

Questions relating to the regulation of fibre fixed line access services (FFLAS) in New Zealand

I have been asked by Chorus to provide some thoughts on issues surrounding proposals for the regulation of FFLAS in New Zealand, specifically the following three sets of issues:

- The features of the legislative framework which may make it challenging for the Commission to replicate the outcomes of a workably competitive market for FFLAS over the lifecycle of these services.
- The nature of the risks (including risks related to regulatory decision-making) faced by a regulated FFLAS supplier in the periods identified by Ingo Vogelsang and Martin Cave, and how those risks could impact on Chorus being able to receive a normal return on, and recovery of, its capital.
- Potential mechanisms to assess and/or compensate Chorus for any risks identified.

In addition, I have been asked to share any comments I might have on two papers prepared by Martin Cave and Ingo Vogelsang, one addressing pricing issues and the other addressing the Financial Capital Maintenance (FCM) Principle.

Outline

What follows is very much a series of ‘thoughts’, with no attempt to construct any sort of systematic scheme of analysis across the piece as a whole: the issues are just too complex to be covered in a single, short paper. What I hope might be more useful is to provide some outside perspectives on relevant matters, in the hope of offering one or two fresh insights that may be of value.

Before getting to the specific questions, however, I do think it useful to revisit some of the fundamental concepts and ideas underlying regulation in NZ, first and not least because there are potential sources of confusion that go beyond FFLAS-specific issues and which can be addressed at a more abstract level. These are covered in Part 1 of the paper.

Part 2 contains comments on the three specific areas of issues identified by Chorus and listed above.

Comments on points made by Cave and Vogelsang are made along the way.

To the extent that there is any central theme, it is a recommendation that, in performing the relevant economic analyses, it is advisable to work with the kind of inductive approach used by the greatest master of political economy, Adam Smith. This proceeds from facts and observations to theorising about things, not the other way round (which generally leads to vagueness).

PART 1

Back to the past: framing the issues

When the input methodologies were developed, I had the pleasure of being invited by the Commerce Commission to join three distinguished colleagues – Prof Martin Cave, Prof Michael Pollitt and Dr John Small – in thinking, *inter alia*, about the use of the concept of workable competition in approaching issues concerning price-quality regulation. Since the range of contexts in which workably competitive markets (WCMs) can be found is large, the features of individual examples can vary considerably from one case to another. This range and variation renders attempts to use a generalised concept of a WCM quite useless as any sort of guide as to how price-quality regulation might best be developed.

What we recommended, therefore, was that the focus be narrowed to WCMs that shared salient features with the economic context under evaluation. This exercise not only forces thinking about what the important economic features of the relevant market or sector are, but also frees the mind to some extent. In looking for similarities/differences with/from other market contexts, the potential gain is new insights on issues that might be very familiar, perhaps even too familiar, in the sector under examination.

The first ‘thought’ therefore is simply that this old ‘thought’ is worthy of recollection.

The concept of workable competition.

As has been said many times before, the concept of workable competition is itself ill-defined, at least with any reasonable degree of specificity.

Competition in general

Competition means rivalry, and rivalry is a feature of a *process*. In saying that a process is rivalrous/competitive then, at this level of abstraction there can be no immediate linkage to the *outcomes* or effects that eventuate. In general, rivalry can lead to many different, possible

outcomes. Competition on a sports field does not lead to a predetermined ‘winner’ and indeed in ordinary language a contest with a more unpredictable outcome can be described as ‘more competitive’ than a contest in which the outcome is much easier to anticipate.

Hayek has summarised the point as follows:

“...competition is important only because and insofar as its outcomes are unpredictable and on the whole different from those that anyone would have been able to consciously strive for.”

He sees competition as quintessentially a discovery process, and discovery (of new information with economic value) as the principal driving force in economic progress.

As an aside at this point, the importance of this dynamic aspect of competitive processes has been increasingly recognised in economic analysis via a strengthening emphasis on the importance of dynamic efficiency. In practice, however, this recognition has tended only to lead to adjustments to a previously dominant static frame of reference – dynamic efficiency often makes an appearance alongside allocative efficiency and cost efficiency – that proceeds by assuming a given *information state* in the market or economy. Discovery though is about something different, it relates to an expansion of the set of economically valuable information.

Moreover, in talking about efficiency, we are usually talking about outcomes in the sense of a particular configuration of prices, quantities, qualities, etc., not the process that leads to them. *Ex ante*, therefore, what will turn out to be more or less efficient is something that itself has to be discovered.

Given these points, there is obviously a great challenge that can be summarised in the question: “Given that its outcomes are unpredictable, how is it possible to evaluate different competitive processes, one against another?”

Hayek’s general answer is that we can’t:

“When, however, we do not know in advance the facts we wish to discover with the help of competition, we are also unable to determine how effectively competition leads to the discovery of all the relevant circumstances that could have been discovered. All that can be empirically verified is that societies making use of competition for this purpose realize this

outcome to a greater extent than do others—a question which, it seems to me, the history of civilization answers emphatically in the affirmative.”

Whilst not contesting the great importance of past, observed experiences, my own judgment is that that Hayek’s answer goes a little too far in the negative direction, and that some foresight is possible. The future may be seen through a glass darkly, but some foresight remains. In seeking to use it though, great care needs to be exercised not to exaggerate its very limited nature, i.e. to fall prey to Hayek’s “pretence of knowledge”.

