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HIGH-FLYING competition

It goes on and on ... Air New Zealand and Qantas continue to pursue approval for a cartel in trans-Tasman flights, most recently with New Zealand's Ministry of Transport and the Australian Competition and Consumer Commission. They've been refused approval in the past, because of regulatory concerns about the effect on prices. Tim Hazledine and Callum MacLennan report on some new research findings[1] that suggest the regulators are justified in their concern.

Probably more than any other industry, air travel has successfully practised what the airlines call yield management and economists call price discrimination – the practice of charging different customers different prices for the same or similar products, based on differences in their perceived willingness to pay.

Of course, differences in willingness to pay are pervasive across markets. That's basically why demand curves slope down. But usually the preconditions for successful price discrimination are not present. It may be difficult to identify the consumers with higher willingness to pay – certainly, they're not going to volunteer this information! Or it may be difficult to prevent the high-value customers from purchasing at the lower price offered to others, either directly or via arbitrage. Or it may simply not be worth the bother of incurring the transaction costs involved in setting up elaborate pricing schemes for low-value goods or services.

Air travel is different. It is a quite expensive item, which makes it worthwhile to invest resources in optimising yields. And it's easy to prevent arbitrage: tickets are named and cannot be used by anyone else. Even more importantly, it's possible to successfully partition customers into high- and low-value groups according to their willingness to accept some inflexibility in their travel arrangements. There is a strong negative correlation between willingness to pay and unwillingness to commit to an itinerary well in advance.

The classic instrument for taking advantage of this has been to attach advance-purchase restrictions on cheaper fares, to which American Airlines in 1985 added the clever innovation of requiring that these fares be offered only on return tickets involving a Saturday night stay-over, as a means of discriminating between leisure and business travellers. This restriction was widely adopted and was undoubtedly very effective at keeping business travellers away from the cheap tickets. Unfortunately, though, the price of this was that many leisure travellers would also be put off – as they were in increasing numbers with the rise of LCCs (low-cost carriers such as Ryanair and Southwest), which offer simple one-way itineraries and fares.

Back to basics

In November 2002, in response to these trends, Air New Zealand introduced a radically different pricing system with its 'NZ Express' fares for travel on domestic routes. These one-way fares eliminated the restrictive 'fence' raised by the Saturday night stay-over requirement, making the new fares attractive to all travellers. Their prices were also generally lower, so that now the airline's risk was that it would 'cannibalise' its high-profit-margin business travel market. Overall, NZ Express was a bold attempt to increase profits by reducing prices and making air travel simpler (the in-the-air product had the

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service frills such as hot meals and business-class seating stripped out of it). The innovation was quickly copied by Qantas, and then extended to trans-Tasman routes.

Our research analyses pricing behaviour under the new regime, making use of the web-based booking systems that provide a transparent and easily accessible source of air-fare data. We focus on **two questions** that are of interest in themselves and also have implications for policy issues in respect of the proposed trans-Tasman cartel.

First: Does the 'old' oligopoly model, in which price-raising power is linked to market structure (number and market shares of competitors), still hold? Given the greater transparency of fare offerings now, and given also the actual or potential threat of competition from LCCs such as Pacific Blue (Virgin), have cross-price elasticities increased to the point where price differentials between airlines can hardly be sustained, no matter how large their size or market share?

Second: Would the new competitive forces have wiped out most of the potential for imposing price differentials across customers – that is, the airlines' traditional price discrimination based on willingness to pay?

1001x8x21=?

We collected data on 1001 flights on 8 domestic New Zealand and 21 trans-Tasman routes (counting, for example, Auckland-Sydney and Sydney-Auckland as separate routes for this purpose). The New Zealand routes and the Auckland-Sydney route were observed for Wednesday flights in November and December 2004, and January 2005. The trans-Tasman routes (including again Auckland-Sydney) were observed for three Wednesdays in July 2005.[2] Some of the domestic routes were Air New Zealand monopolies; some were served by Air New Zealand and Qantas; and some Tasman routes were also served by Emirates and/or Pacific Blue. For each flight, we took the lowest price offered on the websites weekly from eight weeks before flight date, with daily observations in the last week before the flight.

We then constructed a weighted average of these prices, divided this by the length of each flight in kilometres, and used the result as the 'dependent variable' to be explained in a standard econometric model. In this model, the explanatory variable of key interest is the standard Hirschman-Herfindahl measure of the extent of structural competition on each route.

Air New Zealand is able to set its lowest prices higher than the other airlines – about 8% higher than its main rival Qantas and more than 20% higher than the fringe competitors Emirates and Pacific Blue.

Fare go

We found that the Hirschman-Herfindahl measure does indeed have a statistically significant relationship with prices – implying, in particular, that routes served by just one carrier have prices around 20% higher than duopoly routes do.

It has been suggested that the Tasman market is 'more competitive' than other airline markets. This could mean that it has lower prices for a given level of structural competition (a different pricing model or regime). Or it could mean that it has lower prices because it has more structural competition (a different market, with more carriers). Our findings support the latter interpretation: the underlying pricing model is the same for all the routes, and so lower prices on some Tasman sectors are attributable to the presence of Pacific Blue and/or Emirates.

It is interesting to focus on the Tasman market, in particular because data on available capacity and seats actually sold are available for these routes from the Australian Bureau of Transport and Regional Economics. We might expect that empty seats would generate some downward pressure on fares. When we add a variable for the ratio of passengers carried to seats available on each route, we find that this ratio is indeed linked to the prices offered by individual airlines: pricing on a route is systematically related to the size of the overhang of empty seats. A difference of five percentage points in the ratio of seats sold to seats available (for example, going from 70% to 75% utilisation) is associated with an almost equal difference in prices, other things held equal. In other words, as utilisation rises, prices rise at about the same rate.

