Should Cartels be Criminalised in New Zealand?

by
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ABSTRACT

Parliament is currently considering a bill to criminalise cartel conduct in New Zealand. The Ministry of Economic Development introduced the bill on the grounds that it will increase deterrence of cartel conduct. However, the lack of empirical evidence on cartel conduct under the existing civil regime means that the need for criminalisation has not been proven, especially given the associated social and financial costs.

In this paper, I examine the issue of whether cartels should be criminalised in New Zealand from a theoretical standpoint. I do so by analysing the decision of the manager of a firm on whether to collude with other firms to fix prices. I find that the civil regime is likely to deter cartel conduct in New Zealand because the leniency regime makes cartels more unstable. While imprisonment represents a serious and personal cost for managers, it is also likely that the probability of conviction and imprisonment will be low. I conclude that criminalisation may not be justified by arguments that it will increase deterrence.

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1 INTRODUCTION

> I had read [about cartel criminalisation in the United Kingdom] in the papers ... I remember talking at the time, saying, "We are going to have to think about whether we really want to carry on with this." If someone had come to me and said, "Let's pack this in, I think it is too risky," I would have said, "Fine, not a problem." But no one ever did, and because I was dealing with it very much at arm's length, I just didn't give it a thought.
>
> Manager convicted of cartel conduct in the United States and United Kingdom and sentenced to imprisonment.
>
> (O'Kane, 2011, p.491)

When competing firms agree to stop competing with each other and to raise their prices, they increase their own profits, but reduce the welfare of consumers and society. This conduct is called cartel conduct, and it is currently a civil offence in New Zealand. Firms and managers convicted of cartel conduct may be fined under the Commerce Act 1986. At the time of writing, Parliament is considering a bill to make cartel conduct punishable by up to seven years in prison for convicted managers.

Cartel conduct should only be criminalised if the additional deterrence from the possibility of imprisonment outweighs the social and financial costs of criminalisation (Becker, 1968). The Ministry of Economic Development (MED) argues that the existing civil regime is unlikely to effectively deter cartel conduct (MED, 2010).[1] Unfortunately, empirical evidence on the extent of cartel conduct in New Zealand is difficult to obtain; evidence is only available on cartels detected by law enforcement. Since 1986, the Commerce Commission has successfully prosecuted sixteen cartels, and given twenty-nine warnings for alleged price-fixing (MED, 2012b). The number of successful cases is very small and many of the warnings relate to trivial or local conduct like TradeMe tyre sellers and the Gisborne Farmers Market. Does this mean that the civil regime fails to detect and punish cartels? Or does it mean that the civil regime successfully discourages cartel conduct?

The MED prepared a discussion document on cartel criminalisation in 2010, followed by an exposure draft bill. Most submissions on the discussion document and draft bill were critical

[1] The MED became the Economic Development Group of the Ministry of Business, Innovation and Employment on 1 July 2012. As the documents referenced in this paper were published under the MED name, I use MED throughout the paper for consistency.

of criminalisation.[2] Submitters highlighted the lack of empirical evidence of economic harm caused by cartels in New Zealand. Given that the MED proceeded with introducing the final bill into Parliament regardless, deterrence may not be the main motivation for criminalisation. The MED admits that criminalisation only became an issue in New Zealand after the Australian government criminalised cartel conduct in 2009 (MED, 2012a). The proposed law change may be "driven by the perceived need to keep up with our neighbours, rather than a real concern about economic harm" (Buddle Findlay, 2011, p.1).

In this paper, I examine the issue of whether cartels should be criminalised in New Zealand. I do so by analysing the decision of the manager of a firm on whether to collude with other firms to fix prices. I find that the civil regime is likely to deter cartel conduct because the leniency regime makes cartels unstable. While imprisonment represents a serious and personal cost for managers, the probability of conviction under criminalisation will decrease and judges will be unlikely to impose imprisonment as a punishment. I conclude that the high costs of criminalisation are not justified by the increase in deterrence.

Part 2 of this paper sets out background information including the incentives of firms to form cartels and cartel law in New Zealand. Part 3 reviews the existing literature on cartel deterrence and explains the contribution of this paper to the literature. Part 4 develops a simple model for the decision faced by the manager of a firm. Part 5 evaluates whether the current civil regime is likely to deter cartel conduct. Part 6 introduces criminalisation to the model and evaluates the case for cartel criminalisation. Part 7 concludes the paper.

2 BACKGROUND

This section of the paper explains the incentives of firms to collude with each other to raise prices and summarises the law on cartel conduct in New Zealand.

2.1 Why do cartels form?

When firms collude to raise prices, they can increase their own profits without needing to compete with each other. This can be demonstrated by a Cournot competition model with two

[2] 11 of 23 submissions on the discussion document and 12 of 16 submissions on the exposure draft bill were opposed to criminalising cartels. 5 of the discussion document submissions were in favour. The remaining 11 submissions did not express an opinion. Wilson (2012) discusses the submissions in more depth.

firms, as set out by Meriluoto (2012). In the Cournot model, firms compete by setting quantities rather than prices. We will assume that two firms, Firm 1 and Firm 2, produce identical goods with constant marginal cost. We will also assume that firms do not enter or exit the market.

The inverse demand curve is linear and is given by $\rho = \alpha - \beta(q_1 + q_2)$. Note that demand is a function of the sum of the two outputs because the goods are identical and thus consumers only care about the total quantity produced and not about how much each firm produces.

The firms have a common, constant marginal cost of production, c. Accordingly, Firm i, where $i = 1, 2$, maximises profit:

$$\pi_i = [\alpha - \beta(q_1 + q_2) - c]q_i. \tag{2.1}$$

Differentiating equation (2.1) with respect to q_i and solving for q_i gives the best-reponse function for Firm i as a function of its rival firm's output q_j:

$$q_i = BR_i(q_j) = \frac{\alpha - c}{2\beta} - \frac{1}{2}q_j. \tag{2.2}$$

The Nash equilibrium (NE) is an output level such that neither firm can increase profits by changing its output level, and it is found where the best response functions intersect. Mathematically, the NE is found by imposing symmetry $q_1 = q_2 = q$:

$$q = \frac{\alpha - c}{2\beta} - \frac{1}{2}q, \tag{2.3}$$

and therefore:

$$q_1{}^* = q_2{}^* = \frac{(\alpha - c)}{3\beta}. \tag{2.4}$$

The equilibrium profits are:

$$\pi_1{}^* = \pi_2{}^* = \frac{(\alpha - c)^2}{9\beta}. \tag{2.5}$$

This situation is shown graphically in Figure 1.

