemma of market entry with the aid of an entry-timing game. And Basil Sharp and Kiti Suomalainen weigh the ability of the market to deliver an environmental goal by harnessing new technology. The sheer variety and pervasiveness of economic notions undoubtedly would have pleased Smith.

And, like him, the present contributors have taken care to present what can be difficult and highly technical concepts in plain language – “led”, you might say, “by an invisible hand”.

Vaughan Yarwood
EDITOR
Submission Guidelines

The University of Auckland Business Review encourages insights, reflection and debate on contemporary business theory and practice. It reports on new and notable research, focusing on the implications for business professionals. The journal is published twice a year, in spring and autumn, by The University of Auckland Business School.

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In many ways, the impacts of the 2007 Global Financial Crisis (GFC) are still with us. For a number of developed countries, household income remains below the level prior to the crisis, employment has yet to recover, and governments are more indebted. Although New Zealand emerged from the crisis in a relatively robust state, it nevertheless took five years for the country to regain pre-crisis income levels, and six years for employment to rebound. Such severity is not atypical for a financial crisis. In examining some 100 systemic banking crises, Professor Carmen Reinhart and Professor Kenneth Rogoff of Harvard University found that, on average, a country takes eight years to return to its previous level of per capita GDP.
Against this backdrop, researchers and policymakers have devoted a great deal of effort to understanding the causes and consequences of financial crises, as well as the measures required to mitigate future ones. The following article shares insights on these topics derived from recent studies and from doctoral research.

**DRIVERS OF FINANCIAL CRISES**

One factor identified by economists as contributing to the GFC is the loose monetary policy pursued by the United States between 2003 and 2005, when its Federal Reserve slashed interest rates in response to the bursting of the dot-com stock bubble in 2001. According to the researchers, loose monetary policy may induce financiers to take risks in two ways. First, low, risk-free rates prompt fund managers – who are required to achieve a certain returns target – to shift portfolio weightings in favour of riskier assets. Second, such rates are associated with higher and less volatile asset prices, the combination of which suggests to bankers that risks have been tamed. Empirical research using data from Spain, Bolivia, and the United States confirms that loose monetary policy does indeed promote risk-taking in a domestic context.

Despite the finding, it is not obvious how US monetary policy might have spilled to other countries prior to the GFC and caused their banks to take risks. After all, banks in countries that had pursued tight monetary policy also took risks. For instance, although the Bank of England had maintained a tighter monetary stance than the US Federal Reserve, the British bank Northern Rock still geared leverage to an unsustainable level, culminating in the memorable image of depositors queuing outside the bank in September 2007 to withdraw money.

To account for the global reach of US monetary policy, Professor Hyun Song Shin of Princeton University conjectures a causal link between US monetary policy and global banks’ risk-taking, as follows: easy monetary conditions in the US strengthen the currencies of periphery countries relative to the US dollar; strong local currencies, in turn, reinforce the robustness of local firms and, by extension, of local bank lenders; finally, low measured risks in these countries further attract capital inflows, and exacerbate the credit cycle.

To test the theory, the present author compiled a database of 257 banks in 26 countries. The database makes use of a default risk metric computed by researchers at the National University of Singapore. In the econometric analyses, it was estimated that an easing of US monetary policy by one standard deviation raised the default risk of banks by 4-9 per cent. Because other causal factors of default risk, such as economic conditions and investors’ risk appetite, are controlled for, the inverse relationship found can be explained as the banks being enticed into taking risks by US monetary policy, thus lending support to Shin’s hypothesis.

The analysis also uncovers the channel of transmission of US monetary policy. When policy is eased, global risk appetite rises, causing capital to flow to peripheral countries and raise their banks’ default risk. This discovery is consistent with the results of a study by Professor Hélène Rey of London Business School, which documented the existence of a global financial cycle across different asset classes. The present findings echo the recommendation of the International Monetary Fund (IMF), which has endorsed capital controls as a valid tool of macroprudential management.

**CONSEQUENCES OF FINANCIAL CRISES**

The recession that followed the outbreak of the GFC represented the severest economic downturn since the Great Depression of 1930s. In the US, unemployment increased at twice the average rate recorded in post-World War Two recessions. The duration of unemployment also lengthened from the previous peak of 20.5 weeks in the 1980s recession to more than 40 weeks in the post-GFC recession. Two explanations have been advanced to account for such severity. The first proposes a “cyclical”
between bankers and entrepreneurs in their workers, as is conventionally conjectured – but a mismatch arises – not between employers and market (firms). But it is also structural, because “structural” blurs. It is cyclical in that it from this angle, the boundary between “cyclical” to hire employees, resulting in job losses. Viewed collateral, entrepreneurs cannot obtain the funds

Empirical evidence has been found for both explanations – which is unfortunate, as each calls for a different set of remedies. If unemployment is cyclical, then expansionary monetary and fiscal policies should be implemented. On the other hand, if unemployment is structural, then job training or debt relief programmes would better target the problem. To reconcile the difference, the present research develops a theoretical model that synthesises the two possibilities.

The analysis is inspired by the fact that financial assets that were widely accepted as collateral before the crisis – such as mortgage-backed securities (MBS) and collateralised debt obligation (CDO) – were suddenly rendered inadmissible on the eve of the bankruptcy of Lehman Brothers, in September 2008. In this analytical framework, it is conjectured that collateral is required for the intermediation of credit between bankers and entrepreneurs. If bankers refuse a certain class of assets as collateral, entrepreneurs cannot obtain the funds to hire employees, resulting in job losses. Viewed from this angle, the boundary between “cyclical” and “structural” blurs. It is cyclical in that it is driven from the demand side of the labour market (firms). But it is also structural, because a mismatch arises – not between employers and workers, as is conventionally conjectured – but between bankers and entrepreneurs in their intermediation of credit.

The model also highlights the role of information in determining banks’ refusal of collateral, which is a trigger for collateral crises. It shows that the acceptability of assets depends as much on their fundamental quality, as on the intensity of banks’ scrutiny of them. If bankers do undertake an examination, then flaws could be found even in high-quality assets, whereas if a blind eye is turned, then low-quality assets would become admissible. The model identifies a threshold of collateral quality below which banks switch from unmonitored to monitored lending. The switch may account for the sharp drop in job vacancies during the GFC. A supplementary empirical exercise found a negative correlation between collateral quality and job vacancies.

A corollary of the collateral quality threshold is that a trade-off exists between the frequency and severity of a collateral crisis. The reasoning is straightforward: if an economy is settled at a low threshold, it implies that collateral quality may substantially worsen before checking is triggered, and that a crisis is therefore less likely to break out. But when monitoring is triggered, by definition more entrepreneurs will be holding low-quality collateral, rendering them unable to obtain funds for hiring, thus causing more job losses.

WITHDRAWAL OF MONETARY SUPPORT

At the onset of the GFC, the US Federal Reserve launched quantitative easing (QE) programmes and purchased bonds on a massive scale in order to lower the long-term cost of finance. Although the scheme succeeded in containing the crisis, it posed a challenge to the Federal Reserve’s subsequent attempt to withdraw monetary support as the economy recovered. The difficulty culminated in what has been called the “taper tantrum” in June, 2013, when Federal Reserve Board Chair Ben Bernanke’s carefully worded guidance to slow quantitative easing sparked a dramatic bond market sell-off by fund managers. During Bernanke’s talk the credit risk premium increased by 50 per cent.

The incident is remarkable for two reasons. First, it showed that the impacts of quantitative easing could be asymmetric. Though financing costs decline gradually when monetary support is injected, they can quickly soar when it is withdrawn – and the abruptness may disrupt investment. Second, it draws attention to the financial stability considerations of asset management activities. For example, it was erroneously believed that because fund managers were unleveraged they posed a lesser threat to the financial system than their banking counterparts.

From a macroprudential standpoint, the key task lies in assessing the likelihood of another such tantrum in the future, as the inevitable “normalisation” of monetary policy takes place. On this, opinion is divided. On one hand, it is believed that the 2013 sell-off was an isolated incident that occurred because of the premature timing of Bernanke’s statement. If it had been postponed until economic recovery was more robust, goes the reasoning, the financial market might have absorbed the news with ease. On the other hand, some researchers believe that the response was driven by a deeper force that was not connected with Bernanke’s guidance. To avert similar incidents in the future, they say, efforts must be made to tackle the underlying friction.

Among the latter camp are Professor Stephen Morris and Professor Shin of Princeton University. They propose that the taper tantrum was rooted in competition among fund managers, in which underperformance is punished by the withdrawal of funds by investors. The aversion to such losses makes asset managers prone to herd behaviour in which they imitate the investment decisions of their peers. And although, ex ante, it is equally likely for asset managers to collectively hold or sell assets, the indication of an interest rate rise steers them towards selling, which results in an elevated risk premium.
Another intricacy of the taper tantrum was that, just as most funds were rushing to sell bonds, a number of them entered the market, acquiring bonds at a discounted price. These managers, in effect, acted as arbitrageurs. This raises the question: did they just happen to have spare cash, or had they stored capital in anticipation of the fire-sales? Extending the work of Morris and Shin to take account of the role of arbitrageurs, the present research shows that forward guidance of the kind offered by Bernanke determines not only the likelihood of fire-sales, but also the amount of capital set aside for arbitrage purpose. If the central bank foreshadows a rate rise, agents deduce a likelier occurrence of fire-sales and store capital in the hope of profiting from them. Since capital could otherwise be deployed to production, such storage is wasteful. The analysis therefore points to a further concern of the normalisation of monetary policy, in addition to the asymmetric adjustment of financing costs.

