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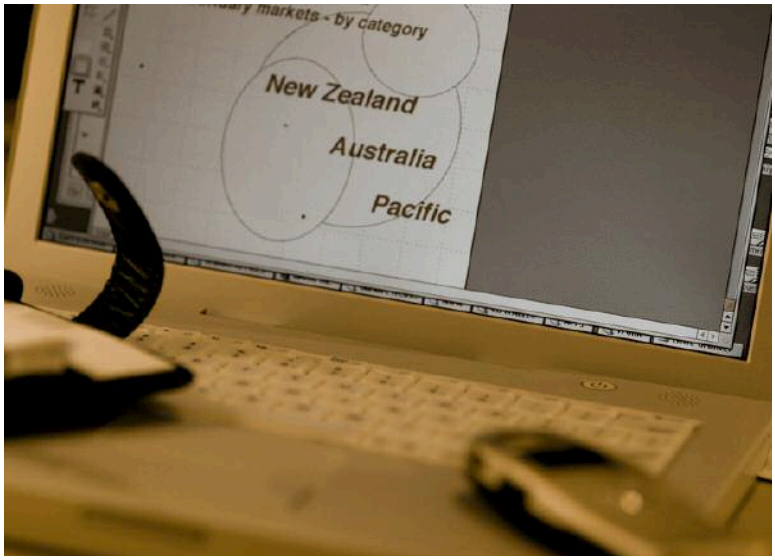
IN THIS ISSUE

ICTelligence?



Information and communication technologies (ICTs) are becoming increasingly common in New Zealand, with this country being well ahead of others in its enthusiastic use of these technologies. But simply investing in ICT alone may not be as 'intelligent' as it first seems. ISCR's Bronwyn Howell points out some cogent lessons for both businesses and policymakers.

The use of ICTs has been associated with greater benefits to those firms, industries and countries investing strongly in ICTs (compared with those who do not pursue such investments with the same vigour). Because capital investment by firms in ICTs is measurable and typically captured within national accounts, it has become a proxy for assessing the relative growth potential of different organisations – even though it's not easy to discern the contribution that ICTs make to value added in the outputs where they are utilised.

The development of national and international information-economy policies designed to encourage firm and industry investment in ICTs has also been spurred on by the presumption that ICT investment leads directly to greater growth – on the basis that if some investment in ICTs has been shown to yield increases in output values, then greater investment should deliver even greater benefits.

It has become evident that ICT investment requires complementary investment in hard-to-measure intangible factors such as human capital, organisational structures and commercial environments in order to produce the anticipated output gains. Nevertheless the 'success' or 'failure' of information-economy policies still tends to be determined to a significant degree by the extent to which such policies are associated with increases in ICT investment alone.[2]

Reality bytes

By ICT-only input measures, New Zealand's prevailing policies should be judged highly successful. New Zealand has led the OECD for much of the last decade in the percentage of GDP spent on ICTs.[3] Relative to comparator countries such as Australia and the United Kingdom, New Zealand's firms are very high subscribers to (and owners and users of) fixed and mobile telephones, computers, the internet, and broadband connections.[4] Yet, despite such affirmations, a popular feeling prevails that New Zealand is somehow 'falling behind' the rest of the OECD in respect of business use of ICTs, and that the nation's ICT Strategy could be doing more to promote the use of these technologies.

As part of the background information to assist in developing the government's new ICT policy,[5] the Ministry of Economic Development commissioned a series of case studies of New Zealand businesses that have been successfully using ICTs.[6]

The case studies, undertaken by ISCR and the Competitive Advantage New Zealand project, documented ICT use in a variety of business sizes, types, sectors, products, and foci.[7] The case studies confirm that successful ICT implementation in New Zealand requires more than simply ICT investment – and that some companies, at least, have succeeded in identifying and making complementary investments that have led to measurable growth.

Lessons for business

The case studies show there is no single formula for successfully investing and implementing ICTs. However, the one factor common to all the successful firms was the quality of their human capital.

If business managers and decisionmakers understand their firm's 'value chain' and also their particular product, business, industry, and trading environment, then they also understand how wealth is created by their business and how information contributes to the creation of wealth. They therefore

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from page 1 have a much clearer understanding of both where the ICTs fit in their individual value chain and the extent to which ICTs can add to the value created. Such knowledge and understanding positions managers so that they can be better at selecting, customising and prioritising any development – and better at managing the costs, risks and opportunities they face in their businesses.

Having knowledgeable and experienced staff who participate in the development and implementation of ICT applications, and having an organisational commitment to ongoing training and learning in both ICT and other organisational systems, also characterise the successful implementations.

Firms with managers who understand how their businesses create wealth are much more likely to have a clear strategy for guiding decisions and operations, and for integrating technology into their business. Technology purchase and implementation then becomes an integral part of the firm's strategy – whether for the purpose of gaining a competitive advantage, or merely to 'keep up with the state of play in the industry'. Well-reasoned analysis also reduces the probability of a firm's investing in a technology solely because it exists or because it has been successfully implemented elsewhere in a different environment or circumstances. Knowing the significance of these differences can sometimes be the point of distinction between successful implementation and costly over-investment.

Overall, the presence of high-quality human capital maximises the probability of a successful ICT investment. If the purposes underpinning the ICT investment are well understood by those making the investment, then it is more likely that the firm is receptive to the need to invest in complementary systems, and that it has put in place processes for monitoring and adjusting the complementary systems so that they align with the new investment.

The quality of business analysis and decisionmaking available to businesses is critical to successful ICT implementations. But the requisite human skills are generic business skills, not specialist technology skills. There is little evidence from the case-study companies of difficulty in accessing ICT specialists, yet almost all noted a significant difficulty in recruiting staff with sufficient business and industry knowledge, experience, and skills – particularly in risk management, change management, and process analysis and improvement.

The significant problem for New Zealand, from the perspective of the case-study companies, appears to be lack of skilled and experienced business 'knowledge workers'. Whilst firms may be prepared to 'grow their own' knowledge workers, they are vulnerable to losing these skills to other markets with higher salaries. This compromises the overall knowledge and experience level of New Zealand management and hence the calibre of decisionmaking; and it raises internal training costs. Poor decisionmaking undoubtedly increases the costs of both implementation and failure in ICT investments.