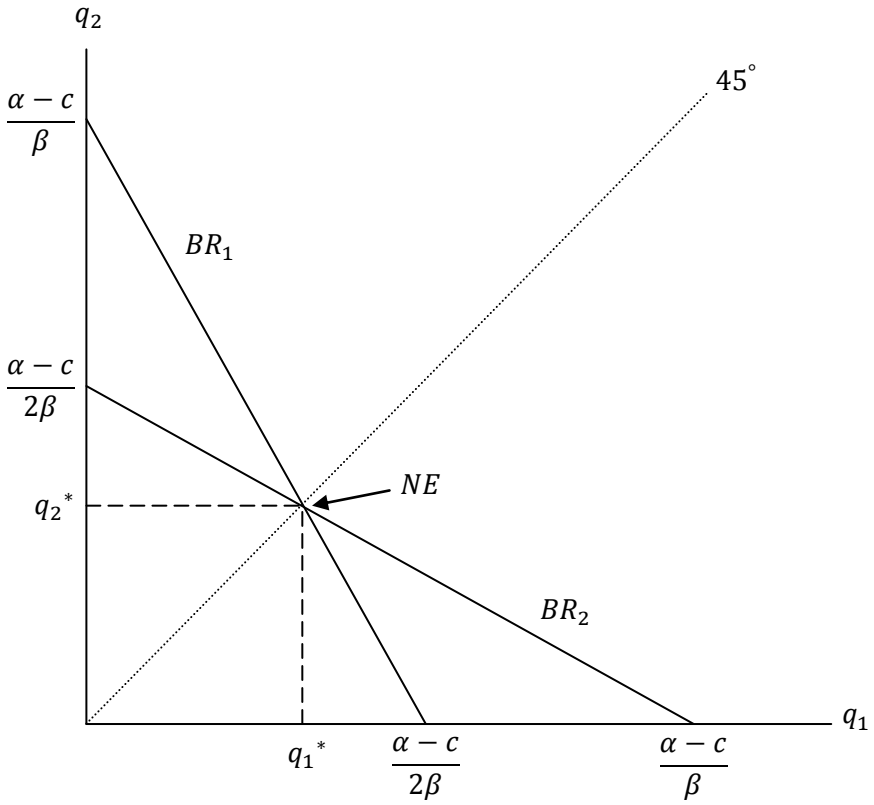

Figure 1: Duopoly firms maximising profit unilaterally

While $q_1{}^*$, $q_2{}^*$ is the equilibrium outcome in the sense that neither firm will have an incentive to deviate from it given that the other firm produces the NE output as well, it does not maximise joint profit. This can be illustrated using iso-profit curve analysis.

Figure 2 illustrates the iso-profit curves going through the NE point. Because each firm's profit is a negative function of its competitor's output, the iso-profit curves are shaped like an inverse U for Firm 1 and like an inverse C for Firm 2. Any deviation from the NE output for Firm i must be accompanied with a reduction in Firm j's output. Iso-profit curves for Firm 1 below the one illustrated exhibit higher levels of profit for Firm 1, and those for Firm 2 to the left of the one illustrated exhibit higher levels of profit for Firm 2.

Because the iso-profit curves cross at the NE point, joint profit is not maximised at this point. In fact, each firm can simultaneously increase its profits if both firms reduce output below the NE. Any point in the shaded area south-west of the NE point gives both firms higher profit than the NE point.

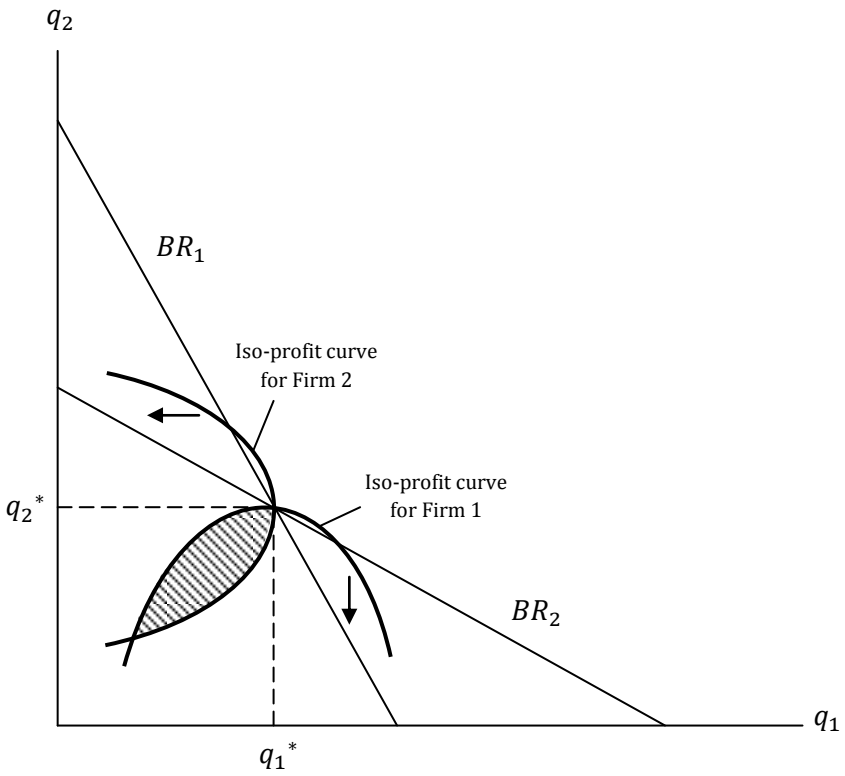

Figure 2: Collusion between duopoly firms

The collusive outcome can be found by maximising the two firms' joint profit:

$$\pi^M = \pi_1 + \pi_2 = 2[\alpha - \beta(2q) - c]q. \tag{2.6}$$

Maximising (2.6) gives the collusive level of output:

$$q_1{}^C = q_2{}^C = \frac{\alpha - c}{4\beta}, \tag{2.7}$$

which is half of the monopoly output due to the constant and common marginal cost assumption. The profit for each firm in the collusive outcome is:

$$\pi_1{}^C = \pi_2{}^C = \frac{(\alpha - c)^2}{8\beta} \tag{2.8}$$

or half the monopoly profit. This can be compared with the original profit in equation (2.5):

$$\pi_1{}^* = \pi_2{}^* = \frac{(\alpha - c)^2}{9\beta}.$$

Since $\pi_i{}^C > \pi_i{}^*$, both firms could increase profit by reducing their output to half the monopoly output. Their ability to increase joint profits by agreeing to reduce output is shown

in Figure 2. Note that Firm 1's profit increases when q_2 decreases and Firm 2's profit increases when q_1 decreases.

2.2 Are cartels sustainable?

Even if firms agreed to form a cartel in order to reduce their output and capture extra profits, in a one-shot game this would be unsustainable. Stigler (1964) first recognised that cartels may be intrinsically unstable because each firm has an incentive to unilaterally deviate from the agreement, increasing its own output and achieving a large increase in sales for a short period.

Figure 3 illustrates this incentive. Assume that Firm 2 is producing its collusive level of output, ${q_2}^C$. Firm 1 then has an incentive to produce more than the collusive amount, or $BR_1({q_2}^C)$. This is because the collusive point is not an equilibrium in a one-shot game, and Firm 1 can increase its individual profit by producing more. Firm 1 enjoys the price-raising effect of Firm 2's output reduction while itself producing at the output level maximising its individual profit. As both firms have the same incentive, the cartel would be hard to sustain.

