CAP PRICES OR CAP REVENUES? THE IMPLICATIONS OF ALTERNATIVE ELECTRICITY PRICING SCHEMES IN JAMAICA

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Overview

A revenue cap may significantly reduce social welfare since the regulated firm is likely to deviate from Ramsey pricing by charging higher prices when demand is more elastic (Comnes, Stoft, Greene, & Hill, 1995; Crew & Kleindorfer, 1996). On the contrary, it has been argued that a price cap regulated firm is likely to converge to a Ramsey pricing structure with very little decrease in overall welfare. To address this debate, I use the current tariff review in Jamaica to investigate the extent to which prices are affected and welfare is reduced under a revenue cap compared to a price cap.

A revenue cap is currently used to regulate the electricity distribution and transmission sector in Trinidad and Tobago and is largely used to regulate the national electricity market in Australia under the auspices of the Australian Energy Regulator. In its 2014-2019 Tariff Application, the Jamaica Public Service (JPS), which is the sole distributor of electricity in Jamaica, requested that the Office of Utilities Regulation (OUR) change its existing price cap plan to a revenue cap. In proposing the change, the JPS highlighted two main arguments. First, a revenue cap will ensure that sufficient revenues are earned to cover all prudent costs in addition to the return on investment. Second, it aligns well with the firm's goals and the government's energy efficiency programs. These arguments were however proposed with very little empirical justification.

A revenue cap differs from a price cap plan in that the regulator places an upper limit on the regulated firm's revenues rather than an index of prices. Revenue caps are more suitable in situations where the positive covariance between costs and sales are low. If tariffs are reflective of the utility's costs and demand is inelastic, a high positive covariance means that a price rise will reduce electricity demand and total costs, while increasing revenue. With the revenues of the utility capped, the reduction in costs will translate directly into profits. This incentivises price increases for the least inelastic market segments served by utilities. This idea was advanced by Jamison (2007) and was similarly supported by Lantz (2008) who emphasised that use of revenue caps is a 'bad idea' since detailed information on the firm's cost function is usually not available.

In light of the above arguments, it is therefore useful to determine the magnitude of the overall effects that each scheme has on prices and welfare, and to determine if the existing price cap scheme can be improved to increase societal benefits. By using the JPS has a case study, this paper develops a Ramsey-type pricing model, which is calibrated with existing data and compared under the two alternative regulatory schemes to judge their impact on prices and welfare. The paper is organised as follows. Section 2 introduces the different pricing methods and their theories. In sections 3 and 4, I calibrate each model with parameter values that approximate the key characteristics of the regulated entity, perform analyses and report these results. Section 5 discusses the main conclusions and implications of the study.

Methods

A constrained optimization model is calibrated with 2013 cost and demand data contained in the JPS 2014 - 2019 Tariff Application as well as price elasticity of demand data for three customer segments: residential, commercial and industrial.

Results

First, the models introduced in this paper confirmed that in contrast to a price cap plan, a revenue cap scheme delivers prices that depart from the Ramsey pricing rule. This results in electricity prices that are more than twice their existing levels for the least inelastic residential customer segment, and prices below marginal cost for the more inelastic commercial and industrial customer segments. With a customer base of over 0.6 million, consumer net benefits decline by approximately US$153 per consumer per year under a revenue cap while US$68 would be lost

under a price cap based on Ramsey weights. The regulated firm's surplus under a price cap would be six times greater than that available under a revenue cap scheme. The evidence confirms that consumers and the utility provider would be worse off under a revenue cap scheme.

A second important finding revealed by the analysis is the potential for price cap regulation to converge to a Ramsey pricing structure. This convergence requires that the price cap constraint be adjusted appropriately by using weights based on the previous period's quantities. Moreover, prices adjust more quickly towards the Ramsey structure when complemented by adequate measures of input price movements and x-factor efficiency.

Conclusions

Though the study is limited to a static model, it does confirm the price cap regime as a superior model to revenue cap regulation. If a revenue cap is expected to encourage energy efficiency, it does so at the expense of efficient price setting. Price cap regulation and energy efficiency can co-exist if the regulated monopolist provides energy services alongside electricity. Changing from a price cap scheme to a revenue cap scheme will create welfare losses for society. Therefore, a price cap system based on Ramsey pricing represents the second-best solution that will deliver the greatest societal benefits.

In addition to the introduction of cost and demand uncertainty, future work will examine the differences in both schemes when a cap is imposed for more than one period. Specifically, I will consider the case where the plan resets every five years, which is typical in most jurisdictions.

References

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