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PRICE REGULATION: Moving with the Times

Modern economies call for modern regulatory arrangements, argues ISCR's Prof Lewis Evans. There's no place for mechanisms such as Telecom's Kiwi Share in the 21st century.

EDITORIAL

PHOTO MONTAGE: ALLTEX DESIGN

In the 1970s and earlier, New Zealand used to regulate the prices of all sorts of goods and services – even the price of fish and tins of baked beans. Prices of infrastructure assets were determined by government budget and election exigencies and were to a large extent independent of the full costs of business operation, the demands of consumers, or the requirements of investment.

Price regulation was common in other countries as well, but it was often more selectively and systematically applied. In many of these countries the price of infrastructure assets that contributed to scale economies – such as those of gas, electricity and telecommunications – were set by government as owner or by regulatory commissions that collected and represented the views of consumers, public-interest advocates, and the firms themselves. In these settings the process was to set revenue requirements which enabled the firm to deliver its goods and services and to decide on prices which produced the required revenue and represented the political pressures of the commissions. Typically, this resulted in prices that cross-subsidised some consumers at the expense of others. The processes inevitably required a regulatory pact between regulators and firms as to what investment was required. Late last century, attempts to address the widely recognised problem of cost-padding by regulated firms saw the introduction of forms of regulation in which prices were regulated to change at the rate of inflation less an amount x (rpi-x). This effected little improvement, especially where x was determined on the basis of some measure of profit.

Steady-state regulation

For much of last century these regulatory institutions remained stable and viable, although their effect on the development and uptake of innovations and their absence of customer focus left a great deal to be desired. The processes remained viable because part of the price-regulation pact with the firm was that entry of other firms to the business was prohibited. (In New Zealand import of many consumer items was prohibited, regulated, or subjected to very high tariffs.[1]) Without freedom of entry, a wide range of outputs could be produced and priced to cover cost with little regard for what consumers may have sought or what other firms would have offered had they had the opportunity. The slower pace of technological *to page 2*

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change of the first part of last century also contributed to stable arrangements.

The modern economy is characterised by changing cost structures and potential entry to varying degrees in most industries, and by far-reaching quick-acting technical change. The imperative has been to allow entry into what used to be rigidly regulated industries. Regulatory authorities have for the most part struggled to handle the new environment. In some jurisdictions – such as the US – attempts have been made to regulate in order to promote competition: thus in the US access-regulation was legislated for telecommunications in 1996. Where the legislation promotes competition, it typically does so at one level (such as users of the network) at the expense of competition at other levels (such as network providers). But it is widely construed as not having worked: indeed some analysts claim that it has had the opposite effect from that intended. The Federal Communications Commission (the US telecommunications regulatory body) is currently split between those who would rescind telecommunications price-regulation entirely and those who would not.

Competition in modern economies raises the spectre of assets being made redundant. Indeed, the possibility of some accelerated redundancy of assets is an essential part of competition: how else can new technologies or more efficient firms enter the industry? The old regulatory model also struggles with this issue. A large part of the problem in the California electricity market arose from market design that sought to protect the owners of assets which had been put in place under the old regulatory commission model and which would become redundant under competition. Investments (tacitly) approved by the regulators had to have a return guaranteed to their owners – otherwise the regulatory pact would be broken and the credibility of the regulatory institution reduced.

Regulating for innovation

In sum, the price-regulatory institutions of last century are struggling in modern economies that seek to evolve with timely innovation and competition. There are several problems. First, innovation and entry require some prospect of profit. Rates of return under the protected stable institutions are demonstrably not sufficient to induce required investments in the presence of competition and rapid technical change. Second, the prospect of assets stranded technologically or competitively poses the following regulatory question: should the firm be compensated in its allowed rate of return for the risks it faces, or should it be guaranteed a (lower) return by the regulator who then ensures that the firm is compensated for any stranded asset? Furthermore, can the regulator even offer such a guarantee? Third, if the rate of return is to be heavily restricted how does the regulator ensure that reasonable innovation, investment and quality is maintained? Measures of quality that the regulator observes need not reliably indicate the key quality effects of cost economies. Losses in economic performance because of delayed uptake of useful innovation has been shown to be a major cost of last century's regulatory approach.

Issues posed by New Zealand's recent penchant for last century's regulatory model are well illustrated by the effect of maintaining consumer price cross-subsidisation in telecommunications. The Kiwi Share forces rpi – x regulation on telephony access (where rpi is rate of inflation and x is zero), a zero usage-price for local calls, and a single access fee for households in all regions. To consider but one aspect of this restriction, let's look at the cross-subsidisation. All networks are much more expensive per connection in less as opposed to more densely populated areas. Thus, city consumers are cross-subsidising rural consumers (I'm one). Such cross-subsidisation cannot be justified on the grounds of equity. But it is sometimes justified on the grounds of network access. Because a network is more valuable the more people connected, it is argued, connections should be subsidised. This argument for the Kiwi Share loses weight when one considers that there exist other arguably more-efficient ways of providing this subsidy. If access demand is not that sensitive to price, locational choice by individuals should be based on the full costs of the choice – particularly in New Zealand, where location of activity is changing rapidly in response to demands and opportunities created by our modern economy.