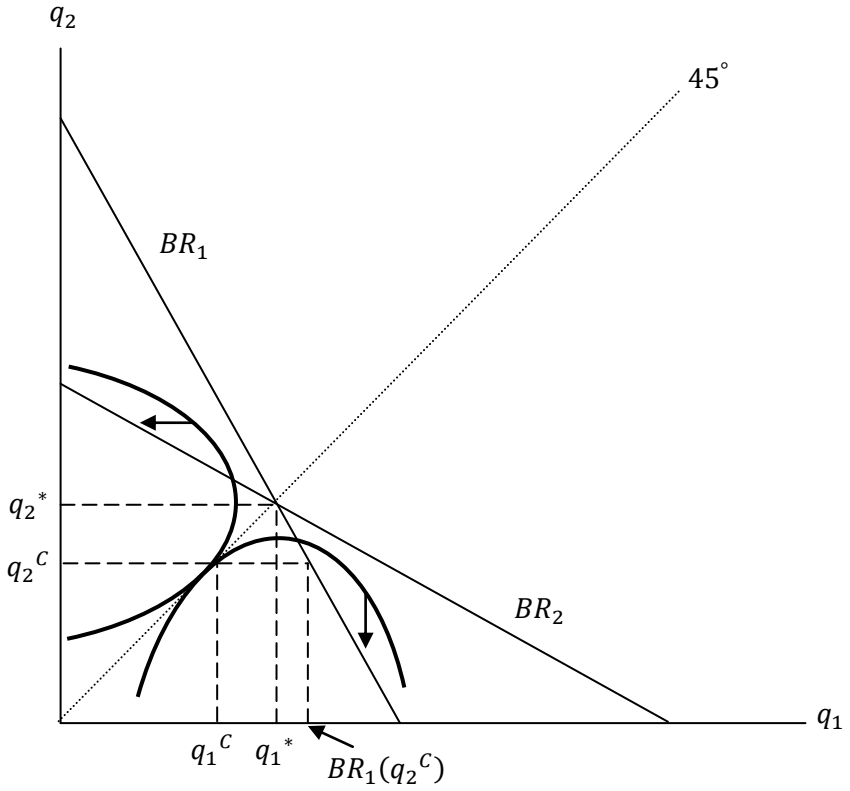

Figure 3: Instability of collusion between duopoly firms

Figure 4 shows a simple example of a cartel game where the strategies of each firm have been reduced to just two (Obey or Defect) to illustrate the main essence of the cartel game in normal form. Although both firms would be better off by colluding and producing low output (Obey), the optimal strategy for each firm is to produce high output regardless of the other firm's decision (Defect). The equilibrium is for both firms to defect on the cartel agreement and produce high output.

Cartel outcomes in a one-off game		Firm B	
		Obeys agreement and produces low output	Defects and produces high output
Firm A	Obeys agreement and produces low output	Both get $10m	A gets $5m B gets $15m
	Defects and produces high output	A gets $15m B gets $5m	Both get $7m

Figure 4: One-shot cartel game

In practice, cartel members interact over a longer period, and collusion can be sustained in a game repeated indefinitely. Cartel members will consider the one-off benefits from defecting against the multi-period benefits of obeying the agreement (Damgaard et al., 2011).

The ease of sustaining a cartel depends on the characteristics of the market. Cartel members must be able to coordinate the behaviour of other members, detect and discourage defection from the agreement, and prevent non-cartel firms from entering the market (Levenstein and Suslow, 2006). A small number of firms in the market makes it easier to set up a cartel agreement and coordinate behaviour between firms. The cartel can also control all or a majority of the market, which is necessary for the cartel to be profitable. If the market is for a homogenous product with predictable industry demand, firms can easily set a price and determine whether other firms are adhering to the agreement. Barriers to entry in the market mean cartel members can stop others from entering the market and undercutting the cartel by selling the product at a lower price.

In practice, cartels do seem to successfully solve the challenges of coordination, cheating and entry by other firms. In an analysis of international cartels from 1920 to 1939, Suslow (2005) found that only 24% of cartel breakups were due to internal instability. By contrast, 42% were due to external shocks, 16% due to new entry and 18% due to competition law enforcement. Empirical evidence shows that cartels can be sustained for long periods of time and achieve increases in prices. Overseas studies suggest that on average cartels last between 3.7 and 10 years and achieve a median 23-25% price increase (Damgaard et al., 2011). The wide variation in duration is due to measurement issues and to differences in the type of cartel; for example, the 10 year average duration comes from a study on legal Japanese cartels, while illegal cartels tend to have shorter average lifespans (Levenstein and Suslow, 2006).

Whether cartels are likely to exist in New Zealand will depend on the characteristics of New Zealand markets. For example, the market for mobile phones currently has three major firms, which might make a cartel easier to arrange. However, this market is also characterised by heterogenous products and frequent technological change. As a result, the firms would find it hard to agree on a price, and would need regular and costly meetings to update pricing. Each firm could easily cheat on the agreement to capture a larger proportion of the market.

The mobile phones market can be contrasted with the market for wood preservative chemicals, used by millers, timber treatment operators and wood product businesses. A cartel operated in this market in New Zealand from 1998 to 2002.[3] During that period, there were two major suppliers of wood preservative chemicals, and another entered the market in 2001. The cartel members agreed not to compete and divided up prospective buyers between themselves. When a potential competitor tried to enter the market, the cartel members restricted the supply of chemicals and blending services to the potential competitor and exerted commercial pressure on suppliers not to meet its orders. A cartel was sustainable because the product was homogenous, demand was predictable and cartel members could prevent other firms from entering the market.

2.3 Competition law

Cartels are illegal in most jurisdictions because, despite increasing firm profit, they cause welfare losses. Consumers have to pay a higher price for the good and some consumers who

[3] *Commerce Commission v Koppers Arch Wood Protection (NZ) Ltd* [2009] NZCCLR 1.

would be willing to purchase the good at the competitive price are driven out of the market (Meriluoto, 2012). As well, the incentives for firms to innovate and increase productivity are reduced because firms no longer need to gain advantages over their competitors (Damgaard et al., 2011).

Cartel conduct is currently a civil offence in New Zealand. Section 30 of the Commerce Act 1986 provides that fixing or controlling the prices of goods or services is deemed to be a prohibited contract, arrangement or understanding. Fines can be imposed on firms and managers for a breach of the Act under section 80, with a maximum penalty of $10,000,000 for firms (or the greater of three times the value of the cartel's commercial gain, or 10% of the firm's turnover) and $500,000 for individuals. In October 2011, the Minister of Commerce introduced the Commerce (Cartels and Other Matters) Amendment Bill 2011 into Parliament. Under clause 18 of this bill, managers of firms convicted of cartel conduct may be imprisoned for up to seven years.

Cartels are difficult to detect. Price increases can occur in competitive markets, and most cartels operate secretly without leaving paper trails. Rather than engage in costly and unproductive investigations, then, most competition law authorities instead aim to exploit the inherent instability of cartels and make defecting more attractive. Competition law authorities worldwide have adopted leniency regimes to give each cartel member an added incentive to defect from the agreement and report the cartel (Damgaard et al., 2011). New Zealand, the Commerce Commission (2011) offers immunity from civil prosecution to the first cartel member to come forward and cooperate with the investigation. If other cartel members choose to cooperate they will still be prosecuted but may receive a discounted penalty. Leniency can be sought by individual managers or by firms. If the firm receives immunity, immunity will extend to all its managers.

As Miller (2009) points out, competition law authorities have incentives to overstate their enforcement capabilities because leniency regimes are more successful when managers involved in cartel conduct believe there is a higher possibility of detection. This means it is difficult to determine from an external perspective how successful the current law is at deterring cartels. A theoretical analysis may aid analysis of the costs and benefits of criminalisation.

3 LITERATURE REVIEW

This section provides a brief overview of the existing theoretical literature on cartel deterrence and explains the contribution of this paper to the literature.

The early literature on competition law enforcement is based on the seminal article on crime and punishment by Becker (1968). He reasons that individuals will commit a criminal offence if the expected utility of committing the offence is greater than the expected utility of not committing the offence. If the government's objective is to maximise society's expected utility, this requires minimising the harm caused by criminal activity and enforcement costs. Landes (1983) applies this reasoning to competition law violations, and concludes that the optimal penalty should equal the net harm to persons other than the offending firm, divided by the probability of arrest and conviction.

Later authors examine the effect of leniency regimes. In the first paper analysing leniency regimes in a dynamic environment, Motta and Polo (2003) find that leniency regimes encourage defection but may also reduce the expected cost of cartel behaviour. Spagnolo (2004) develops a theoretical model to examine the effects of leniency and reward schemes on deterrence, and finds that offering fines-financed rewards to the first firm to report results in complete deterrence. Harrington (2008, p.217) concludes that a leniency regime is most effective where full immunity is awarded to only the first firm to come forward, generating a "race to the courthouse" effect. Generally, the literature on leniency demonstrates that it is easier for competition law authorities to destabilise cartels through encouraging defection than it is to make cartel conduct unattractive by increasing penalties.