Lessons for policy

The case-study businesses unanimously believed that a government ICT policy would have had little effect on their decision to invest in ICTs or on the implementation of their respective ICT systems. Their consensus was that the government has no role to play, beyond its broad responsibilities to provide a sound and certain legal and commercial environment in which business operations can be undertaken. They reported few problems with accessing the infrastructures necessary for their activities, and none reported an inability to access sufficient and suitably qualified technical staff for their activities. Overall, the case-study businesses saw little apparent need for policy intervention in the infrastructure or ICT technical skills markets.

However, they did see a role for the government in promoting an environment where 'commercial literacy' and the use of information in commercial processes is as fundamental as general literacy and numeracy.

Owners, managers, policymakers, employees, voters, and consumers make less-than-optimal decisions if they lack the skills to effectively analyse their position, their business, their industry, and their environment – and, unless all participants in the economy understand economic interactions, such less-than-optimal decisions will continue to be made. Commercial literacy is vital for any economy; but the need for it is highlighted by the emergence of a 'knowledge economy' that is causing all businesses to refocus on the ways in which wealth is created.

Such literacy also needs to be technology-agnostic. Computers are only one form of ICT; human beings are another. Humans are information and communication processors, and skilled humans are an integral part of 'growing' value in an information economy.

'Knowing one's business' is also especially important for the government. Unless government managers and decisionmakers understand the relevant ICT issues, there could be a risk of government intervention harming, rather than helping, progress. Furthermore, as the major participant in New Zealand's knowledge-intensive health and education sectors, the government has its own responsibility to act as a knowledgeable operator. By acting as a role model, and building its own knowledge-based industries, the government can contribute to the total knowledge base in New Zealand.

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1 OECD. 2003. *ICT and Economic Growth: Evidence from OECD Countries, Industries and Firms*. Paris (http://www.oecd.org).

2 Erik Brynjolfsson and Lorin M Hitt. 2002. *Beyond Computation: Information Technology, Organizational Transformation and Business Performance*. Keynote address given at the North American Productivity Workshop, Schenectady, New York, 21 June 2002.

3 OECD. 2002. *Information Technology Outlook*. Paris (http://www.oecd.org).

4 Bronwyn Howell and Mark Obren. 2003. *Telecommunications Usage in New Zealand:* 1993-2003. Available from the ISCR's website (http://www.iscr.org.nz/navigation/research.html) and listed there as 'NZ Telecommunications Usage:1993-2003'.

5 Released in May 2004 and available from the Ministry of Economic Development's website (http://www.med.govt.nz/pbt/infotech/digital-strategy/index.html).

6 http://www.med.govt.nz/pbt/infotech/case-studies/index.html

7 The full list of companies studied is Foodstuffs, Fonterra Co-operative Limited, Gallaghers, Kenex Knowledge Systems, New Zealand Post, Planet Skin, Southfresh, Wakefield Radiology, and Ward's Farm.

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It's going to cost **HOW MUCH?!**

While many people think of unexpected visits to the dentist or panelbeater as expensive, the costs of investing in a superannuation fund can be far greater over a lifetime. Richard Frogley investigates the fees charged by managers of superannuation funds – and finds they can add up to quite a lot.

Compared with the cost of most services, the costs of investing in a superannuation fund are less transparent. The cost of a trip to the movies, the hairdresser, or even a favourite restaurant is easy to understand. The seller states their price for providing the service, and the buyer hands over the money – leaving little ambiguity about how much was paid. But because investment managers deduct fees directly from the funds they manage, investors can't easily tell how many dollars they've paid. Fund managers are required to issue an investment statement, stating what fees they deduct. But most managers charge several types of fees payable at different times, and many are expressed as an ongoing percentage of the fund's market value (which changes daily).

Fees charged by managers of most funds can be broken into two types – one-off fees and ongoing fees. One-off fees include entry and exit charges, as well as any difference between the price at which investors buy and sell units in the fund. Ongoing fees include management charges paid to the fund's manager and administration charges paid to the fund's trustee.

Golden crumbs

The important question for investors is how much these fees reduce the final payout they receive from their investment. This 'total lifetime cost' of fees can be measured as the difference between the actual payout and what would have been paid out if the manager hadn't charged fees. If an investment's actual payout is $9,000 but would have been $10,000 if fees had not been deducted, then the total lifetime cost of fees is $1,000 or 10%.

The total lifetime cost of fees depends on how long an investor invests for, what returns they get, and what taxes they pay. Consider an investor saving $1000 per year for 30 years, receiving an annual return of 7.3%, and paying tax at 33% on income and capital gains.[1] With no fees, their final payout would be $68,398. Ongoing annual fees totalling 1.25% per annum would reduce their final payout to $54,761 – a reduction of one fifth (20%). If ongoing annual fees total 1.62%, then their final payout would be $51,346 – a reduction of one quarter (25%).

One-off fees can also be allowed for – though they tend to be less important for a long-term investment. Suppose an investor is left with $51,346 after ongoing fees, and pays an additional exit fee of 5%. Their total payout net of all fees will now be $48,778, increasing the total lifetime cost from 25% to 28.7%. This result is identical to a 5% entry fee.

It all adds up

Ongoing fees charged by the balanced funds of five major New Zealand banks range from 1.15% to 2.17%. The average was 1.76% per year, which equates to a total lifetime cost of 27%.[2] If all the products achieve the same annual return – which is likely in the long-run – of (say) 7.3%, then the cheapest would have a total lifetime cost of 18.5% and would provide a payout of $55,729, while the most expensive would have a total lifetime cost of 31.7% and would pay out only $46,720.[3] Fees dramatically affect long-term investment returns, and a few hours spent finding a good deal can dramatically affect retirement lifestyle.

Competitive pressure should drive fees down in theory – but only if fees are transparently disclosed and consumers understand their importance. Requiring disclosure of some measure of 'total lifetime cost' might help, just as lenders are currently required to disclose their 'finance rate' under the Credit Contracts Act.

1 Based on: (i) US equities annual return (including dividends) of 9.7% since 1900; and (ii) the 4.6% annual return on US 10-year government bonds over the same period. Typical balanced funds are half shares and half bonds, so we take the midpoint of 7.3%. Returns are calculated on indices from Global Financial Data (www.globalfinancialdata.com).