Beyond the Kiwi Share

These are some of the standard arguments around last century's regulatory model: but they ignore the under-performance of the sector and economy brought about by mis-pricing access. The fact that prices are much lower in rural areas than they would have been without Kiwi Share stifles competition between companies in these areas and hinders the introduction of new technologies. It is now realistic for wireless and other technologies to compete economically with standard wireline technologies in less populous areas; but the old technology is being cross-subsidised so that its real price is not being compared with alternatives. Indeed, we observe the government facilitating and local bodies subsidising the regional application of alternative technologies in the interests of installing new technology that competes with the subsidised wireline service. If the latter were not subsidised, the uptake of other technologies would accelerate and entail less or no subsidisation (of themselves). Furthermore, in order to provide this subsidy, all telecommunications companies are being taxed on value-added services, including new products, that they provide consumers. This also has the effect of inhibiting take-up of modern communication technology. *to page 11*

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OH NO IT'S **RAINING AGAIN!**

But cricket fans needn't worry, as new economics-based research promises to make those annoying interruptions a whole lot fairer. Steen Videbeck explains.

It's a scene that takes place all too often. In the middle of an exciting one-day cricket match, the heavens open, sending players scattering and the covers rolling on. Then, with overs lost, the sun once again decides to shine, leaving all involved asking the same question: so now what? Resuming the match the next day or calling it a draw are all but out of the question as they would propel one-day cricket dangerously close to its traditional counterpart. Adjusting the total and continuing on with a reduced overs match looks to be the best bet. Yet this creates a much more difficult question: how should the total be adjusted? Understandably, many cricket fans get more than a little anxious when calculators replace cricket bats. How do they know the adjusted target that magically appears is fair? Or at least doesn't disadvantage their team? With conventional methods the adjustment can considerably favour one team, and that's just not cricket! But don't despair. A recently proposed adjustment rule, from Michael Carter and the ISCR's Graeme Guthrie, promises to be fair all of the time.

Let's have a look at some of the options that have been suggested in the past, together with the new proposal.

First up is the 'average run rate' rule, which was in fashion when the New Zealand Cricket team still wore beige. For the second team to win it has to achieve a higher average run rate than the team who batted first. This means that, if rain reduces an innings by 20 percent, the target is also reduced by 20 percent. Unfortunately, as it's easier to maintain a high average run rate for a shorter number of overs, the interruption favours the team who bats second. In an attempt to overcome this unfairness, the 'most productive overs' rule was introduced for the 1992 World Cup. As the name suggests, this method uses the most productive overs of the team who batted first to calculate the revised target for the team batting second. Yet this strongly favours the team who batted first – as only its best overs contribute, whereas all of the second team's overs count towards its total. With some very biased targets and countless frustrated fans, the search was on for a fairer rule.

The Duckworth-Lewis (DL) rule was introduced in 1997 and has since become the most widely accepted rain rule. The DL rule works by reducing the target by the expected number of runs that would have been scored off the missing overs, using an extensive database of one-day cricket matches to calculate the adjustment. On average, a team would score more runs off these overs if they occur late in the innings or if the team has more wickets in hand, and the DL rule reflects this. Yet while the DL rule improves on the earlier adjustment rules, it makes no provision for the target to vary with the performance of the batting team prior to the interruption.

As a match evolves, the probability that the team batting second will win fluctuates. A sequence of high-scoring overs during its innings increases the probability of a win. On the other hand, if several wickets fall, a win becomes less likely. The Carter-Guthrie (CG) rule recognises this by adjusting the target score in such a way that the batting team has the same chance of winning immediately before and after the interruption.

Like the DL rule, the CG adjustment depends on when the interruption occurs and how many wickets the team has lost. Yet, unlike the DL rule, it also depends on exactly how many runs the team needed to score when play was interrupted. This ensures that a good start to an innings is not punished by an interruption. Similarly, an interruption does not allow the batting team to escape the consequences of a poor start.

So will the Carter-Guthrie adjustment rule replace Duckworth-Lewis? We will have to wait for the cricketing authorities to give their answer to one of the most often-asked questions in sport: HOWZAT!

For those interested, the full paper presenting the Carter-Guthrie rule, entitled "Cricket interruptus: fairness and incentive in interrupted cricket matches", is available from the ISCR website (www.iscr.org.nz).

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CHEQUES AND BALANCES in New Zealand and Italy

Over the last few years there's been an upsurge in interest in the role played by financial markets in spurring economic development. Although there is no clear way of identifying the separate effects of equity and loan capital markets on the level of investment and growth of an economy, studying particular markets is useful and we can learn much about the performance of New Zealand markets from comparisons with other countries. Giorgio Calcagnini compares the New Zealand and Italian banking markets.[1]

GUEST ARTICLE

Despite many differences between New Zealand and Italy, especially concerning the size of their economies, the two do share several characteristics with regard to their financial markets (see Table 1). Neither are noted for large equity markets relative to those of other economically developed countries, and both leave much of the funding of economic activity to the banking industry.

Table 1: Main Economic Indicators 2001

	New Zealand	*Italy*
Population (million)	3.85	57.63
GDP per capita (US$)	12,900	18,800
Number of companies listed	195	294
Equity market capitalisation to GDP (%)	35	49
Number of companies with shares listed per million persons	51	5
Loans/GDP	1.38	0.97
Deposits/GDP	1.13	0.72

Source: IMF. 2002. The WEO Database (www.imf.org).

The main explanation for the relative size of the equity and banking markets in New Zealand and Italy is likely to be the small size of businesses. In both countries, 99% of businesses have fewer than 50 workers. Moreover, the average business size as measured by the number of workers is 2.7 in both countries for the size group with fewer than 50 workers, and is 212.7 (New Zealand) and 227.2 (Italy) for the size group with more than 50 workers.