In practice, firms do not act as individual agents, and managers of firms decide whether to participate in cartels. Calvani and Calvani (2011) note that agency issues arise when the incentives of managers differ from the incentives of shareholders. Accordingly, some papers examine the incentives of individual agents, and the relationship between individual and firm leniency regimes. Festerling (2005) finds that managers threaten to apply for individual leniency to induce the firm owners to apply for corporate leniency, explaining why individual leniency applications are rarely observed in practice. Aubert et al. (2006) examine the consequences of rewards for whistleblowing by employees, assuming that the probability of an investigation is given and that the decision to engage in cartel behaviour is made by firm

owners. They conclude that offering rewards to employees increases deterrence because firms need to compensate employees to prevent them from reporting and seeking the reward.

Some authors consider the effects of criminalisation on cartel conduct. Buccirossi and Spagnolo (2005) find that if firms or employees are rewarded for blowing the whistle on cartel conduct, the minimum fine required to deter cartel conduct becomes extremely low. In this context, they review the advantages and disadvantages of criminalisation, and conclude that it is not clear criminalisation would be beneficial. Aubert (2008) examines the effect of criminalisation on manager effort and finds that criminalisation reduces the profitability of collusion for firms. In Cseres, Schinkel and Vogelaar (2006), contributors explore the implications of cartel criminalisation for the European Union, and express a range of viewpoints. For example, Wils (2006) argues that personal time in jail is a powerful deterrent, while Spagnolo (2006) suggests that more efficient mechanisms like increasing fines or rewarding whistleblowers would enhance deterrence. The contributors are strongly influenced by the European Union context, and much of the discussion considers whether criminalisation should be at the European Union or member state level.

The model in this paper differs from the existing literature in terms of the theoretical model and the context of the discussion. I assume managers decide whether to collude with other firms or not, and develop a model to evaluate deterrence under the existing civil regime in New Zealand and under the proposed criminal regime. I conclude that the high cost of criminalisation is unlikely to be matched by a significant increase in deterrence.

4 THE MODEL UNDER THE CIVIL REGIME

In this section of the paper, I develop a model to demonstrate when managers of firms will collude with other firms, and examine the effect of increasing the probability of punishment or increasing the fine. At this stage, the model only includes civil fines as punishment.

4.1 The model

In the model, the manager of a firm can decide to collude with other firms or not to collude. If she colludes with other firms, her firm will profit from the increased prices, but she also runs the risk of being arrested, convicted and punished for taking part in an illegal cartel.

The manager's objective is to maximise the expected value of her lifetime utility:

$$EU = \sum_{t=1}^{\infty} \beta^{t-1} U_t \tag{4.1}$$

where U_t is her utility in period t and β is the discount factor, such that $0 < \beta < 1$.

If the manager chooses not to collude in period 1, her expected lifetime utility is:

$$EU_n = \sum_{t=1}^{\infty} \beta^{t-1} U(w) \tag{4.2}$$

where w is the manager's non-cartel income in each period and $U(w)$ is the constant per-period utility of not colluding.

If the manager chooses to collude, her expected lifetime utility is:

$$EU_c = (1 - p_A p_C)[U(w + y) + \beta EU_c] + p_A p_C [U(w - f) + \beta EU_n] \tag{4.3}$$

where p_A is the probability of arrest, p_C is the probability of conviction and punishment, y is the monetary equivalent of the gain to the manager of cartel behaviour, and f is the fine imposed by the court if the manager is arrested and convicted.

If the manager is not arrested and convicted, which occurs with probability $1 - p_A p_C$, her utility for the period is $U(w + y)$, plus the discounted present value of colluding in future periods. If the manager is arrested and convicted, which occurs with probability $p_A p_C$, her utility for the period is $U(w - f)$, plus the discounted present value of not colluding in future periods.

Note that several simplifying assumptions have been made. First, I have assumed that being arrested and not convicted results in no additional disutility for the manager. I consider the effect of loss of reputation in Part 6.1.4.

Second, I have assumed the manager does not collude again after she has been convicted once. This assumption seems realistic; after the manager has been convicted of colluding, the Commerce Commission is likely to closely monitor the industry and manager, and she will perceive the probability of being convicted in the future as high.

Third, I have assumed the manager does not retain the gain from cartel activity on arrest. In reality, managers may retain some pecuniary benefits they receive from cartel conduct (for example, bonuses due to increased profits). On the other hand, some pecuniary benefits may be negated by the discovery of the cartel (for example, any increase in the value of shares held by the manager), and managers are likely to lose any non-pecuniary benefits (for example, the improved reputation from running a profitable company). The assumption is therefore not unrealistic in practice.

The manager's expected utility of not colluding from equation (4.2) can be rewritten as:

$$EU_n = \sum_{t=1}^{\infty} \beta^{t-1} U(w) = [1 + \beta + \beta^2 + \cdots]U(w) = \frac{U(w)}{1-\beta}. \tag{4.4}$$

This allows the manager's expected utility of colluding from equation (4.3) to be simplified to:

$$EU_c = \frac{(1 - p_A p_C)U(w+y) + p_A p_C \left[U(w-f) + \beta\left(\frac{U(w)}{1-\beta}\right)\right]}{1 - \beta + p_A p_C \beta}. \tag{4.5}$$

For the manager to collude, it must be true that the expected lifetime utility of colluding is greater than the expected lifetime utility of not colluding, i.e. $EU_c > EU_n$:

$$\frac{(1 - p_A p_C)U(w+y) + p_A p_C \left[U(w-f) + \beta\left(\frac{U(w)}{1-\beta}\right)\right]}{1 - \beta + p_A p_C \beta} > \frac{U(w)}{1-\beta}. \tag{4.6}$$

Equation (4.6) can be simplified to:

$$\frac{(1 - p_A p_C)U(w+y) + p_A p_C U(w-f) - U(w)}{1 - \beta + p_A p_C \beta} > 0. \tag{4.7}$$

Using the terminology of Spagnolo (2008), this is the participation constraint. Note that the denominator is always positive, so the condition can be further simplified to:

$$(1 - p_A p_C)U(w+y) + p_A p_C U(w-f) > U(w), \tag{4.8}$$

or that the manager's expected utility of cartel conduct in the current period must be greater than the expected utility of her non-cartel income, for her to collude with other firms.

If the manager chooses to collude in one period, in each subsequent period she can choose to cheat on the cartel agreement, allowing her firm to receive higher profits in the current period. After a single period the other firms in the market also reduce their prices and the manager no longer receives any additional benefits from collusion.

For the manager to continue colluding after a single period of collusion, then, the following condition must hold in any period:

$$EU_c > (1 - p_A p_C)[U(w + y^m) + \beta EU_X] + p_A p_C[U(w - f) + \beta EU_n] \quad (4.9)$$

where y^m represents the personal gain to the manager from the monopoly profits the firm can capture for a single period by cheating on the agreement, and where EU_X is the manager's expected lifetime utility when she is not colluding but still runs the risk of being detected and fined for past collusion. That is:

$$EU_X = (1 - p_A p_C)[U(w) + \beta EU_X] + p_A p_C[U(w - f) + \beta EU_n]. \quad (4.10)$$

Equation (4.10) can be simplified to:

$$EU_X = \frac{(1 - p_A p_C)U(w) + p_A p_C U(w - f) + \beta\left(\frac{U(w)}{1 - \beta}\right)}{1 - \beta + p_A p_C \beta}. \quad (4.11)$$

Equation (4.9) can then be simplified to:

$$U(w + y) > [1 - \beta(1 - p_A p_C)]U(w + y^m) + \left(\frac{\beta}{1 - \beta}\right)(1 - p_A p_C)U(w). \quad (4.12)$$

Using the terminology of Spagnolo (2008), this is the incentive compatibility constraint. Note that the manager's decision to collude or defect is independent of the fine, because in this model defecting does not affect the probability of the cartel being detected and the manager being fined. Instead, the manager's decision is affected by the size of the monopoly profit and by the manager's future non-cartel income.