2 Fees from investment statements of: ASB Easyplan Balanced Fund, ANZ Balanced Growth Fund, BNZ Balanced Fund, National Bank Thoroughbred Balanced Trust, and Westpac Diversified Trust.

3 One-off fees are ignored here.

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PHYSICIAN reveal thyself

New Zealand and the United States are the only countries that allow advertising of prescription drugs directly to consumers (DTCA) and this policy is now coming under close scrutiny as policymakers look to ban such advertising. But direct-to-doctor (DTD) advertising, which is extensive and occurs in all countries, is treated with indifference by regulators. Rhema Vaithianathan from Auckland University's Economics Department says we should pay much more attention to the potential harm of DTD to mislead patients.[1]

To pharamaceutical companies, doctors (not patients) are the high road to profits. United States figures show that drug companies spend six times as much on DTD as they do on DTCA.[2] Not only does such large expenditure reveal the extent to which DTD facilitates the sales of drugs; DTD has also proven to be extremely effective in influencing doctors' prescribing.[3]

Lunching on honey ...

Promotional activities aimed at doctors are more varied than simply advertising. The largest spend by far is on 'detailing', where sales representatives meet with doctors and provide information on emerging drugs. What they say, and what they leave out, is a crucial part of the sales pitch.

While the ostensible purpose of these meetings are educational, reciprocity in the form of free samples, gifts and invitations play a major role in the detailing visit. Other promotional activities include funding of company-sponsored conferences and advertising in journals.

Promotion of drugs to doctors can be loosely classified as falling into two categories: explicit rewards for prescribing; and implicit reduction in practice costs.

The first category is contentious, since in most countries ethical guidelines prohibit doctors receiving direct bribes or being 'influenced' by promotional activities. However, there is some degree of leeway when it comes to small gifts and continuous medical education – and some authors claim that even small gifts exploit a natural human tendency towards reciprocity. Furthermore, research[4] confirms that there is a causal link between doctors using a drug and their interaction with promotional activity.

Unfortunately, very little information about the details of the relationship between doctors and pharmaceutical companies emerges into the public arena. An exception is the recent scandal involving the arrest of 4,000 Italian doctors and more than 200 employees of GlaxoSmithKline. The allegation is that employees of GlaxoSmithKline offered bribes to doctors in exchange for prescribing their products – including pro-rata payments to specialists for prescribing an anti-cancer drug. Statements from industry insiders suggest that this sort of activity is rife in Europe, with

doctors getting free perks and so-called research funds that have no restrictions about how such funds can be used.[5]

Reducing the cost of medical practice by providing educational material appears, at first glance, to be less harmful than giving explicit rewards for prescribing. From an economics perspective, however, this sort of activity may be more harmful than direct inducement. This is because it biases the knowledge that doctors possess.

Paying for the 'free lunch'

Drug companies have an incentive to provide more information on drugs that have a higher profit margin. At the same time, they may neglect information on drugs that have low margins, and information on non-drug interventions. This means that doctors face differential costs of search for information: for unprofitable drugs and non-therapeutic interventions, they cannot rely on the sales reps and have to search for information themselves.

While it is argued[6] that the educational role of drug companies is beneficial because it reduces the costs of education, this is misleading. Doctors' search costs will always have to be met. Currently, they are met by the drug company and are (almost wholly) paid for by patients through higher pharmaceutical prices. If drug companies did not subsidise such activity, doctors would have to meet their own search costs and pass these on to patients through higher consultation fees.

Patients would be better off paying for unbiased information through higher consultation fees than paying for biased opinion through higher drug prices. (Of course, in most publicly funded health systems, it is the government that pays the higher drug price or the higher consultation fee – but the point remains valid.)

Promotional activities aimed at doctors are potentially more harmful to patients than DTCA because they create an unobserved bias in the doctor. The 'cheap-talk' literature in economics[7] shows how consumers can obtain quite a bit of information from the recommendations of biased experts as long as the bias is small – and, more importantly, as long as the direction of the bias is known and is common knowledge to both parties.

An example of this is the way in which newspaper readers can successfully de-code the news, if they know the bias of the newspaper. When one is new to a country and unaware of the biases, there is a degree of uncertainty until one knows the direction in which to scale the news.

Similarly, if a patient knows their doctor to be biased towards drug A rather than drug B, the patient may get a second opinion if drug A is recommended. On the other hand, if drug B is recommended, the patient may be justified in assuming that it will be very effective, since the doctor recommended it despite their bias towards drug A.

Promotional activities aimed at doctors are potentially more harmful to patients .... because they create an unobserved bias in the doctor.

A patient ignorant of the direction of the doctor's bias (but who nevertheless believes the doctor is biased) will be less trusting of either recommendation – and may also seek a second opinion.

In the worst-case scenario, the patient may not even know that the doctor has a bias and will trust that the doctor is being impartial about the drug.

Regulating for transparency

This analysis suggests that codes of transparency are more important than codes of conduct. Informed patients who know their doctor is biased are less likely to be misled. But medical associations, in a misplaced attempt to reduce the impact of drug promotion, have placed a greater stress on codes of conduct.

The New Zealand Medical Council has drafted code-of-conduct guidelines on the relationship between doctors and the pharmaceutical industry. Nowhere in these guidelines does it state that doctors should reveal to patients the extent of their interactions with drug companies. Instead, the guidelines attempt to ensure that doctors are not influenced by industry promotional activity: 'doctors may accept small personal travel grants and hospitality ... as long as the main purpose of the event is education'.

There is a problem with such codes: if they work, they become irrelevant. When doctors are restricted from accepting 'travel grants and hospitality', pharmaceutical companies will switch to other methods of influencing doctors that are outside the code of conduct legislation. Ultimately, if pharmaceutical companies have a will to influence doctors and doctors are willing to be influenced, such codes of conduct will not work.

Codes of transparency allow patients to judge the potential bias of their doctors. They also allow a differentiated market of doctors to develop. If some patients greatly value unbiased doctors, they would be willing to pay more to see a doctor who is revealed to be completely free of the influence of pharmaceutical companies. The higher fees would pay for the doctor to undertake their own continued medical education.