These statistics reveal three important facts. The first is that the predominance of small-sized firms challenges stockmarket opportunities to expand – particularly given the second fact, which is that larger companies may not find that the benefits exceed the costs of being listed. Finally, the type of corporate governance may affect which capital market a firm chooses. Among Italian manufacturing firms, for instance, the principal owner's share exceeds 50% in every size group; and the percentage rises to around 90% if we add up the shares of the principal three owners. Moreover, in small- and medium-size firms, 'other shareholders' share the control with the principal owner in what has been called a 'coalition control' (often family-based). It is then less likely that these companies would choose to go public, since this would involve a significant change of their ownership structure, control, and corporate governance. Indeed, this seems to also be the case in New Zealand where 'owners would consider a new equity investor if this did not affect their control of the business'.[2]

Greater efficiency?

Table 1 shows banking-industry indicators in the two countries. The New Zealand banking industry is larger than the Italian one when loans and deposits are expressed per unit of GDP. More interestingly, the New Zealand loan-deposit ratio is smaller than Italy's: this may mean that Italian banks are more efficient in transforming deposits into loans, and that they take on more risk than New Zealand banks.

There are more commercial banks in Italy than New Zealand, and the Italian banks have relatively many more branches. In general, the commercial banks predominate where they provide more sophisticated financial products and services. Competition is determined by regulation

Table 2: Indicators of National Banking Industries 2001

	New Zealand	*Italy*
Number of people per bank (commercial banks)[a]	227,000	185,000
Number of people per bank (all banks)[b]	41,000	69,000
Number of branches per 100,000 people (commercial banks)	21	37
Number of branches per 100,000 people (all banks)	26	51
Number of ATMs per 100,000 people	47	60
ATMs per branch	1.8	1.2
Number of Operations per ATM	108,703	16,363
Number of POSs per 100,000 people	2,401	1,299
Number of operations per POS	5,832	997
Number of credit cards per capita	0.66	0.35
Number of debit cards per capita	1.14	0.40
ATM transactions (average size, US$)[c]	73	82
POS transactions (average size, US$)[c]	33	47

a = registered banks for New Zealand; data for Italy include 60 branches of foreign banks
b = credit unions and building societies for New Zealand; co-operative and mutual banks for Italy
c = 1997.
Sources: various.

as well as numbers, and relatively larger numbers of these banks in Italy does not of itself imply more intense competition. New Zealand has more banks in total, per head of population, than Italy – but it has fewer commercial banks and fewer branches.

New Zealand banks more wired

The most remarkable difference between the two banking systems can be seen in the relative importance of traditional and advanced means of providing financial services.

In Italy the overall number of branches (per 100,000 people) is almost twice that in New Zealand, and is 76% larger when only commercial banks are taken into account. ATMs are also comparatively more numerous in Italy than in New Zealand – although New Zealand has 1.8 ATMs per branch, compared with only 1.2 ATMs per branch in Italy. Traditionally, Italian ATMs were installed at branch locations and only recently have banks started to place them in other locations such as supermarkets, hospitals and universities. The relative use of electronic banking is shown by New Zealand's number of operations per ATM being almost seven times larger than that of Italy (see Table 2). Another (indirect) indication that Italians use ATMs and POS terminals less intensively is the average size of transactions, which are larger in Italy than in New Zealand.

The lower number of ATMs per capita in New Zealand is more than compensated for by electronic point-of-sale (POS) terminals. In 2001 there were twice as many POSs in New Zealand as in Italy (per 100,000 people), while the number of operations per POS was almost six times larger in New Zealand than in Italy (see Table 2).

Despite the fact that the Italian banking industry has more major banks than New Zealand, the Italian interest rate spread (the difference between the lending and borrowing rate) is more than twice as large as New Zealand's (see Table 3). Spreads indicate profitability or risk: so the high Italian spread could indicate high profitability of Italian banks relative to those in New Zealand, and hence less intense competition in Italy. The spread might also be explained by a greater number of higher-risk loans in Italy. In fact, when measured as the share of bad loans over total loans, bank risk was ten times higher in Italy (4.70%) than in New Zealand (0.42%) in 2001. Bad loans tend to both cause and be caused by higher interest rates. So it is likely that the higher interest rate spread observed in Italy reflects *both* higher risk *and* lower intensity of banking competition: it is not possible to separate these factors.

In both countries, banks seem to price loans correctly. Indeed, the ratio of net interest income to total assets shows similar values, albeit lower ones in Italy (see Table 3).

Table 3: Profitability Indicators 2001

	New Zealand	*Italy*
Interest rate spread	1.87	4.00
Net interest income (% total assets)	2.05	1.93
Net profit before taxes (% total assets)	1.57	0.99
Net profit after taxes (% total assets)	1.15	0.60

Source: Denys Bruce. 2002. "Developments in the New Zealand banking industry". Reserve Bank of New Zealand Bulletin Vol. 65(2); Bank of Italy (www.bancaditalia.it).

Branches vs machines

Finally, the return on assets (before and after taxes) is significantly lower for Italian banks than New Zealand banks. This result mainly reflects differences in operating costs which, in the case of the Italian banks, can be easily related to unit labour costs (Italy has the highest of the European Economic Union countries) and to the banks' organisation (the high number of branches).

The differences observed in the New Zealand and Italian banking industries support the interpretation that Italian banks still provide services through more traditional distribution channels, while the development of electronic money is delayed by relatively high costs both for POSs and their customers. The expansion of the number of bank branches during the last fifteen years is a clear signal that local markets are segmented despite some de-regulation and they offer Italian banks profit opportunities.

Italian banks seem to be less efficient than New Zealand banks. Both show quite similar net interest incomes (over total assets); but the Italian banks have a lower return on assets, and a wider interest rate spread that could be explained by more risk or less intense competition.

Trends observed for other European countries suggest that Italy may well be over-branched, but what about New Zealand? New Zealand has a lower number of branches than other countries either of the same size or at a similar level of economic development (such as Europe and the US). Given the growing e-commerce distribution channels for financial services, our interpretation is that New Zealand has reached an 'optimal' or efficient level of bank branch numbers.