**POLICY IMPLICATIONS**

This article has discussed three aspects of the GFC: the build-up of fragility amid loose monetary policy in the United States, the withdrawal of credit from employers in the wake of revised perceptions on the quality of collateral, and the market mayhem caused by taper talk. Each aspect contains implications for policy, which are collated below.

The first aspect describes the influence of US monetary policy on risk-taking attitudes of banks around the world. Given the large stakes, it would be ideal for the US Federal Reserve to take into account the implications of its actions on global financial stability. But to the extent that global considerations and the domestic mandate of the Federal Reserve cannot be fully reconciled in line with International Monetary Fund’s recommendations, small, open economies may consider imposing capital controls to fend off inflows of disruptive capital induced by US monetary policy.

In light of the global influence of US monetary policy, economists also contemplate whether a preemptive tightening of monetary policy is needed to curb credit bubbles. Donald Kohn, the former Vice Chair of the Federal Reserve Board, lists three conditions for deciding on such policy: (1) the timely detection of credit bubbles; (2) the efficacy of moderate monetary tightening; and (3) a sizable improvement in economic performance as a result of less expansive bubbles.
Recent work on the identification of credit cycles points to partial, if not complete, validation of Kohn's requirements.

A proposition for preemptive tightening may be especially relevant given recent trends in the Federal Reserve’s policy setting. Not only has the US central bank refused to lean against credit bubbles, as a “risk management” measure, it has actively eased monetary policy before such bubbles burst. Viewed from the perspective of dynamic control theory, which studies the perturbation of complex systems, such an asymmetric stance is prone to resulting in ever sharper successive cycles. Balancing preemptive easing with a tightening stance cannot guarantee the perfect efficiency of the financial market, but it does aim to keep deviations from equilibrium within acceptable limits, and thus enhance the sustainability of the financial system.

The second aspect highlights the existence of a trade-off between the frequency and severity of a collateral crisis. The key insight is that monetary and macroprudential policies alike may manipulate the trade-off, but they cannot eliminate a crisis. For instance, a lowering of banks’ bargaining power is shown to lessen the likelihood of a crisis, but also to increase its severity when it does occur. This raises doubts about the efficacy of efforts to limit the autonomy of banks in the wake of the GFC – for example, through the Dodd-Frank Act, which sought to improve accountability and transparency, and to strengthen consumer protection.

The third aspect describes the allocative inefficiency stemming from a reversal of loose monetary policy. Such inefficiency results from agents’ storage of capital in anticipation of a fire-sale, triggered by the tightening of monetary policy. Two approaches may be used to mitigate the inefficiency. First, central banks may raise interest rates without prior notice – if a fire-sale is not anticipated, agents will not store capital in advance. Second, exit fees may be imposed on investors, which would reduce their sensitivity to short-term fund performance. Damage to the reputation of central banks constitutes a major shortcoming of the first measure, and the reluctance of the fund management industry to be labelled as destabilising, let alone to be regulated, poses obstacles to the second. Further work is therefore needed to assess the practicality of these suggestions.

Taken as a whole, a consensus among researchers and policymakers is that monetary and macroprudential policies – such as capital controls, exit fees, and limits on the bargaining power of banks – should be used in a complementary way to foster financial stability. Given the intricate relationship between monetary policies and agent incentives, however, individual policies should not be confined to the goals of price and financial stability. Furthermore, in case of conflict, it may well be preferable to prioritise financial stability over price stability.

**KEY TAKE-OUTS**

- Balancing preemptive easing with a tightening of monetary policy promotes the sustainability of the financial system.
- A trade-off exists between the frequency and severity of collateral crises.
- Contingent on its usage, central banks may either cause or curb 'fire sales' through forward guidance.
- Monetary and macroprudential policies should be used in a complementary way to foster financial stability.
Notions of fairness matter for a variety of economic transactions.

IN 2011, JUST BEFORE the Rugby World Cup, Adidas got into controversy over the price of the All Blacks jerseys, which retailed for more than twice as much in New Zealand as elsewhere. According to the company, the price it set in New Zealand was “relative to the local market”. When local team supporters tried to order cheaper jerseys online from overseas suppliers, Adidas moved aggressively to block such attempts. Public indignation rose to such a pitch that even New Zealand’s Prime Minister weighed in on the debate, and several local retailers began selling the jerseys at a loss.
After all, the person sitting in the seat next to you on the airplane may have paid hundreds of dollars more than you did for this very reason, having bought their ticket at the last minute while you bought yours two months earlier.

Adidas implicitly assumed that once the Rugby World Cup got underway, and the All Blacks started to win, fans would catch the fever and would snap up the jerseys, in spite of the much higher prices. However, the logic behind such pricing strategies depends crucially on people’s willingness to accept the price. If enough people consider it to be unfair and refuse to buy then the anticipated profitable trades no longer take place.

The idea that notions of fairness may matter for a variety of economic transactions, including pricing, is not usually taught in classrooms or adequately appreciated by businesses. But there is mounting evidence that they do.

Consider the following scenario: it is your anniversary, and to celebrate you take your significant other on a romantic dinner and a cruise. At the end of the cruise a photographer shows you a lovely photograph of the two of you taken that evening. You are told that a print will cost $50. The photo would be an excellent memento of your memorable night, but $50 seems high. You offer $25, but the photographer balks. You walk away without the photo. Clearly, this is a bad outcome for both of you. You probably value the photo at $25 or more, while the photo is essentially valueless to the photographer. If you had agreed on $25, you would both be better off.

Do people turn down profitable deals if they think that the price is too high? One way to find out is to put people into economic decision-making experiments that involve real money. Such experimental ‘games’ are designed to simulate real-life situations.

**WHAT WENT WRONG WITH Adidas’ strategy?**

The company had merely engaged in traditional price discrimination by charging a higher price to buyers with little purchase flexibility in the expectation that they would be willing to pay a premium.

**MEASURING PERCEPTIONS OF FAIRNESS**

An experiment called the Ultimatum Game, introduced by Werner Gueth and two of his colleagues at the University of Cologne, is particularly suitable for studying such transactions.

The game is simple. You recruit a number of strangers, split them into two equal groups and place them in different rooms. Members of one group are designated ‘proposers’ while members of the other group are ‘responders’. Each proposer is given $10 and told that he or she must suggest a split of the money with an unknown and unseen responder. For instance, the proposer could propose keeping $8 and offering $2 to the responder. If the responder accepts, then they both get the designated amounts. If the responder refuses, neither gets anything. This, then, creates a situation in which there are many ways of splitting the $10 to the benefit of both parties. But each has an incentive to avoid disagreement at all costs, because that would lead to an unwanted outcome.

How should this game unfold? In thinking about problems of this type, a useful approach is to start at the end and work back – a process known in Game Theory as ‘backward induction’. We start by considering the responder’s choice. A simple solution is to assume that people care only about monetary payoffs. If that is true, then any amount, no matter how small, is better than nothing and should be accepted. By this logic, the proposer should make an appropriate offer – say $1 – and the responder should accept the offer because it is better than nothing. The implication is that in a game of this type the proposer would get $9 and the responder $1.

However, it turns out that over many replications of the game in a variety of countries proposers almost always made more generous offers – in the range of $4 to $5 – and offers of less than $3 were routinely turned down by responders. When the results first began to circulate, critics responded by stating that they were due to the very small stakes involved.

**DO THE STAKES MATTER?**

To investigate this possibility, Lisa Cameron of the University of Melbourne replicated the experiments in Indonesia using stakes equivalent to a month’s wage or more. She found that with these much larger stakes, the offers were even more equitable. Proposers ended up offering 40-50 per cent of the total available, and most such offers were accepted. As before, small offers, which
were few in number, were rejected. Similar results were reported in the United States, where college students played with stakes as high as US$100.

The implication is that responders were willing to turn down substantial sums if they considered the offers to be unfair, even if that meant getting nothing. Anticipating such rejection, the proposers felt compelled to make generous offers.

**Payoffs Matter, but Intentions Matter More**

These findings led to at least two further questions. First, in turning down small offers were responders reacting to the amount involved or were they protesting against the unfairness of the proposers? That is to say, were they objecting to the ‘intentions’ of the proposers? Second, when proposers made generous offers were they doing so in anticipation of small offers being rejected or were they merely being generous?

