

The Brattle Group

Review of Incentive Power and Regulatory Options in Victoria

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SUMMARY

This note reviews PEG’s “incentive power” model. It is based on the descriptions in *Incentive Power and Regulatory Options in Victoria*, Pacific Economics Group 2005, and the associated technical appendix, submitted by the Victoria ESC in its submissions to the AEMC’s TFP review.¹

The context of this review is the question of how to give regulated network companies in Australia incentives to improve efficiency. More specifically, the debate is around whether TFP-based approaches would give stronger incentives for efficiency than the current building-blocks approach.

The Victorian ESC expresses some conclusions about the strength of incentives to control costs under various regulatory regimes based on PEG’s incentive power model and its claimed results. We find some of PEG’s conclusions from the model to be uncontroversial. However, ESC and PEG’s conclusion that TFP gives stronger incentives than building blocks is based on unreasonable and flawed assumptions: PEG’s building-blocks scenarios contain a price reset, while PEG’s TFP scenarios do not.

PEG also concludes that customers are worse off under building blocks than under cost of service. This conclusion is really a function of PEG’s assumption that the regulator allows prices to rise under building blocks although in fact costs will turn out to fall under the model’s assumptions. This points to a major challenge in regulatory design – the rent-efficiency trade-off. The only way that regulators can set strong incentives without, at the same time, risking excessively high (or low) profits is to estimate what the firms’ future costs will be, setting high prices for the high cost firms and low prices for the low cost firms. Without information on future costs the regulator has to give all the firms high prices, or give all the firms weak efficiency incentives. PEG’s report (and model) does not address this problem at all.

PEG’s model can be characterized as a “heuristic simulation” model—it contains mathematical representations of PEG’s assumptions about how different kinds of regulation might work, and how a firm might respond in each case. The model presents a quantified measure of the results of

¹ Henceforth, “PEG’s report”.

the simulation. There is nothing intrinsically wrong with this kind of model, but it is clear that this model is not (and cannot be) calibrated against actual experience,² and it is not the result of “experimentation”. It is a way of reducing a multidimensional problem to a set of numbers, and representing numerically some assumptions about how different kinds of regulation might work.

We conclude that PEG’s model, as designed and implemented, is largely irrelevant to the question of whether a TFP proposal would result in stronger incentives than the current building-blocks approach. It is also irrelevant to the wider question of whether building blocks is working in Australia and whether it could be improved.

THE NATURE OF PEG’S MODEL

PEG’s model is a heuristic simulation model. It contains some assumptions about how a regulated firm might operate, including a set of hypothetical cost reduction measures, and “management cost of effort” associated with each one. This is represented mathematically. Both the cost reduction measures and the management cost of effort are hypothetical (i.e., assumed) and are not calibrated against any actual firm or regulatory experience. The model is driven by some simplified / stylized “scenarios” which represent different regulatory regimes. These model inputs are based on actual experience, but the model itself (i.e., what the model does with the inputs) is not calibrated against any actual experience. There is nothing inherently wrong with using this kind of model, but it has limitations. Specifically, it can only ever give “theoretical” results because it is not based on any real-world evidence. Furthermore, while it gives literally quantitative results, these results are no different from qualitative theoretical reasoning because they are not calibrated against experience.

² PEG explains that some of its assumptions about the building block scenarios are calibrated against actual experience in the UK and Victoria. This is not the same thing as calibrating the *model*—i.e., the relationship between a given set of inputs and the model results.

Several features of the model might lead one to question its usefulness.

First, while the model does not capture the detail of different possible regulatory designs, it is not simple. It would be difficult to reproduce the model's results on the basis of what has been published. The model contains many parameters values which must be assumed, yet it is not obvious how one should make the necessary assumptions (without picking numbers at random) or what the consequences would be of changing them. For example, the model assumes that inefficiencies are completely eliminated within 10 years under external regulation, and that the “cost of effort” is 20% of the up-front costs.