In the Tasman model we also used what are called 'dummy variables' to isolate any airline-specific pricing effect. The results of this are also very interesting. We find that, after controlling for the other factors (flight distance, measure of competition, utilisation rate), Air New Zealand is able to set its lowest prices higher than the other airlines – about 8% higher than its main rival Qantas and more than 20% higher than the fringe competitors Emirates and Pacific Blue. These are substantial differences, and they are difficult to reconcile with any notion that the new airfare regime has resulted in homogenisation of prices across airlines.[3]

Buy now or pay later

What about price discrimination? The airlines can still take good advantage of the linkage between willingness to pay and ability to commit to travel in advance of a flight, by raising the lowest-offered fare as the flight date approaches. In yield management jargon, 'buckets' of low price tickets are removed from the market and replaced by higher-priced buckets over the weeks before

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The mafia as protectors of property rights

The mafia is usually associated with lawlessness, violence and thuggery – crimes against person and property. Ironically, however, insights from economics suggest that the origins of the mafia in Sicily during the 19th century may have been due to a desire to reduce crime. As René Le Prou and Glenn Boyle discuss, the mafia can be seen as an institution that arose to fill a void in property rights protection.[1]

At the beginning of the 19th century, Sicily had a feudal system in which barons (who used private armies to protect their property) controlled large areas of land. This system was gradually abandoned over the century, with land being nationalised by the state and subsequently redistributed. The result of these policies was a ten-fold increase in the number of private property owners in Sicily between 1812 and 1860.

But the land redistribution saw productivity fall, which in turn led to declining living standards. As a result, many peasants turned to banditry in the countryside, with cattle-rustling becoming increasingly common. Compounding the problem of banditry was a lack of urban settlements within rural areas, which reduced the landowners' ability to protect their property at night. A public police force did exist, but there were only 350 officers for the whole island and those involved in policing were typically former bandits themselves. Such unwelcoming conditions in the countryside generated a strong demand for the private protection of property rights.

The emergence of the mafia in response to this demand can be seen as having occurred in two stages. In the first stage, landlords offered the mafia payment to protect their land from theft, the amount of which depended on the value of the assets being protected and on the potential effectiveness of the protection. In the second stage, the mafia chose the portfolio of offers that maximised their profits. Because an unprotected landlord was more likely to be the victim of theft, protection had value for an individual landlord. But protection also imposed a negative externality on others: if one landlord were protected, this would deflect thieves on to other landlords' unprotected properties. Similarly, protection of an additional landlord reduced the value of protection to those already protected: in the absence of sufficient unprotected properties, thieves would target protected properties. This reveals a classic prisoner's dilemma: it was optimal for individual landlords to purchase protection in order to deflect thieves; but uniform protection would simply result in thieves stealing from protected landowners (thereby making landowners, as a group, worse off because they were paying for ineffective protection).

> Data from the 1881 Sicilian Parliamentary Survey … reveals that both the presence and intensity of mafia activity was positively related to the number of landlords in a region.

In these circumstances, a landlord's willingness-to-pay depends on the extent to which his protection ensures that he will not be the victim of theft. If theft is still a possibility even after protection has been paid for (because too many other landlords were also protected and so bandits had no option but to target protected properties), then the size of that payment would be correspondingly smaller. But as the number of landlords in a region rises, so does the competition among them to be one of this 'exclusive' protected group – and this, in turn, leads to greater mafia profits.[2] Consequently, if the mafia did indeed arise in response to a demand for private protection of property rights, then the mafia is more likely to have been present, and to have displayed a greater level of activity, in regions with a large number of landlords.

In fact, this is exactly what happened. Data from the 1881 Sicilian Parliamentary Survey (which provides information on mafia activity and the number of landlords across 70 villages in the west of Sicily) reveals that both the presence and intensity of mafia activity was positively related to the number of landlords in a region.

How can this economic view of the mafia as a protector of property rights be reconciled with its traditional role as a violator and extorter of these rights? In fact, one followed naturally from the other. Having acquired a reputation for violence through its provision of enforcement services for landowners, the mafia was then in a unique position to exploit this by threatening and extorting other merchant classes.

Following the demise of feudalism, the Sicilian mafia met demand for property rights protection in the absence of adequate public provision. Although the landowning class it protected was ultimately made worse off by this service, the negative externality generated by protection meant that individual landlords initially found it to be in their best interests. Such are the consequences of inadequate state protection of property rights.

1 See Oriana Bandiera. 2003. 'Land Reform, the Market for Protection, and the Origins of the Sicilian Mafia: Theory and Evidence' *Journal of Law, Economics and Organization* 19(1) pp218-244.

2 As the number of landlords becomes large, the share of land owned by each landlord becomes small. If this goes far enough, a landlord's willingness-to-pay to exclude others from protection diminishes, because the marginal excluded landlord is too small to ensure that his exclusion makes the protected property immune from theft. At this point, mafia profits become independent of the number of landlords.

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AGREEING TO DISAGREE:
When Cooperative Governance is Best

In popular theory, cooperative organisations are the poor relations of vastly superior investor-owned firms (IOFs). They are seen as less innovative, poorly governed, and bound by financing constraints that arise from their traditionally non-tradable and non-market-valued ownership rights. Yet a closer look at the theory and evidence on these matters paints a very different picture – as Richard Meade explains.

A cooperative can be defined as an organisation in which those who transact with the organisation also own and formally control it, and derive significant benefits from those transactions over and above any financial returns they derive from their investment in it. IOFs, by contrast, typically reward their owners solely through investment returns, with little if any benefit derived from their owners' patronage of the firm.

The reality is that cooperatives are an enduring organisational form in many (often rural) sectors. Moreover, they are often the only viable form of organisation in sectors that are declining or experiencing 'bad times', or in sectors where investment returns are insufficient for attracting IOFs to provide necessary goods or services. They can also coexist with IOFs in any given industry. So it is instructive to examine the cooperative form, to identify when and where it is superior to that of IOFs.

Cooperatives provide a troublesome counter-example to the popular idea that good governance requires voting rights vested in proportion to invested capital, and that it also requires the use of high-powered incentives such as profit-related bonuses to ensure that managers best serve their shareholders' interests. Traditional cooperatives – although not the contemporary 'new generation cooperatives' (NGCs) – allocate a single voting right to each of their members, irrespective of their relative capital contributions. Furthermore, evidence exists that cooperatives make less use of performance-based pay than do their IOF counterparts, and that they are less likely to tie performance-based pay to realised firm sales (rather than target profits). Indeed, since cooperative shares are traditionally non-traded, cooperatives cannot even be listed on a stock exchange – and hence they typically lack both market scrutiny and the important performance measure provided by a listed share price. (But the very same can be said for the vast majority of New Zealand firms and other organisations, which are also not listed on any stock exchange.)

So is cooperative governance good or bad, given that it differs markedly from the sometimes one-size-fits-all governance prescription emerging after prominent corporate scandals like Enron? The short answer is that, even though traditional cooperative governance may be bad, it is not necessarily worse than the governance of IOFs (particularly in those circumstances where cooperatives most naturally arise). A longer answer would point out that cooperatives also rely more heavily on certain governance mechanisms than do IOFs, and that this compensates for their perceived governance deficiencies.