Cartel conduct is often profitable, but each cartel member has an incentive to defect and capture monopoly profits (Spagnolo, 2008). As noted in Part 2.3, competition authorities take advantage of this through leniency regimes. If the manager has chosen to collude in one period, in each subsequent period the manager can choose to cheat on the agreement *and*

confess her involvement in the cartel to the Commerce Commission, seeking immunity from prosecution.

The manager will choose not to seek leniency if:

$$EU_c > U(w + y^m - c) + \beta\left(\frac{U(w)}{1-\beta}\right) \tag{4.13}$$

where c represents the cost of seeking leniency. This is the second incentive compatibility constraint because this condition must also hold for the manager to engage in cartel conduct.

If seeking leniency is costless, and if the manager chooses to cheat on the agreement, she will also seek leniency from the Commerce Commission, because she is unambiguously better off without the possibility that she will be fined. In reality, there are costs to seeking leniency; for example, the time and effort of applying to the Commission, and the potential harm to the manager's relationship with other people in the industry. It is therefore plausible that a manager may choose to defect and not seek leniency.

There are multiple managers in an industry and each manager is aware of the others' incentives to cheat on the cartel and seek leniency. If a manager believes that the above equation is likely to hold for other managers, she will not collude because only the first manager to come forward qualifies for immunity. Therefore, the incentive to defect can act to deter cartel conduct.

4.2 Increasing the severity or probability of punishment

In this section, I analyse the effect of increasing the severity or probability of punishment on the manager's expected lifetime utility. I have set $p = p_A p_C$ for simplicity.

Assuming positive marginal utility, the manager's expected lifetime utility of colluding will decrease if the punishment increases, as follows:

$$\frac{\partial EU_C}{\partial f} = -\frac{pU'(w-f)}{1-\beta+\beta p} < 0. \tag{4.14}$$

The manager's expected lifetime utility will decrease if the probability of arrest and conviction increases, as follows:[4]

$$\frac{\partial EU_C}{\partial p} = -\frac{U(w+y) - U(w-f) + \beta[U(w-f) - U(w)]}{[1-\beta+\beta p]^2} < 0. \qquad (4.15)$$

Becker (1968, p.178) shows that, in static crime models, risk averse individuals are deterred more by an increase in the severity of punishment than they are deterred by an equal percentage increase in the probability of arrest and conviction. The opposite is true for risk loving individuals. He obtains this result by deriving the elasticity of the change in expected utility with respect to p and f, and finding that the size of each depends on the individual's risk attitude. As Brown and Reynolds (1973) and Heineke (1975) demonstrate, however, this result only holds if we assume that the individual retains the entire gain from the criminal activity even if arrested and convicted, which generally is not a realistic assumption.

In the model presented in this paper, the analysis is further complicated by the dynamic nature of the model and the assumption that the manager has to stop colluding after she is arrested and convicted. This means that even a risk averse manager may be more deterred by an increase in the probability of arrest and conviction than by an increase in the fine.

The intuition is simple. When the probability of arrest and conviction increases, the expected punishment increases and the expected gain from the cartel decreases (due to the loss of the gain from the cartel and the inability to continue the cartel in future periods). When the fine increases, however, the expected punishment increases but the expected gain from the cartel does not change. Accordingly, and contrary to Becker's model, even a risk averse manager may be more deterred by an increase in the probability of punishment than by an increase in the fine.

The next question is whether managers are more likely to defect from existing cartels when the probability or severity of punishment increases. Equation (4.12) gives the condition for the manager not to defect from the cartel:

[4] Although $\beta[U(w-f) - U(w)] > 0$, the difference between $U(w+y)$ and $U(w-f)$ will be larger than the difference between $U(w)$ and $U(w-f)$, and accordingly $\frac{\partial EU_C}{\partial p} < 0$.

$$U(w+y) > [1-\beta(1-p)]U(w+y^m) + \left(\frac{\beta}{1-\beta}\right)(1-p)U(w).$$

Increasing the fine has no effect on whether the manager is more or less likely to defect, because she is equally likely to be arrested and convicted whether she defects or colludes.

To determine the effect of an increase in the probability of arrest and conviction, equation (4.12) can be rearranged to:

$$U(w+y) > (1-\beta)U(w+y^m) + \left(\frac{\beta U(w)}{1-\beta}\right) + \beta p\left[U(w+y^m) - \frac{U(w)}{1-\beta}\right].$$

If $U(w+y^m) > \frac{U(w)}{1-\beta}$, then an increase in the probability of arrest and conviction will increase the right-hand side and the manager will be more likely to defect. On the other hand, if $U(w+y^m) < \frac{U(w)}{1-\beta}$, an increase in the probability of arrest and conviction decreases the right-hand side and the manager will be less likely to defect. This is because the manager gets the benefit of the monopoly profit from defecting, but still runs the risk of being arrested and convicted for past cartel behaviour. If the benefits of the monopoly profit are not significant compared to her future non-cartel income stream, she will choose to remain in the cartel.

Equation (4.13) gave the condition for the manager not to seek leniency:

$$EU_c > U(w+y^m-c) + \beta\left(\frac{U(w)}{1-\beta}\right).$$

This condition is only affected by an increase in the severity or probability of punishment to the extent that this decreases expected utility and makes seeking leniency more attractive.

Overall, we would expect the manager to be more likely to defect and seek leniency if the probability of arrest and conviction or the fine increased. However, if the cost of seeking leniency is very high, an increase in the fine may have no effect on the manager's likelihood of defection and an increase in the probability of arrest and conviction could plausibly make defection less likely.

On a practical level, there may not be much scope to increase the probability of arrest and conviction in New Zealand. The MED (2010) notes that the strongest cases originate from leniency applications as they include direct evidence from cartel members. The Commerce

Commission already investigates all leniency applications, and improving the Commission's investigative techniques and resources would be expensive. Because increased funding is likely to exhibit diminishing marginal returns, devoting significant additional resources to detection is unlikely to provide much marginal benefit. Increasing the severity of punishment, however, "may be achieved by simply increasing the magnitude of fines or prison sentences" (Damgaard et al., 2011, p.406).

If we believe that cartel deterrence needs to be increased, increasing the punishment may be the only practical way to do so. On the other hand, it may be that the existing civil regime already deters managers from colluding. The next section of this paper considers whether this is likely to be the case.

5 DETERRENCE UNDER THE CIVIL REGIME

This section examines whether managers are likely to engage in cartel conduct when faced with the prospect of fines. I conclude that cartels are likely to be deterred under the existing civil regime, because even if cartel conduct is profitable for managers, it is likely that managers in cartels have incentives to defect.

5.1 Participation constraint

Much of the existing literature focuses on whether cartel conduct is likely to be profitable for firms. For example, Wils (2006) calculates the fine level required to make cartel conduct unprofitable for firms. The optimal fine is equivalent to the increase in profits earned from cartel conduct multiplied by the risk of detection, assuming firms are risk neutral. Based on a five-year cartel maintaining a 20% price increase and a 10% increase in profits, with an optimistic 33% probability of detection and punishment, the fine would need to be at least 150% of annual turnover. Any lower and cartel conduct would be the profit-maximising choice for firms. By comparison, the maximum fine for New Zealand firms is up to 10% of annual turnover, under section 80 of the Commerce Act 1986.