Sally Blount of the Chicago Business School provided an answer to the first question by comparing offers generated by human proposers and computer proposers. She found that computer offers, not matter how small, were always accepted, while unfair human offers were routinely turned down. Responders clearly made a distinction between the intentions behind the offers. Small human offers were treated as lacking in fairness whereas no such motive was imputed to computer offers.

Robert Forsythe and colleagues at the University of Iowa decided to answer the second question by comparing behaviour in the Ultimatum Game with the Dictator Game. Gary Bolton of Penn State University and Rami Zwick of the University of Auckland took a different tack. They investigated what happened when the responder’s ability to punish the proposer was removed. In other words, where the rejection of an offer resulted in the proposer getting what he or she decided on but the responder getting nothing. Bolton and Zwick found that in all cases the offers were very small, yet the responders invariably accepted them.

**Do Fairness Perceptions Differ Across Cultures?**

Anthropologists tested the Ultimatum Game in a large cross-cultural study involving a number of tribal societies across the world. They found significant differences in what was considered fair and acceptable. In the Peruvian hunter-gatherer society of Machiguenga, proposer offers were often small but were nevertheless routinely accepted, while among the whale-hunting Lamalera of Indonesia offers were often ‘hyper-fair’ in the sense that proposers, quite often, offered more than half of the total available to the responders. However, it appears that the norms do not differ widely across industrialised nations and, moreover, the greater the market integration, the more fair the offers tend to be.

Nobel laureate Alvin Roth of the University of Pittsburgh, and fellow researchers Vesna Prasnikar, Masahiro Okuno-Fujiwara, and Shmuel Zamir, compared bargaining and market behaviour in four locations: Jerusalem, Ljubljana (Slovenia, formerly part of Yugoslavia), Pittsburgh, and Tokyo. Figure 1 summarizes their results.

Several things stand out from the data. Not surprisingly, the proposers seldom offered the responder more than 50 per cent of the total available. Second, overall the offers are very similar, yet the responders invariably accepted them.

Rejection rates are also broadly similar - roughly 28 per cent of all offers were rejected in Israel and the US, 29 per cent in Yugoslavia, and 22 per cent in Japan.
**FAIRNESS AS A CONSTRAINT ON PROFIT-SEEKING**

But how exactly do notions of fairness act as a constraint on profit maximisation or the exploitation of market power? One of the early attempts to understand this was undertaken in the mid-1980s by Daniel Kahneman, a psychologist at Princeton University and winner of the Nobel Prize in economics, and two economists, Jack Knetsch of Simon Fraser University and Richard Thaler of Cornell University.

They used an extensive questionnaire to understand people’s predispositions toward a multitude of strategies adopted by businesses. Here is an example from the questionnaire: “A hardware store has been selling snow shovels for $15. The morning after a large snowstorm, the store raises the price to $20.”

Of 107 respondents, 82 per cent considered the action unfair.

Kahneman and his colleagues then teased out the responses to a variety of pricing strategies, four of which are outlined below.

**(I) EXPLOITATION OF INCREASED MARKET POWER**

The market power of a business reflects its ability to charge its customers a higher price (in the form of a higher mark-up over costs) and often depends on the availability of suitable substitutes. Monopolies, for instance, are able to charge large mark-ups because customers have no alternative choices. By and large various types of price-gouging were seen as unfair because such actions constituted opportunistic behaviour.

One of Kahneman’s examples is as follows: “A severe shortage of Red Delicious apples has developed in a community and none of the grocery stores or produce markets has any of this type of apple on their shelves. Other varieties of apples are plentiful in all of the stores. One grocer receives a single shipment of Red Delicious apples at the regular wholesale cost and raises the retail price of these Red Delicious apples by 25 per cent over the regular price.”

Only 37 per cent of 102 respondents considered this price increase acceptable.

Firms with market power often use that power to engage in price discrimination as alluded to in the Adidas example at the beginning of this article. But the survey results suggest that many forms of price discrimination are considered unacceptable.

**(II) THE CONTEXT FOR PRICING DECISIONS**

The next two scenarios look at what happens when a business increases price in an attempt to protect its profit: “Suppose that, due to a transportation mix-up, there is a local shortage of lettuce and the wholesale price has increased. A local grocer has bought the usual quantity of lettuce at a price that is 30 cents per head higher than normal. The grocer raises the price of lettuce to customers by 30 cents per head.” And, “A landlord owns and rents out a single small house to a tenant who is living on a fixed income. A higher rent would mean the tenant would have to move. Other small rental houses are available. The landlord’s costs have increased substantially over the past year and the landlord raises the rent to cover the cost increases when the tenant’s lease is due for renewal.”

These increases were considered acceptable by 79 per cent and 75 per cent of the respondents respectively. This suggests that it is acceptable for firms to protect themselves from losses even if this means raising prices.

**(III) SOCIAL NORMS**

In traditional economic theory, compliance with contracts depends on enforcement. But buyers and sellers may be willing to abide by norms of fairness even in the absence of any explicit enforcement, as the following scenarios illustrate:

“If the service is satisfactory, how much of a tip do you think most people leave after ordering a meal costing $10 in a restaurant that they visit frequently?” And, “...in a restaurant on a trip to another city that they do not expect to visit again?”

The average tip for the first example was $1.28 (122 respondents), and for the second $1.27 (124 respondents). The possibility of enforcement in the form of repeat visits is therefore evidently not seen as a significant factor in the control of tipping. This is entirely consistent with the widely observed adherence to a 15 per cent tipping rule in the US, even by one-time customers who have little reason to fear embarrassing retaliation by an irate server. Most people who travel to that country on business will appreciate the strength of this social norm.

**(IV) FAIRNESS IN LABOUR MARKETS**

Do such fairness norms extend to the market for labour as well? It turns out that even there, market prices and the history of previous transactions between a seller and a buyer can serve as reference transactions. The role of prior history in wage transactions is illustrated by the following scenario:

“A small photocopying shop has one employee who has worked in the shop for six months and earns $9 per hour. Business continues to be satisfactory, but a factory in the area has closed and unemployment has increased. Other small shops have now hired reliable workers at $7 an hour to perform jobs similar to those done by the photocopy shop employee. The owner of
the photocopying shop reduces the employee's wage to $7."

Out of 98 respondents 17 per cent thought this was acceptable while 83 per cent considered it unfair.

Kahneman and his colleagues suggest that “many actions that are both profitable in the short run and not obviously dishonest are likely to be perceived as unfair exploitations of market power. Further, even in the absence of government intervention, the actions of firms that wish to avoid a reputation for unfairness will depart in significant ways from the standard model of economic behaviour.”

One problem with survey evidence is that people’s survey responses and their real-life actions do not always match up. A classic example comes from a 1930s study by social psychologist Richard LaPierre who wanted to discover if people with negative attitudes toward other ethnic groups would demonstrate these behaviours overtly. For approximately two years LaPierre travelled around the US with a young Chinese couple, stopping at 184 restaurants and 66 hotels. They were refused service only once. LaPierre subsequently wrote to each of the businesses where he and the Chinese couple had dined or stayed. In the letters, which gave no indication of his previous visit, he enquired whether they would offer service to Chinese customers. Although almost none of the establishments had refused service, the majority said that they would not serve the Chinese visitors. There are many other such examples of dissonance between attitudes and behaviour. So, will buyers actually refrain from buying at prices they consider to be unfair? As indicated above, proving a negative is difficult.

**Experimental Evidence of Demand Withholding**

Rather than relying on survey responses, Bradley Ruffle of Ben-Gurion University of the Negev decided to study this issue using more elaborate decision-making experiments with real money at stake.

Ruffle set up an experiment involving a ‘posted-offer’ market, in which the buyer has the option of either purchasing a product at the price set by the seller or not buying at all. Most retail stores operate on this principle in that each item has a price tag and there is no scope for haggling over the price.

If a trade takes place, the seller’s payoff is determined by the difference between the price and the cost of each unit sold. The buyer, in turn, earns a ‘consumer surplus’ — which in one sense is a psychological payoff — as measured by the difference between how much the buyer values the good (the maximum price he is willing to pay) and the price that he actually pays (i.e., how much he actually is out of pocket). If the buyer rejects the price then neither party earns any surplus. Thus a posted-offer institution is a natural multi-player extension of the ultimatum game.

What Ruffle found — and bear in mind that these experiments involved people playing for real money, with real gains and losses — is that ‘demand withholding’ by buyers is indeed a factor in these markets. The effect of such withholding is more pronounced when (1) there are two buyers rather than four; (2) when the surplus accruing to the seller is six times that accruing to the buyer; and (3) when the buyers are made aware of this inequitable distribution of the surplus. These results are similar to turning down small offers in the ultimatum game except here such rejection comes in the explicit context of a market transaction.

So what does this all mean? Does fairness make a difference in real life? I end with two examples where the stakes were high.

In 2007, Rosanne Martinez of Santa Fe, New Mexico was hit by a car that was insured by industry giant AllState. Her medical bills and lost wages added up to $25,000. Allstate offered $15,000 to settle. According to an AllState claims adjuster, Martinez’s case reflected what many US insurance companies did to save money — including, in some cases, making extremely low offers. The logic is that people will often accept such an offer, fearing that otherwise they would end up with nothing.