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1 An extensive analysis of the Italian banking industry is provided by Giorgio Calcagnini and Donald D Hester. 2002. *Banking Changes in the European Monetary Union: An Italian Perspective.* Carocci. Roma.

2 Robert T Hamilton and Mark A. Fox. 1998. "The financing preferences of small firm owners". International Journal of Entrepreneurial Behaviour & Research 4(3) pp239-248. Quote is from p244.

LEGAL CERTAINTY **AT A COST**

Until recently it was possible for a foreign bank to operate in New Zealand through a branch of the parent bank rather than through an entity incorporated in New Zealand. The Reserve Bank has now removed this option for foreign banks operating in New Zealand. If a bank has more than $200 million of retail deposits or $10 billion of wholesale deposits in New Zealand, it must incorporate in New Zealand. Neil Quigley questions this move to mandatory local incorporation.[1]

The Reserve Bank has provided a variety of reasons for its change in policy, including:

- legal uncertainty about the assets that would be available to pay New Zealand depositors of a branch of an international bank
- the inadequacies of branch-based disclosure of the financial position of international banks
- the potential disadvantage for New Zealand depositors arising from the combination of uncertainty about the domicile of assets and the depositor-protection provisions of Australia's Banking Act (Section 13A of this Act provides that in the event of the insolvency of an Australian bank the assets are to be allocated to meet the claims of depositors in Australia in priority to all other liabilities)
- the risk that, in the event of a banking crisis, Australian directors will shift assets to Australia even if this is in breach of their legal obligations in New Zealand
- the greater force of criminal and civil liability for such breaches on independent New Zealand directors of a locally incorporated bank.

Regulatory solutions always come at a cost, and mandatory local incorporation is no exception. Some of the costs are unique to the banking sector, but those relating to governance and management structures would be equally important for any non-bank corporation considering the choice between branch and subsidiary for their New Zealand operations.

Local incorporation would provide greater protection to New Zealand depositors in the scenario where an Australian bank fails but the assets of the New Zealand operation are sufficient to cover local deposit liabilities. Conversely, in the scenario where the New Zealand operation fails but the bank as a whole remains solvent, local incorporation makes New Zealand depositors worse off. The bank may decide to allow its New Zealand operation to fail, or it may be precluded by regulatory constraints on its global balance sheet from recapitalising the local bank from its own resources. This second scenario is of particular importance, because the principal bank failures in New Zealand's history have resulted from losses sustained in investment in New Zealand.

IMAGE SERVICES

Systemic stability or depositor protection?

The Reserve Bank has emphasised that its concerns about foreign branches are motivated by a desire to reduce systemic instability in the banking system. But countries such as the US, Australia, and Canada require local incorporation as a means of depositor protection (often to bring the deposits within the scope of the local deposit-insurance scheme). If local incorporation is a depositor-protection policy, and if it is based on the notion that depositors cannot assess the risk of placing deposits with the local branches of Australian banks, then it marks a departure from the Reserve Bank's stated focus on disclosure and depositor monitoring as the primary basis for prudential regulation.

More consistent with the current policy regime would be a requirement that branch banks in New Zealand explicitly inform potential depositors that they are not incorporated in New Zealand. This information would enable banks and their customers to weigh up the costs and benefits of local incorporation.

Governance issues

Local incorporation requires that an international bank create a local board for its wholly owned New Zealand subsidiary. Since the directors who serve on such a board cannot own shares in the New Zealand subsidiary, they will have much in common with directors of organisations such as state-owned enterprises (who have liability for the accuracy of the reports they sign but no personal wealth directly at stake in the performance of the organisation). Liability has significant incentive effects, but it is diluted by the uncertainty associated with the outcomes of legal processes and is thus not a substitute for having personal wealth at stake in the performance of the New Zealand entity they oversee.

The literature on corporate governance assumes that managers and directors are agents of the shareholders, and that the fundamental problem of corporate governance is the need to align the incentives of these different groups. The

Reserve Bank's local-incorporation policy has the effect of giving local managers and independent directors greater control of the New Zealand operations at the expense of the owner of the company (the international bank). The practical impact of local incorporation is therefore to drive a substantial wedge between the ownership and the control of the New Zealand subsidiary. This will have the effect of magnifying principal-agent problems where the interests of a company's management and owners diverge. The ongoing welfare losses (including increased systemic risk) associated with the enhancement of the separation of ownership and control across all aspects of the bank's operations may well be significant.

In the case of the requirements imposed on the local board in New Zealand, however, the distortion to the private model of governance goes much further. The requirements placed on directors of banks operating in New Zealand mean that in this capacity at least the directors owe a primary duty to the Reserve Bank and to the creditors of the bank rather than the owners of the bank. The directors of the bank incorporated in New Zealand are therefore best viewed as 'whistle-blowers' injected into the governance structure of the bank by the regulator.

The practical effect of a governance structure of this type is to provide that directors have two principals, the regulator and the shareholder. The dual allegiance of these directors is likely to result in a material reduction in the efficiency of decision-making and governance within the organisation. (This is without taking into account any performance losses associated with the creation of an unnecessary addition to the governance structure.)

Where local management disagrees with policies set down by the shareholder, they may attempt to enlist the support of the local directors in repudiating these policies. Where these local directors also have a quasi-official role, through recognition by (or reports to) the financial-sector regulator, then the scope for these challenges to policy from the head office of the bank may be extended. Ultimately, the ability of management to enlist local directors in support of their views is likely to lead to ineffective governance structures.