Wils (2006) assumes that shareholders, as firm owners, are primarily responsible for the decision to participate in a cartel. Spagnolo (2006) supports this approach. In some firms this may well be true, particularly in countries where shareholders tend to exercise control over

firm operations. In most large firms in New Zealand, however, ownership and control is separated, with the firm's day-to-day decisions made by managers (Farrar, 2008). Gallo et al. (2000) suggest the possibility of prosecution and penalties provide firms with adequate incentives to control the behaviour of managers. This argument is questionable since shareholders are unlikely to be in a position to evaluate whether increases in prices and profits are due to cartel conduct or simply good management. Many firms also have performance-based remuneration in place, like bonuses, to encourage managers to increase firm profits (Farrar, 2008). This provides an additional incentive for managers to fix prices. As such, the model in this paper assumes that managers make the decision as to whether to collude.

In equation (4.5), the manager's expected utility of cartel conduct, the punishment f represents only the costs of punishment borne by the manager. The actual value of the fine imposed on a firm is unlikely to significantly affect f since the manager does not personally bear the cost.

Examining fines imposed in New Zealand suggests that judges rarely impose individual fines on managers. Under section 80 of the Commerce Act 1986, the court can impose individual fines up to a maximum of $500,000. In 2001, Parliament amended the Act to require the courts to impose civil penalties on individuals unless there are good reasons not to. Since the amendment, the Commerce Commission has successfully prosecuted six cartel cases, but individual fines were imposed in only two cases. The values of the fines imposed were one $10,000 fine, three $15,000 fines, one $35,000 fine and two $65,000 fines (MED, 2012b). Fines are usually not imposed on managers, and when fines have been imposed, they have not exceeded 13% of the maximum allowable fine.

The model set out in Part 4 can be used to conduct a simple analysis of the decision faced by the manager. The manager will collude if $EU_c > EU_n$, or from equation (4.8):

$$(1 - p_A p_C)U(w + y) + p_A p_C U(w - f) > U(w).$$

Suppose the manager expects the cartel to have a 30% chance of detection,[5] with a further 50% chance upon detection that the manager will be subject to an individual fine. Suppose

[5] Bryant and Eckard (1991) estimate the probability that a cartel will be caught and prosecuted by the Department of Justice in the United States to be at most 13% to 17% in any given year. This was, however, before the introduction of the leniency regime.

also that the manager is risk neutral. For the manager to collude with other firms despite an expected $65,000 fine, then, she must value the gain from cartel activity at more than $11,470.59 each year. The gain from cartel activity will partly depend on the manager's pay structure; if the manager receives bonuses for higher profits or owns shares in the firm, the gain is likely to be larger. The manager will also receive non-pecuniary benefits like an increased reputation from running a profitable company.

The minimum gain required for cartel behaviour to be optimal will decrease if the manager suspects a lower probability of arrest and conviction or expects a lower fine to be levied. On the other hand, the minimum gain will increase if the manager is risk-averse or receives other disutility from the imposition of a fine, such as loss of reputation.

Although this analysis is simplified, it does suggest that the current level of civil enforcement would not make cartel conduct unprofitable for managers unless the manager did not place much value on the benefits of cartel conduct or believed there to be a very high likelihood of arrest and conviction.

5.2 Incentive compatibility constraint

A simple analysis of cartel profitability only takes into account the participation constraint; it does not take into account the incentive compatibility constraint (Spagnolo, 2008). Profitable cartels may still collapse if cartel members have incentives to unilaterally defect from the agreement. Leniency regimes increase the incentive to defect and ensure that cartels can be deterred "with much lower expected sanctions" than the analysis in the previous section would predict (Spagnolo, 2008, p.261).

Spagnolo (2004) applies this reasoning and finds that complete deterrence without costs of investigation or prosecution can be achieved by rewarding the first firm seeking leniency with a reward financed from the fines levied on other cartel members. This strategy maximises the conflict between the interests of the cartel and each individual firm. Cartel agreements are then unsustainable. Even if rewards are not offered, leniency regimes increase the likelihood of defection and make collusion a riskier strategy, as long as only the first firm to come forward is granted leniency.

As Spagnolo (2004) recognises, this analysis focuses on firms, but in practice firms are made up of many individual agents. In the context of the model introduced in this paper, for the manager to continue colluding in any period, the incentive compatibility constraints in equations (4.12) and (4.13) must be satisfied:

$$U(w+y) > [1-\beta(1-p_A p_C)]U(w+y^m) + \left(\frac{\beta}{1-\beta}\right)(1-p_A p_C)U(w)$$

and:

$$EU_c > U(w+y^m-c) + \beta\left(\frac{U(w)}{1-\beta}\right).$$

If the first inequality is not satisfied, the manager will defect. If the second inequality is not satisfied, the manager will defect and seek leniency. Unless *c* is particularly large, perhaps because the manager feels that seeking leniency will cause serious damage to her relationships with other managers in the industry, the manager will always defect and seek leniency rather than defect. The manager may reduce the cost of seeking leniency by asking the other agents of the firm to seek corporate leniency on behalf of the firm, rather than seeking individual leniency herself (Festerling, 2005). This means other firms will not be able to identify her as the individual who came forward. However it is obtained, leniency allows her to enjoy the monopoly profits for that period but without risking arrest and conviction in the future.

A numerical example using the same parameter values as in the previous section can demonstrate how the leniency regime encourages defection. For the manager to seek leniency, the following condition from equation (4.13) must be satisfied:

$$\frac{(1-p_A p_C)U(w+y) + p_A p_C\left[U(w-f) + \beta\left(\frac{U(w)}{1-\beta}\right)\right]}{1-\beta+p_A p_C \beta} < U(w+y^m) + \beta\left(\frac{U(w)}{1-\beta}\right).$$

Suppose that seeking leniency is costless and that the manager values the monopoly profits from defecting at twice the value of the gain from the cartel. As in the previous example, a risk neutral manager expects a 30% chance of detection, with a further 50% chance upon detection that the manager will be subject to an individual fine of $65,000. The manager will then seek leniency as long as $9750 > y[1.7\beta - 1.15]$.

The manager's decision depends on the value of β, or the weight she places on future periods in her utility function, where $0 < \beta < 1$. If the manager places a weight on future periods

such that $\beta < 0.676$, the manager will always seek leniency as long as the gain from the cartel is non-negative. On the other hand, if the manager places a high weight on future periods of $\beta > 0.676$, the manager will seek leniency as long as the gain from the cartel is less than \$9,750 divided by $1.7\beta - 1.15$. For example, even if the manager places a high weight on future periods such that $\beta = 0.9$, the manager will still seek leniency as long as the gain from the cartel is less than \$25,657.89. This is about \$14,000 more than is required for the cartel to be profitable for the manager under the same parameter values, as shown in Part 5.2. A cartel may therefore be unstable even when it would be profitable for managers.

It would be possible to further destabilise cartels by providing the first manager or employee to blow the whistle on the cartel with a fines-financed reward, as Spagnolo (2004) has suggested for firms. In the United Kingdom, whistleblowers can receive rewards of up to £100,000 for specific information that leads to the investigation and prosecution of a cartel (Office of Fair Trading, n.d.). However, this scheme is aimed at employees who currently do not have incentives to come forward. Managers who are directly involved in the cartel will not be granted rewards unless their involvement was "peripheral" (Office of Fair Trading, n.d.). The MED (2010) has dismissed the use of such a scheme in New Zealand, noting that it is questionable whether employees who are not involved in the cartel will have enough information on the cartel to sustain a prosecution. The focus of any reward scheme should instead be providing an incentive for managers to defect from the cartel.

