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BREAKING the BANK

Since the recent economic downturn, many New Zealanders who've sought to refinance their mortgage or sell their house have been unpleasantly surprised to find that breaking the fixed term of the mortgage loan could cost them tens of thousands of dollars. But, while refinancing's become a gamble, it may sometimes be possible to beat the bank – or at least break even. Toby Daglish and Nimesh Patel investigate.

Most residential mortgage borrowers are risk-averse individuals who seek certainty regarding their regular financial outgoings. 'Fixed' interest rate terms have become popular because they insulate borrowers against higher repayments when interest rates rise; but when interest rates fall, these same borrowers face strong incentives to break the fixed term in order to take advantage of the lower interest rates. However, when a borrower breaks the fixed term of a mortgage, the lender (typically a bank) charges the borrower a 'break fee' which compensates the bank for the income lost when the original agreement doesn't run its full term. And while a longer fixed term gives the customer more certainty over the size of their mortgage payments, it also gives the possibility of much higher fees if they break their contract.

A bank raises the funds it uses for loans by issuing relatively short maturity debt. This is either in the form of bank deposits from its customers, or the issuing of bank bills. As a result, a bank's debt costs vary with the prevailing interest rates (that is, they 'float'). On the other side of the ledger, the bank's revenues come from interest charged to borrowers. These can either 'float' with the prevailing rates or be 'fixed' for longer periods. When a customer enters into a fixed-rate loan, there's a mismatch between the bank's financing costs (which float) and its revenue stream (which is fixed).

The bank is therefore exposed to interest-rate risk: a rise in rates would mean it has to pay a higher rate than the rate it receives. To avoid this risk, banks typically enter into a fixed-floating swap in the wholesale market, agreeing to make a stream of fixed-rate payments in return for a stream of floating-rate payments. With this swap in place, the bank uses the customer's fixed payment to cover its obligation under the swap.

When a customer breaks their fixed term, the bank can respond in one of two ways. The appropriate response when the bank has many customers seeking loans is to make a new loan using the 'repaid' principal and use the fixed payments of this new loan to service its swap payments. If interest rates are rising, the new rate will be higher than that of the original loan – and so the bank makes a gain (which it keeps). However, if retail interest rates have fallen since the start of the fixed term, the new loan will be at a lower rate than the original loan and hence the bank will make a loss.

The second possible response, which is particularly appropriate when the bank is reducing its new lending, is to 'close out' the swap. If wholesale interest rates have risen since the start of the fixed term, the bank profits since it will be receiving a larger floating payment than the fixed payment currently made. In contrast, a fall in wholesale rates means that the bank must pay the counterparty in the swap in order to close it out.

Both actions lead to a loss to banks if interest rates have fallen since the start of the customer's fixed term. The result is a break fee charged to the

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customer. However, banks in New Zealand use different methods to calculate their break fees. BNZ and National Bank base the calculation on a new loan being made. ANZ, Westpac and Kiwibank choose to calculate the break fee under the assumption that the swap is closed out.

The loss to the bank under the first method is based on the difference in fixed payments between the original loan and the new one. This difference is based on retail interest rates and hence this method is called the 'retail methodology'. The second method is called the 'wholesale methodology' since the loss in this calculation depends on the change in swap value, which is determined by wholesale interest rates.

Up, down ... and whooosh

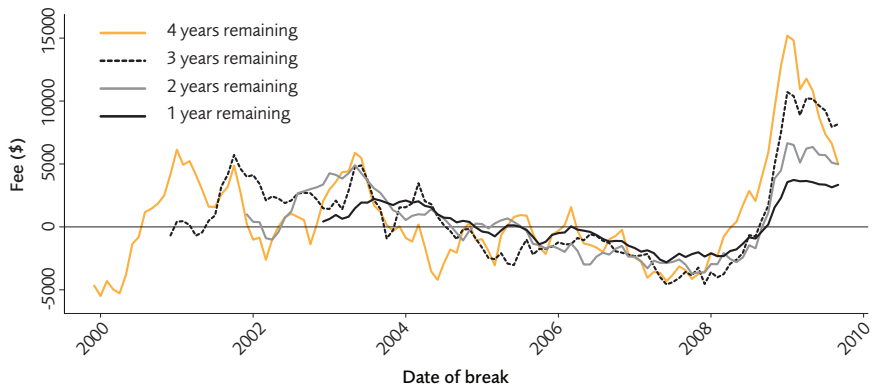
The Reserve Bank uses the Overnight Cash Rate (OCR) to influence economic activity. When this rate is adjusted, interest rates throughout the whole economy are affected and this flows through to break fees. So the large swings in interest rates over the last decade have resulted in significant movement in break fees.

During the first half of the decade, high interest rate volatility corresponding to OCR movement led to volatile movement in break fees. In contrast, interest rates steadily increased after 2004 through to the end of 2007 on the back of a booming property market. However, once the global financial crisis struck, the OCR and wholesale interest rates plummeted from their decade high at the end of 2007 to their decade low at the end of 2008.

This interest rate movement directly influenced break fees. Figure 1 shows the wholesale-methodology break fee for a customer who has different amounts of time remaining on a five-year fixed term, and where the amount being repaid is $100,000. The large short-term movement in interest rates over the first half of the decade created scenarios where the interest rate had changed significantly between the start of a fixed term and a break date. The result was numerous peaks and dips in the level of break fees. The second half of the decade saw steady increases in interest rates and hence very few occasions where a break fee would have been charged. This all changed once the global financial crisis prompted large drops in the OCR. The huge sudden fall in rates meant a massive increase in break fees. At around the beginning of 2009 the wholesale-methodology break fee for a customer with a five-year term that had four years left to run would have been around 15% of the amount being repaid. The retail-methodology break fee would have been around 8%. The wholesale-methodology fee was much higher because wholesale interest rates fell by a larger magnitude than retail interest rates during 2008, owing to a rise in credit spreads.