However, Martinez refused the offer. Instead, she sued and a jury awarded her $167,000 dollars. But that verdict took three years.

The second example involves the players of major league baseball in the United States who, in 1994, went on strike. This led to the cancellation of 938 games, including the entire post-season and the World Series. Team owners were demanding a cap on player salaries and came up with a new revenue-sharing plan. The players’ union rejected the offer, which they thought was unfair to the players. After prolonged negotiations failed to break the impasse, the acting commissioner, Bud Selig, cancelled the rest of the season. The move resulted in the loss of US$580 million in ownership revenue and US$230 million in player salaries. Thus, the players essentially walked away from US$230 million collectively — the average salary of players at this time was about US$1.2 million per year — because of what they considered was an unfair offer. This in turn resulted in a loss of more than twice that amount for the owners.

**KEY TAKE-OUTS**

+ Perceptions of fairness can act as a constraint on profit-seeking and exploiting market power.
+ Context matters. It is acceptable for firms to raise prices in order to recoup losses.
+ Strategies perceived as ‘price gouging’ may be counter-productive.
+ Getting the price wrong can have a significant and long-term negative impact on a brand’s reputation.
Among developed countries, New Zealand has taken a unique approach to the provision of retirement income. At its centre is universal New Zealand Superannuation (NZS), supplemented by KiwiSaver and other forms of voluntary private saving. Along with high rates of home ownership, residency-based NZS has been outstandingly successful in reducing poverty among those over the age of 65. Indeed, this group has the best living standards profile of any age group in New Zealand.

The fiscal cost of NZS, in net terms, is relatively low by international standards at around 4.1 per cent of GDP today, rising to 6.1 per cent in 2050 and just 6.7 per cent by 2060. While this appears to be a modest increase, associated fiscal pressures from an ageing population, including healthcare costs, make the picture less benign.
NZS DOES NOT discourage saving or working since it is not income- or asset-tested, and there is no requirement to actually retire from work. Wealthy recipients of NZS may still be in well-paid work and/or have other significant private incomes and assets.

Some of this group may have accumulated their wealth with tax-free capital gains and may have benefited substantially from the 2010 income tax cuts and lower Portfolio Investment Entity (PIE) rates of tax. The amount of NZS retained, after-tax, by individuals taxed at the top income tax rate of 33 per cent – perhaps because they still work full-time – actually exceeds the net Jobseeker Support benefit rate paid to an unemployed adult (see Table 1).

The argument for cost containment may become compelling over the next two decades as increasing numbers of baby boomers reach retirement with ever larger, subsidised KiwiSaver lump sums and qualify for NZS, which under the pay-as-you-go system must be funded by current taxpayers. NZS is partially prefunded, but the New Zealand Superannuation Fund (NZSF) in itself does not reduce the cost of NZS, and accumulation in the fund has opportunity costs. A simplified visual picture of the scale of demographic change is provided in Table 2.

**Table 1: New Zealand Superannuation (NZS) and Jobseeker Support rates at 1 April 2014**

<table>
<thead>
<tr>
<th>Category</th>
<th>% Net average wage</th>
<th>Annual rate NZS (gross)</th>
<th>Annual Net Primary Tax</th>
<th>Annual Net Tax 33%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NZS Single, living alone</td>
<td>43%</td>
<td>$21,932</td>
<td>$19,080</td>
<td>$14,692</td>
</tr>
<tr>
<td>NZS Single, sharing</td>
<td>40%</td>
<td>$20,154</td>
<td>$17,612</td>
<td>$13,503</td>
</tr>
<tr>
<td>NZS Married person or partner in civil union or de facto relationship</td>
<td>33%</td>
<td>$16,600</td>
<td>$14,677</td>
<td>$11,121</td>
</tr>
<tr>
<td>Jobseeker Single, 25+ years</td>
<td></td>
<td>$12,147</td>
<td>$10,871</td>
<td></td>
</tr>
<tr>
<td>Jobseeker Married, civil union or de facto couple (with or without children) (each)</td>
<td></td>
<td>$10,122</td>
<td>$9,059</td>
<td></td>
</tr>
</tbody>
</table>

The argument for cost containment may become compelling over the next two decades as increasing numbers of baby boomers reach retirement with ever larger, subsidised KiwiSaver lump sums and qualify for NZS, which under the pay-as-you-go system must be funded by current taxpayers. NZS is partially prefunded, but the New Zealand Superannuation Fund (NZSF) in itself does not reduce the cost of NZS, and accumulation in the fund has opportunity costs. A simplified visual picture of the scale of demographic change is provided in Table 2.

**Table 2: Structural Ageing in New Zealand 2006 to 2050**

<table>
<thead>
<tr>
<th>Projected ratios of different age groups</th>
<th>15-64 years</th>
<th>65+ years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: New Zealand Treasury

Future pension payments may be reduced through the use of one or more of three main levers: the age of eligibility, the level of payments, and means-testing. While raising the eligibility age is often discussed as if it were the only option, a carefully considered mix of the three levers might most effectively maintain the best features of NZS. The first two levers are briefly discussed below, followed by a more detailed proposal for use of the third lever: income-testing. This third lever has been seldom discussed seriously in New Zealand since the late 1990s when the surcharge was abolished.

**LEVER 1: INCREASE THE QUALIFYING AGE**

The New Zealand Treasury has investigated the possibility of raising the eligibility age for NZS. Though this may appear inevitable in the face of an ageing population and increasing longevity, caution is advised. An important disadvantage of relying on this strategy to improve NZS sustainability is that many people with physically demanding jobs are disabled or sick by age 65 and unable to work further. Others lack the required skills or education to meet market requirements, or have full-time unpaid caregiving duties, such as looking after parents or grandchildren. The savings accrued from raising the age of eligibility would need to take account of the costs...
of supporting such people and would require another form of state assistance. The use of conventional welfare benefits with stringent income tests may mean that those who cannot continue to work exhaust their private retirement resources before reaching the new, higher age of eligibility.

The level of NZS needs to be high enough to prevent hardship, and it does that for most – particularly for those who are homeowners – though some pensioners clearly still struggle.

However, New Zealand runs some fiscal risk by being out of step internationally. In Australia, for example, the increase to age 67 for the Age Pension will begin in 2017 and is to be achieved over only six years, with talk of a further extension to age 70 by 2035. New Zealand’s current reciprocity agreements with Australia and other countries mean that individuals’ residency there can be used to qualify for NZS if they emigrate to New Zealand. This potential for people from other countries with higher qualifying ages and higher residency and/or contribution requirements for the age pension to benefit from our less stringent conditions is another risk to the future affordability of NZS.

While an increase in the qualifying age is inevitable to reflect improved average longevity, greater participation in the workforce, and to align with other countries such as Australia, if the only way to do this politically is to give a long lead-in time, there will be little or no potential for immediate savings from using this lever. To date, both major parties have shown a lack of political will to signal a timetable for any such rise.

**LEVER 2: DECREASE THE PAYMENT**

A second lever to reduce the cost of NZS is to reduce the payment level. One approach is to change the indexation basis for NZS. Projections show that fiscal savings from indexing the annual payment of NZS to inflation rather than wages would lead to significant long-term savings. The real spending power of NZS would be protected but the rate of NZS would fall relative to average wages. However, the baby boomers now aged 49-69 are very diverse in both health status and resources. Many are not well-off, and some have lost money in New Zealand’s finance company meltdown and in the leaky homes fiasco. Others have suffered through divorce and ill health.

The level of NZS needs to be high enough to prevent hardship, and it does that for most – particularly for those who are homeowners – though some pensioners clearly still struggle. While the Retirement Commissioner has suggested there is a case for a moderation of the indexation formula, reducing either the level of NZS or the relativity to wages over time may undermine the desirable achievement of low hardship rates for the 65-plus group.

Another approach is to rationalize the three different rates for NZS. As shown in Table 1, there is a married rate, a single sharing rate at 60 per cent of the married rate, and a single living alone rate at 65 per cent of the married rate. As previous Retirement Commission and Periodic Report Groups Reviews have noted, these differences are hard to justify. The rates are historical and are unsuited to a modern world of flexible living arrangements and relationships. There is a case therefore to pay the same flat rate to everyone, set somewhere between the married person and single sharing rate, with an additional means-tested payment where housing costs are high.

About 27 per cent of superannuitants live alone and possibly the majority would still need accommodation assistance. Nevertheless, savings can be made here without affecting the living standards of those dependent solely on the pension. Whether or not there is a separate rate for living alone, the alignment of the married and single rates appears justified. To save costs without direct cuts, the single sharing rate could be frozen until the married rate catches up through normal annual adjustments.

In summary, apart from modernizing and improving simplicity by aligning the rates of NZS, there appears little justification for reducing NZS costs by lowering the level of NZS payments as this approach risks increasing old-age hardship.