Doctors – and their professional associations – appear extremely reluctant to introduce such codes. There was a move in Australia last year to require drug companies to make their DTD activities more transparent; the Australian Medical Association reacted with the extraordinary statement that such a requirement would only 'serve to expose doctors and the pharmaceutical companies to public derision by people with unfounded prejudices'.[8] The way to eliminate unfounded prejudice is to expose it to light. Physician, reveal thyself!

1 R. Vaithianathan *Better the Devil you know to the Doctor you don't: Why prescribing drugs to doctors is more harmful than consumers* (http://yoda.eco.auckland.ac.nz/-rvaiooi).

2 MB Rosenthal et al. 2002. 'Promotion of prescription drugs to consumers' *New England Journal of Medicine* 346:7 pp498-505.

3 A Wazana. 2000. 'Physicians and the pharmaceutical industry – Is a gift ever just a gift?' *Journal of the American Medical Association* 283:3 pp373-80.

4 Ibid.

5 John Hooper. 2004. 'Over 4,000 doctors face charges in Italian drugs scandal' *The Guardian* 27 May 2004 (http://www.guardian.co.uk/italy/story/0,12576,1225576,00.html).

6 New Zealand Medical Council. 2002. 'A professional relationship with the pharmaceutical industry' (a draft code of conduct).

7 VP Crawford and J Sobel. 1982. 'Strategic Information-Transmission' *Econometrica* 50:6 pp1431-51.

8 'Drug companies scuttle proposal to reveal wining and dining of doctors' *The New Zealand Herald* 3 December 2003 (Employment Section).

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Strange Goings-On ...in the New Zealand Stockmarket ... Or Not?

Are stock prices primarily determined by hard-headed and rationally calculating automatons, or are they instead the result of emotive and irrational tendencies and beliefs? Before about 1960, it would have been difficult to find anybody who believed in the former and, while most practitioners never retreated from this position, theoretical and empirical research resulted in the consensus academic view doing a 180° turn. In the last few years, however, so-called behavioural considerations have prompted an academic re-think. Glenn Boyle surveys the history of this debate and reports on some recent New Zealand-based research.

Do sharemarket prices solely and accurately reflect economic fundamentals; or are they also partly the result of psychological whims and biases on the part of investors? Such a question was very much in the minds of Wall Street legends Benjamin Graham and David Dodd, who distinguished between a *weighing machine* in which stock prices reflect only economic fundamentals and a *voting machine* in which prices also have an emotive component.[1] Graham and Dodd inclined towards the latter classification. So did the great economist John Maynard Keynes, who described stockmarket pricing as being akin to a beauty contest.[2] More recently, and closer to home, the New Zealand Shareholders' Association asserts that 'to a significant degree, share markets reflect human emotion at least as much as the efficient pricing of risk.'[3]

The view that stockmarkets are essentially irrational first came under serious challenge in 1953 when Maurice Kendall showed that stock price changes appeared to be unpredictable.[4] Since truly new information about economic fundamentals arrives by definition in an unpredictable fashion, stock prices that reflect only economic fundamentals should themselves change in an unpredictable manner, just as Kendall documented. Academic economists (most notably Eugene Fama) subsequently applied rigorous statistical analysis to the question of whether stockmarkets are *efficient* (a weighing machine) or *inefficient* (a voting machine).[5]

The general consensus arising from this research was that stockmarkets are indeed efficient, at least for most stocks most of the time, and that any deviations from efficiency are short term in nature. More recently, however, this view has come under attack from behavioural economists, partly on the basis of laboratory experiments that highlight the ubiquity of investor irrationality, and partly from the prevalence of so-called anomalies in stockmarket pricing that cannot easily be reconciled with efficiency.

Talking the walk

The degree to which stockmarkets are efficient is of course important to everyone, not just to academic economists. If prices do not reflect economic fundamentals, then some stocks are over-priced while others are under-priced and traders with better information about which is which have a significant advantage. As a result, some traders (primarily individuals) are reluctant to enter the stockmarket because of

the risk of losing out to more informed investors, thereby reducing the total amount of capital available for investment. With the capital that is made available, firms cannot be sure whether stocks with a low expected return are low risk or simply over priced, and so cannot use stockmarket prices to determine the appropriate hurdle rate for justifying investment in some new project. Similarly, firms cannot use stock returns to assess and remunerate their top-level executives, thereby exacerbating the problems that arise from managers having different interests from their shareholders. Overall, inefficient stockmarkets lead to an inappropriate allocation of resources, with subsequent adverse effects on investment and economic growth.

From a policy perspective, the importance of efficient financial markets implies that resources should be devoted to removing as many barriers to efficiency as possible. But such a strategy makes sense if and only if there are actually significant inefficiencies to eliminate; otherwise any resources expended on attaining further efficiency would simply be wasted. This explains economists' attempts to empirically verify (or reject) market efficiency.

There are, however, significant problems in doing this. Assessing the extent to which actual market prices correspond to prices which reflect only economic fundamentals requires the identification of such 'ideal' prices. And such identification necessitates the use of some model of asset pricing in an efficient market. But if the chosen model is mis-specified, then any observed difference between actual and ideal prices may be due to problems with the model rather than to any violation of market efficiency. In short, this approach suffers from an inability to distinguish between two potentially competing hypotheses, which makes it impossible for it to resolve the market efficiency question.

Making it fit

In the last 10 years, behavioural economists have suggested, and implemented, a potential solution to this problem. They argue that the standard approach outlined above is akin to testing the hypothesis that 'all swans are white' by looking only for white swans. Instead, they suggest, it would be better to adopt the Popperian falsification principle and look for the financial equivalents of black swans – that is, examples of stockmarket pricing that are clearly inconsistent with market efficiency and are potentially consistent with inefficiency. Specifically, they focus on identifying 'economically neutral' events that psychology research has shown may have an effect on investor behaviour.

Because such events are independent of economic fundamentals, they cannot have a systematic effect on stock prices in an efficient market. But if markets are inefficient, and thus subject to behavioural and psychological influences, then these events may affect prices by inducing irrational impulses in investor behaviour.[6] Specific examples of economically neutral events that have been analysed in this way include sunshine hours, daylight-saving changes, lunar phases, public holidays, and Friday the 13th.

