

HOW HARMFUL IS THE RATE OF RETURN REGULATION? AVERCH-JOHNSON CRITIQUE REVISITED

Timo Kuosmanen, Aalto University School of Business, Helsinki, Finland, +358 947001, timo.kuosmanen@aalto.fi
Tuan Nguyen, Aalto University School of Business, Helsinki, Finland, +358 947001, sheng.dai@aalto.fi

Overview

Monopoly is a classic example of market failure. To protect the customers from abuse of market power, the government has several policy instruments at their disposal. Historically, the rate of return regulation has been the most widely used regulatory instrument, and despite its shortcomings, it remains in use today. In this regime, the regulated company can recover the incurred costs while the customers are protected from overpaying for the monopoly services. Like any regulation regime, however, the rate of return regulation has its shortcomings.

The seminal paper by Averch and Johnson (1962) presents a sharp critique on the rate of return regulation, pointing out its distortionary effect in terms of increased capital intensity in production. This paper is one of the key intellectual roots of the deregulation movement that started in the 1980s, and still continues in many countries today. Examples of successful deregulation are known in such sectors as airlines, railroads, trucking, and telecommunications, while deregulating the energy sector has proved more challenging, especially in the U.S. (e.g., Joskow, 2006). The empirical motivation of this study arises from collaboration with European energy regulators.

Despite its major impact on regulation practice and economic thinking in general, there exist surprisingly little quantitative evidence exists on the magnitude of the capital-bias in production, known as the Averch-Johnson effect. Two notable empirical studies include Spann (1974) and Cicala (2015), who both find convincing evidence of the Averch-Johnson effect in the regulated electric utilities in the U.S. While the economic literature traditionally emphasizes the distortionary effects of regulation, for the sake of balance, we find it important to note that imperfect regulation may still be better than no regulation at all. Further, price cap or revenue cap regulation are by no means immune to the Averch-Johnson effect if the regulator specifies the caps depending on the capital input of the monopoly, as we demonstrate in this paper.

Methods

The main contribution of this paper is to examine the magnitude of the distortionary Averch-Johnson effect and the desirable welfare effects by means of numerical simulations. We compare the optimal profit maximizing behavior of the regulated monopoly with that of the unregulated monopoly and the competitive market in the controlled environment of the classic textbook setting with a monopoly that produces output using the Cobb-Douglas production function and faces a linear inverse demand function. Our results confirm the theoretical results, but also shed new light on the magnitude of the effects. The simulation results prove surprisingly robust to changes in the underlying parameter values and the functional form of the production function.

Results

Table 1 reports the results on the simulation results for the regulated monopoly as percentage relative to the optimal solution of the unregulated monopoly. In the left-most column of Table 1, the regulation parameter s_1 increases from 1.02 to 10: the smallest value of s_1 corresponds to heavy handed regulation where the regulator enforces the acceptable rate of return very close to the true opportunity cost of capital, and the largest value of s_1 correspond to cosmetic regulation where the regulation constraint is not binding. That is, the case of $s_1 = 10$ is equivalent to the optimal solution of the unregulated firm: regulation constraint becomes redundant when s_1 is large enough.

Table 1: Comparison of the regulated vs unregulated monopoly: the percentage of the regulated monopoly's outcomes relative to that of the unregulated monopoly as a function of parameter s_1 .

s_1	output	price	total revenue	monopoly profit	consumer surplus	capital intensity
1.02	110 %	92 %	101 %	2 %	121 %	9611 %
1.05	110 %	92 %	101 %	6 %	121 %	9068 %
1.25	110 %	92 %	101 %	24 %	121 %	6390 %
1.50	109 %	92 %	101 %	41 %	120 %	4444 %
1.75	109 %	92 %	101 %	52 %	119 %	3264 %
2.00	109 %	93 %	101 %	60 %	118 %	2502 %
2.25	109 %	93 %	101 %	67 %	118 %	1975 %
10.00	100 %	100 %	100 %	100 %	100 %	100 %

Our baseline scenario confirms that the output increases and the price decreases as the rate of return regulation becomes more stringent. As a result, the consumer surplus increases. While the total revenue increases modestly, the monopoly profit decreases. However, the simulation also confirms the Averch-Johnson effect: the capital intensity dramatically increases as the monopoly responds to the regulation.

Conclusions

The seminal article by Averch and Johnson (1968) has had a major impact on economic thinking and the regulation practice. Emphasizing the distortionary effects of regulation, this study has contributed to deregulation of monopolies worldwide. While the Averch-Johnson argument is correct, for the sake of balance, the benefits of regulation should not be forgotten. In this paper we have re-examined the Averch-Johnson model by means of numerical simulations, showing that rate of return regulation has several desirable effects, as the regulation generally decreases the consumer price and the monopoly profit while increasing the output and the consumer surplus compared to the unregulated monopoly. In the absence of better regulatory instruments, the simple rate of return regulation offers clear benefits compared to an unregulated monopoly.

References

- Averch, H., and Johnson, L.L., 1962. Behavior of the firm under regulatory constraint. *American Economic Review* 52, 1052-1069.
- Cicala, S., 2015. When does regulation distort costs? Lessons from fuel procurement in US electricity generation, *American Economic Review* 105(1), 411-444.
- Spann, R.M., 1974. Rate of return regulation and efficiency in production: An empirical test of the Averch-Johnson thesis. *The Bell Journal of Economics and Management Science* 5, 38-52.