**LEVER 3: A MEANS TEST**

This leaves some form of means test – sometimes referred to as the ‘third rail’ of superannuation policy, by analogy with the potentially
lethal electrified third rail of a railway track. ‘Touch it and you die’. New Zealand’s income-test history has made it a politically unattractive option (see sidebar). Yet there is a way to apply an income test fairly, and with enough useful savings to take the pressure off sole reliance on raising the qualifying age or reducing the rate of NZS.

In Australia the means test on the Age Pension takes account of both income and assets. It is likely that New Zealanders would find that a step too far. This paper therefore concentrates on an income-based means test, but that does not preclude an attempt to include as much imputed income from assets as feasible over time.

Using 2014 figures, if there is no other income, the gross amount of NZS is taxed at the lowest tax rate and net disposable income is $14,677 for a married person (see intercept on vertical axis in Figure 1). For a superannuitant with enough other income to be in the top tax bracket, the net NZS payment after tax at 33 per cent increases his or her disposable income by $11,121.

In the context of the overall population, the net $11,121 of NZS paid to the wealthiest married superannuitant is more than the net Jobseeker Support of $9,059 (annualised) paid to an unemployed married adult. The current net gain to single sharing and single living alone wealthy superannuitants is even greater: $13,503 and $14,692 respectively, compared to $10,871 (as an annual rate) for a single person on Jobseeker Support.

**USING THE TAX SYSTEM**

Finding a way for the upper line to meet the lower line in Figure 1 by reducing the generosity of net NZS at the top end may reduce the degree to which the other two main levers must be employed. The intent is to save costs by affecting only those with significant ‘other’ income, while leaving the disposable income of the vast majority of superannuitants virtually unchanged.

To make the lines meet, a ‘negative income-tax approach’ could be used. In the past, when the surcharge operated, such an approach was suggested as a sensible rationalisation. This reform option means that the flow of tax to the IRD on gross NZS and other income, and the surcharge paid by a superannuitant, is offset while there was no income test for National Superannuation, the top personal tax rate was 60 per cent, and then 66 per cent between 1982-86, when a 10 per cent surtax was imposed. This meant that income retirees who were still in well-paid jobs or receiving other substantial income, could retain at most 34 per cent of the gross pension. Universal pensions and progressive taxation went hand in hand.

In 1985, the Labour government controversially imposed a 25 per cent surcharge on all other income over an exempt amount. This had the effect of recovering the full amount of the state pension from high earners. When the top tax rate was later reduced, the surcharge effectively acted as a substitute for more progressive taxation for those receiving the universal pension.

On regaining office in 1990, and despite promising to repeal the surcharge, the National government instead intensified means-testing of the pension by recasting it as a welfare benefit. The deeply unpopular policy was abandoned before being implemented and in a policy U-turn, the surcharge was reinstated, but at a more stringent level. However, by its last year, 1998, the threshold of exempt income for the surcharge had become more generous and the rate of clawback was only 20 per cent.

While the surcharge was complicated and contentious, it performed a useful cost-saving function without imposing hardship. The cost of abolishing it was estimated to be $400 million, or 10 per cent of the net cost of NZS. By the end of the 1990s, the state pension was again fully universal and for a brief time, the better-off paid a maximum of 33 per cent tax on it. When Labour was elected in 1999, the top tax rate was raised to 59 per cent, and in 2010 the National government reduced it once again to 33 per cent. Figure 1 shows the current disposable income of a married superannuitant compared to an ordinary taxpayer.

**A HISTORY OF INCOME TESTS**

When the National government introduced ‘National Superannuation’ in 1977, it was more generous than the previous age pension arrangements. Between 1977 and 1985, National Superannuation was fully universal, as now, and though relativity to the average wage was reduced from its initial 80 per cent for a married couple, it was always higher than the rate for ‘welfare’ benefits.

While there was no income test for National Superannuation, the top personal tax rate was 60 per cent, and then 66 per cent between 1982-86, when a 10 per cent surtax was imposed. This meant that income retirees who were still in well-paid jobs or receiving other substantial income, could retain at most 34 per cent of the gross pension. Universal pensions and progressive taxation went hand in hand.

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against the gross NZS payment from the IRD. Money would flow one way only.

However, a ‘basic income’ approach may be simpler to implement and understand. A Universal Basic Income (UBI) is already part of the current discussion in New Zealand about the future of work. The UBI is based on principles of non-conditionality and individual treatment, and changing NZS into a basic income would demonstrate how such a policy would work for the group aged over 65.

To illustrate, the basic income, called here the ‘New Zealand Superannuation Grant’ (NZSG), would be paid to all superannuitants as an unconditional weekly non-taxable basic income. Then, a separate tax scale would apply to all of a superannuitant’s gross earnings, whether from wages, dividends, or interest.

In this example, it is proposed that the NZSG is the same for everyone (married, single sharing, single living alone) and that any extra supplement for high housing costs would be part of the welfare system.

While the NZSG could be set at any level, Figure 1 shows it as equal to the current (after-primary tax) rate of NZS: i.e. $14,677 for a married person.

A break-even point exists where the NZSG, plus extra income from work or investment, net of the new tax rate, is equal to the disposable income of an ordinary taxpayer paying the usual rates of income tax. This point is effectively where the gain from the NZSG has been offset by the new tax. Any over-payments of tax by high-income earners could be claimed back at the end of the tax year.

Technically, this proposal differs from the surcharge of 1985-1998 in that the NZSG payment is not part of taxable income. The surcharge was exceedingly complex, applying until the net advantage from NZS was equal to the surcharge paid, and could mean different end points (when NZS had been fully clawed back) for different taxpayers. Few could follow the calculations. The surcharge was also perceived as an additional, discriminating tax that could result in marginal rates of tax exceeding 50 per cent.

Under the NZSG, an individual could either opt for the NZSG and the new tax scale for all other income, or wait until the end of the tax year and take any NZSG due as a rebate. For high-income earners, whether that income is earned from paid work or from investments, the new tax scale would not remove their right to the basic income floor of the NZSG if other income reduces or disappears. Thus the NZSG is the prototype of a basic income that provides automatic income security as of right.

Given that for 80 per cent of NZS recipients, NZS provides at least 55 per cent of their income, a tiered tax structure is needed to protect those with limited extra income. Figure 2 illustrates a tiered scenario; with rates of 17.5 per cent for the first $15,000 of other income, and 39 per cent on each dollar above that.

FEATURES OF THE NEW ZEALAND SUPERANNUATION GRANT

The NZSG would be far less complicated than other forms of clawback such as the surcharge, a welfare-type means-test directly on NZS, or even a negative income-tax approach. As with any targeting regime, an increase in the degree of targeting will result in some avoidance activity. However, the NZSG proposal is not nearly as harsh as the welfare means-test that applies to rest-home care subsidies or welfare benefits. It provides a gentle clawback using the principle of progressive taxation which, it can be argued, is the natural counterpart of the universal provision of a basic income.

Another concern may be that the NZSG would need to be carefully packaged so as not to adversely influence the decision to save. This, of course, would be much more of a problem with a full means-test that included assets than the proposed income-test operated through the tax system.
The integrity of the NZSG approach would require that the top PIE rate be aligned to 39 per cent. Alternatively, gross PIE income could be included as ‘income’ to be taxed at 39 per cent, less the tax already paid by the PIE on the member’s behalf (similar to the imputation regime). The same argument applies to income earned through trusts, companies and overseas vehicles. Treatment of current annuities and defined benefit pensions raise other complex but not ins soluble problems.

### CONCLUSION

This preliminary analysis suggests that the combined approach of adopting the two-tiered tax scenario, freezing the single-sharing rate so that over time it aligns with the married rate, eliminating the living-alone rate, and increasing supplementary assistance for accommodation costs, will result in immediate savings of more than 10 per cent of net NZS, and that this should increase gradually over time.

These savings are possible without imposing hardship or affecting those with modest additional income and can be achieved relatively quickly.

After a phase-in period, the proposed NZSG would aim to pay a single rate to all, independent of relationship status or living arrangements. This would remove unfair classifications that are difficult to police. It would also reduce the cost of NZS, although additional payments for those with high accommodation costs, whether living alone or not, would be required.

As with any targeting regime, efforts to maximise returns will lead to some tax planning activity. However, those who should be paying the top rate of tax of 33 per cent already have an incentive to reduce their taxable income and some already pay little or no tax. It is debatable whether a marginal 39 per cent tax rate would substantially change behaviour but there is the possibility that it could provide the impetus for a full investigation into, and exposure of, current and potential tax avoidance activities by wealthy individuals. Under the proposed NZSG, a wealthy person would need to reduce taxable income to under $15,000 to avoid the 39 per cent rate completely.

The proposed change would decrease the fiscal cost of NZS through reductions in payments to high-income superannuitants and thus allow more spending or lower taxes for younger New Zealand taxpayers. It may therefore lead to improved perceptions of inter- and intra-generational equity.

...the proposed NZSG offers several potential advantages compared with other targeting regimes. It is relatively simple to administer, and it is flexible.