The results of this approach are heartening for efficient markets nay-sayers. All of the above events are (at least in some studies) systematically associated with movements in stock prices – a result that is 'explained' on the basis that each event affects the investors' mood and thus their buying and selling activity. The implication of this is that stockmarkets are inefficient.

This alternative approach is also not without problems. In particular, the huge number of possible economically neutral events means that chance alone ensures that some such events will have a statistically significant but spurious association with stock prices in some markets. Thus, the critics argue, the potential for data-mining means that the results of such studies should not be taken seriously.

Kiwi efficiency

Two recent New Zealand-based studies respond to this criticism by extending the alternative approach to a non-United States market and by examining a more compelling economically neutral event.

One study examines the reaction of New Zealand stock price indexes to several of the economically neutral events listed above.[7] Of these, only the holiday event has stockmarket returns that are statistically different from those on other days – and even this disappears in the post-1984 period, which is consistent with the view that the 1980s' reforms enhanced market efficiency.[8]

The second study focuses on sporting success and failure, an economically neutral event that psychology research suggests works through affecting individual self-esteem and, if anything, has a stronger effect on behaviour than changes in general mood.[9] The specific sporting contests analysed by the authors are All Blacks test matches, these being serious stuff to most New Zealanders. For example, former Wellington journalist Spiro Zavos describes the arrival of the 1956 Springboks as follows: 'The atmosphere when [the Springboks] finally landed in New Zealand resembled that of France when the first German troops stepped foot on its soil in 1939. There was fear, loathing for past humiliations, anxiety, awe, a fierce desire for revenge and above all a determination to win at all costs.'[10]

Similarly, recent All Black Jeff Wilson describes the atmosphere following an unexpected semi-final loss to France in the 1999 World Cup: 'Few criminals convicted of the most heinous crimes, few politicians whose deeds have a daily impact on the lives of all New Zealanders, have been villified as much as we were.'[11]

Despite such strong emotions, however, the research finds no evidence of any relationship between All Blacks success and stockmarket returns, regardless of the time period analysed, the frequency of the data used, or the classification of All Blacks success and failure.[12]

The results of these studies contrast with several from the United States, and this casts doubt on the ability of the 'anomalies' approach to effectively identify market inefficiencies. It is difficult to believe that the deeper, more liquid, and more transparent United States stockmarket is more inefficient than that of New Zealand. The question of market efficiency remains unanswered.

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1 B Graham and D Dodd. 1934. *Security Analysis*. McGraw-Hill. New York.

2 JM Keynes. 1936. *The General Theory of Employment, Interest and Money*. MacMillan and Co. London.

3 New Zealand Shareholders' Association. 2004. *Chief Executive Pay* (discussion document).

4 M Kendall. 1953. 'The Analysis of Economic Time Series Part I: Prices *Journal of the Royal Statistical Society* 46 pp11-25.

5 See, for example: E Fama. 1970. 'Efficient capital markets: A review of theory and empirical work' *Journal of Finance* 25 pp383-417; and E Fama. 1991. 'Efficient capital markets: II' *Journal of Finance* 46 pp1575-1618.

6 E Saunders. 1994. 'Testing the efficient market hypothesis without assumptions' *Journal of Portfolio Management* 20 pp28-30.

7 G Boyle, A Hagan, R O'Connor, and N Whitwell. 2004. 'Emotion, fear and superstition in the New Zealand stockmarket' *New Zealand Economic Papers* 38 pp65-85.

8 Several other events have mean returns that differ from the mean returns on non-event days in an economically significant manner, but these effects are swamped by the noise in daily return data and so are not statistically significant.

9 G Boyle and B Walter. 2003. 'Reflected glory and failure: international sporting success and the stock market' *Applied Financial Economics* 13 pp225-235.

10 S Zavos. 1979. *After The Final Whistle*. Fourth Estate Books Ltd. Wellington.

11 J Wilson with R Palenski. 2000. *Seasons Of Gold*. Hodder Moa Beckett. Auckland.

12 An earlier example of the sport-stockmarket link appears in: C Hedley. 1996. 'Investor behaviour and the America's Cup' BCom (honours) dissertation, Department of Finance and Quantative Economics, University of Otago. Hedley examined the relationship between KZ7 success and the stock price of Fay Richwhite, but this sheds little light on market efficiency since KZ7 results may not have been economically neutral events for Fay Richwhite.

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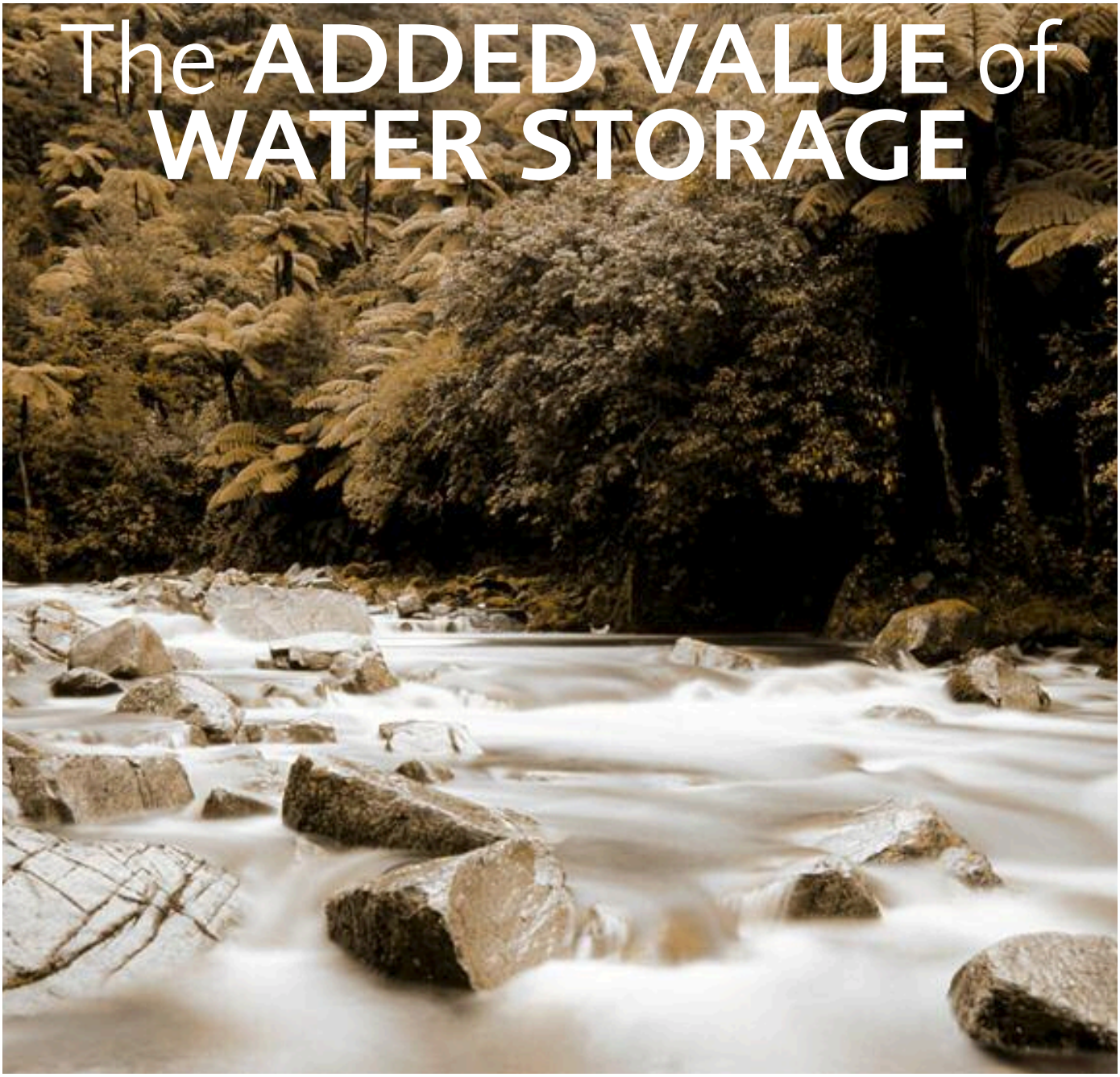
The ADDED VALUE of WATER STORAGE