Second, while it is not simple, the model is in some senses simplistic. For example, the regulated firm has a number of options for pursuing cost reduction, with payback periods of up to five years—and the firm management is able to predict the results of implementing these measures with complete certainty. There is no uncertainty in the model at all, yet the whole point of incentive regulation is to reward firms for trying new ways of reducing costs even if these are uncertain to succeed. It would seem a bizarre (and unfair) characterization of the managers of firms subject to cost of service regulation to claim that these managers deliberately choose to run their firms wastefully by ignoring cost reduction options with certain payoffs.

Third, PEG introduces the model by reference to debates at the *Utility Regulators' Forum* in which calls were made for studying detailed designs rather than general approaches.³ However, despite its claim to the contrary, PEG's model is not capable of doing this: neither the Victorian TFP proposal nor the TFP scenario in PEG's model are “detailed designs”, but even so the differences⁴ cannot be captured by the model.

³ “the economic incentive effects of various approaches are affected by details of component instruments and parameters as much as by the approach *per se*. Accordingly, we cannot draw categorical conclusions about the absolute effectiveness of general approaches without considering detailed design.” and “we suggest it may be beneficial to develop high level modelling tools to help better understand the potential incentive properties of different detailed designs (and to compare these with other regulatory approaches).”, quoted in PEG's report at p. 4.

⁴ Specifically, for example, the fact that TFP would be optional.

INCENTIVES ARE STRENGTHENED IF PRICES ARE DELINKED FROM COSTS

Essentially all of PEG’s results can be understood in terms of the following simple concept: if a firm knows that its future prices will be at least partly independent of its costs, it has an incentive to reduce costs because by doing so it will increase profits. In contrast, if a firm knows that future prices will be strongly related to future costs, it has a weak incentive to control costs because most of any cost reductions will be passed on to customers as lower prices.⁵

This concept explains why PEG finds that “external” regulation has the strongest cost-control incentives, and why PEG’s “partial true-up” options, where prices are reset to a weighted average of an external benchmark and the firm’s own out-turn costs, have intermediate incentives.⁶ PEG does not spell this out, but at least to first approximation the incentive to control costs is unaffected by the level of prices or the method by which they are set, as long as prices have no connection at all with the firm’s costs. Thus, a regulatory regime in which future prices are set to be 100, or 90, or a random number picked from the range 80–120 each year all have strong incentives. A regime in which prices are set to reflect the historic rate of industry-wide TFP growth therefore also has strong incentives, but there is nothing special about this path of prices as far as the incentive properties are concerned: any price path has the same strength of incentive as long as the price does not depend on the firm’s costs.⁷

If the need to provide strong efficiency incentives were the only constraint facing regulators, their task would be simple: prices would simply be frozen. Or, if regulators were concerned that future costs might be higher than past costs, such that a price freeze would leave some firms in financial difficulty, the regulator could freeze prices at 150% (or some other multiple) of current levels.

⁵ Thus, for example, under a cost of service regime, the regulator would review the firm’s out-turn costs and reset prices to be equal to out-turn costs (including a reasonable return of and on capital). In this case the firm knows that its prices will be closely dependent on costs, albeit with a lag. In this case the incentive to control costs is weak (but not absent, due to the lag).

⁶ In our view, a “partial true-up” is infeasible for the same reason that it is infeasible never to reset prices to the firm’s out-turn costs, explained below. Furthermore, the suggestion that prices be partially reset has nothing to do with setting X (and therefore nothing to do with the relative merits of building-block or TFP methods for setting X).

⁷ What is (under some strong assumptions) special about the TFP-based path of prices is that it should result in normal profits for the average firm. Among other (strong) assumptions, this requires that *the past costs of the industry as a whole be a good guide for the specific firm’s future costs*.

Unfortunately such a simple approach is not possible in practice because regulators and legislators are also concerned that firms should not be too profitable. Therefore regulators are in practice obliged to prevent the prices of each firm from straying too far from *that firm's own costs*—i.e., obliged to keep each firm's profits within a certain band. PEG's report correctly acknowledges this (in referring to the “rent and efficiency trade-off”). However, PEG's report does not explicitly explain how the trade-off is operationalised in their model. In fact the assumptions which PEG makes about the trade off in their various scenarios are unrealistic and also pre-determine their results. In a sense, as a proponent of TFP, PEG assumes away this difficulty because PEG assumes that prices growing at the industry-wide rate of TFP growth will be sufficient to keep each firm's profits within a reasonable band. This assumption is inconsistent with PEG's characterization of the building-blocks scenarios in their model (see below).