Necessary – and not even evil

Cooperatives often (but not always) arise where multiple, competing suppliers of a perishable and homogeneous product face downstream market power in their supply chain. If these individual suppliers are left to sell into spot markets, or to contract with a downstream IOF, they are vulnerable to market uncertainty or possible abuse of market power. Conversely, if no IOF finds it profitable to provide them with downstream services, these suppliers have no surety of being able to sell their products or services in a timely fashion. Hence cooperatives. These suppliers club together to own their downstream counterparty, thus diminishing the risk of any market-power abuse (since they enjoy the profits of any such abuse, distributed to them in proportion to their patronage). Or they club together to provide a market that otherwise would not exist. It should therefore come as little surprise that the cooperative form is the internationally dominant ownership model in the dairy-processing sector – just think of the relative homogeneity and high perishability of milk, and the economies of scale in dairy processing that require large and often geographically-confined processors.

Certain features of such industries suggest that strong financial-performance-related ('high-powered') managerial incentives may not be ideal for them. In particular, the common use of cooperatives for processing and marketing agricultural products implies that cooperatives often operate in industries facing seasonal and weather-related variations

in product supply that are beyond cooperative managers' control and that require cooperatives to carry additional processing capacity (which an IOF, on economic grounds, might prefer not to carry). And where managers of the downstream plant are obliged to process whatever product their owners supply as and when it is supplied, this too diminishes their ability to control the firm's output. More fundamentally, since cooperative owners are concerned to a greater degree with their patronage returns (the payments they receive on their product supplies) than with investment returns, it is natural for cooperative managers to focus on maximising total supplier returns rather than simply on the value of their part in the supply chain. Cooperative managers' lack of discretion over their input supplies, their common exposure to weather-related vagaries, and their focus on total supplier-level returns imply that softer or less financial-performance-related (i.e. 'low-powered') managerial incentives are often appropriate – for example, greater reliance on fixed rather than profit-related pay.

Various mainstream organisational academics also lend weight to this view. As Holmstrom and Milgrom put it: 'an optimal incentive structure may require the elimination or muting of incentives which in a market relationship would be too strong. Thus the use of low-powered incentives within the firm, although sometimes lamented as one of the major disadvantages of internal organization, is also an important vehicle for inspiring cooperation and coordination.'[1] While this remark was not directed specifically at cooperative organisations, it is particularly apt – especially where cooperatives are formed to counteract downstream market power. Interestingly, it suggests that reliance on softer incentives at the cooperative level may reduce the risk of conflict among the cooperative's owners. This in turn possibly explains why non-proportional voting (each member having a single vote) has survived in traditional cooperatives, despite the many problems that can be caused by separating control rights from investment levels. Perhaps the greater 'cooperation' engendered by low-powered firm-level incentives compensates for the conflicts that otherwise arise in cooperatives under such a voting system?

Hart and Moore go so far as to argue that both cooperatives and IOFs are inefficient organisational forms in their own ways, but that cooperatives work best when the owners and the owners' preferences are homogeneous.[2] Under such circumstances, allotting each owner a single voting right is an efficient (or perhaps merely the least inefficient) way of giving owners clarity and of protecting those owners with smaller cooperative patronage against abuse by those with larger patronage. Thus, softer incentives combine with supplier homogeneity to make the traditional cooperative control system work more efficiently than it would in an IOF that has owners with heterogeneous ownership stakes and managers with stronger financial-performance-related incentives.

The members-owners of cooperatives are unable to diversify their investment risk and so have particularly strong incentives to monitor cooperative performance.

Compensating advantages

But what of other useful governance features peculiar to (or simply more commonly used in) cooperatives? There is some evidence that cooperative boards interact more frequently with their managers than IOF boards do. Thus more-frequent managerial monitoring might serve to substitute for relatively impersonal performance-based pay mechanisms.

What's more fundamental, however, is that cooperatives may have many small owners (and thus lack the single strong voting block that is so often found to be a useful governance discipline in IOFs); yet these owners relate to their firm in a way that compensates for the lack of ownership concentration. In particular, cooperative owners often have a considerable part of their investment capital tied to their cooperative (as is the case with dairy farmers owning Fonterra) and they receive the largest part of their income through patronage returns from their cooperative (the annual dairy payout). This means that, like the owners of unlisted IOFs (and, in particular, family-owned IOFs), the members-owners of cooperatives are unable to diversify their investment risk and so have particularly strong incentives to monitor cooperative performance. Furthermore, they are (typically) committed long-term investors, either unable or unwilling to withdraw their capital invested in the cooperative. The resulting repeated interaction enhances their ability to monitor cooperative performance, and means they rely more on 'voice' than on 'exit' when dissatisfied with that performance. Thus cooperative ownership brings its own governance advantages to compensate for any disadvantages that it might be argued to suffer, relative to IOFs.

Increasingly, as global market circumstances evolve, we see traditional cooperatives adapting their organisational form to better serve their owners' interests. Cooperatives like Fonterra sometimes adopt various NGC-like characteristics (such as more proportional voting rights, contracted supply commitments, or market-value-based entry and exit prices for cooperative shares). Where they do so, they relieve certain of the problems associated with the traditional cooperative form – such as limited access to equity capital, or the investment distortions that arise from non-market-value cooperative shares. They do this at the expense of certain traditional cooperative benefits, however; and, in the extreme, can destabilise the cooperative model by escalating divergences of owner or owner/supplier interests.

Given that traditional cooperatives are typically first formed in response to imperatives such as downstream market power, any adaptations in the cooperative model will involve tradeoffs between the perceived gains from adopting this form of organisation and the remaining costs associated with those imperatives. Unless and until these imperatives abate altogether, we should conclude that the cooperative form of governance may not always be 'good', according to simplistic theoretical or otherwise received benchmarks – but it can still be 'best'.

1 B Holmstrom and P Milgrom. 1994. 'The Firm as an Incentive System' *American Economic Review* 84(4) September pp972-991.

2 O Hart and J Moore. 1996. 'The Governance of Exchanges: Members' Cooperatives versus Outside Ownership' *Oxford Review of Economic Policy* 12 (4) pp53-69; and O Hart and J Moore. 1998. *Cooperatives vs. Outside Ownership* National Bureau of Economic Research Working Paper 6421.