Accountability of directors

In practice, the accountability benefits of local incorporation are minimal. The Board of Directors of each Australian bank currently have liability in respect of their disclosure statement to the Reserve Bank and the conduct of the bank's business in New Zealand in a manner consistent with local regulations. The fact that they are resident in Australia is unlikely to diminish the focus of responsible directors on the liability that they might face in New Zealand. No major Australian bank would accept a situation in which its directors faced criminal charges in New Zealand.

> "REGULATORY SOLUTIONS TO LEGAL UNCERTAINTY ARE FAVOURED BY BANK REGULATORS AND POLITICIANS WHO WILL BE THE FOCUS OF SCRUTINY IN THE EVENT OF BANK FAILURE."

Directors of locally incorporated banks may reallocate resources in response to the incentives provided by regulation. Exposure to liability will no doubt cause local directors and management to allocate resources to tasks, systems, and reporting requirements that will minimise their personal risk of liability in the event of insolvency. But simply meeting directors' liability does not of itself imply any impact on the actual quality of internal controls or on the probability of insolvency.

The information-technology revolution in banking has provided vast scope for specialisation of functions and economies of scale in management. The very small scale of the New Zealand market makes it highly inefficient to segregate Australian and New Zealand operations in a range of areas. As a result, all the Australian banks have reduced the range of management and 'back-office' functions undertaken in New Zealand by introducing common systems in both Australia and New Zealand and transferring management responsibility for those systems to Australia. The high level of competition in the New Zealand banking market provides the discipline that ensures these efficiency benefits are passed on to New Zealand consumers.

The fact that two Australian banks were considering moving their New Zealand operations to a branch basis is strong a priori evidence that substantial costs can be avoided through operating within a branch structure given the current organisation of banking operations in New Zealand.

If in the future the impact of mandatory local incorporation is amplified by the addition of minimum requirements for any operational separation that may be established, then the costs of the policy would be much higher. Perhaps more importantly, requiring New Zealand directors to sign statements in respect of matters that are (on grounds of efficiency) best decided, and as a practical matter necessarily decided, in Sydney or Melbourne will primarily have the effect of reducing the quality of the independent local directors that the banks are able to get to sign the attestations.

Regulatory solutions to legal uncertainty are favoured by bank regulators and politicians who will be the focus of scrutiny in the event of bank failure. It is, however, often unclear whether the impact of the policy change on the productive and dynamic efficiency of the regulated industry are given sufficient weight in assessing the costs and benefits of these policy changes. In the case of mandatory local incorporation the costs appear to be substantial.

1 A fuller version of this paper is available at iscr.org.nz (go to: research/latest papers).

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COURTING THE ENVIRONMENT

The Resource Management Act 1991 dramatically altered environmental management in New Zealand. For the first time, legislation provided a framework for decentralised decisionmaking about the environment and resource use, with the Environment Court being an integral part of this framework. Richard Hawke from Victoria University's Earth Sciences is examining the use of Environment Court proceedings as an instrument of competition. In this, the first of two articles, he outlines the importance of the framework.

The framework for allocating society's scarce resources is set by its various institutional arrangements. The range of possible mechanisms for allocating resources among individuals and groups extends from markets to government and from private altruism to anarchy. There is no doubt that system 'failure' can occur in any system, and that no system can yield a perfect outcome (even if this were known). So there is no a priori reason to assume one system is unambiguously better than another. Rather, a system is best judged by the outcomes it produces and by how it affects transactions (including what incentives it creates).

In most systems, markets and government are complements; and government provides, at a minimum, the legal arrangements for property rights and contract enforcement. Under the Resource Management Act (RMA), the government has devolved resource management and stewardship to a combination of legal, individual and group processes.

The framework created by the RMA emphasises decentralised decisionmaking. Decentralised decisionmaking allows local balancing of the preferences and information needs of decisionmakers (individuals, groups and courts) to achieve outcomes for the economy as a whole that are at least as desirable as centralised control. Although there will be variations across jurisdictions, this structure does provide a systematic framework within which to manage the environment. It avoids the problems associated with centralised decisionmaking – for example, a nationwide 'consensus' which not does not fit the preferences of any sub-group of people within the economy and which imposes a single view of the trade-offs (as happened with the passing of the purpose-specific National Development Act 1979).

Clarifying property rights

Property rights are a key component for the operation of markets, governments, and environmental management. A property right is an enforceable claim to particular uses that the state will agree to protect through the assignment of duty to others. Hence, the property right is not an object but a social relation; and it defines the property holder with respect to something of value (the right to make decisions about the object of the property right). When these property rights are insecure or ill-defined, the result is often a reduced incentive for stewardship and investment – and resource overuse.

Therefore to assign or allocate rights is also to assign or allocate some powers over aspects of resource use. This, of course, requires an authority system that enables defence of a rightholder's interest. Hence the importance of Environment Court decisions.

How the RMA affects property rights

The essence of the RMA is to define a rights structure that gives protection to particular uses of certain environmental resources. These rights then pose constraints and provide incentives within which resource users must make choices about resource use. The aggregated result of all these decisions and choices will be a series of outputs, one of which is 'environmental quality'.

The RMA sets out the processes for developing principles of entitlement. It is quite different from a system of landuse zoning, whereby inputs and processes are regulated directly. The RMA's influence in defining property rights affects the allocation of costs and benefits, and influences the decisionmaking processes. To be a successful allocation mechanism, the Act relies on generating information about the costs and benefits of alternative resource uses and motivating people to use this information. Indeed, this is one of the principal reasons why local authorities produce policy and planning documents. But do court decisions inform in an efficient way? If court processes are beset with high transaction costs (informational, bargaining, and enforcement

costs), they will impart uncertainty about property rights – and this will adversely affect investment and stewardship.