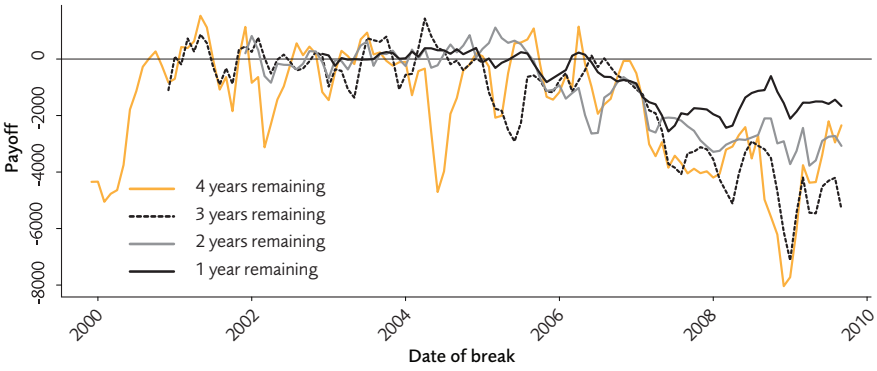
In addition to interest-rate differentials, there are two other main factors in determining the size of a break fee. The first is the amount being repaid (because this directly affects how much the bank could potentially lose). The second is the number of payments remaining as at the break date. When rates are dropping and a customer breaks early in their fixed term, the bank will miss out on many more high-interest payments than they would if the customer had been towards the end of their fixed term. Thus the bank loses more – and so the break fee is larger. This also explains why the break fee for a loan with four years remaining is more extreme than the break fees where there are fewer years remaining.

Figure 1: Wholesale-methodology break fees (5-year fixed term; $100,000 being repaid)



Source: Retail interest rates from RBNZ; wholesale swap rates from Datastream.

Figure 2: Payoff to customers of banks using wholesale-methodology break fees (5-year fixed term; $100,000 being repaid)



Note: Payoff = gain from breaking minus cost of breaking.
Source: Retail interest rates from RBNZ; wholesale swap rates from Datastream.

Who can break the bank?

Figure 1 also shows that – when interest rates fell during 2008 – customers whose banks used a wholesale-methodology break fee encountered a huge fee increase. Yet the wholesale methodology does present an opportunity for profitable breaking.

If a bank, in response to a customer breaking the contract during a fall in rates, chooses to keep the swap in place, then the

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customer's profit will be exactly equal to the bank's loss. So a customer whose bank uses the retail methodology will find their profit exactly offset by the break fee. This is not the case for a customer whose bank uses the wholesale methodology – because the wholesale-methodology calculation need not equal the customer's gain. This is where the possibility of profitable breaking arises.

Figure 2 indicates that the last decade has offered very few opportunities for customers to break profitably. It shows a customer's payoff from breaking when a bank uses the wholesale methodology. The payoff is calculated by subtracting the wholesale-methodology fee (or zero if no fee is required) from the retail-methodology fee.

Rising interest rates through 2004 to 2007 rendered breaking pointless, since switching to a higher rate would mean higher interest payments. Once interest rates started falling, breaking was still not optimal since wholesale rates fell more than retail rates – which means that the cost from breaking (the wholesale-methodology fee) exceeded the gain from breaking (the retail-methodology fee). The medium term, however, may present profitable opportunities for breaking because we may see credit spreads fall from their current high levels. If the decline in spreads exceeds wholesale rate rises, a household may be able to refinance into a lower rate without paying any fee.

But it's not Monte Carlo

Although break fees over the recent past have been quite high, it should be remembered that these fees are a fair measure of the bank's loss when a fixed-term loan contract is broken. Not allowing banks to charge such a fee would be likely to result in a surge in breaks every time interest rates fell – and banks would have to bear the full cost of these. Without the existence of break fees, banks in New Zealand would be the big losers when interest rates fall and customers refinance their loans. 'Disallowing' break fees would result in higher lending rates overall – as banks would factor in the added risk of future breaks when initially making loans – and hence would increase the financial burden on households.

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Regulatory Restrictions DOWN ON THE FARM

Intense public concern over the nationality of potential purchasers of the 22 North Island dairy farms being offered for sale by the Crafar family's receivers has placed the Overseas Investment Act 2005 at centre stage. Dave Heatley and Bronwyn Howell observe, however, that farm ownership restrictions are not new to New Zealand.

Recent ISCR research[1] finds that whilst New Zealand's Overseas Investment Act 2005 (OIA 2005) has many similarities to foreign investment controls implemented by other countries, it stands out for its very strong focus upon controls over who may own land or shares in businesses that have an ownership interest in land. Yet many of the obligations that foreign farm-purchasers must meet in order for a sale to be approved derive from historic restrictions on farm ownership that apply to all potential owners regardless of nationality, and that date from as long ago as 1877.

The OIA 2005, administered by the government department Land Information, sets out the screening mechanisms required for approval of foreign investment transactions in New Zealand assets. In broad terms it applies to three types of assets: investments in business assets worth $100m or more; fishing quotas; and land.

Land that is subject to the OIA 2005 includes:

- any non-urban land (including farm land) in excess of five hectares
- foreshore and seabed, lake beds, regional parks, land reserves, conservation land or land subject to a heritage order
- land in excess of 0.2 hectares adjoining the foreshore
- land in excess of 0.4 hectares adjoining lakes, reserves, heritage or conservation areas or including an historic place or wahi tapu.

This land is our land

Whilst all qualifying foreign investments are subject to tests assessing the good character of the potential purchasers (similar to those required of New Zealand company directors), land purchases and investments in businesses with an interest in such land are subject to a further test of whether the purchase would be of benefit to New Zealand. In the case of any transaction involving more than five hectares of non-urban land, the benefit to New Zealand must be 'substantial and identifiable'. This test poses a significant hurdle for intending investors to overcome, as they must be able to demonstrate that their ownership will lead to greater benefits than exist under the current ownership arrangements.

Restrictions on foreign ownership of land of special character such as foreshore and seabed, lakes, conservation, heritage and historic sites clearly draw their origins from the degree of sensitivity to the identity of their owners, even when they are New Zealanders. But the different treatment of applications by foreigners to purchase business and other land assets appears a little perverse. Arguably, New Zealand's economic fortunes over the past two hundred years have risen principally upon a tide of investment by non-New Zealanders in the businesses that comprise the growth

engine of the New Zealand economy – that is, primary sector industries (and notably the farms that produce fundamental fibre, milk and meat products). However, the reason for the distinction between investments in farms and other businesses becomes clear when one learns that as recently as only fifteen years ago, even New Zealand citizens wishing to purchase farm land had to apply for consent from the government, and that government regulations imposed restrictions upon the extent of land aggregation and the structural and production choices available to the owners of farm land.

A short history

Government intervention in land sales has been a fundamental feature of land policy since the signing of the Treaty of Waitangi in 1840, when the colonial administration was granted a monopoly to purchase land from Māori and then dispose of it to settlers – with the profit realised becoming a principal means of funding that administration and its successors.