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EMISSION PRICING: avoiding both the *rock* and the *hard place*

For at least thirty years, environmental economists like ANU's Jack Pezzey have been urging governments to control environmental quality by using indirect and artificial market forces as well as – or even instead of – direct regulation. Here Dr Pezzey explains how payment thresholds can be used to balance the politics and the economics of emission pricing.

The two main devices that would create such market forces are an environmental tax and tradable environmental permits. There are many different environments to which these devices could be applied – and there are many different names for them. A tax could be called a fee, levy, or charge; and a tradable permit could be called a marketable allowance or a transferable licence (and so on). Here, I will use just the example of air quality being harmed by polluting emissions which are well mixed in the atmosphere, and will refer only to an *emission tax* or *tradable emission permits* (although the range of environmental applications is much wider). When an emission tax and tradable emission permits are considered together, they will be called *emission pricing*, since they both require all emitters to pay the same price (say in dollars per tonne) to increase their emissions by one unit, just as buying an extra kilo of broccoli costs all customers the same price in a supermarket.

Economists recommend emission pricing because in theory it has several cost-saving features. One is that emitters will choose their emissions level so that all their marginal costs of controlling emissions by one more unit equal the same emission price, which minimises total control costs. Another is that new emitters entering the industry have to pay the full environmental cost of their emissions (as they should). And emission pricing rewards innovations that lower the cost of emissions control, no matter how low emissions have already fallen.

More realism needed

If anything like emission pricing's full potential for cost-saving is ever to be realised, economists and policymakers need to approach emission pricing in a much more flexible and politically realistic way than they have up till now. At the moment, however, the vast majority of economists analyse (and discuss as policy options) just three 'polar' forms of emission pricing:

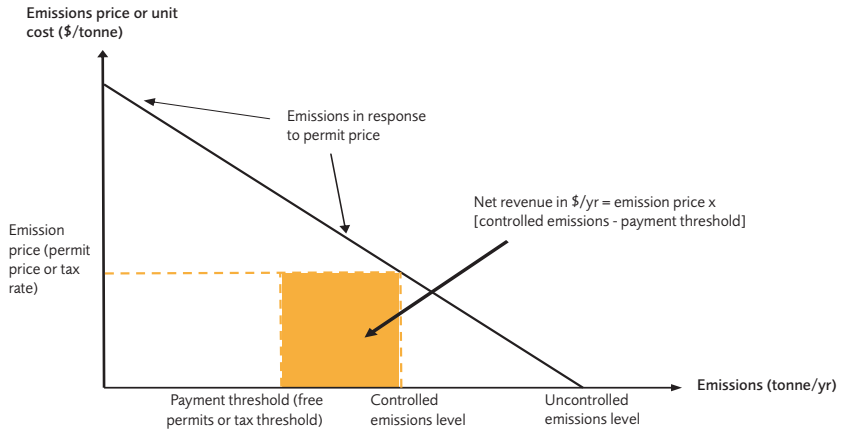
- a pure tax on all emissions
- tradable permits that are initially all auctioned
- tradable permits that are initially all distributed free ('grandfathered') to polluters.

Many economists now advise that to maximise net benefits, only the first two forms should be used. This is in order to maximise the revenue from the tax or from tradable-permit auctions, so that the rates of existing taxes on labour and capital can be lowered by as much as possible and thus cause less distortion of various market choices such as between labour and leisure. Such 'revenue-raising' advantages are now considered all the more important because, in the 1990s, many economists showed there are also distorting interactions between emission pricing and existing taxes. Such distortions lower the net benefit of emission pricing considerably – and pricing that raises no revenue imposes a net cost if the price is very small.

The problem with this advice is that maximising revenue by taxing all emissions or auctioning all tradable permits is now (and always has been, and always will be) politically impossible, because of the power exerted by existing polluters' interest groups. Two prime examples come from the early 1990s, when the European Commission's proposals for a carbon tax on almost all emissions were politically defeated, while the US sulphur-emissions-trading scheme (which made 97% of tradable permits initially free) was success-

fully adopted. By setting an agenda of just three (polar) mechanisms, and arguing for just two of them on net benefit grounds, economists set up an unwinnable choice between a rock and a hard place. The 'rock' is fully free tradable permits, which is politically acceptable though maybe of zero or negative net benefit; the 'hard place' is full tradable-permit auctioning or a pure tax, which gives most net benefit but is politically unacceptable.

Figure 1: How payment thresholds reduce the revenue raised by emission pricing, while leaving the emission price unchanged



Avoiding the shipwreck

Neither the rock nor the hard place need to be chosen, because intermediate forms of emission pricing are readily available. In tradable permits, the obvious intermediate form is *permits being partially free* (with the rest being auctioned). In an emission tax, it is the little-known option of giving existing emitters *tax thresholds*. To maximise efficient entry and exit of emitting firms, such thresholds should ideally be quasi-property rights[1] – effectively a bond that pays the bearer the threshold size (in tonnes per year) x the current emission tax rate set by the regulator (in dollars per tonne) forever. In either case, emitters individually and in total then have *payment thresholds* – free tradable permits, or tax thresholds – so that their net payments to the environmental protection agency or just 'regulator' (and hence the net revenue received by the regulator) are:

emission price x
(controlled emission level - payment threshold).

This formula is illustrated in Figure 1. With tradable permits, the regulator creates permits equal to the controlled emissions level, and the market determines the permit price in response. With a tax, the regulator sets the tax rate, and total emissions are determined in response. In both cases, the regulator's choice of payment threshold affects neither emission quantity nor emission price. The threshold is chosen anywhere between 0% and 100% of controlled emissions – whatever gives the best balance between the political rock of ensuring acceptability and the economic hard place of maximising overall net benefit. Just how the threshold is distributed among emitters, consumers, and other interests will doubtless be contentious; but in principle the problem is solvable, unlike the rock-versus-hard-place dilemma.

Such arguments are central to the purpose of environmental economics. They bring the beneficial power of market forces to bear, in reality rather than just in textbooks, on the pressing and costly problems of environmental management. The idea of using payment thresholds to help solve the crucial problem of making market mechanisms of emissions control politically acceptable is nowhere refuted by current academic writing. It is, however, ignored (the overwhelming case for tax thresholds) or relegated to minor footnotes (often the case for partially free tradable permits).[2] As long as this oversight persists, many economists writing on market-based emissions control are in effect wasting their breath, in terms of any effect they may have on policy. Recent conversations suggest that policymakers are in fact more attuned than academics to the idea of selling some but not all tradable permits, but that the idea of tax thresholds is still completely overlooked.