Workable competition and its outcomes

The references to competition in the NZ legislation are qualified by the adjectives ‘workable’ or ‘effective’, which raises immediate questions about what they signify, about what is meant by ‘workable’. The first answers must lie in the statute, s162 of which it will be useful to cite here for explanatory purposes.

The purpose of this Part is to promote the long-term benefit of end-users in markets for fibre fixed line access services by promoting outcomes that are consistent with outcomes produced in workably competitive markets so that regulated fibre service providers—

- (a) have incentives to innovate and to invest, including in replacement, upgraded, and new assets; and*
- (b) have incentives to improve efficiency and supply fibre fixed line access services of a quality that reflects end-user demands; and*
- (c) allow end-users to share the benefits of efficiency gains in the supply of fibre fixed line access services, including through lower prices; and*
- (d) are limited in their ability to extract excessive profits.*

The objective is clear enough, promotion of long-term benefits to end consumers, so, at the highest level, workable/effective competition might be a label assigned to any competitive process that works well for the long-term interests of consumers. That leads on to the question of how well is ‘well’? Judgment calls are inevitably required here.

To guide those judgments, the purpose statement sets out four exemplary characteristics of the processes under assessment. The first two and the fourth are to do with the incentive structure of an effectively/workably competitive market, the third is more ambiguous in that it could be read either as a statement about a final outcome (in the usual meaning of that term) or as, for the other three, about aspects of the incentive structure that might be expected

to lead to this final outcome. I will work on the assumption that it is the latter, and by implication the ‘outcomes’ that the legislation is immediately directed toward are features of an incentive structure. That renders them rather more assessable than end outcomes, which fall foul of Hayek’s point.

There is perhaps an analogy here with concepts in business strategy: the four features are like ‘proximate objectives’ in strategy, i.e. feasibly attainable goals that, if achieved, can be expected to contribute positively to the achievement of the over-arching objective.

Discussion of the precise meaning of the word ‘outcome’ – is it referring to measurable performance variables such as prices, quantities, quality measures, efficiency, etc. or, as the NZ legislation seems to suggest, to features of incentive structures (incentives to promote innovation, improved quality, prices that are close to costs, etc.) – may seem esoteric, but words are important. Let me call the first an event-outcome and the second a structure-outcome (the relevant structure being an incentive structure).

In the UK the notion of outcomes-based regulation became a popular theme for a while, but the meaning of the expression tended to be rather variable and uncertain. And if the concepts that regulators use are variable and uncertain, that will likely transmit itself through into variability (arbitrariness) and uncertainty of decisions, and that regulatory uncertainty is a rather important matter.

In the current context, an example of the problem is to be found in the Vogelsang-Cave pricing paper, where it is said (at para 5) that “*While s162 contains a multi-purpose statement, it appears to be quite compatible with an efficiency objective*”. But that is a category error, if the multi-purpose outcome is directed at structure-outcomes, efficiency being an event-outcome. Moreover, the purpose statement is clearly not directed at efficiency anyway, at least if efficiency is measured as the total gains from trade, i.e. producers’ surplus plus consumers’ surplus (the usual working assumption in applied economics). It is clearly focused on consumer benefit only: there is a distinct distributional slant to the s162 purpose. Again the confusion can only contribute to regulatory uncertainty.

Regulatory uncertainty

A degree of regulatory uncertainty is inevitable. Regulators must necessarily make discretionary decisions and those decisions, being at least partly unpredictable, cause changes

in information conditions in the relevant markets and in forward-looking incentives. It is the magnitude of the ‘surprise’ that matters.

One strategy of good regulation is to seek to reduce the uncertainty by basing decisions on stable sets of ‘principles’, made known to market participants, who can then, in any given economic context, anticipate the likely outcome of the decision. This can be called ‘contingent predictability’: regulators have flexibility to respond to changing economic contexts, but, knowing both the current context (the ‘contingencies’) and the principles at work, businesses can develop reasonably accurate expectations of the decision itself. The regulatory decision making does not then add greatly to the background uncertainties of the market context.

Where adopted, one indicator of the effectiveness of this approach is to observe share price movements around the time of the release of new information. There are some circumstances in which a distinct step up or down in the capital market response can be expected, as for example when a regulatory decision amounts to a simple binary choice between A and B. If the principles and circumstances are such as to indicate that it will be a close call, the pre-decision share price may hover somewhere in the region indicated by a 50/50 bet on the outcome. Once the decision is made and announced, the price will then jump to either the (say) higher A-value or the lower B-value.

Where, in contrast, the regulatory announcement is concerned with the resolution of a complex array of trade-offs, and a fortiori when the announcement is part of a pre-decision process, large share price movements provide reasonable grounds for concern about the content of the announcement. In this context, the circa 10% fall in Chorus’s share price surrounding the release of documents on 21 May 2019 is what, from my own experience of capital market reactions to price review announcements, can only be described as very large. It equates to a 10% reduction in shareholders’ capital and, given that expropriation of capital is the cardinal sin of price regulation, it is a cause for reasonable worry.

These remarks should not be overinterpreted. For any number of reasons, the diagnostic indicator referenced here may turn out to be a false negative. But it still sits there as a diagnostic reading, warranting further investigation and pointing to a requirement to seek to understand the reasons for it. In that, the context appears to me somewhat different from the more familiar situation in which regulatory uncertainty arguments are deployed, supported by economic arguments that are unaccompanied by any specific evidence. Aesop’s fable

reminds us that the fact ‘wolf’ has been cried many times on occasions where no wolf was present does not imply that a wolf will never appear.