Under the RMA there is a mixture of planning and individual actions. The framework provides standards of performance which have been collectively (politically) determined, and also allows mechanisms for implementation which reward individual initiative, stewardship, experimentation, and efficiency. For example, once the property rights of the participants have been identified (through a planning process) the owners can then negotiate and be sure of the limits of stewardship. In many cases this happens directly: for example, an applicant under the RMA has to show that their proposed action will not impinge on the affected party's property rights.

The processes of the RMA have the fallibilities of any human institution. Some people cannot reasonably exercise their rights (perhaps because of high participation costs), and so others do it for them: in most cases this is one of the roles of territorial local authorities and regional councils. However, these bodies are political institutions whose members have their own particular objectives. Furthermore, any assessment of the 'public interest' which might represent the wider public is fraught with difficulty and open to interpretation. The RMA seeks to address some of these concerns by having open processes of decisionmaking.

Understanding the trade-offs

The decision to use, not to use, and how much to use all involve trade-offs (including trade-offs of a resource's environmental qualities). So it is fundamentally important to understand what is involved in these trade-offs. It is commonly held that it is not possible to do this without some idea of the 'economic value of environmental assets': for example, 'economic (monetary) valuation of non-market environmental assets may be more or less imperfect given the particular asset together with its environmental and valuation contexts; but, invariably, some valuation explicitly laid out for scrutiny by policy-makers and the public, is better than none, because none can mean some implicit valuation shrouded from public scrutiny'.[1] Some argue that using monetary values reduces the complexity to an extent that renders the information neither necessary nor sufficient for coherent and consistent decisionmaking. Others argue that the measurement of costs and benefits are important to obtain, if only to balance against subjectively assessed intangible costs and benefits.

Cost-benefit analysis is the classic technique for assessing decisions by firms and people and, despite some criticisms, it is still commonly applied in environmental economics.[2] Indeed, Section 32 of the RMA requires cost-benefit analysis before a council adopts objectives, policies, or roles – but it is not limited to monetary terms.[3]

Even if monetary valuation is used, there is still the issue of time[4] and other philosophical issues. For example, what exactly do we owe those who will come after us? And are they not adequately represented now in the cost-benefit analysis – for example, by taking account of all age groups and their differing views? Or are they not already well represented more generally in the RMA decisionmaking process?

It is now recognised that the question has become not whether a cost-benefit analysis should be done, but rather what should be included in the analysis and how. As such, cost-benefit analyses are viewed as a pragmatic instrument to ensure that limited resources will be devoted to areas where they will do the most good.[5] Thus it can be argued that cost-benefit analysis seeks to produce an outcome similar to that of a court decision.

Measuring uncertainty

Environmental qualities are subject to considerable uncertainty in assessment and in the way they change over time. Many of them are intangible in nature and not routinely exchanged in markets – for example, air quality. Such uncertainties, however, are not inherently different from the problems of measuring the qualities of other goods and services. Perhaps it is the potential for irreversibility that sets environmental qualities – including biodiversity – apart. There is no doubt that irreversibility affects cost-benefit calculations considerably. However, conceptually it too is amenable to techniques that are now routinely applied. These techniques embody options that in uncertain worlds provide insights into how to evaluate decisions that are risky and costly to reverse.[6]

In making a decision there may be sunk costs or sunk benefits. For example, if environmental damage can be partially or totally reversed then society may benefit from acting now and not waiting to re-consider the issue at some date in the future. Policy adoption is rarely a now-or-never proposition; it is almost always possible to delay and wait for new information. By including irreversibility, the decision shifts from being an immediate 'yes/no' to being 'maybe, but when and how'. So rather than irreversibility being a reason not to apply economic analysis to environmental decisions, it becomes a reason to do so.

The Environment Court

The Environment Court plays a pivotal role in the framework for establishing property rights (such as appeals relating to plans) and impingements on those rights (such as appeals relating to individual resource consents). It explicitly adjudicates between competing uses of resources, using relevant qualitative and quantitative information to do so. The success with which it functions depends upon the credibility of the institution itself; this, in turn, depends on it being a necessary part of the enforcement-decision-making framework.

Credibility requires that the court has a unique and essential function. Credibility encourages, even requires, parties before the court to take the process seriously, to invest at a high level in relevant information, and to reveal information that is necessary for wise resource-management decisions. If the court was bypassed for any reason, then its status, the attendant incentives, and the performance of the RMA would suffer.

T*his is the first of two articles. The results of the ISCR's research into the use of Environment Court proceedings will be discussed in a forthcoming issue of* Competition and Regulation Times.

1 R Turner, D Pearce and I Bateman. 1994. *Environmental economics: an elementary introduction.* Harvester Wheatsheaf, London. Quote is from p109.

2 G Heal. 1997. *Valuing our future: cost-benefit analysis and sustainability.* United Nations Development Programme Office of Development Studies discussion paper series, 13.

3 Port Otago Ltd v Dunedin C.C. C004/02 7 NZED 254.

4 Time is too complex to be dealt with in passing here. See J Krautkraemer.and R Batina. 1999. "On sustainability and intergenerational transfers with a renewable resource". *Land economics* 75(2) pp167-184.

5 C Sunstein. 2000. *Cost-benefit default principles.* AEI-Brookings Joint Center for Regulatory Studies working paper 00-7.

6 A Dixit and R Pindyck. 1994. *Investment under uncertainty.* Princeton University Press, Princeton, New Jersey.

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CAN'T SEE THE **TREES** FOR **THE FOREST**?

With climate change and the Kyoto Protocol being issues of such global importance, it is easy to lose sight of the fact that Kyoto's success will depend on the decisions made by individuals. Dinesh Kumareswaran investigates how the protocol will affect individual forest owners.