Whilst initial land policy from 1840 restricted the disposal of Crown land, this changed in the 1850s to the promotion of land settlement. The change in policy coincided with the establishment of colonial self-rule, and the embryonic national parliament delegated the oversight of land disposal to its provincial counterparts.

By the mid-1860s, leases were taken up for all available pastoral land. However, inconsistent application by some provincial governments and overt political cronyism by others resulted in large tracts within some provinces coming under the control of a small number of runholders (notably the South Island high country, Marlborough, Nelson, and Hawke's Bay).[2]

In part as a reaction to the acrimony arising from both cronyism and land consolidation, the Land Act 1877 (which was passed following the collapse of the provincial governments) introduced a nationwide policy of auctioning land leases. Although the sale process was now transparent and fair, successful leaseholders were required to reside on the land and make improvements as specified in their lease agreements.

The main policy objective of the 1877 Act and the land policies of successive governments was 'closer settlement'. Small-scale farmers were assisted to settle on the land, whilst the aggregation of land to an undesirable extent was precluded. Closer settlement was seen as a way of expanding production via the government-sponsored engineering of an idealised social and economic structure based around 'family' farm ownership.[3]

Only Kiwis need apply

The twin goals of closer settlement and discouragement of undue aggregation persisted for at least the next hundred years, and are manifest in legislation such as the Land Settlement Promotion and Land Acquisition Act 1952[4]. This Act required intending purchasers of more than five acres of farm land to sign a declaration that they did not already own farm land; or, in the case that they did, to seek a clearance from the Land Valuation Tribunal to continue with the proposed purchase.

When evaluating the application, the Tribunal was required to consider a number of criteria, which included: whether the farm was 'sufficient to support the purchaser or lessee and his wife and such of his children as are dependent on him in a reasonable manner and in a reasonable standard of comfort'; whether 'the acquisition of additional farm land would, judged by ordinary and reasonable standards, be considered excessive'; and whether the purchase would 'ensure and preserve the diversification of the ownership of farm land by individuals'. The Act also required that purchasers of farm land reside on the land and be actively engaged in farming – although that requirement was lifted in 1961.

It was only in 1968 that an amendment containing provisions to control acquisition of land by overseas corporations and persons who were not New Zealanders was introduced into the body of New Zealand legislation.

By contrast, when the Overseas Investment Act 1973 (OIA 1973) created an Overseas Investment Commission whose role was to supervise and control overseas investment in New Zealand, the focus was on investments in businesses and securities, and the raising of debt. Consequently, the OIA 1973 was administered by the Reserve Bank of New Zealand.

When the Land Settlement Promotion and Land Acquisition Act 1952 was repealed in 1995, its provisions relating to foreign purchase of land were consolidated into the OIA 1973.[5]

Nostalgia for the rural past

The OIA 1973 was reviewed in 2003 and replaced with the current 2005 legislation. However, nostalgia for the rural past won out over economic rationality: despite the 1973 and 2005 acts being similar in intent and operation, the OIA 2005's administration was moved from the Reserve Bank to the newly created Overseas Investment Office located within Land Information New Zealand.

The OIA 2005's different treatments of land and business assets can now be seen as a consequence of their separate legislative roots. Similarly, the focus on the identity of the owners of such small parcels of land appears to be more a result of legislative and social policy history rather than the consideration of meaningful economic units of production in modern agriculture. However, since the restrictions that engineered an industry structure based on family ownership of small farming ventures have been lifted (progressively from 1961), corporate farms such as the 22-farm Crafar family venture have become the norm. It begs the question of whether the OIA 2005 is more consistent with maintaining a 19th-century social vision than supporting the 21st-century reality of economies of scale and corporate farm ownership, where New Zealand's cornerstone corporate agricultural businesses need the same ability as their non-land-based counterparts to access the mobile international capital required for growth and development.

1 D Heatley and B Howell (2010) 'Overseas Investment: is New Zealand "Open for Business"?' (www.iscr.org.nz/Overseas_Investment).

2 See: R McIntyre (2008) *Whose High Country? A history of the South Island high country of New Zealand*. Penguin Books. Auckland; and R Boast (2008) *Buying the Land, Selling the Land: Governments and Māori Land in the North Island 1865-1921*. Victoria University Press. Wellington.

3 JR Fairweather (1985) 'Land Policy and Land Settlement in New Zealand' *Agricultural Economics Research Unit Research Report* 166. Lincoln College. Canterbury, New Zealand.

4 Before 1968 this was titled the Land Settlement Promotions Act.

5 J Treacy (1995) 'An overview of the Overseas Investment Act 1995' *Reserve Bank Bulletin* 58 (4).

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'COTTONING ON' to the competitive consequences of genetic modification

Arguments around the development of genetically modified plants and seeds tend to focus on the creation of potentially harmful 'frankenfoods'. Kyle Stiegert asks whether the resulting concentration of market power in multinational bio-tech firms poses a more tangible risk.

The production of plants for human food consumption and as inputs for livestock, fibre, wood, energy, and ornamentation all rely fundamentally on the underlying plant genetics. Both crude and advanced forms of plant genetics have been at the center of research into agricultural seeds for thousands of years. Indeed, the origin of agriculture is associated with the selection and planting of seeds that eventually contributed to large increases in food and fibre production. The science of modern seed development through breeding is based on hundreds and perhaps thousands of trials to find a few superior varieties that perform well in specific growing regions. It takes time to develop, produce, and release seed for wide distribution – up to a decade for some plants. While the changes in the genetic makeup of seeds as a result of extensive breeding trials are noteworthy and important in many respects, the process is essentially natural and limited to what the cross-breeding technology can yield.

Over the last few decades, advances in biotechnology have enabled the production of genetically modified (GM) crops with specific and desirable traits not found in their parents. GM traits are usually inserted into a successful variety emerging from the trial-and-error process described above. By a wide margin, the most successful mass-produced GM traits provide either resistance against insects or tolerance to specific chemical herbicides. New GM traits available in some food and fibre seeds address a broader array of market demands including nutrition enhancement, drought tolerance, and protection from plant disease. While the use of GM technology remains controversial in many countries, the rapidly advancing biotechnology seed industry has contributed to improved agricultural productivity and had a major impact on the production, delivery, and pricing of agricultural seeds and other inputs in the US and around the world.[1]

The debate changes

Genetic modifications to plant life have elicited strong negative reactions from many policy and consumer groups. A common concern is that 'fiddling' with the natural process would inevitably lead to many and drastic unforeseen consequences for those countries determined to push GM technologies on to the market too fast. This has led to restrictive control on both GM-based farm production and imported GM foods in many regions, including Europe and New Zealand. However, the debate about GM plant technologies has begun to shift away from a firm normative stance to one engaging the costs and benefits of this new form of farming.