PART 2

The first set of issues

The first set of issues put forward for comment asks about the challenges in *replicating* the incentive structure (the ‘outcomes’) of a WCM, and the same notion of replicating the outcomes of a WCM appears also in the Cave-Vogelsang paper on Financial Capital Maintenance. If, though, competition is a discovery process, a pursuit of replication presumes that the deliberations of an enforcement agency can be viewed as a very good substitute for rivalrous discovery.

That, of course, is not the case for a range of reasons of which maybe the most important are:

- (i) the incentive structure of an administrative bureaucracy is very different from those of competitive businesses and
- (ii) the ‘limited channel’ information processing capacity of an agency is far less than the information processing capacity of a competitive market.

(These two differences are to be found, succinctly expressed, in J.S. Mill’s *Principles of Political Economy* (1848), and the second in Smith’s *Theory of Moral Sentiments*, (1759), so we have known about them for some time, albeit that they seem to be repeatedly forgotten.)

It is fortunate therefore that the NZ legislation does not instruct the Commerce Commission to attempt replication/mimicry, but rather only to be guided by *consistency*. In practice the incentive structures of what might be judged to be effectively competitive markets can vary quite considerably. It is not, therefore, difficult to put ticks against the individual ‘proximate objectives’ boxes (a) – (d) by adjusting a regulated business’s incentive structure. The skill lies in (a) combining regulatory measures in a simple and coherent way (in recognition that the likely overall incentive effects on business behaviour can be expected to be co-determined or jointly-determined by the combination), (b) providing for the flexibility that is inherent in competitive processes, where, say for a period, one incentive effect may become rather more powerful than another, only to reduce in significance in a later period, and (c) reflecting the importance of particular incentive effects in the strengths of the incentives that are established.

Lifecycle pricing challenges

In the context of price regulation generally, and in particular in economically dynamic contexts (i.e. where the background economic conditions are changing at a relatively rapid pace, for example because of technological change) asset life-cycle issues are, I think, of central importance. The prospect of a continually shifting economic environment highlights both (a) the weaknesses of static conceptual frameworks, of which the building-block plus short (e.g. 3-5 year) review periods is one, and (b) opportunities for policy improvements built upon some stand-back thinking focused on inter-temporal issues.

To get the ball rolling on this, first recognise that a durable network asset will, once built, serve customers in a multiplicity of periods. Thinking of supply in these different periods as distinguishable activities or services, it is therefore an asset that gives rise to a *joint cost*. This raises a familiar question of how that joint cost is to be allocated to the various, individual pricing periods, recognising that the initial investment decision will depend upon the prospective revenues from what is considered to be the optimised, inter-temporal ‘marketing strategy’.

Rather than looking at this as an abstract, textbook problem, consider instead how this question is resolved in two WCMs that can be said to share the following features with telecoms: dynamic, changing economic contexts; rivalry heavily focused on product or service quality improvements; and requirements for relatively large, up-front investments in quality improvement whose costs are recovered over multiple time periods. The two illustrative examples are CPUs and movies, where the following can be observed:

- CPUs: Intel makes considerable investment expenditures in developing new, more powerful CPUs ahead of any sales, and it will expect to recover these from sales revenues over time, i.e. over multiple (short) periods. What we observe is that a new generation of more powerful CPUs will launch with high prices and that those prices are then reduced over time as rivals match their higher quality and offer new products of yet higher quality.
- Movies: Movie studios similarly have up-front, sunk costs and traditionally have used business models based on a similar, inter-temporal pattern of cost recovery. The movie itself is a durable product and the inter-temporal pricing patterns are sustained by a system of sequential distribution windows. It was simpler in the olden days (i.e. before internet disruption): there would be theatre release, followed by video/DVD release,

followed by pay-TV, followed by sales to free-to-air broadcasters. Average price-to-view declined over time.

What is going on here is a form of inter-temporal price discrimination, whereby earlier customers for a new CPU or movie make a higher contribution to sunk cost recovery than later customers. Whilst price discrimination is frequently looked at askance in static regulatory contexts, in these examples, and in many others, it takes on a much more benign aspect.

One reason for that is that the two examples feature a process of competition that depends heavily on product/service innovation. When a new CPU or new movie is introduced it does not immediately displace older CPUs or movies, but it does tend to command a higher price. It is perceived, whether on objective or subjective grounds, to offer an enhanced consumer experience for which customers are willing to pay more. In a rather generalised sense, the new offering is perceived to be of higher ‘quality’. Since competition to improve product quality is a widely found phenomenon, it is not surprising to find this identified pattern of inter-temporal discrimination across a range of WCMs. (For technically inclined economists, what we are looking at here is form of second-degree price discrimination in markets characterised by dynamic competition in the supply of *vertically differentiated* products/services.)

A number of points can be quickly noted:

- One benign aspect of this form of inter-temporal price discrimination is that a willingness to pay for incremental ‘quality’ tends empirically to be strongly correlated with income. In achieving higher margins for ‘higher quality’ products, the effect of the pricing pattern is broadly ‘progressive’ in terms of the distribution of income.
- One way to think of this is to go back to the notion of the joint, sunk input and the old question of how the costs of this collective good should be recovered. Were the input to be a publicly provided one, financed by taxation, one of Adam Smith’s principles of taxation is that the financial burden should be allocated according to the benefits it affords to different users. The life-cycle pricing patterns exhibited in the two WCM examples above broadly accords with this principle.