It's a gas, gas, gas

Just how much payment thresholds could increase the net benefits of emission pricing can be shown in the case of controlling global emissions of greenhouse gases (GHGs). My ANU colleague Frank Jotzo and I applied a simple model under certainty (where emission pricing could equally be tradable permits or a tax with thresholds) of the net benefits of using emission pricing to control GHG emissions in 2020 below a predicted business-as-usual level of 54 $GtCO_2/yr$.[3] We assumed firms' direct costs of emissions control – the sum of their direct control costs, and their net payments to the regulator under emission pricing – are politically constrained to be less than 10% (a somewhat arbitrary but realistic figure) of the environmental damage caused by uncontrolled emissions. Net benefit is the benefit of reduced emissions, minus the cost of emissions control (allowing for distortionary effects), minus the distortionary cost of the payment threshold which reduces the revenue raised. In choosing an emission price to maximise net benefit subject to the political constraint, we compared leaving the payment threshold flexible with setting it to zero (representing a pure tax or fully auctioned tradable permits). If environmental damage costs $\$50/tCO_2$ ($ are 2000 US dollars), then using a flexible threshold results in about two-and-a-half times as much emissions reduction and about 10% more net benefit as with no threshold. If damage costs $\$75/tCO_2$, the advantage of a flexible threshold over no threshold is much higher: nearly five times more emission reduction, and about four-fifths more net benefit.

To get market forces to work on lowering the costs of emission control, there is thus no dilemma between a rock and a hard place. The dilemma just has to be avoided, by choosing a payment threshold (the level of free permits, in the case of tradable emission permits; a threshold much like an income tax threshold, in the case of an emission tax) that balances politics and economics. The payoff from such pragmatism could be huge.

1 As tradable permits are. This point is explained in: J Pezzey. 1992. 'The symmetry between controlling pollution by price and controlling it by quantity' *Canadian Journal of Economics* 25.

2 For examples of conventional treatments see: RN Stavins. 2003. 'Experience with market-based environmental policy instruments' in KG Mäler and J Vincent eds *Handbook of Environmental Economics* (Volume I). Elsevier Science. Amsterdam; and TH Tietenberg. 2006. *Environmental and Natural Resource Economics* 7th edition. Pearson Addison-Wesley. New York.

3 Our model of the interaction between emission pricing and an existing labour tax comes from LH Goulder et al. 1999. 'The cost-effectiveness of alternative instruments for environmental protection in a second-best setting' *Journal of Public Economics* 72. All other data come from F Jotzo and JCV Pezzey. 2005. 'Optimal intensity targets for emissions trading under uncertainty' *Economics and Environment Network Working Paper* EEN0504 (http://een.anu.edu.au).

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Has the **CONTINUOUS DISCLOSURE** regime had an impact on **CORPORATE BEHAVIOUR?**

The increasingly integrated global economy and the recent spate of corporate scandals have led to renewed interest in the identification and adoption of best-practice capital market governance. New Zealand is no exception – and, in an attempt to raise the integrity and confidence in the country's capital market, the government introduced statutory sanctions to support the New Zealand Stock Exchange's (NZX's) continuous-disclosure listing rules. But have the sanctions made a difference? Gerry Gallery, one of the authors of a recent study on this,[1] says yes – and no.

The new continuous-disclosure provisions of the Securities Market Amendment Act (2002) require public issuers 'to notify information about events or matters as they arise for the purpose of that information being made available to participants in the registered exchange's market'. And – perhaps more importantly – since 1 December 2002 the Securities Commission has had the power to impose criminal or civil penalties (up to $300,000) for breaches of the these continuous-disclosure provisions.

In many aspects the new disclosure regime resembles the Australian continuous-disclosure model. While trans-Tasman harmonising of disclosure rules has its benefits, particularly for cross-listed firms, it has been argued that compliance costs will increase disproportionately for companies listed only in New Zealand.[2] And it has also been argued that the benefits of continuous disclosure could have been more efficiently achieved by strengthening the enforcement mechanisms contained in the previous stock-exchange listing rules and securities laws.[3] This raises the question: what sanctions are necessary to ensure that managers disclose information on a timely basis?

Strategic disclosure

The literature suggests that managers balance conflicting interests in deciding to disclose or withhold information. They may wish, for example, to withhold information perceived to be proprietary to the firm. Or they may wish to time the release of information so that it influences capital markets and achieves a desired objective (such as maximising the benefits of exercising stock options). Ultimately, the decision to disclose is strategically driven – and is influenced by the nature of the information held by the manager, the incentives of managers, the circumstances of the firm, and investors' expected reaction to the disclosure. Intervention in the form of mandatory-disclosure rules potentially increases costs for non-compliance and can lead managers to reassess their disclosure strategies. However, if the rules are considered to be weak or are poorly enforced, the introduction of mandatory-disclosure rules may be insufficient to change behaviour.[4]

Given these circumstances, it is important from a regulatory perspective to understand what types of mandatory-disclosure rules and enforcement mechanisms are effective, in the New Zealand setting, in inducing managers to disclose a desirable level of information on a timely basis.

Our study attempted to address the regulatory-effectiveness issue by empirically examining changes in the behaviour of New Zealand companies after the December 2002 introduction of statutory sanctions. It focused on the change in the quantity and quality of company earnings guidance (referred to as 'management earnings forecasts') provided in announcements to the NZX.

Simple but elegant

Researchers usually test the effectiveness of changes in disclosure regimes[5] by using alternative measures such as changes in stock price volatility, bid-ask spread, analyst forecast dispersion, and earnings forecasts. But earnings forecasts by themselves have a number of properties that make them eminently desirable for testing the effectiveness of the New Zealand regime. First, unlike one-off price-sensitive events (such as a merger proposal), earnings expectations are applicable to all firms and their quality can be readily evaluated ex post through periodic financial reports. Second, NZX's continuous-disclosure guidance release specifically requires the disclosure of a change in a listed entity's financial forecast or expectation to the stockmarket. As a consequence, it is difficult for a company to rely on carve-out[6] provisions to avoid disclosure when an earnings change is probable.

Our approach to testing the impact of the statutory sanctions was to initially identify all management earnings forecasts contained in documents lodged with the NZX during a pre-sanctions period (from 1 June 1999 to 30 November 2002) and a post-sanctions period (from 1 December 2002 to 30 September 2005) – a total of 701 earnings forecasts in 2604 announcements released by 94 NZX-listed firms. To measure the change in the quantity and quality of these, we recorded and coded changes in forecast frequency, timeliness, precision, news direction, and accuracy.