The positive side of this ledger has gained considerable momentum in the past few years for several major reasons. One is that no catastrophic problems have yet to emerge from GM plant life. Second, foods with GM ingredients have found their way into the food supply of most countries with no noticeable problems to public health. Many of these GM-based products are barely noticeable and include thickeners from GM grains, meat produced with GM grains and oilseeds, enzymes produced from GM fungi, and preservatives derived from other GM micro-organisms.[2] Third, reductions in pesticide use have been well documented – particularly in the case of GM cotton produced in the US, China, and India. Pesticide applications in developing countries are linked to many health and environmental issues for rural areas. Finally, prospects for GM products with new and unique health traits such as vitamin enhancement has led many to reconsider the upside potential for GM technologies to solve serious human health issues.

Super-seed me

While it is certainly true that GM seeds remain controversial, it is also true that the use of GM seeds is likely to broaden along both geographic and product lines. Should this forecast prevail, there are many relevant questions about how the biotech seed industry should be allowed to function and evolve. Public policy concerns are quite real in this environment and regulation should play an important role.

The US represents an interesting case study for understanding some of the major structural issues facing the biotech-seed industry. Over the last few decades, horizontal and vertical merger activities in US agricultural biotechnology and seed industries have contributed to the development of a concentrated and complex industry. Since the 1980s, the agricultural biotech industry has received extensive utility-patent protection under US law. Despite the high concentration of firms in the GM seed markets, this patent protection has effectively precluded antitrust oversight over the use of those rights. For example, approximately 90% of all soybean seeds currently sold in the US contain Monsanto's herbicide-resistant gene. While alternative genes are available that can provide herbicide tolerance and more are under development, few are commercialised and none has achieved significant market position.

Biotechnology firms have vertically integrated downstream, so that they now include seed-producers; at the same time, they are licensing patented traits to other seed companies that in turn offer GM seeds. In this setting, vertically integrated biotech-seed firms compete for seed sales against independent seed firms licensing the same traits. How and to what extent these licensing arrangements extend or limit competition is an emerging and important issue.

This is illustrated in the patent infringement court case between Monsanto and DuPont involving GM corn hybrids. In this case, at issue is whether or not Monsanto can enforce contract terms that prohibit its licensees from stacking its genes with other patent holders' GM traits.[3] If allowed, the extensive patent protection that Monsanto has on GM traits could essentially dictate how competing products can be developed. Such control could allow Monsanto to restrict use of GM traits for seeds that it considers highly competitive in regions where it wishes to dominate or increase market share. This was a centerpiece issue in a merger settlement between Monsanto and the US Department of Justice.

Syngenta has received permission to include the Monsanto insect-resistance gene and a herbicide-tolerance gene from Bayer Crop Science in its cotton seeds. This permission is the result of an antitrust settlement in May 2007 that imposed conditions on Monsanto's vertical acquisition of Delta Pine & Land (the dominant cotton-seed producer) to terminate all provisions in its cotton-seed licenses that restrict trait-stacking of genes from different sources.

The rapid emergence of only a few firms holding most patents on GM traits is a public-policy concern …

The economic analysis associated with large firms and concentrated industries has long recognised the potential for such firms to produce welfare gains through, for example, economies of scale and scope. In the GM corn- and cotton-seed markets, there is considerable evidence that prices for seeds with multiple-stacked traits (that is, seeds with more than one patented trait) contain bundled discounts. This means that farmers might pay more for a triple-stacked seed than for a double-stacked one, but the difference is much smaller than going from a conventional seed to a GM seed with a single-patented trait. As a result, farmers who demand a menu of traits can benefit when the right bundle is made available. The gains from bundling are, however, not uniform across all years and all markets. What appears to be at work is that bundling discounts are most often made available in regions where there is elastic demand for certain traits.

Pricing power

On the flip side, increased concentration can provide the type of market power to firms that allows them to raise prices. Three sets of findings are emerging from research on seed markets in the US. First, increases in concentration in both cotton and corn have led very generally to higher prices.[4] Second, cotton and soybean GM seeds sold by vertically integrated biotech firms have tended to be priced above those sold through licensing.[5] And finally, when increased options of different types of stand-alone and stacked seeds are available in specific regions, the tendency is for lower prices.

Seeding some thoughts

The rapid emergence of only a few firms holding most patents on GM traits is a public-policy concern both in the US and around the world. These trends raise questions about the organisational efficiency of the US and global seed industries that supply an input necessary to feed the world's populations and provide for other critical human needs including energy.

Will such a market structure lead to higher prices, fewer choices for farmers, foreclosure of independent seed companies, or reduced investments in seed development? Can governments properly regulate the industry or administer antitrust policies that strike a balance between encouraging innovations while using competitive forces to keep seed prices low? Can support for research and development lead to a broader set of firms with patents on GM seed? Can a more uniform set of antitrust policies across nations lead to greater competition in the race for patented GM seed? To answer these and other pertinent questions, more economic research is necessary.

Obtaining data for GM seed sales outside the US will prove increasingly more important as the use of GM seeds spreads out across the world. Future research should be directed toward providing policymakers with good information about the structure of the industry and the nature of firm competition in seed markets.

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1 The website www.gmo-compass.com provides up-to-date information about GM trends for all major plant applications.

2 Also see www.gmo-compass.com for discussion on GM ingredients in the world food supply.

3 S Kilman (2009) 'Monsanto, DuPont Escalate Patent Fray' Wall Street Journal *(wsj.com)* 20 August (http://online.wsj.com/article/SB125064945552442221.html).

4 For an analysis of corn, see: G Shi, JP Chavas and K Stiegert (2008) 'An Analysis of the Pricing of Traits in the U.S. Corn Seed Market' *Food System Research Group Working Paper FSRG2008-01* (www.aae.wisc.edu/fsrg/publications/wp2008-01.pdf). For cotton, see: G Shi, K Stiegert and JP Chavas (2010) 'An Analysis of Bundle Pricing in Horizontal and Vertical Markets: The Case of the U.S. Cottonseed Market' *Food System Research Group Working Paper FSWP2010-05* (www.aae.wisc.edu/fsrg/publications/wp2010-05.pdf).