- The sorting mechanism in the examples is simply time. Those who value the new higher quality product more will be willing to pay more to adopt/view it earlier. They will be heavily represented in the population of ‘early switchers’ to the product.
- The crucially important, initial investment decision will be influenced by forward expectations of the life-cycle pattern of pricing, which will in turn be influenced by the dynamics of the context. Intel and Time-Warner know all this when they are investing in the development of new chips and doing their NPV (or alternative) profitability assessments before greenlighting the production of a new movie. We can infer as a general matter in these cases that the inter-temporal price discrimination increases profitability relative to a more inter-temporally levelized pricing policy and hence, also as a general matter, that the life-cycle pattern can be expected to affect the investment decision. Put simply, this is an issue that matters: imposition of constraints on inter-temporal price discrimination would tend to chill investment in the development of new CPUs and in the production of new movies.

Read across into telecoms

Every market has its own, individual mix of characteristics/features and the two examples here are chosen because they provide relatively dramatic illustrations of the implications of market features that are of relevance in telecoms. This, I think, is how the references to WCMs in the NZ legislation can be most productively utilised: first search for WCMs with features shared with telecoms and use observations on those WCMs to inform analysis of what will inevitably be a different mix in telecoms.

Thus, like for CPUs, in mobile telecoms the 2G, 3G, 4G, 5G, ... evolutions, map into sequential improvements in the services offered to consumers. The product life-cycles are characterised by an initial period in which the new offering is a premium quality product in the market, competing with older service offerings. Over time, new offerings coming on to the market will tend to erode the quality premium and the competitive position is constantly changing: generally, the competitive advantage afforded for any specific vintage of investment will be weakening, as happens when a new CPU becomes an old CPU, or a new movie becomes an old movie, although the pace of change is slower in telecoms than in the

two examples.¹ It is still there though, and it's therefore reasonable to characterise telecoms as a 'dynamic' sector of the economy.

Also present in telecoms is the critically important feature that the quality improvements arrive 'embodied' in major investment decisions: without the investment the quality improvement (product improving technological change) will not happen. This is what makes the life-cycle issues much more important than any static economic model might typically suggest.

(A tangential thought: long ago I sat through undergraduate lectures on 'embodied technological change' and on the importance of the entanglement between investment and innovation, but that older knowledge appears to have been largely forgotten: there are few references to it now. As Prof Ronald Coase has observed, economists appear to suffer from a weak ability to build cumulatively on past knowledge, and it is perhaps this characteristic of many of its practitioners that undermines any claim for the discipline to be regarded as a science.)

Candidate hypotheses regarding capital market responses to the new legislation

The introduction of the new s166(2)(b) – requiring, where relevant, the promotion of workable competition in telecommunications markets – appears to have been an issue of concern in some quarters in New Zealand, and this concern is a candidate explanation for the fall in the Chorus share price mentioned above. However, *viewing it in isolation*, my own first reading of it was more positive: it seemed like another step in the direction of a fuller recognition of the dynamics of the sector. What today are regulated activities might, because of a steadily changing competitive context, tomorrow be deregulated and there are now many examples of economic sectors proceeding along this path (although also now a number of examples of regulation reversing direction, as in the UK retail energy market progression: price regulation, price de-regulation, price re-regulation).

The NZ legislation is distinguished by its references to workable competition which, although they might give rise to difficulties in interpretation, provide the base for approaches that, compared with legislation in other jurisdictions, take a more dynamic view of the market environments facing regulators. For Hayek's reasons, competition is at its best in dealing

¹ This is very much an averaged statement: I still watch and enjoy the Wizard of Oz, released 80 years ago, though don't of course make use of Intel CPUs of that vintage.

with conditions of change and uncertainty, and there are myriad WCMs to observe and to learn from in developing a more precise understanding of both why that is the case and how evolved, differing incentive structures are adapted to different, particular contexts.

Further, as Vogelsang and Cave point out in their paper on pricing, and I agree with them on this, the exemplary ‘outcomes’ set out in the legislation have a tilt toward the dynamic aspects of economic performance. The first two of the four are:

(a) have incentives to innovate and to invest, including in replacement, upgraded, and new assets; and

*(b) have incentives to **improve** [my emphasis] efficiency and supply fibre fixed line access services of a quality that reflects end-user demands;*

Given these points, s166(2)(b) could be read as a step in the same direction involving, as it does, recognition that the competitive environment can be expected to change over time, that regulation should itself adjust to the commercial realities as they change, and that provision for, and guidance on, those regulatory adjustments, is a matter for now, not a can to be kicked down the road.

The key word here is probably ‘guidance’, which supports contingent predictability (regulatory certainty). Whilst some matters of detail can be left to later, individual regulatory decisions, the development of a broad regulatory strategy cannot, and this requires not only a statement of general principles, but also an indication of what those principles tend to imply in the very specific context of interest.

I have therefore stressed what appears to be a highly salient feature of context: the fact that the competitive dynamic is centred on quality/product/service improvement over time. Taken in conjunction with the fact that improvements tend to be embodied in new investments made at specific times, the context has a particular feature: the competitive positions of products and services associated with particular vintages of technology can be expected to weaken over time as later ‘quality’ advances in competitive or partly substitutable products/services are brought to market.

This contextual feature and its implications, therefore, are matters for examination and assessment from the very beginning, in the first regulatory period. It would be a mistake to assume that those implications can be ignored in (say) a first period in which competition might be judged nascent and ineffective, for example by applying a rigid BBM approach and

assuming all else can be considered later. Indeed, if there is a reasonable expectation that a comparable WCM would exhibit a rather different profile of life-cycle pricing, the rigid BBM approach would be *inconsistent* with outcomes to be found in relevant WCMs, and hence with the legislation itself.