Water resources in New Zealand and worldwide are becoming increasingly scarce – and with this comes a growing awareness that water, like any scarce resource, has value in its alternative uses. When water is an input into a production process, its value can be determined through the price of the commodity that's produced. But, as Kevin Counsell points out, the ability to store water may add an extra premium to its value. [1]

Water resources around New Zealand are coming under increasing pressure. The need for renewable electricity generation alternatives is fueling demand for water for hydro-generation; agricultural users are using more irrigation water to increase the value of their production; growing populations in the big cities require additional clean drinking water; and there is an increasing willingness to provide water for recreational, environmental and cultural needs.

With this pressure on our water resources comes the realisation that water has value in its alternative uses. Knowing the value of water in these different uses allows water to be allocated to the uses that value it the most. Yet, under the current administrative approach to water allocation, water value cannot be determined through transactions in the same way that (for example) land value can. There is thus a need to find a way of determining the value of water outside of market mechanisms.

Traditional methods

When water is applied to a production process (such as irrigating crops or generating electricity), its value can be inferred from the price of the commodity produced. Traditional methods for valuing water often take this approach. For example, the value of water in irrigation can be calculated by determining the contribution of a unit of water to the revenue of the irrigated crop, holding all other inputs constant. Or the value of water in hydro-generation can be calculated from the wholesale price of the amount of electricity that each unit of water generates.

More specifically, traditional approaches determine the contribution of an extra unit of

water to the output of the final commodity and multiply this by the average price of the commodity to gain a measure of the value of water.

For example, suppose a hydro-generator can generate one megawatt of electricity using one cubic metre of water in one second. This implies that one megawatt-hour (MWh) of electricity requires 3,600 cubic metres (m^3) of water. If the average spot price of 1MWh on the wholesale electricity market were $36, the value of $1m^3$ of water would be $0.01 (dividing $36 by $3,600m^3$).

The problem with this valuation approach is that it implicitly assumes that the water user will always immediately apply any water it has to its production process. That is, the water user will always accept the current price of the commodity. But if the water user has storage (which will especially be the case with hydro-generation but may also occur with irrigators using on-farm storage), the user can store water now and use it at a later date when the commodity price is higher. Hence, storage provides a water user with an option to use the water later. Traditional approaches may therefore underestimate the value of water, as they do not incorporate the value of this option into the value of water.

The value of options

When a water user has storage capacity, it can accumulate water now and release it at a later date. Thus, having water in storage gives the user an *option to release*. This option has value because the water can be held until a later date, when there is a chance that the price of the commodity (which the water is used to produce) is higher than the current price.

For example, a hydro-generator may want to generate less in summer, when demand for electricity is low and so too is the price of electricity. The generator would stand to make a greater profit if it released the water in winter, when the electricity price is likely to be much higher. Thus in summer the generator will retain its option to release, and in winter this option will be exercised when water is released from storage. The option's value comes from the volatility in electricity prices.

The option to release provides valuable flexibility in the timing of water *usage*. Storage capacity also provides flexibility in the timing of water *storage:* it gives the *option to store*. Specifically, the user does not have to utilise available storage capacity, but can instead apply water to its production process now and store water later.

Storing water is costly – the water user foregoes the price of the commodity it could obtain by applying water to the production process. So allowing the user to choose the timing of storage is obviously valuable. For example, a hydro-generator would not want to store water in winter as the foregone price from not generating is high, so it would hold on to its option to store until a later date. The option would be exercised in summer, when the foregone price from not generating is likely to be a lot lower. In this case, the option has value because the water can be stored in summer when there is a chance that prices foregone are lower than they are in winter.

The value of water when there is storage will be determined by incorporating not only the price of the commodity, but also the value of the options gained or lost from storage. The value of water to a water user with a storage facility will be determined by the value of the option that results from having the water in storage (the option to release) less the value of the option from not having the water in storage (the option to store). The water's value therefore includes not only the contribution of a unit of water to the price of the commodity produced, but also any extra option value that the water has.

Behaviour of the option value

The option value of water is unlikely to be constant, but will depend on the way water supply and prices change over time. It is straightforward enough to predict how this option value might change with changes in the current price of the commodity, if all other variables (river flows, levels of storage, etc) are held constant.

Firstly, it would be expected that the total value of water (including its option value) would have a positive relationship to the price of the commodity. This result is reasonably intuitive: if the price of (say) electricity or an irrigated crop were high, the water would have more value than it would if the price were low. This is because the payoff from the use of the water is higher.