Timeliness was measured in two ways: forecast horizon (the period between the forecast date and the periodic earnings announcement); and the extent to which the forecasts were non-routine (that is, disclosed in stand-alone announcements to the NSX – as opposed to routine announcements such as

the preliminary final report or chairman's address to shareholders). Precision was measured in four increasing categories of specificity: general impression (qualitative forecasts), open-ended, range, and point forecasts. The more precise the forecast, the more informative it is for market participants. News direction records whether the news contained in the earnings forecast is positive (good news), negative (bad news) or neutral (no change). Accuracy recorded whether the last forecast provided in a financial period was within 10% of the actual realised earnings (or, if the forecast was qualitative, whether it was in the forecast direction).

We then examined the change in the quantity and quality of the forecasts across the two periods. We also controlled for known firm-specific characteristics that could affect the disclosure decision in the absence of regulatory change. These characteristics included the size of the firm (measured by market capitalisation), the firm's performance (measured by net income), growth prospects (measured by market capitalisation divided by the book value of equity), and listing status (whether it was listed only in New Zealand, or was cross-listed on overseas exchanges).

Making a difference?

Some of the measures indicated a positive change in disclosure behaviour. First, the frequency of earnings forecasts contained in announcement documents lodged with the NSX significantly increased from 22% in the pre-sanctions period to 32% in the post-sanctions period. Second, there was a noticeable increase in the number of non-routine announcements that contained earnings forecasts (from 14.1% to 23% of all forecasts). Third, there was clear evidence that forecasts have become more precise, with the number of qualitative forecasts declining from 70% to 46% and being replaced by an increase in more-quantitative forecasts.

However, the results are not all good news for the corporate regulators. First, nearly half of all material changes in periodic earnings (changes greater than or less than 10%) were not signalled by an earnings forecast, even after the introduction of statutory sanctions. Second, forecasts continue to exhibit a 'good news' bias: the percentages of forecasts containing good news (approximately 60%) and negative news (approximately 20%) changed only marginally across the pre- and post-sanctions periods. Third, the forecast horizon has declined from an average of 201 days to 187 days, which implies that mangers are providing forecasts on an even less timely basis since the introduction of statutory sanctions. Finally, while there has been a small improvement in the accuracy of the final forecasts, a surprisingly large number of forecasts (20.6%) continue to be materially inaccurate.

Taken together, our results provide only qualified support for the effectiveness of statutory sanctions. The asymmetrical treatment of earnings expectations (combined with the continued large number of material earnings changes not signalled by an earnings forecast, the continued large number of inaccurate forecasts, and the decline in the length of the forecasts' time horizons) suggests that the disclosure culture of New Zealand listed firms has not yet reached the stage where it could be considered truly continuous in nature.

The introduction of more-active and visible monitoring and enforcement mechanisms would seem to be a necessary pre-condition for achieving this. The market-surveillance system used by the Australian Stock Exchange (ASX) leads to companies being automatically queried when there is a suspected breach of continuous-disclosure rules; and key information sought in formal ASX queries includes whether the company expects a material change in earnings. A similar system could be adopted in New Zealand. It could also be extended to require companies to explain, in their annual reports, why they have failed to update the market when there has been a material change in earnings in the current reporting period. In addition, auditors could be required to provide an opinion on the adequacy of companies' continuous-disclosure practices. It should come as no surprise[7] that tangible benefits accrue to those countries who back their securities laws with strong enforcement action.

1 K Dunstan, G Gallery and TP Truong. 2005. *The impact of New Zealand's statutory-backed continuous disclosure regime on corporate disclosure behaviour*. Working Paper. University of New South Wales and University of Wellington.

2 For critiques of the new continuous-disclosure rules, see: C Erlenwein. 2003. *The New Statutory Continuous Disclosure Regime in New Zealand – Was it Necessary?* Working Paper. Law Faculty, Victoria University of Wellington; and N McGill. 2004. *The Ethical Dilemma of Continuous Disclosure*. Working Paper. School of Accounting and Commercial Law, Victoria University of Wellington.

3 Erlenwein (see footnote 2).

4 For example, insider-trading rules have been found to be effective in reducing a country's cost of capital *only* after the occurrence of the first prosecution. See: U Bhattacharya and H Daouk. 2002. 'The World Price of Insider Trading' *Journal of Finance* 57(1) pp75-108.

5 See, for example: 'Insider trading curbed by legislation' *Competition and Regulation Times* issue 18 November 2005 p9 (available at iscr.org.nz/navigation/newsletter.html).

6 Carve-outs permit companies to withhold price-sensitive information in limited circumstances, primarily where the information is proprietary or too uncertain to warrant disclosure (NZX Listing Rule 10.1.1).

7 See, for example: Bhattacharya and Daouk (see footnote 4).

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Major ISCR Research Publications January 2005 – June 2006

Lewis Evans & Richard Meade, 2006. *Alternating Currents or Counter-Revolution? Contemporary Electricity Reform in New Zealand*. Victoria University Press.

Glenn Boyle & Graeme Guthrie, 2006. Payback without Apology, *Accounting and Finance*, vol 46, 1-10

Glenn Boyle & Graeme Guthrie, 2006. Hedging the Value of Waiting, *Journal of Banking and Finance*, vol 30, 1245-1267

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Lewis Evans & Graeme Guthrie, 2006. A dynamic theory of cooperatives: the link between efficiency and valuation, *Journal of Institutional and Theoretical Economics*, vol 162, 364-383.