I agree with Cave and Vogelsang that this is a very challenging exercise, but it is not an exercise that is either infeasible or one that can be safely ducked. Competitive businesses face similar challenges in developing their own inter-temporal pricing strategies on a routine basis and, consistent with the legislation, there is much to be learned from their experiences.

Non-separability in rule-making

The general problem is that increments in legislation cannot properly be assessed in isolation: the effects that any set of rules and regulations will have on market conduct and performance are generally non-separable. And here, I think, is the biggest source of challenge.

Legislation and regulatory practice have recognised that in periods before a market might be judged workably competitive there may be a number of obstacles in the way of an evolutionary development toward greater competition. It is reasonable to make provision for their removal or remediation, but this requires that non-separability be taken into account by considering the full sets of rules and regulations that might be in force over the economic lifetimes of investments, not simply adding, subtracting and evaluating on a myopic basis.

For example, progress towards a more competitive market may be hindered by the conduct of firms with substantial market power, but from my own experience, empirically the greater source of such obstacles is regulation itself. And I don't think that experience is idiosyncratic. I can still vividly recall a conversation with an Oxford-based Deputy Chairman of the then Monopolies and Mergers Commission on a train home from London around 30 years ago in which he said to me: 'It is a funny thing, but every time we find a restriction of competition we also usually discover that there is some or other government regulation lying behind it.'

Another hypothesis then is that the challenges chiefly lie in the 'join' between (a) policy that increasingly recognises the reality of dynamically changing contexts and (b) the static conceptual frameworks that have dominated utilities regulation in recent decades and which have given rise to an established stock of existing rules and regulation. Might this be a case of new wine in old bottles?

Light hands vs heavy hands

The building block approach, with its periodic reviews, was established for contexts where monopoly, or at least very substantial market power, could be expected to endure over several pricing periods. At any one price review there was always the thought that any errors could be corrected at the next review, without causing significant economic harm, and the thought itself was influential in leading to a more light handed approach to the decisions to be made and to a fairly narrow focus on matters of the next few years, without need for taking longer looks forward (looking back has never been a significant issue). In economic theory terms, the interactions between regulated businesses and regulators could be viewed as a game that, to a decent approximation, would be repeated over several periods.

When, however, the economic context is changing more quickly, the repeated game aspect of the issues reduces in significance. Correction of the mistakes later may be less straightforward because the evolutionary process might have moved on in the interim and no easy reversal mechanisms may be available. The harms done by myopic decisions may, therefore, be higher, because they may shape a whole subsequent evolution in market conditions.

The issues these points raise go well beyond the telecoms sector. The sectors for which the building block + periodic price reviews were developed, of which electricity distribution is the most frequently cited example in NZ, are themselves now subject to disruptions of a type that makes dynamic contextual change an important reality. Nevertheless, telecoms has always been seen as a sector in which a recognition of ‘change ahead’ has been to the fore. In Britain we tend to forget now that the governing philosophy, attributable to Michael Beesley and Stephen Littlechild, was that price control would be an approximate and light handed affair, lasting for perhaps five or ten years, providing more of a safety net for consumers in a process of transition (to something like Workable Competition), not an enduring feature of the regulatory set up.

I have identified one example of the problems for regulation created by changing economic contexts (inter-temporal sunk cost recovery over a project’s lifetime), which might or might not be the most significant (once the general problem is diagnosed I suspect that other examples will be discovered). The building blocks approach tends to treat assessments for the next pricing period as a distinct and separable exercise, perhaps with some error correction

adjustments for the preceding period: costs for the period are estimated, including costs of capital, and allowable revenues are set accordingly. Proceeding in this way will, however, tend to suppress inter-temporal price discrimination, which is to be found on a grand scale in WCMs such as CPUs and movies.

Pricing periods vs regulatory periods

In their paper on Financial Capital Maintenance, Cave and Vogelsang (CV) define three actual or potential policy or regulatory decision points in the development of fibre in NZ, which in turn define three relevant periods in a project life-cycle:

1. The decision to launch the Ultra-fast Broadband (UFB) initiative, followed by the implementation of that decision up to 2020;
2. The installation of the new regulatory regime following the passage of the Telecommunications (New Regulatory Framework) Amendment Act in November 2018;
3. A possible future decision to release from regulation UFB operators formerly regulated by information disclosure or price-quality paths covering some or all of their wholesale services, as a result of developments in the relevant marketplaces which make such regulation unnecessary.

This is a useful start in getting to grips with the temporal issues that are of interest and a number of points can be noted at the outset.

- The slicing of the life-cycle is determined by regulatory decisions. Behind this imposed, regulatory perspective of sequential blocks of time (e.g. each of three years' duration), however, lie the continuous, evolutionary dynamics of the marketplace.
- The second period can be expected to encompass other major regulatory decisions in the form of three yearly, periodic reviews – otherwise it would be difficult to see any justification for the proposed building block approach: a much simpler, transitional approach, such as the original Beesley-Littlechild approach in the UK would be more appropriate, if, say, workable competition were expected to develop over the next three to five years.
- The words 'potential' and 'possible' signify uncertainty concerning the timing of the third decision.

- The timing of the third decision is at the regulator’s discretion and, since this is a new type of decision, there is little prior information that businesses can use to assess contingent predictability.