Donald Owen, www.forestryimages.org

On 10 December 2002, the government signed an instrument of ratification for the Kyoto Protocol, cementing New Zealand's involvement in the international agreement aimed at arresting harmful effects of global climate change. The protocol identifies forests as carbon sinks (reservoirs that absorb and temporarily store carbon) and includes provisions for forestry projects to receive credit for sequestering carbon dioxide (a greenhouse gas identified as contributing to climate change). It is proposed that parties to the protocol receive tradable 'carbon credits', which reflect the carbon-sink activities in that country, and that governments be free to distribute these credits to their countries' forest owners. Growers may sell their credits in an international emissions-trading market, giving a market incentive to plant new forests that will (it is hoped) mitigate the effects of climate change.

As a signatory to the protocol and a nation heavily dependent on forestry (forestry alone earned New Zealand $2.8 billion in export receipts in 1999), New Zealand may be significantly affected. We have a comparative advantage over most countries in the production of *Pinus radiata* – the dominant species grown commercially here and recognised internationally as a superior softwood – and so some argue that the protocol places New Zealand growers in an enviously advantageous position. However, carbon credits may alter the behaviour of forest owners in ways that are not immediately obvious.

While in principle the idea of rewarding carbon-sink activities has been approved by the parties, and a number of nations have already ratified, there are still many issues that need addressing before the commencement of the first commitment period in 2008. A contentious issue has been the choice of carbon-accounting regime – the method used to account for carbon sequestration in order to issue credits. Three main accounting methods have been discussed internationally.

What type of regime?

In one scheme, carbon-credit payments are determined by the incremental change in the forest carbon stock, and so reflect the dynamics of carbon flows from the atmosphere on to land via the sequestration process. An example is the annual **crediting regime**, where the credits issued are based on the annual change in the forest carbon stock. Hence, when the forest is harvested and there is a sharp fall in the total carbon stock, the credit payment will be negative. This corresponds to a repayment of credits (a 'Kyoto obligation') by the owner.

In another scheme, credit allocations are determined by the total carbon stock on the land at any point in time. An example is the **tonne-year crediting** regime, which recognises that temporary emission-removal projects (such as the planting of new forests) do not have the same long-term effect on mitigating climate change as permanent reductions of emissions do. Therefore it rewards forest owners on an annual basis not only for the amount of carbon sequestered, but also the length of time that carbon is held out of the atmosphere. It is convenient to think of credits under this regime as rent payments to forest owners for storing atmospheric carbon. Owners receive this rent as long as carbon remains locked in the form of living forest biomass; but once the trees are harvested the forest ceases to store carbon and therefore simply stops attracting this rent. Hence there are no 'Kyoto obligations' under this regime.

A third and simpler scheme awards growers a one-off **lump-sum payment** for planting on previously unforested land. Prior to planting, the carbon density of the clear land is minimal; but

once forested (and provided no clear-felling occurs), the carbon density of the land rises to some long-run average level. The lump-sum payment reflects this one-off change. The owner may retain the credits as long as the land is not permanently deforested. If deforestation occurs, the lump-sum amount must be paid back. Credit payments under this regime can be thought of as an interest-free loan to the forest owner as long as trees remain in the ground.

The 'price' of incentives

So, what is the effect of issuing carbon credits to forest owners? Should growers change their harvest policies? The answer depends crucially on the carbon-credit regime adopted, and also on profitability – not only on the profit arising from the current rotation, but also the expected profit from all future rotations. The forest owner must decide when to harvest the forest (in New Zealand most commercial plantations of *radiata* carry rotation lengths of 25 to 30 years) and whether to replant the bare harvested land or convert it to an alternative use.

The first decision is irreversible – the trees cannot be put back in the ground once they have been harvested. The second decision is reversible, but at some cost. Suppose the owner abandons the forestry project and then decides this was a bad decision: in this case, the land must be converted back to forestry and significant costs most likely will have to be sunk in the conversion process. Suppose, instead, that the owner replants and later regrets doing so: planting and maintenance costs will have been incurred unnecessarily. Hence, there is a strong incentive to get it right the first time.

Irreversibility matters greatly when there is much uncertainty – in this case uncertainty about future movements in log prices. Sometimes it is desirable to await new information about the future before making a decision about harvesting. If prices are low today, the owners may want to delay harvest to see if the situation improves. If they harvest now, they may be sacrificing a favourable price in the future. Conversely, if prices are doing unusually well today and harvest is planned for later, the owners may want to harvest early to take advantage of high prices.

In addition, it may be worthwhile deferring harvest to gain more information before making the replanting/abandonment decision. If log prices move favourably, it is worth harvesting now with the intention of replanting to maximise returns. If prices move lower the owner may also choose to harvest now, but then immediately abandon the project to cut future losses. If prices are somewhere in between, there is real value in waiting to see how prices move: this will avoid a poor replanting/abandonment decision that is costly to reverse.

If the **lump-sum payment** is sufficiently high, the owner is practically certain to replant (the large 'Kyoto obligation' makes exiting the project costly). So there is little value in waiting to see how prices change. The larger the carbon-credit payment, the more certainty the owner has about replanting and the smaller the need to delay harvest. In fact, in all three regimes considered, the likelihood of abandonment declines as the size of the credit payments increases.

The results are different under the **annual crediting** and **tonne-year crediting** regimes. In contrast with the lump-sum payment, these two regimes give the owner a steady stream of carbon-credit revenues throughout the life of the forest. The credit revenues are small at the beginning of the rotation and grow through time as the total carbon stock (and the incremental change in the carbon stock) grows. Thus, when the forest is harvested, high carbon-credit cashflows at the end of the current rotation are succeeded by small cashflows at the start of the next rotation. When the value of these payments is sufficiently large, forest owners will become reluctant to replace large cashflows with small ones and so will delay harvest even though replanting becomes more certain. Therefore the larger the payments, the later the optimal harvest date.