If it is agreed that the cost of NZS should be reduced by increasing the degree of targeting, using the tax system and the proposed NZSG offers several potential advantages compared with other targeting regimes. It is relatively simple to administer, and it is flexible. The choice of tax rates for other income allows flexibility and clarity in reaching a desired breakeven point and required fiscal savings. It also provides choice and clarity for high-income superannuitants who are not denied access to the basic income floor of NZSG if their situation changes.

NZSG illustrates a possible reform to NZS as a means of enhancing the sustainability of an already world-class retirement system.

### KEY TAKE-OUTS

- Fiscal pressures out to mid-century suggest that changes to New Zealand Superannuation (NZS) are needed.
- These changes must retain the valuable aspects of NZS.
- Altering NZS to a basic income could save 10 per cent of the net cost from the upper end of the distribution while leaving the majority of superannuitants little affected.
Imagine you head a large carmaker, such as Volkswagen, at the start of the Chinese economic reforms in 1978. You know that an enormous market is opening up. But after decades of Chinese import-substitution policies promoting local self-reliance there is substantial uncertainty about the best way of entering the market. It is unclear, for example, what the best production and distribution alternatives are, whether you should ship your cars from Germany or manufacture locally. And if you decide on local production, you need to determine whether you should produce in one or in several facilities, where they should be located, and how best to get the products from those facilities to customers. Given that you are entering new territory, none of these questions have an easy answer.
The one certainty you do have is that other carmakers are evaluating the opportunities in China at the same time you are.

The natural reaction to the uncertainties surrounding entry into a new geographical market is to first conduct market research to determine the demand, to investigate various production and distribution alternatives, and even to experiment with alternatives, before committing to market entry.

The natural reaction to the threat of entry by competing carmakers is to pre-empt their entry. Being the first in a growing – but still fledgling – market may enable you to prevent competing entry for a considerable period of time. Alternatively, one could join forces by creating a joint subsidiary to access the foreign market. If one was to go down the cooperative route, one would have to determine the best timing, how to select the best among the two firms’ ideas, and how to share the fruits of market entry. A complicating factor is that often much of the information acquired by one's potential competitor during the investigation is hard to verify prior to collaborating.

Note that, even though we have described the decision problem as one of companies contemplating entering new geographical markets, it is not specific to this application. For example, when firms are engaged in a race to obtain an innovation, they often start by building small prototypes or running small-scale experiments before investing in a large-scale research project. Once a firm has started developing a new product, the race will often end in a merger, with one of the firms acquiring the research output of the other before the new product reaches the market. Sometimes, the firms’ investment decision is mediated by an outside agency, such as a venture capitalist or a granting agency. The questions of how much time to spend in experimentation, and whether to enter alone or jointly, apply here as well.

The present writers explored this topic in a recent paper published in the journal *Economic Theory*. The focus of the research was to use an entry-timing game to better understand the interplay between information-gathering experimentation and collusive behaviour, and to study collusive mechanisms between two firms engaged in developing new products or accessing new markets. The questions we wanted to answer were: Do firms invest too early or too late? How does the fact that signals are public or private affect entry-timing decisions? When do simple compensating payments allow firms to achieve the collusive outcome? What share of the surplus should accrue to each firm in the collusive transfer scheme? And, what is the optimal time to implement cooperation?

**THE ROLE OF ASSUMPTIONS**

To answer these questions, we studied investment decisions by two firms competing to enter a new market or develop a new product. However, instead of examining a host of case studies, we chose to apply economic theory. The concept is simple: One identifies a problem’s salient features, possibly backed by empirical observations, strips out all non-salient information, and identifies the logical implications of those features for individual – in our example individual firm – behaviour. For our purposes, the salient features that we needed to capture were (i) varying degrees of, and uncertainty about, the profitability of entry; (ii) the ability to learn over time; (iii) possible competition in entry; (iv) the ability to join forces; and (v) the complication that what one firm learns about itself is its private information, which it may have an incentive to lie about to its rival.

The simplest scenario containing these salient features is one with only two firms. Of course, this does not correspond to reality – there were dozens of carmakers...
contemplating entry into the Chinese market in the early 1980s. So, is it a useful assumption? This is a question that can only be answered by having in mind the questions we would like to answer. As a general rule, a particular, even highly unrealistic, assumption is useful as long as the answers to our questions, which we derive from the model, do not change significantly if we make a more realistic assumption. In that case, it constitutes a simplification that we are allowed to undertake. To give an example, virtually all markets fall between the extremes of a perfectly competitive industry and a monopolist whose product does not have a substitute. Nevertheless, we study models of perfect competition and monopoly because they teach lessons that hold true in more realistic models – and, indeed, in the real world. In our case, it turns out that increasing the number of potential competitors beyond two does not affect the model’s insights.

Further, we assumed that, to begin with, the firms were uncertain about the cost of entry and that it could take on two values, either low or high. We also assumed for a host of reasons – including differing experiences, differing personnel, or differing underlying technologies – that entry costs were independently distributed across the firms. This meant that one firm’s entry cost had no predictive power for the entry cost of any other firm. Unlike the duopoly assumption, this entry-cost assumption turns out not to be without consequence for the model’s insights. The following limitation must therefore be kept in mind: What we derived with this assumption held true only if the correlation between the firms’ entry costs was not too strong, that is, if each firm’s idiosyncratic entry cost component was sufficiently strong as compared to their common entry cost component.

Firms gradually acquire signals about their entry cost through research and experimentation and, at the same time, form beliefs about the signals received by their competitors. At any point in time, irrespective of what they have learned about their entry cost, each firm can decide to enter the market. If both firms enter, they receive duopoly profits on the market; if only one firm enters, it will obtain monopoly profits. The firms in our study were assumed to make positive profits, net of the entry cost, as duopolists only when their entry cost was low and to make positive expected profits, again net of the entry cost, as monopolists when they had not yet learned their costs. The implication is that a firm that learns it has a high entry cost will not enter. More than two levels of entry cost would yield a qualitatively similar result providing that higher entry costs imply a lower likelihood of entering the market.

**COMPETITION: NO NEWS IS GOOD NEWS**

With these assumptions, we first modelled the behaviour of firms competing in their entry decisions. This revealed that a firm with a low entry cost always enters immediately. Deferring entry implies receiving product market profits later, and, because costs are firm-specific, this will not affect the competitor’s belief about its own cost. Obviously, this would not necessarily hold if the competitor’s entry costs were strongly positively correlated. If, in this case, a firm’s optimal plan of entry is to enter immediately once it has learned that its entry cost is low, then its rival would infer that its own entry cost is very likely low, too, and would immediately follow suit. This suggests that the best strategy in this alternative case may be to manipulate a competitor’s beliefs by waiting. Because, in the case with strongly idiosyncratic entry costs, a firm that has learned it has a low entry cost enters immediately, and because firms that have learned their entry cost is high do not enter, not observing the entry of one’s rival amounts to valuable information. There are only two reasons why a rival may not have entered: either the rival has delayed entry because its experimentation has not yet produced information about its entry cost, or the rival has learned that it has a high entry cost and so will never enter. The latter implies that a firm that does not observe its rival enter becomes more and more optimistic – in other words, that no news is good news. Indeed, no news may be so good that, at some point, a firm whose experimentation was so far unfruitful, enters the market regardless.

In general, three equilibria are possible, depending on the expected entry cost, the speed of learning, and the firms’ patience. If firms are patient, learning is relatively fast, and the expected entry cost is relatively high, then they will experiment and enter only when they have learned about their entry cost. If, on the other hand, firms are impatient, learning is slow, and the expected entry cost is not too high, then they will decide to enter without experimentation. Given more realistic degrees of patience, learning speed, and entry costs, firms will experiment and, if they do not observe their rival’s entry within a reasonable time, they will enter the market anyway. Private information plays an important role here: The urge to pre-empt a rival’s entry is higher when firms are secretive with regard to their business practices or R&D results, or if they simply cannot communicate them credibly to their rivals than it would be were the results of experimentation leaking to the firms’ rivals.
The conclusion is that competition leads firms to invest excessively early and to experiment too little. This is generally good news for consumers, but it is bad news for the firms. As a consequence, we should expect carmakers to have entered the Chinese market prematurely only to discover that this was a mistake.

**COOPERATION**

Our second set of results dealt with the firms’ ability to access the foreign market by forming a joint subsidiary. Competing firms face three sources of inefficiency: market competition; duplication of entry costs; and insufficient experimentation to pre-empt rival entry. Each of these inefficiencies destroys value for the firms and would, therefore, likely be avoided through cooperation. But because what firms learn by experimentation is their private information, they may lie about it. As a consequence such reports cannot be trusted, which makes optimal cooperation difficult to achieve. In the study, we considered two schemes by which firms could seek to reach the cooperative outcome that ensured optimal investment in pre-entry experimentation and which avoided both entry cost duplication and product market competition.