5 For an analysis of soybeans, see: G Shi, JP Chavas and K Stiegert (2009) 'Pricing of Herbicide Tolerant Soybean Seeds: A Market Structure Approach' *AgBioforum* 12(3&4) pp326-333.

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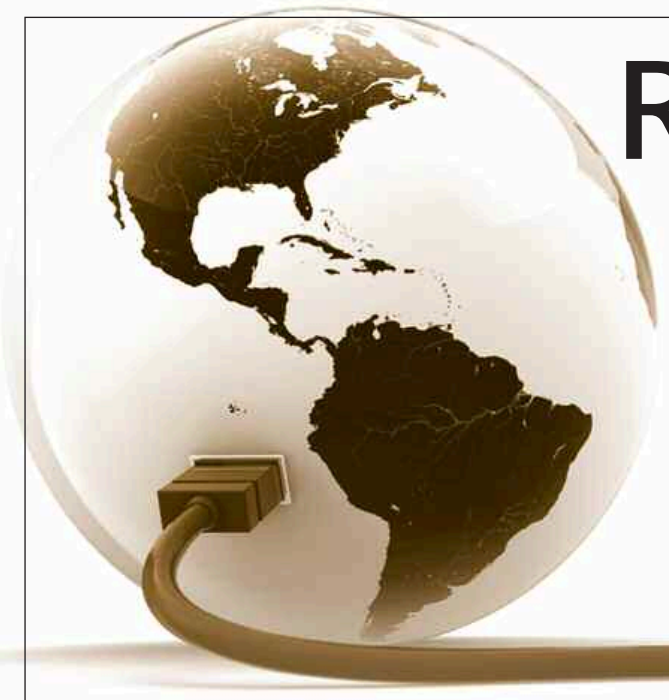

REGRESSION ... towards poor evidence-based policy?

Inadequate understanding of the limitations of regression models may result in poor broadband policy decisions. Bronwyn Howell illustrates how.

In our increasingly complex world, policymakers are coming under greater pressure to ensure that the various policies, laws and regulations they impose are 'evidence-based' – that is, that evidence exists to support the efficacy of the proposed intervention in delivering its desired outcome. As there are likely to be many factors affecting the outcome, some within the control of policymakers and some not within their control, it is important that the evidence used to support the policy does in fact support the contention that the policy, and not some other factor, has been responsible for the changes in outcome observed in the evidential data.

Regression analysis is one of the most commonly used quantitative techniques in evidence-based policymaking because it enables an empirical assessment to be made of the effects that multiple possible factors (independent variables) have upon the variable of interest (the dependent variable). See box on facing page for details.

Many different regression models have been constructed in the quest by policymakers for evidence that local loop unbundling (LLU) has both a positive (that is, the coefficient is bigger than zero) and statistically significant effect on broadband uptake per capita. Whilst there is strong evidence in many models that factors such as GDP per capita, population density and the number of computers per capita have expected and significant effects on broadband uptake, there is far less consistency in the likely effect of LLU policy. Considerable variation exists in the empirical evidence, with statistical significance often appearing to hinge on the proxy used to capture LLU policy and model structure. For example, LLU is rarely found to be statistically significant when specified as a 0/1 absent/present factor, but has been found statistically significant in models where it is specified as the length of time that LLU has been in place. Similarly, its statistical significance appears highly contingent upon the presence or absence of other factors in the model: in John de Ridder's OECD model,[1] for example, LLU ceases to be statistically significant when the average age of internet users is added to the regression model.

Needles and haystacks

The results obtained from a regression analysis, and the statistical significance attached to any particular independent variable, are highly contingent upon the careful selection of all the independent variables included in the model. Whilst software can undertake the task of fitting a line to the data supplied, the outputs are of little value if, in the conceptual specification of the model, important relationships between the variables are overlooked or an important variable is omitted. If a crucial independent variable that is likely to be statistically significant is omitted from the model, then the software will in many circumstances misattribute significance to the remaining variables. If two independent variables are jointly influenced by a third and unspecified variable, then the software may attribute significance to them and not to the omitted variable (which is the truly significant driver of changes in the dependent variable).

Thus policymakers appraising such models for their value in evidence-based policymaking must carefully inspect not just the efficacy of the statistical techniques used for empirical analyses but also the adequacy of the models themselves to accurately capture the complexity of the relationships in the real world into which the model seeks to provide insight. What is not in the regression model may have a greater effect on the dependent variable than what is actually in the model. Moreover, if the data used to proxy a particular policy effect are actually capturing more information than the policy alone, then statistical significance found in the model may be inappropriately attributing to the policy an effect that is more properly attributed to an excluded variable. 'Evidence' from such regressions will not support good evidence-based policy unless all such effects have been plausibly eliminated.

The hidden variable

The need for caution in appraising regressions showing LLU as statistically significant in driving broadband uptake per capita is illustrated in ISCR research. Boyle, Howell and

Zhang,[2] in critiquing de Ridder's OECD model, showed that the LLU policy proxy variable – the length of time LLU had been in place in OECD countries – was highly correlated with another (omitted) variable that was certainly a very important driver of broadband uptake: the length of time broadband itself had been available.

As broadband was a comparatively new technology, it was still in the early stages of its diffusion. All such new technologies increase in their uptake (diffusion) over time, because of several factors: more people become aware of the technology; more applications are developed to utilise its capacities; the price falls as the technology is able to be produced more cost-effectively (more units are produced); and – importantly for LLU policy – competition in its supply also reduces the price. LLU policy, however, has an effect on only one of these factors.

So unless the model is specified to take account of the other possibilities as reasons for the observed increase in broadband uptake, the impact of all of these effects will be – erroneously – attributed to LLU policy. When re-specifying the OECD model to include both the length of time that broadband had been available and the length of time that LLU policy had been in place, it was found that it was not LLU policy but the combination of the other three factors, captured in the length of time since broadband had been available, that was statistically significant.