Bronwyn Howell, 2006. Restructuring Primary Health Care Markets in New Zealand: From Welfare Benefits to Insurance Markets, *Australia and New Zealand Health Policy* vol. 2:1–22 (available at: www.anzhealthpolicy.com/content/2/1/20)

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Glenn Boyle & Graeme Guthrie, 2005. Human Capital and Popular Investment Advice, *Review of Finance*, vol 9, 139-164

Matthew Burgess & Lewis Evans, 2005. Parallel Importation and Service Quality: An Empirical Investigation of Competition Between DVDS and Cinemas In New Zealand, *Journal of Competition Law and Economics*, vol 1(4), 747-770

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Lewis Evans & Neil Quigley, 2005. The Interaction Between Contract and Competition Law, ch.10 in *Competition Policy in East Asia*, Erlinda Medalla (ed), Routledge, London, 213-230

Ignatius Horstmann, Frank Mathewson & Neil Quigley, 2005. Agency Contracts with Long-Term Customer Relationships, *Journal of Labor Economics*, vol 23(3) 589-608

Bronwyn Howell, 2005. Medical Misadventure and Accident Compensation in New Zealand: An Incentives-Based Analysis, *Victoria University Law Review*, vol 35(4), 857-877

Richard Meade, 2005. Electricity Investment and Security of Supply, ch.3 in *Development of Electricity Markets*, W. Mielczarski, Instutat Elektroenergetyki Politechniki Lodzkiej, (ed), 51-85

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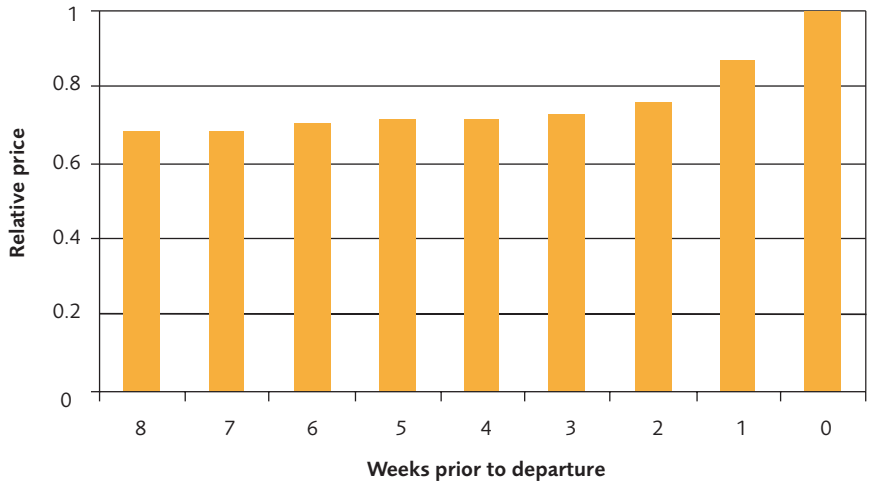
the flight. Figure 1 shows this in action. For each of the 1001 flights, the lowest price observed weekly before the flight date is divided by the price at 'week 0', which is usually the day before the flight and which usually (but not always) is the highest 'low price' observed for a flight.

We see that, on average, prices eight weeks out are about two-thirds of the last-minute price, with most of the increase taking place in the last two weeks before the flight. This inter-temporal price discrimination is probably milder than under the old Saturday night stay-over regime, under which discounted fares would disappear completely from the market when the last advance-purchase date had been passed. But it remains substantial: last minute travellers are paying about 50% more than those who were able to commit to the flight some weeks in advance.

In the new world of one-way cheap fares, internet booking, and competition from LCCs (and Emirates), the old learning about competition and price discrimination seems still valid. Prices are lower if there is more competition 'in the air'; prices are lower if there is more excess capacity; the large incumbent carriers are able to charge a price premium; and the price-discrimination practices that have been such a striking feature of the air travel market are still alive and well.

All these findings have implications for policy – in particular, for policy decisions on the current proposal by Air New Zealand and Qantas that they be able to coordinate their capacity and pricing in the trans-Tasman market.

Figure 1: Geometric means of relative prices (all observations)



1 This research is an ongoing programme supported by grants from ISCR and the University of Auckland. The most recent working paper giving a detailed account of the econometric model and results can be obtained from Tim Hazledine (t.hazledine@auckland.ac.nz).

2 The July 2005 data were collected by Callum MacLennan for analysis in his BCom (hons) dissertation in economics at the University of Auckland.

3 Since the differences here are just in the lowest prices charged, the actual differences in average prices paid will be larger, because Air New Zealand (and Qantas) also offer and sell higher-price tickets that have fewer restrictions than their lowest fares.

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This is the reasoning the Commission adopts in relation to the HVDC, saying:

> the HVDC link could not be sold or modified to another use without destroying most of its value; therefore the existing HVDC asset can be treated as a sunk cost.[8]

The Commerce Commission applied similar reasoning in its inquiry into whether airfield activities should be regulated, when it defined sunk costs as follows:

> Once the investment in creating the asset has been made, the outlay cannot be recouped by re-selling the asset for some other use. The asset, or that portion of its value that cannot be recouped, is 'sunk'.[9]

In forming these views, both Commissions apply an incorrect interpretation of 'alternative use'. They interpret this to mean use other than that for which the investment was originally made. This interpretation is incorrect, because opportunity costs are determined by the context of the decisions. From the perspective of the garage owner, the highest-value alternative to using the equipment is likely to be selling the equipment to someone else who can use it to carry out the same service.

Suppose, for instance, that another mechanic in the same town was willing to buy the equipment from the garage owner, to use it in the same way. (The mechanic believes he can use the equipment profitably.) In deciding to go ahead with the original plan of using the equipment in her repair service, the garage owner foregoes the opportunity of selling it. Hence the price at which the equipment could be sold (to be used in the same way) is part of the opportunity cost of the repair service. The investment in the equipment is not sunk, because the owner could recover some or all of the cost of the equipment through selling it to the mechanic.

In this example, the equipment cost is a fixed cost of providing an ongoing repair service. The garage owner should price the service to achieve a return on her investment at least equal (in net present value terms) to the amount the mechanic would pay her for the equipment. If the garage owner cannot price at or above that level, she would be better off selling the equipment. If the equipment is being sold to someone who can provide the service profitably, its sale would also be welfare enhancing (as someone more efficient would provide the service).

Hence 'the distinction between sunk and fixed costs … is not a mere terminological quibble … it makes a substantial difference for analysis and policy if the costs of the firms in an industry include the one rather than the other.'[10] The implications of fixed costs for efficient pricing are very different from the implications of sunk costs. Fixed costs are opportunity costs, but sunk costs are not. Competition in the market will most likely drive prices down to their opportunity costs, which would allow the recovery of fixed costs (but not necessarily sunk costs).

Opportunity knocks

The HVDC is clearly a valuable asset. This valuable asset could be sold to another owner and retained in its existing use – hence it is not a sunk cost. In the garage-owner example, the opportunity (fixed) cost of the specialised equipment was equal to the amount the mechanic would pay for the equipment with the intent of applying it to the same use. Similarly, the opportunity (fixed) cost of the HVDC includes the amount a hypothetical entrant would pay to acquire the HVDC to provide transmission services.