The most important point perhaps is that the new, extended s166 powers are very open ended. S166(2) states that:

The Commission or Minister must make the recommendation, determination, or decision that the Commission or Minister considers best gives, or is likely to best give, effect –

- a) to the purpose in section 162; and*
- b) to the extent that the Commission or Minister considers it relevant, to the promotion of workable competition in telecommunications markets for the long-term benefit of end-users of telecommunications services.*

S166(2)(b) could therefore be used in conjunction with s120 to deregulate and to open-up a third period in the way anticipated by CV. For example, a regulatory assessment might conclude that, taking account of wider effects on competition, the regulator-determined revenue caps were leading to focal points in pricing that created an ‘umbrella’ effect in the pricing of other products/services (i.e. that the regulatory intervention itself was contributing to ineffective competition – an issue that has arisen in differing market contexts in Australia, Britain and the US). Taking away the focal points by deregulating might then be chosen as the favoured way forward.

On the other hand it could, in the same circumstances, be determined that regulatory activism was in order: Taking the wider, s166(2)(b) view of future implications for competition, it might be argued that the appropriate measure is to tighten the revenue cap, to take away the comfort of the umbrella (a form of price leadership) for competing parties or suppliers of substitutes. The latter might still ‘price-off’ regulated prices, but would then themselves be placed under greater downward-pricing pressure.

One point here is that there is little guidance as to what the regulatory choice might be, but the hypothetical example is chosen to emphasise another point, another issue in play. It is that the likelihood that this type of problem would eventuate in the first place is a function of early regulatory decisions. Following BBM principles alone, it is easy to see that the implied profile of sunk cost recovery might, in the context of market dynamics, lead to regulated prices that are in excess of those in a comparable WCM *in the later years of an investment’s*

life-cycle. Failure to consider the inter-temporal issues is, therefore, likely to increase the probability of eventuation of a problem concerning whose resolution no very clear guidance has been given.

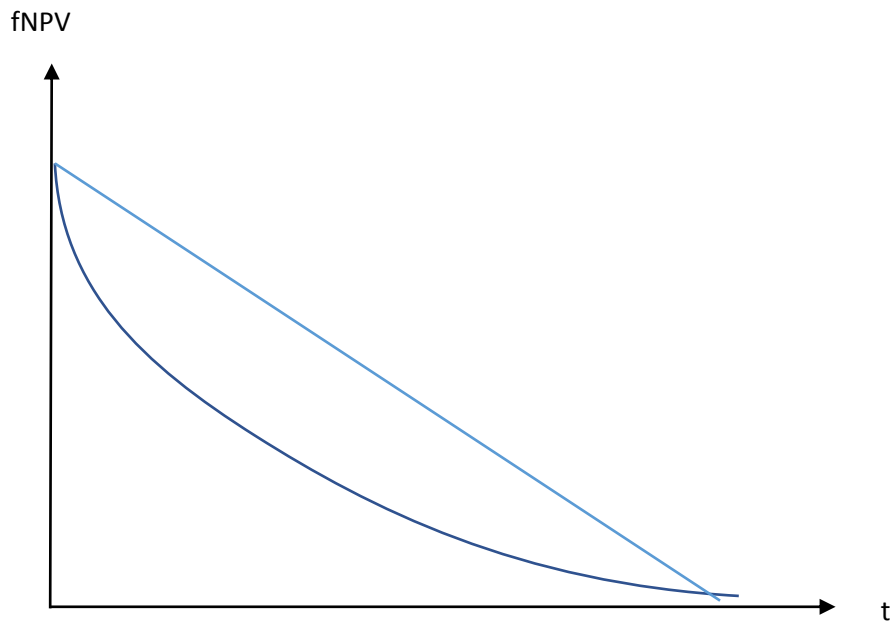
There is also an inherent tension between s166(2)(b) and the s162 purpose statements. CV cite a Commerce Commission view that:

“We expect in practice the s166 objectives will generally be met for most of our decisions if they promote the s162 outcomes. However we recognise that it is possible there may be situations where the best blend of the objectives in s166 would be achieved by making a decision that may promote the outcomes in s162 to a lesser extent, but that enhances competition in one or more telecommunications service markets.”

The first part of the statement is likely intended to reassure markets that no great change in regulatory approach will be consequential on the introduction of s166(2)(b). However, a dearth of substantiation for the expectation and a lack of guidance on situations in which new implications could emerge, may combine to have the opposite effect. S166(2)(b) certainly introduces an additional element of regulatory discretion into the mix and, in the absence of information that provides for the development of significant, contingent predictability, that means increased regulatory uncertainty.

A WCM benchmark for depreciation

A particular problem area that has been discussed is depreciation, and it might be helpful to consider it more specifically in the kind of market context considered earlier, in which the quality advantage of any generation of technology declines over time, thanks to the introduction of later, improved (rivalrous) technologies that draw demand away from its use, In the movies and CPU cases, it is a distinctive feature of the two WCMs that the rate of fixed/sunk cost recovery tends to be higher in relatively earlier periods. Plotting the value of the net present value of forward-looking cash flows as a function of time, $fNPV(t)$ points to a curve such as that shown by the black line in the sketch diagram below. There are, however, reasons to expect that an application of the BBM, intended to yield the same NPV at the outset, would lead to a life-cycle pattern of pricing that produces something closer to a linear $fNPV(t)$ profile, shown in the diagram as the blue line.