Regression reality

Despite the clear caution issued in the ISCR paper, it seems that some policymakers are persisting with the use of the OECD model as support for the efficacy of LLU policy. In a report produced by Harvard University's Berkman Center for the United States Federal Communications Commission and based upon minor extensions to the OECD model that did not take any of the omitted variable concerns into account, it was strongly recommended that LLU-type policies be adopted to increase US broadband uptake.[3] Despite citing the ISCR paper, the Berkman authors further asserted that the longer that LLU policy had been in place, the lower would be the price of broadband and thus the higher the broadband uptake per capita. This failure to take account of the effects of time on broadband uptake independent of the policy factor has led to an overstatement of the significance of the LLU policy variable. Further analysis[4] shows that the cost of producing broadband equipment has been falling over time. While regulation might have assisted in these cost savings being passed through to broadband consumers, it is not at all clear that LLU policy, other regulation or even unregulated competitive forces from other technologies (such as mobile and wireless broadband) can be credited with the observed lowering in OECD broadband prices. Once again, the separate effect of falling prices over time – aside from the length of time unbundling had been in place, as used in the ISCR approach – would have captured this effect.

The LLU example illustrates the danger of policymakers accepting the 'evidence' from regression models without critically and carefully analysing the full structure of the model from which the positive support for a policy has come. After all, regression models are just that – models that simplify the complexities of the real world. Software tools such as eviews, stata and sas enable all sorts of regression relationships to be created and tested once a data set has been formed but there is no substitute for careful 'reality testing' of the model and the results that it produces. If in the modelling process important real-world interactions are lost, then the model itself loses credibility as a support for the policymaking process, and costly but futile policies may be implemented when caution may have been a wiser prescription.

1 J De Ridder (2007) 'Catching-up in broadband: what will it take?' (www.oecd.org/dataoecd/34/34/39360525.pdf).

2 G Boyle, B Howell and Q Zhang (2008) 'Catching-Up in Broadband Regressions: Does Local Loop Unbundling Lead to Material Increases in OECD Broadband Uptake?' (www.iscr.org.nz/f410,11598/11598_LLUBroadband01c_rev_300708.pdf).

3 Berkman Center (2009) 'Next Generation Connectivity: A review of broadband internet transitions and policy from around the world' (www.fcc.gov/stage/pdf/Berkman_Center_Broadband_Study_13Oct09.pdf).

4 B Howell (2009) 'Comments to Federal Communications Commission in response to Broadband Study Conducted by the Berkman Center for Internet and Society' (www.iscr.org.nz/f542,15628/15628_Berkman_Report_Response_to_FCC.pdf).

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If *Y* is the (dependent) variable to be explained and if X_1, X_2 *and* X_3 are the (independent) variables suspected of explaining Y, then regression estimates the effects of the Xs on the expectation of Y – that is, their effects on the predicted or average value of Y, after controlling for the levels of the Xs.

When data sets of observations of (*Y*, X_1, X_2 and X_3) are input into the regression modelling tool in statistical software such as eviews, stata or sas, an equation of the form *predicted* $Y = aX_1 + bX_2 + cX_3$ is produced. In terms of the data Y = *predicted* Y + *error term*.

The coefficient estimates a, b and c indicate the effect each respective independent variable has on the predicted value of Y while the importance of the error term relative to the importance of *predicted Y* indicates the strength of the explanation of *predicted Y*. For example, if variation in the error term explains most of the variation in Y, the Xs play a relatively minor role in explaining *predicted Y*. Nothing in regression implies causality: the coefficients indicate the form of association of Y with the Xs in the observed data.

Whilst a coefficient indicates how a change in one independent variable will affect the level of the dependent variable, the confidence one has in the coefficient should also be factored into an assessment. This confidence is indicated by the measures of statistical significance attributed to each of the independent variables. These indicate the probability that a coefficient is, in fact, different from zero; and thus a coefficient increases the certainty that the associated variable is important in explaining Y. For example, estimation of the regression model above may return a large coefficient *a* and small coefficient *b*. However, if the variable X_2 is statistically significant at the 5% level but the variable X_1 is significant only at the 20% level, then (despite its larger coefficient) changes in X_1 are less likely to explain changes in the level of Y_1 than are changes in X_2. The inference is more complicated where X_1 is associated with X_2.

Competition for New Zealand's Donor Dollars

New Zealand has a large number of registered charities (more than 24,000 at last count) that were formed to support a diverse range of causes and beneficiaries. Charities compete actively with each other – and this competition is becoming increasingly international in nature, with a surprising number (3358) of New Zealand's registered charities working internationally.[1] Carolyn Cordery, David Sutton and Rachel Baskerville describe how increased and international competition for the donor dollar affected one large New Zealand charity.

New Zealanders are generous people, responding to calls for donations to both national and international causes that include natural disasters such as an earthquake in Haiti, a tsunami in Samoa and a cyclone in Fiji. Expression of that generosity is not limited to individuals: in addition to the many millions donated by the public, the New Zealand government commits $500m annually to international aid.

Almost half of the New Zealand population aged 10 and over donated to charities in 2008. While committed support to charities remained relatively stable, survey evidence suggests people increased the number of ad hoc donations they made that year.[2] New Zealanders' monetary support for charities is therefore being spread over more organisations than previously. So what might increased competition for the donor dollar lead to?

Our recent paper[3] models the impact of competition for the donor dollar on charity failure, as applied to the Council for the Organisation of Relief Services Overseas (CORSO).

We know what's best

In 1987 Lester Salamon of John Hopkins University, an authority on the non-profit sector, posited[4] a typology of voluntary-organisation failure. One of his 'types' of failure is paternalism – where donors make decisions about which beneficiaries are deemed 'deserving' and how they should be funded. The prime weakness of paternalism is in the dependency relationship created between society's wealth holders and those who are relatively poor. Paternalism may inhibit social change as it requires charities to conform to the expectation of donors, including the expectation that charities will support those the donors deem worthy rather than addressing underlying needs. Similar paternalism also affects government support, to the extent that only politically acceptable ('popular') charities are funded in the first place or assisted when they fail, thereby exacerbating the trends towards social rigidity and homogeneity.

CORSO is an example of how a charity can fail because of paternalism – that is, CORSO's donors remained rooted in a paternalistic approach at a time when the organisation itself was moving towards a focus on aid development and education on the causes of global poverty. At the same time, international aid agencies entered the New Zealand charity market and were able to exploit the 'paternalism' gap.

Marching to a different drummer

CORSO began in 1944 as a voluntary organisation coordinating activities geared towards overseas relief. It grew rapidly to become New Zealand's premier aid agency, but failed when international competition captured its donors' dollars. It failed to make pragmatic concessions to the donating public's demands and consequently lost its public support. The CORSO story is complex, but it is clear that competition was at least one of the reasons for its demise.