Transpower has to date approximated the opportunity cost of the HVDC (the price a hypothetical new entrant would pay for the existing HVDC) by setting its revenue requirement using an Optimised Depreciated Replacement Cost valuation.[11] Some submissions to the Electricity Commission also implicitly recognise that the asset could be sold, in arguing that Transpower should partially sell the HVDC link by issuing capacity rights.

Correctly classifying the HVDC as a fixed cost has important implications for the task facing the Commission. It means the distinctions many submitters try to make between existing and new HVDC assets become largely irrelevant to efficient pricing. Some submitters argued that existing assets should be treated differently from new assets, because new assets were not yet sunk. On current network configuration, the provision of transmission services requires the HVDC – and hence the cost of the HVDC assets is a fixed cost of transmission. This fixed cost can be projected out into the foreseeable future, as an HVDC will continue to be required as an input into Transpower's transmission services. Indeed, demand for transmission services utilising the HVDC is such that Transpower proposes investing an additional $795 million in upgrading the HVDC.[12] It does not matter for the design of efficient pricing methods whether this fixed cost is provided by assets several years old or by assets that are new.

Most importantly, the prices charged to customers should reflect the full opportunity cost of providing transmission services. Only with such pricing can efficient decisions (on consumption, generation, transmission alternatives) be made.

This is not a novel or new conclusion about fixed costs. Ronald Coase pointed out 60 years ago that efficient decisions in relation to a product using fixed costs requires that its price equal its total opportunity cost.[13]

1 For a discussion of the difference between the economic concepts of fixed and sunk costs see: X Henry Wang and Bill Z Yang. 2001. 'Fixed and Sunk Costs Revisited' *Journal of Economic Education* Spring pp178-185.

2 *Electricity Governance Rules 2003* Part F, Section IV, Rule 2.4.

3 The Commission's *Statement of Reasons* (February 2005) and *Issues Paper* (November 2005) simply state that the investment in the HVDC is a sunk cost but provide no explanation or justification for this view.

4 Electricity Commission. 2006. *Explanatory paper – submissions and cross submissions and draft decisions: HVDC transmission pricing methodology* February para 6.12.26.

5 Submissions to the Electricity Commission on HVDC pricing are published on the Commission's website (www.electricitycommission.govt.nz/opdev/transmis/tpg).

6 The concept of sunk cost has been well recognised and uniformly defined in almost all microeconomic textbooks. The confusion usually arises by defining fixed costs incorrectly as sunk costs. Wang and Yang (see footnote 1) p180.

7 DW Carlton and JM Perloff. 2000. *Modern industrial organizational theory* 3rd edition. Addison Wesley Longman. Reading, Mass. p28, pp59-61.

8 Electricity Commission (see footnote 4).

9 Commerce Commission. 2002. *Final Report Part IV Inquiry into Airfield Activities at Auckland, Wellington, Christchurch International Airports* para 5.14.

10 WJ Baumol and RD Willig. 1981. 'Fixed Costs, Sunk Costs, Entry Barriers, and Sustainability of Monopoly' *The Quarterly Journal of Economics* 96(3) August p407, p408.

11 The Commerce Commission has recently announced that in the future Transpower may value its assets using a rolled-forward indexed method, with the starting valuations set using Optimised Depreciated Replacement Cost.

12 Transpower's proposed grid upgrade is available on its website (www.transpower.co.nz/?id=4498).

13 R Coase. 1946. 'The Marginal Cost Controversy' *Economica* 13 pp169-182.

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SUNK? FIXED?
Defining costs in infrastructure pricing

Lawyers learn early in their careers to be clear about the meaning of words. Economists, however, sometimes assume a common understanding of terms when no such understanding exists. The result, as Kieran Murray points out, is confused analysis.

One example of this confusion concerns the meaning of sunk costs and fixed costs.[1] The Government has tasked the Electricity Commission with determining a method for transmission pricing that, amongst other things, allocates 'sunk costs ... in a way that minimises distortions to production/consumption and investment decisions made by grid users.'[2] At the time of writing, the Commission is again consulting about its transmission pricing guidelines on charging for the high-voltage direct-current-link (the HVDC) between the South and North Island transmission grids.

The Commission in its initial analysis assumed that the HVDC is a sunk cost.[3] In its draft decision following re-consultation, it confirmed that it viewed the HVDC as a sunk cost.[4]

The Commission's position may reflect the prevailing view. Most submissions to the Commission assume the HVDC is a sunk cost;[5] Transpower for a number of years stated that the HVDC was a sunk cost and that its cost should be recovered by a fixed and unavoidable charge levied on South Island generators.

Getting the terms right

The rationale for such a charge is similar to the arguments for the poll tax implemented by the Thatcher government in 1990 – if a tax or levy can be designed so as to be truly fixed and unavoidable, then the subject of the tax or levy has little incentive to alter their behaviour (ignoring wealth effects). Many of the 'pro-sunk' submissions to the Commission support this line of reasoning. But the Commission is tasked with designing an efficient transmission-pricing method, not a poll tax.

The HVDC is not a sunk cost. It is a fixed cost, over timeframes relevant to the analysis. This difference is important in designing efficient pricing for infrastructure assets. Sunk costs are irrevocably committed and cannot be salvaged or modified through resale or other changes in operations.[6] Easily understood examples include R&D and marketing. If R&D expenditure fails to develop a successful product, the costs incurred in the project are usually irreversible. The costs are sunk.

Because sunk R&D costs cannot be recovered, they are not an opportunity cost of the product. (Recall that the opportunity cost of making a product is the highest value the firm could have achieved if it decided not to make the product). As long as the price received for the product allows the firm to recover its opportunity costs, the firm is better off continuing to supply the product even if the price does not cover the sunk R&D cost.

Fixed but not always sunk

This doesn't mean that fixed costs are not recovered in competitive markets. They sometimes are, because not all fixed costs are sunk. Carlton and Perloff provide an example of a lawyer signing a lease agreement.[7] The monthly rent payments are a fixed cost, as they do not vary with output. But they are not sunk – provided the lawyer could, on exit, sublet to someone else or pay a penalty for breaking the lease. Only the unavoidable part of the rent or penalty fee is sunk.

A more interesting example might be a small-town business (say, a garage) that invests in specialised equipment capable of meeting the entire town's demand for a particular type of repair. The Electricity Commission, it seems, would view such an investment as sunk because the equipment has minimal or zero value in any other use (because it is designed for a specific purpose).

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