What is happening here is that the BBM leads to initial prices that seriously constrain the early revenues that, in a WCM, would derive from the early quality-superiority of the new product/service, leaving them to be recovered later. There are at least two difficulties with this, which can be illustrated by considering the case in which a s166(2)(b) examination leads on to a s210 deregulation of prices:

1. By the time the decision is implemented, competitive conditions will be such that the fNPV attaching to the linear profile cannot be recovered. In the diagram, this can be measured as the difference between the two profiles shown (since the lower profile relates to the conduct of an unregulated, competitive business). In the circumstances asset stranding is not just a risk, it is a racing certainty.
2. There is accompanying incentive to deregulate, precisely because the asset stranding goes together with forward looking benefits to consumers², which is what the high-level objective of the legislation asks for.

It seems to me therefore that there is a fundamental incompatibility between s166(2) and a rigid implementation of the BBM, but it is not an incompatibility introduced by s166(2)(b)

² Subject to caveats concerning the possibility of the focal point issues noted above.

itself, which is perhaps why I took a rather favourable view of s166(2)(b) when I first read it, in isolation from the non-separability issues. The incompatibility stems rather from rigidity in the application of the BBM and the legislative requirement for consistency with outcomes in WCMs.

It is an incompatibility that can be lived with in static monopoly conditions: all that the BB methodology does is to set a particular temporal pattern of cost recovery (including recovery of capital costs). The time profile that is determined by the BB approach may be allocatively inefficient, but the magnitude of the losses will likely make it a minor factor in any overall assessment.

As just indicated above, however, the difficulties become much greater in more dynamic settings, where the BB approach as currently applied can be said to be inconsistent with outcomes in WCMs with broadly comparable features. The latter suggest rather different life-cycle profiles for prices and for economic depreciation than those that a traditional application of the BB methodology might suggest. What s166(2)(b) adds to this base position are additional regulatory opportunities, and arguably additional regulatory incentives, for what is at bottom a form of capital expropriation.

The issue is a particularly important one because, at least in deterministic situations and where investment projects are lumpy, there is a sharp asymmetry around a $NPV = 0$ determination. Increases (from zero) in allowed NPV have marginal effects on the equilibrium, associated with slightly higher prices and slightly lower sales volumes. When NPV turns negative, however, a whole investment project may be affected, and that might not be such a small change: there may be a significant discontinuity because of lumpiness (technically ‘indivisibilities’) in projects and the economic harms may be much greater. Moreover those harms will tend to be magnified when it is not only a case of lower investment leading to lower output, but also of lower investment chilling the emergence of new, higher quality products and services which rely on innovations that can only get to market by way of being embodied in new investments (embodied technical change).

The structure of these arguments is not novel. Economics 101 students see diagrams of U-shaped average cost curves in the course of deriving the supply curve in a perfectly competitive market (where the firm is assumed to be a price taker). Starting from a high price and descending, the firm-level supply curve is just the rising part of a marginal cost

curve until that marginal cost curve intersects the average cost curve, which occurs at the minimum point of the latter. If price is lowered any further, there is, at that point, a discontinuous jump in the equilibrium to zero output, i.e. the firm exits the market.

Fixes/patches for the problem

The underlying problem being to do with deviations between the life-cycle pricing patterns in (a) a comparable WCM and (b) regulatory determinations, the targeted fix is most obviously to correct the latter. That can be done by changing the profile of allowed depreciation, or (provided track is kept of the numbers over time) by simply profiling allowed revenues so as to accord with FCM over successive regulatory periods. Given the potential pace of change, this properly requires profiling *within* regulatory review periods, otherwise the administrative procedures might introduce some significant, artificial (and avoidable) discontinuities.

Adjustment of the revenue profile necessarily involves a whole life-cycle assessment of the pricing pattern and that of course requires the application of a substantial degree of judgment. Regulators, however, are in the business of making judgments and, even when they have little sight of the future, judgments can at least be based on the little sight that is available. In this case, for example, it is foreseeable that economic depreciation will be very unlikely to proceed at a constant arithmetic rate.

Moreover, once an initial view is taken as to a depreciation profile that is broadly appropriate for the specific market context, there will then be scope for adjustments at later reviews, guided by facts that will then be available (which are not available *ex ante*), by the FCM principle, and by the principle that forward looks encompass the whole future period, not just the next three years.

I note that CV express some concerns about the subjectivity of the decisions involved when revenue adjustments are made by making specific provisions for headroom, and appear to suggest that this counts against the headroom approach. Whilst I agree that there is a better way of doing things than the headroom approach, it is not for this reason. All the fixes/patches face the same problems of uncertainty and subjectivity (as of course do the exercises in estimating long-run marginal costs that are a feature of some regulatory regimes for telecoms in other jurisdictions). That there can be no certainty of being able to produce approximately accurate estimates of the desired levels of headroom, seems to me to be a poor reason for discounting the approach. If there are sound reasons for expecting that headroom

will be positive, to argue for a zero determination on the ground that there is no sound basis for landing on a specific number implies substituting a certain error for a probabilistic error.

The reason for my own aversion to the headroom approach is simply that, if the headroom is not profiled within review period, it introduces the administratively created discontinuities noted above. And, if it is profiled within a review period, providing the rationale for doing that is more complicated than it need be, not least because, when it has been used (as it was, for example, in the deregulation of retail energy markets in Britain – in my view successfully) the features of the relevant markets were rather different from telecoms networks, and product/service enhancing innovation was not a central driver of the competitive processes.