PEG'S CONCLUSION ON THE STRENGTH OF INCENTIVES UNDER BUILDING-BLOCKS AND TFP IS MISTAKEN

The key trade-off for regulators results from the requirement that each firm's prices should remain reasonably close to each firm's actual costs. Regulators typically “reset” each firm's prices to out-turn costs at the end of a regulatory period. In PEG's model the building-blocks scenarios (e.g., 8 and 17 in PEG's Table 1) include such a reset, referred to by PEG as a “true-up”. **However, PEG has no TFP scenario with a true up.** Both of the TFP scenarios (3 and 4) require that the firm's prices are **never** reset, no matter what happens to the firm's costs. First, this characterization makes the TFP scenarios implausible or irrelevant. Second, it determines PEG's result that TFP has stronger incentives than building blocks, because both building-block scenarios have resets, whereas neither of the TFP scenarios do. Third, PEG makes some assumptions (buried in the model) about the relationship between the firm's costs and the industry-wide TFP growth rate. These assumptions determine that, in the TFP case, prices fall over time (because industry-wide TFP growth is positive). Therefore customers see price reductions at the same time as the firm sees profits increase, suggesting that the firm's “savings” are shared with customers. While this looks like the result of a (partial) “price reset” or “true-up”, it is not: PEG assumes a relationship between the firm's costs and industry-wide TFP. This can be seen by a simple change to one of PEG's inputs: consider a case in which the industry-wide historic TFP growth-rate is *negative*, but where the firm modelled is still able to find cost savings. Prices under the TFP scenario would therefore be rising and customers would see

negative savings (as defined by PEG). The firm would still “beat” the regulator’s price assumption and earn increased profits—and in fact this TFP scenario would look like PEG’s building-blocks scenarios. While this scenario may not sound very realistic, it is no more unrealistic than PEG’s building-block scenarios.

Thus PEG’s conclusion that building-blocks has weaker incentives than TFP is only correct under very restrictive assumptions concerning the design of the regimes and the underlying industry TFP trend, all of which are hard-wired into their model. What PEG has shown is that a regulatory regime with a price reset has weaker incentives than a regime without a price reset. As we stated above, this is uncontroversial, but it is also unhelpful because no regulator would be able to propose a regime without price resets (and, even if one were proposed, the proposal would not be credible to the regulated firms). Furthermore, PEG’s TFP scenario only delivers savings for customers if TFP is growing—if TFP is falling, customers end up paying more than under cost of service.

WHAT SHOULD PEG HAVE CONCLUDED ABOUT STRENGTH OF INCENTIVES?

If we make a proper comparison between TFP and building blocks we would hold constant everything apart from the method for determining X. Under TFP X is equal to the historic industry-wide rate of TFP growth, adjusted for differences in inflation. Under building blocks X depends on firms’ forecasts of future costs, but the regulator has some discretion. In practice all regulatory schemes will reset prices to cost at the start of the period⁸ (the current building-block regime in Australia does this, as would the Victorian TFP proposal, or any feasible TFP alternative). Compared on this basis there is a negligible difference in the strength of incentives between TFP and building-blocks. The difference only arises because, in principle, the regulator *could* use information on out-turn costs in the previous period to set X for the forthcoming period. In our view this difference is marginal and is not something which can be quantified through modelling (although it perhaps might be explored through a detailed review of how regulators in practice set X in Australia). In our view, the strength of incentives under TFP and building blocks is similar for any practical design of TFP scheme. It is simply not credible to

⁸ For ease of exposition we ignore here the impact of efficiency benefit sharing schemes and the impact of “profiling” to smooth the path of prices within a price control period. See the discussion in *Incentives under Total Factor Productivity Based and Building-Blocks Type Price Controls*, report for the Australian Energy Market Commission prepared by *The Brattle Group*, June 2008.

propose a TFP scheme where prices are never reset to the firm's *own* costs and to compare that with building blocks where costs are so reset. Furthermore, it makes no sense to define a TFP scenario where industry-wide TFP growth is positive and compare it with a building-blocks scenario where the firm is able to convince the regulator to set prices on the basis of costs trending upwards.