CORSO initially focused on aid in impoverished countries in the post-WWII period. By the late 1960s, it focused increasingly on development (rather than just emergency relief) to assist recipients in gaining greater self-reliance. It also began to make demands for improved human rights and political changes in the countries to which it provided aid. However, it was ahead of its time: many of its donors appeared happy to continue funding emergency relief without seeking to improve the structures in aid recipients' countries that would reduce the need for such relief. Further, CORSO did not communicate its change in strategic direction sufficiently to its existing and potential future supporters. It therefore experienced a decline in its socio-political legitimacy that led to pressures on donations.

Previously, rivalry between charitable organisations in New Zealand had been restrained or low-key, especially as CORSO acted as an umbrella organisation for other overseas-aid organisations. However, the establishment of the New Zealand office of

World Vision in 1971 heralded increasing competition for donors' dollars. World Vision more closely corresponded with public perceptions of a politically neutral international-aid organisation at a time when television exposure of the demand for aid increased the public's awareness of global issues. CORSO's profile was at variance with those of its international rivals.

An increasing number of international-aid charities also entered the market at this time. (Figure 1 shows the extent to which other agencies prospered compared with CORSO.) World Vision's overseas experience in donor-mobilisation resulted in it becoming the largest aid agency in New Zealand by 1977; the Evangelical Alliance Relief (TEAR) Fund grew rapidly from its inception in New Zealand in 1974; and Oxfam, a slightly later entrant into the local charitable market, raised $611,402 just two years after opening a branch in New Zealand in 1990.

The rise of international charities in New Zealand in the 1970s exploited the philanthropic paternalism of the donating public at a time when CORSO broadened its focus to include development as well as local needs. CORSO was the only charity shown in Figure 1 to receive fewer funds in 1984 than it had in 1972, and by 1977 it had lost its place as the largest charity in New Zealand.

Fighting for the donor dollar

By the 1980s, competition was clearly whittling away CORSO's base support. Then in 1990 a number of the organisation's key personnel left CORSO to establish Oxfam in New Zealand – and prominent CORSO supporters also switched their allegiance to this new rival.

> … popularity may drive who receives charity, rather than genuine need …

An article in a 1991 CORSO newsletter[5] identified Oxfam's arrival as a 'foreign take-over bid': Oxfam had launched fundraising events that clashed with local charities (including the New Zealand Red Cross national appeal), promoted shops in competition to Trade Aid, and justified its establishment by 'putting about the lie that CORSO no longer existed'. Another CORSO article earlier that same year[6] rebuked the Christian Children's Fund for coming to New Zealand (and by 1992 the Christian Children's Fund had raised $2 million).

To combat negative press, CORSO compared its efficiency in distributing aid with that of Oxfam. It promoted itself as by-passing the international bureaucracies because of its exclusive New Zealand nature. It compared CORSO's low expenses (16% of its 1990 annual-appeal income) with Oxfam's target of holding expenses to 30% of income. CORSO further criticised the budgeted advertising expenses of other aid organisations as 'expensive', despite the evidence that such advertising was necessary and effective in attracting donors' dollars. It also argued that there could be duplication of services to particular beneficiaries. However, this public fight for the donor dollar did not help CORSO. Unable to generate its previous levels of funding, it exists today as a marginalised shell of its former self.

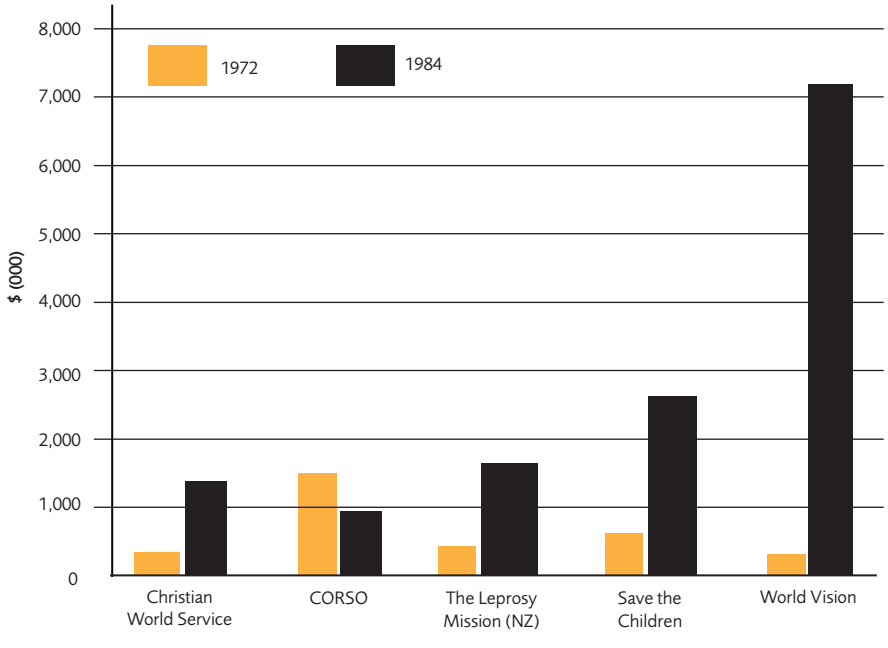
The push to charitable conformity

CORSO may well have been able to maintain its market share, if it had also retained a narrow definition of overseas aid. But this would have been at the cost of its mission.

Examination of past New Zealand charity failures – including CORSO – suggests that in today's increasingly crowded market, the higher risk of failure may lead charities towards more homogeneous missions which ignore the needs of beneficiaries whose 'cause' is not in accord with popular sentiments. Donor disaffection is a very real issue for charities, and perhaps even more so today than in the 1970s, because of the sheer number of charities vying for donors' dollars.

Thus popularity may drive who receives charity, rather than genuine need, if charities are otherwise unable to raise sufficient funds. And the increased competition for the donor dollar is likely lead to result in more charity failures occurring in the future.

Figure 1: Incomes for aid agencies in New Zealand 1972 and 1984



1 Charities Commission (2010) *A snapshot of New Zealand's charitable sector*.Wellington.

2 Generosity Hub (2009) *How do New Zealanders give? Towards an understanding of generosity in Aotearoa New Zealand*. Volunteering New Zealand, Office for the Community and Voluntary Sector, Philanthropy New Zealand. Wellington.