Thus, while a headroom approach can be expected to be superior to doing nothing, it would appear to me to be better for the Commerce Commission to take the view that its regulatory decisions should profile revenues directly, in the search for outcomes that are consistent with outcomes in WCMs exhibiting similar, important economic features. In support of the decisions made, it might then be useful for the Commission to engage in some case studies of depreciation profiles in WCMs that are characterised by an emphasis on competition in product enhancing innovations that are embodied in new investments.

Similar remarks apply a fortiori to adjustments to allowed revenues implemented by hikes to the cost of capital. Again, this is better than nothing, but it does involve an element of deception. The issues have nothing to do with variations in the cost of capital: that particular building block would just be being used as a dumping ground in the regulatory accounting.

Another possibility might be to compensate a business suffering capital losses from a s210 decision on an ex post basis. In general I am in favour of heavier use of ex post measures when the relevant contexts indicate an uncertain and extensive mix of ‘things that may go wrong in the night’ and lean against trying to anticipate which of these potential problems might eventuate and, on that basis, seeking to establish ex ante rules that might mitigate the harms. In this context, I was struck by a sentence at paragraph 41 of the Vogelsang-Cave pricing paper (opening up a short ‘overall conclusions’ section). *“The price regulations imposed on Chorus along with the total revenue constraint lead to multiple interactions and constraints that prevent clear conclusions and policy recommendations.”* The complexity overwhelms and much of it derives from the regulatory interventions themselves.

The two ex post mechanisms discussed in the CV material are:

- a) Retain part or all of the RAB contribution of a deregulated part of the business in the remaining RAB;
- b) Establish a compensation fund that will make disbursements in the event of subsequent capital losses.

The first of these is possible only where the deregulation is partial and limited in scope, since eventual recovery of the value of the RAB that is retained requires a sufficient base of more ‘captive’ customers to provide the necessary flow of funds. If the RAB is sliced and diced by later partial deregulations, it will be steadily shrinking and ever higher burdens will be placed on the remaining customers. In the end, much or all of the reallocated capital may turn out to be irrecoverable anyway and the whole process may come to be seen as having been something of a deception. In any event, loading up the burden on captive customers raises equity issues and is unlikely to be consistent with Smith’s ‘benefit principle’.

In respect of a compensation fund, the monies will have to be sourced from somewhere and it therefore requires ex ante measures to do that. What better base for that finance than those customers who switch early to the new service and, in effect, become voluntary contributors to the recovery of the costs of the joint asset by being willing to pay more for early use of that asset? If the compensation fund is sourced from surcharges in earlier periods, the position of end consumers will not be much affected whether the additional revenues go to the investing business or to the fund, but the latter will introduce another layer of regulatory discretion that might be expected to have chilling effects on investment in the longer term.

In a sense the issue of the extra layer of regulatory discretion, and the effects of that discretion, is already in play and the implications of ex post compensation arrangements are already observable. They are there in the questions surrounding the initial RAB at the end of CV’s first period and the start of the second. Chorus and other FFLAS providers have already made substantial and now sunk investments in their networks, but they have done so under contractual arrangements that made no specific provision for FCM.

The Government Policy Statement cited at para 90 of the Emerging Views Paper did, however, give investors grounds for confidence on the matter and the Statement is notable for its emphasis on taking a ‘whole life-cycle’ perspective on matters which is closely aligned with many of the thoughts set out above. See, for example, *“ensuring that any price regulation proposed under Schedule 3 of the Telecommunications Act 2001, that may occur*

*in the future, recognises that revenues, **over the life of the assets**, are sufficient to cover efficient operating costs and a normal return on, and recovery of, capital invested". [My emphasis]*

How then might the Commerce Commission make these initial decisions? The obvious option is to go back to the start of the first period and rely on the FCM principle ($NPV = 0$) from that earlier point onwards. The argument for doing so is that it is consistent with the principle that the Commission has committed to apply in the future,

There appears, however, to be no legislative necessity for this view to be taken and stated regulatory commitments re the future are not cast-iron guarantees: they always come with questions about their credibility. Until the Commission decides how to proceed, capital markets are almost bound to be slightly nervous. A decision on initial RABs that would amount to $NPV < 0$ would I think serve to reduce the credibility of the commitment to $NPV = 0$ looking forward, and hence to be negative for regulatory certainty and investment in later periods. It would look just a little like St Augustine's prayer: "Lord, make me chaste and celibate, but not yet."

That said, it has never been a part of any regulator's remit to ask consumers/customers to bear the costs of imprudent investments and egregiously inefficient operations (where it can be firmly substantiated, on the basis of available evidence, that such conduct has occurred). The Commission therefore necessarily has a task to perform here, and a discretionary decision to make.

In the end fixes/patches are just what those words imply, modifications of something that is already substantively constructed, and the really important matters concern what it is that is being adjusted. Whether they are presented as adjustments to the depreciation profile, or to costs of capital, or as provisions for headroom, or as RAB adjustments, or as compensation, is a matter of secondary importance. Indeed, over the lifetime of an investment project, the adjustments made as new information becomes available may appear under different labels at different times and in different combinations. What matter **much** more are (i) the guiding principles that motivate the adjustments and (ii) ex ante confidence that those guiding principles will be maintained.

In respect of the first of these, I think what is required is a forward-looking depreciation policy covering the full lifetimes of the relevant assets, which is informed by practice in

reasonably comparable WCMs, i.e. is grounded in empirical, commercial realities, not in abstractions and untested assumptions. In respect of the second, the chief consideration will likely be the ability of the Commerce Commission to maintain its own, good reputation and this will hinge chiefly, as reputations always do, on examinations of its past and present conduct.

George Yarrow

Hertford College, Oxford, UK.