PEG CONCLUDES THAT CUSTOMERS ARE WORSE OFF UNDER BUILDING BLOCKS THAN COST OF SERVICE

PEG states that under building blocks “customer benefits are *lower* than they would be under “pure” cost of service regulation”. PEG’s model results imply that prices would be higher under building blocks than if *the same firm* were regulated under cost of service. This result is a simple consequence of PEG’s assumptions about the building-block scenarios. PEG assumes that under building blocks the firm forecasts that costs will increase over time (by 40% in scenario 17 and 80% in scenario 8),⁹ and that some fraction of the cost increase is allowed in prices. In contrast, under cost of service costs do not increase. The fact that customers are worse off is thus hardly a result of the model—it is a simple restatement of the assumption that, in PEG’s building blocks scenario, the regulator allows a price increase, whereas in fact costs are falling.¹⁰ It is of course still the case that, although prices rise under building blocks but not under cost of service, the firm has *lower costs* under building blocks than under cost of service. And, as expected, it is more efficient, since building blocks is a partial de-linking of prices from costs and therefore has a stronger cost-control incentive than cost of service.

In fact, PEG’s selective definition of its building-blocks scenario¹¹ illustrates a problem at the heart of regulatory design: in order to make the right trade-off between efficiency and rent extraction, the regulator needs to know whether firms will have high costs or low costs in the future. If the regulator had this knowledge, it could set a high fixed price (strong incentive) for the high cost firms and a low fixed price (strong incentive) for the low cost firms, safe in the knowledge that both groups have the opportunity to earn a normal return. However, in general the regulator *does not know whether firms will have high or low costs in future*, as PEG’s

⁹ These figures appear to relate only to CAPEX. From inspection of the formulas on pp. 4–5 of PEG’s technical appendix 1 it appears that PEG assumes OPEX increases also.

¹⁰ As we explained above, had PEG assumed that industry-wide TFP growth were negative PEG would have found that TFP left customers worse-off than cost of service.

¹¹ PEG itself acknowledges that its building-block scenario is a special case that would not, for example, have applied to earlier price control periods in Victoria (PEG’s report, p. 22.).

building-block scenarios illustrate. TFP has nothing whatever to do with the problem of determining which firms will turn out high cost and which will turn out low cost. Proponents of TFP simply assume away this problem by setting prices to track the historic rate of TFP growth. This is of no help to a regulator facing a firm that claims its costs are increasing. Firms will make such claims, legitimate or not, and the regulator's task (and legal obligation) is to respond appropriately. Ignoring the firm's evidence is unlikely to be appropriate, but this is what PEG's TFP characterization amounts to.

WHY DON'T REGULATORS IMPLEMENT "PERMANENT" TFP

TFP without a price reset, as modelled by PEG, is impractical because of the risk that firm profits would, over time, become either very high or very low.

SHOULD REGULATORS IMPLEMENT TFP WITH PRICE RESETS?

We have shown above that the incentives *for efficiency* under TFP and building blocks, where both schemes have price resets, are similar. It is true that TFP avoids the problem of "gaming" of cost forecasts (which the Victorian ESC¹² terms "ex ante incentives"). However, TFP avoids the problem by ignoring it—the regulator cannot be tricked into accepting a high cost forecast if the regulator never reads the cost forecast, instead setting X on the basis of historic industry-wide TFP growth. Thus, "compulsory" TFP might indeed result in lower prices than building blocks—but it would do so by risking that some firms would end up unable to make a normal return because of foreseeable exogenous cost pressures. We showed in our earlier report that prices under "optional" TFP will be higher than under building blocks, because if they were not higher firms would not exercise the option to switch to TFP.

¹² Victoria ESC second supplemental submission, p.6.