However, offering rewards to managers involved in cartels is problematic for other reasons. Aubert et al. (2006) find that individual reward schemes may negatively impact firm internal organisation and reduce performance. Individuals who wish to obtain the reward may also provide manufactured or false information. To some extent this can be mitigated by having tough sanctions for information fabrication and by only rewarding information which directly leads to the successful prosecution of other cartel members (Spagnolo, 2008). Nevertheless, the risk cannot entirely be removed, and public approval for a scheme financially rewarding wrongdoers for blowing the whistle on other wrongdoers is likely to be low.

Including the leniency regime in the analysis demonstrates that even if the current level of civil enforcement does not make cartels unprofitable, cartels may still be difficult to sustain because each manager has an incentive to defect and seek leniency. This is particularly true if managers do not place a high value on future income and if managers are able to reduce the

costs of seeking leniency by seeking leniency through their firms. The difficulty of sustaining cartels is likely to discourage managers from colluding. Thus, and contrary to the arguments of the MED (2010, 2012a, 2012b), the civil regime may be sufficient to deter cartel conduct.

6 CRIMINALISATION

Criminalisation introduces another potential cost for the manager: a prison sentence of up to seven years. This section examines the effect of criminalisation on the model, and evaluates the case for criminalisation.

6.1 Effect on the model

If the manager is convicted of cartel behaviour the judge can choose whether to impose a fine or imprisonment. The probability of conviction, p_C, can be separated into the probability of an imposition of a fine and the probability of an imposition of a sentence of imprisonment, such that $p_C = p_F + p_I$, where p_F is the probability of a fine being imposed (given arrest) and p_I is the probability of a sentence of imprisonment (given arrest).

The expected utility for the manager of colluding under criminalisation is:

$$EU_c = (1 - \hat{p}_A[p_F + p_I])[U(w + y) + \beta EU_c] + \hat{p}_A p_F[U(w - f) + \beta EU_n] + \hat{p}_A p_I\left[U(w - i) + \beta^i EU_n\right] \quad (6.1)$$

where f is the monetary value of a fine, i is the monetary equivalent of imprisonment, β^i is the discount factor to the power of the period the manager is released from prison (because the manager does not earn in prison) and $\hat{p}_A$ is the probability of arrest under criminalisation. $\hat{p}_A$ can be different from the probability of arrest under the civil regime, p_A.

I now consider how the parameters of the model will change under criminalisation.

6.1.1 Probability of conviction

The probability of conviction is likely to decrease under criminalisation, because the need for the prosecution to prove beyond reasonable doubt that the manager took part in a cartel will make it difficult for the Commerce Commission to secure convictions. The civil standard only

requires the prosecution to prove cartel conduct on the balance of probabilities. In the United Kingdom, the first contested cartel trial under criminalisation collapsed because the competition authority was inexperienced with criminal investigations, and the court did not consider evidence provided by the leniency applicant and its witnesses strong enough to sustain a criminal case given that the leniency applicant was equally implicated in the alleged offence (Office of Fair Trading, 2010).

Additionally, if juries believe imprisonment is too harsh and that the judge is likely to impose imprisonment, they may be less likely to convict the manager. Stephan (2008) conducted a survey of public attitudes towards imprisonment in the United Kingdom and found that although 73% of respondents agreed that fixing prices was harmful to customers and should be punished, only 11% thought that imprisonment was an appropriate punishment for managers involved in price-fixing. In the United Kingdom, it is necessary to show that price-fixing is "dishonest" to secure a criminal conviction, and only 63% of respondents believed price-fixing could be dishonest. An extensive survey conducted in Australia by Beaton-Wells et al. (2010) found that 71.9% of respondents thought that price-fixing agreements between competitors should be against the law, but only 15.8% thought that imprisonment was an appropriate punishment.

It seems likely that the public perception of cartel conduct and its blameworthiness in New Zealand would be similar to the public perception in the United Kingdom and Australia. However, any effect on the jury's decision would be mitigated by the fact that the proposed New Zealand offence does not include a dishonesty requirement; the prosecution is only required to prove that the manager intended to fix prices, not that she dishonestly did so (MED, 2012a). Additionally, under section 361D of the Crimes Act 1961, judges have the ability to order a trial by judge alone in a criminal trial that is likely to be long and complex. Given the complicated nature of economic crimes, it is possible that such orders will be made in cartel cases and that trials will be heard by a judge alone.

Nevertheless, given the requirement to prove cartel behaviour beyond reasonable doubt, we would expect the probability of conviction to decrease overall.

6.1.2 The probability of imprisonment

The relative likelihood that imprisonment will be imposed on the manager instead of a fine will depend on how judges view cartel criminalisation.

Before Australia criminalised cartels, Beaton-Wells (2008, p.230) pointed out that the Australian judges were reluctant to impose anywhere near the maximum fine level. As a consequence there was "reason to doubt whether judges will be prepared to send such individuals to jail or to sentence them to lengthy jail terms under the new criminal regime". No criminal prosecutions have been brought in Australia since the law change was introduced in 2009 (MED, 2012b), so we cannot evaluate how judges have reacted to criminalisation.

It is possible that judges may perceive the offence as more serious following criminalisation. However, given that New Zealand judges rarely impose individual fines on managers, and never impose fines higher than 13% of the maximum fine, it seems highly unlikely that New Zealand judges will be prepared to sentence managers to imprisonment. We would expect the probability of imprisonment to be small, though perhaps the change in perception may lead to judges imposing higher fines.

6.1.3 Probability of arrest

The probability of arrest depends in part on the likelihood of managers coming forward and seeking leniency, which itself depends on the manager's expected utility of cartel conduct. However, because managers do not have full information about the Commerce Commission's investigations or about other managers seeking leniency, the probability of arrest in the model can be viewed as the perceived probability of arrest. The manager will act based on her beliefs about the behaviour of other managers and the Commission.

All other things equal, the possibility of imprisonment makes colluding less attractive, so managers would be more likely to come forward and seek leniency. This would increase the probability of arrest. However, if managers believe that the probability of conviction or the probability of imprisonment is low, as seems likely given the above analysis, this effect would be weaker. Perception of the effectiveness of criminalisation is likely to be a key factor in determining the probability of arrest.

The costs of seeking leniency are also likely to increase with criminalisation because, by seeking leniency, the manager may subject the other managers involved in the cartel to prison sentences. Evidence suggests that whistleblowers experience "trouble finding work and a troubled social and private life after reporting" (Spagnolo, 2008, p.278), and these negative effects are likely to increase substantially when others have been imprisoned. The Commerce Commission does endeavour to keep the identity of leniency applicants confidential (Commerce Commission, 2011), but in practice this may be difficult to do, particularly when court proceedings are issued against all managers involved except the applicant.

Even if the identity of the leniency applicant is kept confidential, the manager may still experience a cost from knowing that she was responsible for imprisoning her fellow managers. O'Kane (2011, p.491) interviewed a British manager who was imprisoned for cartel behaviour in the United States and the United Kingdom. When asked about the leniency regime, the manager said:

> It was almost like sneaking at school. It's not something one really does. Go shop your fellow conspirators; it's a bit below the belt. I think it is more likely to happen now, but at the time, well, we are English; we don't do that sort of thing.

New Zealand has small markets where managers are likely to know each other and consider each other friends, so it is plausible that managers may not seek leniency after criminalisation if they believe that the probability of detection by the Commerce Commission is otherwise low and that coming forward would condemn other managers to prison sentences.