But does the same relationship hold for the option-value element only? If the commodity price is very high, most of the total value of the water comes from the ability to use the water and obtain this high price. There would be very little value from using the water at a later date, and so the water has little option value. At lower commodity prices, however, the value of water determined only by these low prices would not be much.

Most of the water's total value would come from the user's ability to wait to use it at a later date, when prices are likely to be higher. It might therefore be expected that the option value of water would be negatively related to the commodity price.

Consider, however, the case where river flows are not held constant. If river flows and commodity prices are correlated, the option value could be positively related to the commodity price. If prices were very high in a drought and the drought was expected to continue for some time, there might be significant value in holding on to any stored water so that the water user could survive through the dry period. Thus the water has significant option value.

While the relationship between commodity prices and the option value of water is therefore somewhat ambiguous, the key point is that option value always adds a premium to the value of water. Hence, the finding that water has option value suggests that traditional approaches to valuing water (particularly where there is significant water storage such as for hydro-generation) may underestimate the value of water.

The growing scarcity of water means that society needs not only to use and allocate water wisely, but also to value water wisely. While buyer and seller interaction would be the ideal way to value water, non-tradability of water means alternative approaches to valuing water must be used. The concept that water has option value is important – and it needs to be incorporated into such approaches.

1 This article is based on Kevin Counsell's Master Thesis. 2004. *Methods for the Allocation and Valuation of Water Property Rights in New Zealand.*

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Compliance Costs: **PERCEPTION** versus **REALITY**

There's a widespread belief that compliance costs impose a significant burden on New Zealand businesses – especially small businesses – and even the government now recognises compliance costs as a serious constraint on entrepreneurship and economic growth. A study by Business New Zealand in 2003 concluded that firms employing 0-5 workers spend 313 minutes per week on compliance. Perception? Or reality? A recent study from Otago University has taken another look at the compliance burden, as Stephen Knowles explains.[1]

When the government passes a new law, or imposes a new rule or regulation affecting business, the cost to businesses of adjusting their behaviour to meet the new requirements is a compliance cost. Such costs can be monetary costs or opportunity cost (time). For example, the amount of time a business owner spends doing their GST return is a compliance cost, as is any money they pay someone else to do the GST return. Other common examples of compliance costs in New Zealand include doing PAYE and income tax returns, complying with health and safety regulations, negotiating employment contracts with a union or with individual staff, obtaining resource consents, or filling in forms for Statistics New Zealand. The amount of tax paid, however, is not a compliance cost – it may be a cost, but it is not a compliance cost.

Methods matter

The Business New Zealand estimate (313 minutes per week spent on compliance) was obtained by asking firms how much time they had spent on compliance in the previous twelve months. The 2004 Otago University study used a different methodology. As well as asking firms about their experience with compliance costs in the past, they asked firms to keep a diary and record the amount of time and money they spent on compliance at the time the cost was incurred.

Five different types of business were included in the Otago survey: cafes, motels, garages, hairdressers, and small engineering firms. All firms in the survey employed fewer than twenty workers, and over two-thirds of the sample employed fewer than five.

The study involved three stages. In the first stage, firms were interviewed about their attitudes to compliance costs and were asked which compliance costs they had faced over the previous twelve months. Twenty-five firms took part in this stage. Of these firms, eight thought compliance costs were a major issue, eleven thought they were a minor issue, four thought compliance costs were no issue at all, and two were unsure. So not all firms see compliance costs as a problem.

Of the firms that saw compliance costs as a major issue, one stated that they had not taken on additional workers because of the compliance costs involved and another said that compliance would make them think again before buying another business.

Dear diary

Firms were then invited to take part in the second stage of the study. This involved keeping a diary for three months and recording (at the time) how much time was spent on compliance – recording events as they happen is likely to produce more reliable data than relying on memory.

Eighteen firms saw this part of the study through to completion. The results are shown in Table 1. On average, firms spent 64.55 minutes per week on compliance, which is considerably less than in the Business New Zealand survey.

An obvious question to ask here is whether spending one or two hours a week on compliance is a lot of time or not. There is probably no correct answer to this question and, to someone running a business, this amount of time may well be a significant intrusion into the working week. Nevertheless, one or two hours a week is not a high proportion of a forty-hour working week.

The third stage of the survey involved doing a follow-up interview with each firm. Thirteen firms took part in this stage.

The information obtained from the weekly diaries (stage two) and from the follow-up interview (stage three) was then used to

calculate how much money was spent on the external cost of compliance – that is, how much was spent on compliance in addition to the opportunity cost of time. Examples of the external cost of compliance include paying an accountant to assist with tax returns, or paying for a membership to an organisation that a firm is required by law to belong to (such as the Motor Trade Association, which garages must belong to in order to issue warrants of fitness). The results are given in Tables 2 and 3.

Dollars a bigger problem than time

The first row of Table 2 gives the summary data for all compliance costs; the second row presents that data excluding payments to an accountant (which clearly make up the majority of these costs).

The average for all compliance costs is $110.19 per week. But there is a considerable degree of variation across firms, with a maximum of $464.05 and a minimum of $13.46. This shows that different firms do have very different experiences with compliance costs.

It should be noted that this figure for the average external cost of compliance is similar to the figure obtained in the Business New Zealand survey.

It is also possible to calculate the total (time-plus-external) cost of compliance as a proportion of the firm's turnover. These calculations are reported in Table 3. On average, firms spend 1.48% of their annual turnover on compliance, with a range of 0.42% to 3.46%. This is slightly higher than in the Business New Zealand survey. Spending 1% or 2% of turnover on compliance may not seem like a high figure – but, if firms have slim profit margins, this would represent a significant proportion of profits.

Something else to emerge from the follow-up interview was that most firms spend several periods of time a week dealing with compliance, rather than one solid block of time. Some firms pointed out that it was not the amount of time per week they spent on compliance that was the problem, but the number of time periods they had to devote to compliance issues. This is important from a policy perspective. Simply reducing the total amount of time spent on compliance will not satisfy these firms. What is needed is a reduction in the number of tasks.