**BUY-OUT: THERE IS A LATEST POINT**

First, we looked at payments made by one firm to another as compensation for staying out of the market. In the real world, a firm could buy out its competitor, or acquire its market-specific investment, taking over the personnel devoted to the new market. We assumed, however, that it was jointly optimal for firms to experiment and learn the entry cost in order to determine the right way to enter the market, and sought to design a compensating payment scheme that gives incentives for the firms to do this. There are two difficulties when it comes to designing a compensating payment scheme that encourages such behaviour. First, when a firm does not observe a competitor enter a market, it becomes less inclined to buy out that rival, and so effectively lowers its willingness to pay for avoiding competition. Of course the rival may well have delayed entering because its experimentation was not yet successful, in which case it would rather continue experimenting than accept a low buy-out offer. It can be shown that at a certain point a buy-out is rendered impossible as the active firm becomes convinced that the rival has dropped its entry plans, and is unwilling to compensate it at a level that would prevent entry.

Second, we found that even within the window of opportunity, firms needed to pay attention to their sharing rule. To achieve efficient entry timing decisions, the monopoly surplus should be shared between the active and inactive firms in an equitable fashion. The share of the active firm – the one taking over – should be large enough to give it an incentive to invest as soon as it learns its cost. The share of the inactive firm – the take-over target – should be large enough to discourage early entry in order to pre-empt its rival.
 ранних сценариев, когда два независимых предприятия начинают параллельные научные проекты и третья сторона может нарушить эффективность. Третья сторона могла бы быть венчурным капиталистом, например, или сторонним организатором конференции по научным исследованиям, а не двум научным командам, работающим на одной и той же проблеме. Наш анализ позволяет подсчитать риск того, что решение будет принято слишком рано или слишком поздно. Он также показывает, что разница, которую переключили на неработающий партнер, оказывает большое влияние на каче ство. Мы исследовали также, какое влияние на ситуацию оказывает возможность аукциона. Выяснилось, что при аукционе разница, которую переключили на неработающий партнер, оказывает большое влияние на качество. Мы также исследовали влияние того, что третья сторона может нарушить эффективность. Наш анализ показал, что третья сторона может нарушить эффективность, если она не может обеспечить достаточную эффективность. Это также показывает, что разница, которую переключили на неработающий партнер, оказывает большое влияние на качество. Мы также исследовали влияние того, что третья сторона может нарушить эффективность. Наш анализ показал, что третья сторона может нарушить эффективность, если она не может обеспечить достаточную эффективность.
NEW ZEALAND HAS MAINTAINED a high share of renewable energy in the electricity sector during its transition from a state monopoly to a competitive electricity market. The development of hydro resources prior to industrial reform in the mid-1980s, coupled with the abundance of competitive low-carbon energy resources – especially geothermal and wind power – has certainly been an advantage. Currently, domestic fossil fuel resources offer opportunity for economic growth, while renewable energy resources present opportunities for green growth in both domestic and global markets. What is particular about New Zealand’s case is the ‘middle out’ approach of its national renewable energy strategy. Rather than the top-down model often adopted elsewhere, consenting in this country is done on a case-by-case basis at regional level, which allows for wide community and stakeholder participation.
New Zealand has roughly 10 GW of total installed capacity (including cogeneration) consisting of roughly 57 per cent hydro, 16.2 per cent geothermal, 16 per cent gas, 5 per cent wind, 4 per cent coal, and approximately 1.5 per cent biogas, wood, waste heat and oil combined, according to Ministry of Business Innovation and Employment (MBIE) data. The total share of renewable resources in 2014 was 80 per cent. The share changes annually, depending mainly on the hydro resource availability, which in turn depends on precipitation patterns, and to a lesser extent the inter-annual variability of wind. Figure 1 shows demand growth and the generation mix since 1976. From 2005 demand plateaued at around 42,500 GWh. Figure 2 shows the share of hydro falling from around 80 per cent to slightly over 50 per cent, between 1974 and 2012, while geothermal grew to roughly 14 per cent and wind to 5 per cent over the same period.

**HYDRO POWER**

Current installed capacity for grid-connected hydro power is almost 5500 MW. Some 240 MW of hydro capacity is currently consented, the largest project being 70.5 MW. However, future energy scenarios developed by (MBIE) include almost 2700 MW of new hydro capacity available in the period 2015-2050. In these scenarios the largest hydro installations are pumped hydro stations of 300 MW each. A relevant characteristic of the New Zealand hydro generation system is its relatively low storage capacity of 4900 GWh (EA, 2013), which roughly corresponds to 38 peak demand days (which in winter generally do not exceed 130 GWh).

**GEOTHERMAL ENERGY**

Geothermal has played an important role in New Zealand’s electricity mix since the 1950s. Currently, about 16.2 per cent of annual power generation is provided by thirteen geothermal stations, with direct heat being used in the paper and pulp, dairy, agriculture, and fishery industries. Along with wind power, geothermal is among the most economic sources of electricity in New Zealand, although future large-scale projects may become more cost-intensive than previous ones as the most attractive geothermal sites have now been tapped.

The degree of renewability of a geothermal resource depends on the rates of extraction and heat regeneration. Excessive extraction of heat can speed depletion, reduce reservoir productivity, and in some cases lead to subsidence. The previous ‘single-tapper’ policy, which allowed only one developer per
Since the 1950s, geothermal reservoir, was aimed at avoiding the 'tragedy of the commons'—a situation in which several developers exploit a resource at an unsustainable rate to gain economic advantage, in the process depleting it and causing damage that affects all users. Regional councils have now adapted their policies to allow multi-tapping, while insisting on joint-management plans to ensure sustainable use of the resource. At the time of writing, a 166 MW project is under construction, a 250 MW project is consented, and resource consent has been applied for in relation to several other projects totalling in 190 MW.

**WIND ENERGY**

Currently, there are 19 operational wind farms totalling 683 MW of installed capacity that supply some 5.2 per cent of national electricity demand, with a further 66.6 MW under construction. An additional 12 wind farms projects, totalling up to 1670 MW of capacity, hold consents. The consenting process itself has ranged from four to 40 months, with one of the longest involving Project Hayes, a 634 MW project planned for the South Island. The applications for the relevant resource consents for Project Hayes were submitted in October 2006, with the process continuing in the Environment Court, and then in the High Court. The developer withdrew its applications in 2012, announcing that other projects had higher commercial priorities. Given changes in the global economy during the consenting period, and the flattening of electricity demand in New Zealand, it is possible that the economic viability of the project altered significantly during this time.

One possible way to overcome the challenge of expanding wind power at a time of softening national electricity demand lies in distributed generation. Unlike large grid-connected wind farms that sell all their power output in the wholesale electricity market, small-scale distributed generation is generally consumed locally, or eventually partly sold to the grid at a buy-back rate determined by the retailer or distribution company. In the distributed-generation model, the owner of a small-scale wind farm would not be directly concerned with the slow growth of national electricity demand. Indirectly however, flattened demand and potentially low electricity prices in the wholesale market would be reflected in the buy-back rate that the producer would receive for any power sold to the grid.

Empirical evidence of community preferences regarding wind farm development in New Zealand is limited. Two quite different approaches have been used to estimate the external impacts of such development. Researchers Martin Barry and Ralph Chapman identified two main factors limiting the potential of wind generation in New Zealand: a trend towards large-scale installations, leading to increased opposition; and a small number of investors. Their survey of 338 rural landowners found a significant preference for small (2-turbine) projects as opposed to a large (14-turbine) projects, suggesting that in rural areas, at least, small-scale projects might face less opposition.

Analysing 4,800 property transactions near New Zealand’s largest wind farm, the 134-turbine Tararua wind farm, T Nguyen estimated the external affects during three stages of development: pre-announcement of development, transition, and post-construction. He found that negative effects on property prices were only significant during the pre-announcement period. The study by Barry and Chapman adopted a stated-preference approach and the sample was obtained from rural landowners in two regions, whereas Nguyen’s study was based on market transactions, with location and view controlled for in the analysis. The significance of the pre-announcement affect and the preference for small-scale development suggest that developers could speed up the consenting process by engaging with local communities early in the development process, as they place great value on spatial location. Evidence to date suggests that after development has occurred, negative external impacts associated with large-scale development fade.

**MARINE ENERGY**

As part of its New Zealand Energy Strategy 2007, the government established a four million dollar Marine Energy Deployment Fund (MEDF). The fund was designed to accelerate innovation and assist with concept testing and device deployment. The grants were allocated to six proposals in four annual rounds, between 2007 and 2011.

The largest proposed project involved 200 submerged turbines capable of generating 200 MW of electricity from tidal currents in the Kaipara harbour. The project received a conditional resource consent in March 2011, which allowed the project to start with 3 MW, after which a favourable environmental impact assessment would enable it to transition to a full-scale project. As at March 2015 the project had not proceeded.

None of the other five projects were successful. The funding was subject to conditions, such as individual projects obtaining resource consents and meeting milestones, and as a result very little funding was actually spent. Government support for marine energy projects has not been continued.