While the Australian competition law authority reported an increase in leniency applications following criminalisation (MED, 2010), lawyers practicing in the area have indicated that this was because firms sought to ensure that transactions were notified even if they did not breach the law, in order to demonstrate a culture of compliance to the authority and help the firm defend possible future allegations (Matthews, 2010). The fact that no criminal cases have been brought against cartels in Australia suggests that the increase in leniency applications may not have been based on actual cartel conduct.

The probability of arrest is also affected by the Commerce Commission's investigations into cartel behaviour. The Commission will have additional powers of investigation following

criminalisation; for example, the ability to use covert surveillance to gather evidence (MED, 2010). However, criminal investigations are also more expensive, and setting up a criminal regime will incur high administrative costs, like developing procedures for criminal investigations and prosecution guidelines (MED, 2012b). Furthermore, the Commission will be keen to avoid a repeat of the experience in the United Kingdom, where the first criminal trial collapsed due to the competition law authority's inexperience with criminal investigations (Office of Fair Trading, 2010). We would expect these factors to at least initially decrease the probability of arrest.

The likely effect of criminalisation on the perceived probability of arrest is difficult to judge. While the MED (2012a, p.11) claims that criminalisation "would improve the effectiveness of the leniency regime by increasing the value to the individual applying for leniency", it is not at all clear that this would be the case, and the Commerce Commission is likely to conduct fewer criminal investigations.

6.1.4 Social stigma

A loss of reputation will occur on arrest even if no punishment is imposed by the judge. Eide (2000, p.351) notes that the "nuisance associated with appearing in court, and the reactions of employer, family and friends, might have a stronger effect than formal sanctions". This effect becomes amplified after criminalisation given that the social stigma associated with arrest for a criminal offence is much greater than the social stigma associated with arrest for a civil offence.

The manager's expected lifetime utility of colluding then becomes:

$$\begin{aligned} EU_c = (1-\hat{p}_A)[U(w+y)+\beta EU_c] + \hat{p}_A p_F[U(w-f-g)+\beta EU_n] \\ + \hat{p}_A p_I\left[U(w-i-g)+\beta^i EU_n\right] \\ + \hat{p}_A(1-p_F-p_I)[U(w+y-g)+\beta EU_n] \end{aligned} \tag{6.2}$$

where i and f now include the mental costs of loss of reputation following the imposition of a fine or imprisonment, and g represents the increase in loss of reputation incurred on arrest for a criminal offence. This loss of reputation is incurred even if the manager is not convicted of the offence.

The British manager interviewed by O'Kane (2011, p.495) said that the most frightening thing about being arrested for cartel conduct was:

> ... the fear of the unknown and the fact that your personal reputation is shredded, it's in tatters. Even though I didn't have any personal gain, and that was accepted by everybody, there is no smoke without fire, is there?

Including social stigma in the model means that managers will find cartel conduct less attractive following criminalisation even if they do not believe imprisonment is a likely punishment.

6.2 The case for criminalisation

Even if the civil regime does not deter managers from colluding, criminalisation is not necessarily the optimal policy. If the government's objective is to maximise society's expected utility, then this requires minimising the harm caused by cartels and minimising the costs of enforcement. Becker (1968) demonstrates that because enforcing is costly, it is never optimal for the government to deter all criminal activity. To evaluate the case for criminalisation we must weigh up all the benefits and costs.

Imprisonment as a punishment has unique benefits. A prison sentence represents a direct and personal cost to the manager. Fines are limited by the manager's ability to pay and, as noted in Part 5.1, judges usually choose to impose fines on firms only. Even when fines are imposed on managers, managers may not bear the full cost; although firm owners are prohibited from indemnifying managers from fines under section 80A of the Commerce Act 1986, it is still in practice possible for firm owners to compensate managers for individual fines simply by increasing the manager's pay.

On the other hand, fines should be preferred to prison sentences where feasible because, as Becker (1968) recognised, fines are simply transfer payments from offenders to government. Fines can be increased at no cost and the revenue can be applied to enforcement expenses. By contrast, imprisonment involves considerable social and financial cost; prisons are expensive to run, and managers in prison cannot produce economic activity. While precise estimates of the financial costs of criminalisation are not available, the MED (2012b) states that the government's costs will include administrative costs, the costs of developing the Commerce

Commission's capability to investigate criminal offences, the increased costs of cartel prosecutions and incarceration costs. Additional administrative costs are estimated to be $500,000 for the first year that the regime is in place. The other costs are not estimated, but given that the Commission's current civil litigation fund is over $8.5 million, we would expect the scale of the additional costs to be high (Bell Gully, 2011).

Criminalisation also imposes costs on firms and society. For example, internal business compliance costs will increase. Managers may avoid pro-competitive behaviour, like sharing resources and technology with other firms, if they believe this could be mistaken for cartel conduct. The model in Part 4 assumes that the manager will only be arrested and convicted if she has colluded, but in reality wrongful arrests and convictions do occur. Calvani and Calvani (2011) suggest the risk of discouraging pro-competitive behaviour could be mitigated by ensuring that any doubt means the case is only civil. The MED (2012a) has taken this approach. The bill also includes exemptions and and a clearance regime for collaborative activity. Despite these measures, Treasury has voiced concerns about the risk of "chilling" pro-competitive behaviour (MED, 2012a, p.12). Arguably, it is not significantly mitigated because accused managers must either seek clearance from the Commission in advance of their activity or prove on the balance of probabilities that their activity falls within the exemptions. Even if managers believe conviction or imprisonment to be unlikely, a wrongful arrest would seriously damage their reputation.

Given the high social and financial costs of criminalisation, and the fact that these costs will not be matched by a significant increase in deterrence, the case for criminalisation does not appear to be made out.

7 CONCLUSION

In this paper, I have examined cartel law enforcement in New Zealand and the likely effects of criminalisation. While the existing civil regime may not make cartel conduct unprofitable for managers, the leniency regime acts to destabilise cartels and creates a conflict of interest between the interests of the cartel and the interests of individual managers.

Even if the existing civil regime does not deter cartel conduct, criminalisation is not necessarily the optimal policy. Criminalisation is expensive, even excluding the direct costs of

imprisonment; the government has to set up and administer the criminal regime, firms have to improve their internal compliance policies, and pro-competitive behaviour will be discouraged. These costs are unlikely to be matched by a significant increase in deterrence. The prospect of personal imprisonment and the stigma of arrest for a criminal offence will make cartel conduct less attractive, but this is countered by the low probability of conviction and imprisonment. The costs of seeking leniency for a criminal offence are likely to be high, because managers will not want to subject other managers in the cartel to prison sentences, so leniency applications may not increase and managers may not be any more likely to defect from the cartel. Given the high social and financial costs of criminalisation, criminalisation may not be justified by arguments that it will increase deterrence.

This paper takes the first steps towards a more principled analysis of deterring cartel conduct in New Zealand. More research could shed further light on the issue. For example, we could investigate in more detail other options to improve deterrence, like offering fines-financed rewards to the first firm or individual to seek leniency. We could also survey managers of firms operating in New Zealand about their perceptions of the changes likely to occur under criminalisation. While managers are likely to understate their beliefs as to cartel profitability, it may be possible to determine more accurately how parameters of the model, such as the perceived possibility of arrest, are likely to change with criminalisation.

The MED introduced the criminalisation bill into Parliament despite opposition from most submitters and without any evidence that cartel criminalisation will increase deterrence. This suggests that the decision to criminalise cartels is politically motivated. Cartels undeniably cause economic harm, but there is no evidence that they exist in New Zealand to the extent warranting criminalisation. In fact, as this paper shows, cartels may already be deterred by the existing civil regime.

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