The Otago University research suggests that small businesses don't spend as much time on compliance as was previously thought – but many of them do spend a significant sum of money on compliance issues. Some firms perceive compliance as a serious problem, and this may well be a disincentive to expansion.

1 This article is based on a paper by WRJ Alexander, JD Bell & S Knowles. 2004. Quantifying Compliance Costs of Small Businessess in NZ. (http://www.iscr.org.nz/documents/compliance%20costs.pdf).

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Table 1: Time spent on compliance per week, by firm type (minutes)

Firm type	Average	Median	Standard deviation	Maximum	Minimum
Motels	74.25	77.50	48.16	120.00	22.00
Cafes	56.75	55.50	43.18	110.00	6.00
Hairdressers	86.00	53.00	63.32	159.00	46.00
Engineering	80.00	109.00	51.10	110.00	21.00
Garages	35.00	38.50	18.57	53.00	10.00
All firms	64.55	49.50	44.08	159.00	6.00

Table 2: Time costs and external costs per week ($)

	Average	Median	Standard deviation	Maximum	Minimum
External cost	110.19	73.44	124.33	464.05	13.46
External cost *excluding accountant*	47.26	33.76	60.82	215.00	nil

Table 3: Costs of compliance per year and as percentage of turnover ($)

	Average	Median	Standard deviation	Maximum	Minimum
Time cost*	1,097.34	874.57	554.74	1,980.16	544.54
External cost	5,729.88	3,818.88	6,464.98	24,130.60	699.92
Total cost	6,827.22	5,171.99	6,394.84	25,005.17	1,458.98
Total cost as percentage of turnover	1.48%	1.24%	1.00%	3.46%	0.42%

* = based on the New Zealand average hourly rate of $19.04.

Independence and Incentives at NZX DISCIPLINE

The recent Access Brokerage default highlighted some potential conflicts arising from the multiple roles that the demutualised and privately owned New Zealand Exchange (NZX) has as marketplace owner and operator, regulatory monitor and enforcer, and listed company. Drawing on work earlier this year by Veena Mishra, Lisa Ryan takes another look at these conflicts.

The former NZSE, as a mutual organisation, comprised members who traded on the exchange. The failure of any single member created financial obligations and imposed reputational costs on all other members. This created a strong incentive for members to monitor each other and intervene at an early stage if there was evidence suggesting that the behaviour of one member might affect the group's collective welfare. The Access Brokerage failure raises the question of whether NZX's new discipline rules provide equivalent incentives to monitor participants' behaviours, detect potential breaches, and act upon them in a fair and timely manner.

The discipline rules establishing the new regulatory body NZX Discipline came into force on 3 May 2004. NZX Discipline determines whether there has been a breach of NZX's rules and also determines appeals from waiver and ruling decisions made by NZX Regulation.

The new body, it was claimed, would achieve the goal of one simple, consistent, fair and transparent structure for listed issuers and all market participants. Its membership comprises two legal appointees, two market participants, two company directors of listed issuers, eleven members of the public, and five NZX representatives. NZX accepts nominations for NZX Discipline and its appointments are confirmed by the Securities Commission. A special division of NZX Discipline, comprising three independent members selected by the chairperson of NZX Discipline and confirmed by the Securities Commission, monitors NZX as a listed company.

Potential conflict

The dual roles of marketplace provider and industry regulator place NZX in a position of potential conflict. In particular, its interests as a company that makes commissions on market transactions are at odds with the requirement to discipline, or even suspend from trading, a malfeasant dealer whose transaction volumes influence NZX's financial performance. The significant power NZX holds in the selection, appointment and remuneration process for NZX Discipline members also raises concerns about the true nature of the latter's 'independence'. For example, NZX management may inadvertently select members with a philosophy similar to their own – resulting in 'group think' mentality or decisions in NZX's favour.

Given that a key focus of NZX is to retain its major listed issuers and expand the number and size of listings, NZX has an obvious incentive not to lean too heavily on the higher-transacting companies listed on its exchange. If this mentality also permeates NZX Discipline, then surveillance may be laxer and penalties more lenient than is desirable for a properly functioning stockmarket. The penalties system that was originally proposed also raised concerns. Any fines levied had the potential to add directly to NZX's bottom line (thereby distorting disciplinary incentives), and were not subject to appeal.

The X-factor

NZX explicitly rejected most of these criticisms, maintaining that the proposed structure was in line with international practice and that safeguards prevented a conflict. It did, however, amend the rules to include an appeals process – and it will direct income from penalties into a fund exclusively for educational and regulatory purposes.

Overall, the NZX view is that its ability to increase trading volume, and therefore its own profitability, relies heavily on trust and the reputation of the marketplace, and so it does have incentives to punish any breaches of its conduct rules. While there is obvious merit in this argument, its empirical relevance is unclear: there is some evidence that macroeconomic performance matters more than regulatory policy when it comes to establishing market confidence.

A contrary view comes from the IMF's *Financial System Stability Assessment*, released in May this year. This report encouraged the Securities Commission to develop a program for monitoring NZX's continued operational capability and fitness to perform its regulatory functions. It also recommended that either NZX adopt a broader definition of 'independence' for the members of NZX Discipline's Special Division or that disciplinary functions in respect of NZX be transferred to an independent body such as the Securities Commission, in order to better manage this conflict.

The failure of Access Brokerage has provided an unexpected test of NZX's regulatory regime. It will be interesting to see if this gives rise to a review of NZX's multiple roles and the conflicting incentives to which they give rise.

1 V Mishra. 2004. 'A Study of the Quasi Self-Regulatory Governance Structure of the New Zealand Securities Market' (available on request from ISCR).

2 A former member of the earlier Market Surveillance Panel has claimed that NZX warned the panel not to be too hot-headed or heavy-handed in using remedies for listing-rule breaches and that several larger listed companies used to bully the exchange. See 'Lawyers take aim at NZSE rules revamp' *National Business Review* 14 March 2003.

3 J Lawrence. 1999. 'The Economics of Market Confidence: (Ac)Costing Securities Market Regulations' (http://cclsr.law.unimelb.edu.au/research-papers/economic-market.html).

4 International Monetary Fund. 2004. *Financial System Stability Assessment* (available at http://www.imf.org/external/country/NZL and at http://www.imf.org/external/pubs/ft/scr/2004/cr04126.pdf).

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