The introduction of carbon credits leads to harvests that are not optimal from the perspective of the value of wood alone. The value of the forest derives from wood and carbon credits. Any carbon-credit regime generates cashflows for the forest owner, but it also distorts harvest decisions. Thus, while the value of the forest enterprise rises as the size of carbon-credit payments increase, the wood component of the forest's value falls. Of course, a lump-sum regime will deter forest owners from switching to alternative land uses and any regime will encourage planting of new forests, so the effect on aggregate forest values is ambiguous. However, one thing isn't ambiguous – implementing Kyoto will profoundly affect all aspects of New Zealand's forestry industry.

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Kiwi Share exemplifies the stranded-asset issue: it is very real for the regulator (the Commission), the incumbent Telecom, and all telecommunications firms in the industry. Should the possibility of stranded assets be reflected in the return allowed to the provider of subsidised services (Telecom)? Or can the regulator guarantee a lower return now and ensure that Telecom will be compensated for stranded assets as a way of achieving the reasonable rate of return that the NZ Telecommunications Act provides?

On balance, there seems to be no place for the current form of the Kiwi Share today.

1 Import and foreign exchange restrictions were part of a policy regime designed to manage a fixed and over-valued exchange rate.

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Best Practice Broadband for Business

It's happening here in New Zealand, writes Bronwyn Howell

Infrastructure competition between differing technology platforms, owned by legally and financially distinct entities, is the best way to develop broadband access for business use, concludes a new report recently released by the OECD.[1] ISCR research[2] shows that New Zealand continues to be at the forefront of the OECD in the development of a competitive broadband market based upon this best practice model espoused now by the OECD.

Currently, broadband services are provided via five technology platforms in New Zealand. CityLink became one of the world's first commercial broadband providers when it began its Ethernet LAN service in Wellington in 1996, and was joined in 1998 by satellite provider Ihug with its nationwide service. Telecom became the third broadband provider in New Zealand when it began offering DSL products in 1999 and, in doing so, it made New Zealand the third (after Canada and the US) of the thirty OECD countries to have a telephony-based broadband product commercially available. Since then, competition has been augmented by Saturn's (now TelstraClear's) cable modem service in Wellington and Christchurch, and by Walker Wireless's service in Auckland, Wellington and eight other provincial business centres (with nine more centres planned to be operational in the near future).

While telephony-based broadband providers appear to have a market share in excess of 80%,[3] non-telephony products such as satellite, wireless and Ethernet LANs are an important part of the business broadband marketplace because "the initial market for … these technologies tends to be business users".[4]

Competition stimulates uptake

There is considerable evidence from ISCR's research to indicate that early and significant competition between technology platforms has led to high levels of uptake of broadband by New Zealand businesses. Nearly all of CityLink's connections are provided to business clients in the

Wellington CBD; and over 50% of New Zealand's DSL connections are owned by business users, compared with 30% in the United Kingdom, 20% in the United States, and 5% in France.[5]

Moreover, New Zealand's DSL uptake among small and medium businesses is extensive, by OECD standards. The report states that small and medium businesses (SMEs), defined to be those which employ between 10 and 500 employees, are the businesses most likely to benefit from the use of DSL connections. At the end of 2001 Statistics New Zealand identified 22,000 significant New Zealand businesses with 10-49 employees, 2000 with 50-99 employees and 1300 with 100 or more employees; and ISCR research indicates an estimated 15,000 business DSL and DSL-like internet connections existed at this time. If the majority of these connections were sold to SMEs (10 to 500 employees), then the New Zealand broadband diffusion rate is likely to be around 60% for these businesses.

Telecom customer data confirms this extensive New Zealand level of diffusion, with nearly 60% of its 'medium size' business customers (10 to 100 employees) and 65% of 'corporate' customers (100-plus employees) subscribing to DSL. In addition, nearly 10% of its 'micro' businesses (fewer than 10 employees) purchase the service. This compares with a total broadband SME diffusion rate of 20% in Norway, 5% in the United Kingdom, and an OECD-wide situation where 'use of new broadband technologies, such as DSL, is still not very common among businesses' as the majority still connect to the Internet via dial-up technologies.

Our competitive edge

Competing broadband technology platforms have played a significant role in promoting the growth of broadband technology use amongst New Zealand businesses. Whilst non-telephony platforms may not by themselves have a large market share, their presence in the marketplace has provided both stimulus for telecommunications providers to introduce their own products in a timely manner, and competitive pressure on the prices that telecommunications companies can charge. Clearly, the winners have been New Zealand businesses, which are benefiting from fast and convenient information exchange considerably in advance of many of their OECD counterparts. And, as it is business use of this information that adds value to the products and services that these businesses make and sell, the New Zealand economy stands to gain proportionately more from the use of broadband than do the economies of lower-using countries.

Bronwyn Howell is a Research Principal with ISCR and is completing her PhD.

1. OECD Working Party on Telecommunications and Information Services Policies. 4 December 2002. Broadband Access for Business. OECD Directorate for Science Technology and Industry Paper DSTI/ICCP/TISP(2003)/Final (http://www.oecd.org).
2. ISCR's portfolio of research on the internet, electronic commerce, and broadband technologies is available on the ISCR website (http://www.iscr.org.nz).
3. Phoenix Research, quarter 1 of 2002/03 financial year.
4. OECD p15. 5. ISCR p28. 6. OECD p26.