In addition, there were two projects outside the government funding scheme. A 12 MW tidal-stream project involving 10 turbines was proposed for the Cook Strait. A similar project, involving just one 1 MW turbine to be installed off the south coast of Wellington,
SCENARIOS FOR THE NEW ZEALAND ELECTRICITY SYSTEM, EMPLOYMENT HAS PRESENTED FOUR PLAUSIBLE FUTURE SUPPLIERS.

The difference between retailers and solar power for new installations for a limited time, by covering that it would guarantee a price of 16 cents per kWh. However, the lines company in Auckland announced 2016, ranged from nothing to eight cents per kWh.

Consumers. Current buy-back rates, as of January in buy-back rates, as several retailers have decided to cut their rates for new PV installations, in an effort to avoid subsidising solar power at the expense of other consumers. Current buy-back rates, as of January 2016, ranged from nothing to eight cents per kWh. However, the lines company in Auckland announced that it would guarantee a price of 16 cents per kWh for new installations for a limited time, by covering the difference between retailers and solar power suppliers.

SOLAR ENERGY

New Zealand has an accumulated installed capacity of 34.5 MW of solar power. All solar power installations are small-scale distributed generation, the largest reaching 240 kW. Like other renewable energy sources, solar power does not receive any government subsidy in New Zealand. There has been a recent drop in buy-back rates, as several retailers have decided to cut their rates for new PV installations, in an effort to avoid subsidising solar power at the expense of other consumers. Current buy-back rates, as of January 2016, ranged from nothing to eight cents per kWh. However, the lines company in Auckland announced that it would guarantee a price of 16 cents per kWh for new installations for a limited time, by covering the difference between retailers and solar power suppliers.

REACHING THE ENERGY TARGET

The Ministry of Business, Innovation and Employment has presented four plausible future scenarios for the New Zealand electricity system, with an additional three demand sensitivities. In the “Mixed Renewables” scenario, also known as the “business-as-usual” scenario, total electricity demand grows on average by 1.1 per cent each year, reaching approximately 45.6 TWh in 2025. The demand sensitivity with the lowest demand outcome assumes a gradual shut-down of the Tiwai Aluminium Smelter by 2018, reaching a total demand of approximately 40.5 TWh in 2025. The highest-demand scenario results in a total electricity demand of approximately 46.8 TWh in 2025.

To estimate how much existing and consented renewable energy power stations could potentially contribute to the 90 per cent renewable energy target by 2025, we calculated the total annual supply from hydro, wind and geothermal power, and compared the results with the total-demand projections. Assuming that consented stations will have the same capacity factor as existing renewable energy stations, we calculate that the total annual renewable energy supply would reach roughly 46.4 TWh. Even factoring in a 10 per cent decrease in productivity for new stations due to the best resource locations having been already taken, and a similar decrease in the productivity of existing generation due to aging equipment or, in case of geothermal, subsidence, the total renewables annual output would still be roughly 41.8 TWh (See Table 1).

TABLE 1: POTENTIAL TOTAL SUPPLY FOR EXISTING AND CONSENTED RENEWABLE ENERGY

<table>
<thead>
<tr>
<th>Technology</th>
<th>Operating Capacity</th>
<th>Total Annual Output</th>
<th>Consented Expected Annual Output</th>
<th>Total Annual Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geothermal</td>
<td>840.7</td>
<td>6345</td>
<td>0.86</td>
<td>1886.8</td>
</tr>
<tr>
<td>Wind</td>
<td>683</td>
<td>2434</td>
<td>0.41</td>
<td>9712.9</td>
</tr>
<tr>
<td>Hydro</td>
<td>5469.5</td>
<td>24900</td>
<td>0.52</td>
<td>1113.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>46.4</td>
</tr>
</tbody>
</table>

These simplified calculations show that existing and currently consented renewable energy projects have the potential to meet demand projections in 2025. Thus, in terms of of renewable energy resource availability, reaching the 90 per cent target is viable. This exercise does not take into account grid restrictions, peak load capacity, and other technical restrictions which may limit the share of certain renewables, such as wind, in the system. However, the results do illustrate the potential for renewable energy development in New Zealand.

THE ECONOMICS OF RENEWABLES

The Levelised Cost of Electricity (LCOE) is a common metric used to compare the production cost of a unit of electricity derived from different energy sources and technologies. The LCOE for a given technology will typically depend on the scale and resource availability (location dependence), which is why a range of values are often presented. In terms of LCOE, the most common renewable energy technologies have become cost competitive compared to fossil fuel technologies. Even solar technologies are reaching cost-competitive levels, although concentrating solar power (CSP) still has a higher cost range than fossil fuel. Marine energy technologies, both wave and tidal, remain comparatively expensive, with an LCOE in the range of 0.25 to 1.06 USD/kWh.

However, it is important to understand that a lower LCOE does not directly translate to competitiveness in the electricity market. Wholesale market electricity prices vary significantly throughout the year depending on demand and eventual constraints in supply. There may be few hours of very high wholesale prices each year, and the ability to generate power at such times thus has a direct impact on the profitability of new generation plants. In New Zealand, where nodal pricing differentiates the wholesale prices across the country, location is also a factor in the profitability of new investments.
CHALLENGES AND OPPORTUNITIES

New Zealand comprises two main islands and is approximately 1,600km long, with a population of about 4.5 million. The location of generation assets, the pattern of supply from renewable sources, and the location of major centres of demand create challenges for distribution and security of supply. In 2014, 44 per cent of total electricity was generated in the South Island, with hydro accounting for about 98 per cent and wind less than 2 per cent. By contrast, 56 per cent was generated in the North Island, with geothermal and gas contributing 29 per cent and 28 per cent respectively. Supply originating in the South Island is therefore predominantly hydro, whereas in the North Island geothermal has recently surpassed natural gas in total generation.

During years of normal rainfall, power flows from hydro assets in the South Island to the North Island through the High Voltage DC link. The link was recently upgraded to a capacity of 1,200 MW at a cost of $672 million. However, the frequency of dry years has increased, resulting in power flows in the other direction. Changes in recent years to the frequency distribution of rainfall suggest that conditions will become more favourable for investment in renewable sources of electricity in the South Island. On the demand side, changes in industrial demand at the Tōtai Aluminium Smelter could shorten the period that electricity flows from the North Island to the South Island. In addition, increased competition for water may pose a challenge – especially given that in dry years hydro power stations may save water in the expectation of higher electricity prices, while that retained water is also needed for irrigation downstream.

Fortunately, the country has considerable renewable energy resources including wind, hydro, geothermal, solar, biomass and marine energy, some of which are already price competitive. The recent drop in solar photovoltaic (PV) panel prices has also led to new developments in the small scale installations of PV panels. However, emerging technologies appear to experience difficulty in demonstration and deployment, and to the growth of solar power installation in new residential and commercial buildings, energy technologies that are in the development phase. Nevertheless, there may be significant opportunities in distributed generation, as already mentioned. In addition to the growth of solar power installation in new residential and commercial buildings, and the potential for small-scale wind farms in rural communities, both technologies have been deployed in small, organised communities that choose to collectively invest in technology which permits a more sustainable and environmentally responsible way of living. Along with renewable energy resource opportunities on the supply side, the demand side offers opportunities for energy conservation and strategic planning. Smart metering and smart grids are still in their infancy in New Zealand, and the increase in solar power installations in the residential sector is opening a new market for smart metering diffusion and technology learning.

The uptake of emerging technologies such as solar PV and electric vehicles has however been slower in New Zealand than in other OECD countries. Solar PV prices have fallen and an increased uptake can be seen in small scale installations, indicating that recent uncertainty in buy-back rates has not had a direct effect on the adoption of solar power in this country.

Similarly, the uptake of electric vehicles has been slow at the national level, but significant advances have occurred at the municipal level. In fact, due to the availability and competitiveness of renewable resources for power generation, New Zealand has an opportunity to transition the transport sector towards carbon neutrality. Coordination between municipalities and regions could further aid the deployment of electric vehicles and other low-carbon solutions in this sector.

In the medium- to long-term, taking advantage of the wide range of green growth opportunities will require supporting demonstration projects to allow for development in emerging technologies, creating an entrepreneurial environment that promotes experimentation and allows ideas to be developed for wider markets.

The further evolution of New Zealand’s energy system will be conditioned by market forces. The development of renewable sources will continue, provided they meet commercial criteria, while investment in demand-side management technology is likely to moderate growth in demand. Domestic sources of gas will continue to play an important role in providing security of supply and will offer the opportunity for short-term economic growth. Meanwhile, already consented low-carbon electricity projects, currently suspended due to stagnated demand, have the potential to meet the 90 per cent renewables target by 2025.

KEY TAKE-OUTS

- Leveraging green growth opportunities will require support for demonstration projects that showcase emerging technologies and foster experimentation.
- The competitiveness of New Zealand’s renewable power sources may boost the transition to transport-sector carbon neutrality.
- Consented projects, now on hold, have the potential to meet the national target of 90 per cent renewable energy by 2025.
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