3 DB Sutton, RF Baskerville and CJ Cordery (2010) 'A development agenda, the donor dollar, and voluntary failure' *Accounting, Business and Financial History* 20(2) pp209-229.

4 L Salamon (1987) 'Of market failure, voluntary failure and third-party government: towards a theory of government-nonprofit relations in the modern welfare state' *Nonprofit and Voluntary Sector Quarterly* 16(1/2) pp29-49.

5 D Small (1991) 'Overseas alms dealers target NZ market' *CORSO Newsletter* October.

6 CORSO (1991) *Overview* June.

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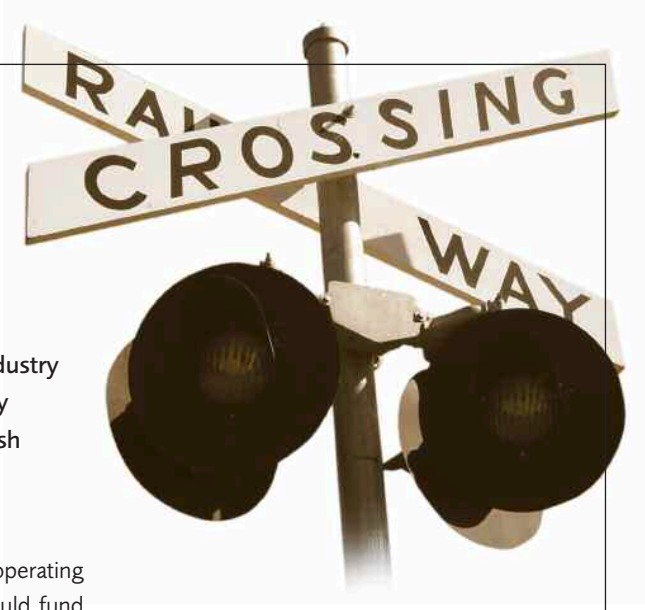
Level crossing: collision ahead?



Has two years back in state ownership made it any more likely that our rail industry will be better governed or more economically self-sustaining than indicated by ISCR's 2009 stocktake?[1] Dave Heatley suggests that – despite government cash injections – there are a few obstacles that could derail progress.

KiwiRail's shareholding Ministers recently announced acceptance of a ten-year 'turnaround plan' that requires additional shareholder funds of $750m over three years, to spur internal generation of an additional $3.85b over ten years for capital redevelopment. For an already undercapitalised firm – even one that's not required to pay its shareholders a return on capital – the achievement of such profit targets appears a Herculean task.

In order to meet the projected reinvestment targets from operations alone, KiwiRail needs to increase its revenues at an annual compounded rate of 12% over the next nine years without incurring any additional operational costs. That's in an economy with very sluggish growth predictions. Moreover, although KiwiRail's core business looks hopeful with total freight volumes predicted to rise, rail's share of the land freight market fell between 1999 and 2009.

The turnaround plan indicates the main priority is to improve traffic volumes and yields on domestic container traffic travelling between Auckland and Christchurch. As this is already one of the country's most contested freight routes, it appears unlikely that the necessary increases in net operating surpluses can be achieved without granting KiwiRail price-setting (market) power – in other words, artificially tilting the competitive playing field and facilitating a very substantial shift in modal share away from road haulage and the more cost-effective and environmentally-friendly coastal shipping operators.[2]

Thus rail's profit growth must come predominantly from segments where it faces limited competition: bulky export-bound goods such as coal, logs, and manufactured dairy products. However, any increase in internal transportation costs for these goods reduces their competitiveness in international markets, constraining our national economy's growth potential.

Warning: track out …

As achieving very large increases in operating surpluses is problematic, KiwiRail could fund at least part of its reinvestment programme by closing economically unviable lines and selling any associated land.[3] Although the 2008 Rail Development Group recommended running one train per week on every line regardless of cost or demand, KiwiRail recently announced that four lines were under review and would be 'closed or mothballed by 2012 if anchor customers do not emerge'.[4] The Ministers' strong signal that taxpayer contributions will be capped at the $750m already pledged leads to the conclusion that, for the turnaround plan to succeed, the pattern of line rationalisation which ceased under private ownership must begin again – albeit with the decision to do so deferred until the next parliamentary term.

… and visibility reduced

Taxpayers are bankrolling the turnaround plan. Can they be reassured that their agents – the shareholding Ministers and KiwiRail management – are using their funds wisely? Under state ownership, there's been a considerable reduction in the quality and quantity of information supplied to taxpayer/shareholders (compared with the level of disclosure and reporting required of ASX-listed Toll Holdings and NZX-listed TranzRail).

The public version of the turnaround plan is a mere two pages and contains none of the detail that shareholders would normally expect to receive in order to evaluate a $750m investment. Although Ministers and officials have most likely been kept informed, to date little financial information other than KiwiRail's 2009 annual report has been released publicly. And although KiwiRail is a state-owned enterprise (SOE) and should therefore be reporting as a commercial entity, its 2009 results were reported as for a 'public benefit entity'. Thus its 'profit' figures and 'asset' valuations bear little relation to those of its private sector and SOE counterparts. For example, while the annual report identifies 'profit as a public benefit entity' of $239m, KiwiRail's total operational income of $518m was almost exceeded by various forms of government funding totalling $425m.

Elsewhere in its 2009 annual report KiwiRail states 'a $63.3m positive result before depreciation, interest, taxation and shareholder contribution'.[5] This figure, too, is not comparable to any commercial profit figure. Furthermore, KiwiRail's $12b 'asset' figure values operating assets on the basis that the business is a going concern – yet it includes land valuations that are realisable only if KiwiRail ceases trading. Such obfuscation makes it very difficult to assess the firm's underlying financial state.

While the turnaround plan is bold, so were all other earlier rail-saving plans. The signals so far suggest faith as much as funding underpins current endeavours.

1 D Heatley (2009) 'The History and Future of Rail New Zealand' (www.iscr.org.nz/n511.html). See also: 'KiwiRail: strategic asset or strategic blunder?' *Competition and Regulations Times* issue 29 p1.

2 An historic example of this was the prohibition on moving goods by road for more than 30 miles where there was a competing rail service.

3 As suggested in Heatley (2009).

4 www.kiwirail.co.nz/uploads/Publications%20and%20Reports/Overview%20of%20KiwiRails%20Turn-around%20plan.pdf

5 www.kiwirail.co.nz/uploads/Publications%20and%20Reports/KiwiRail%20Annual%20Report%2009%20(web).pdf

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