Regulation and Economic Interests

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Abstract

The capture theory of regulation is analyzed in this paper with the motor trucking industry. The evidence supports the argument that regulation is acquired by industry and is designed and operated primarily for industry's benefit. It is also found that the optimal level of regulation provided by the legislature is less than the outcome most desired by the special interests because of the involvement of the political costs.

I. Introduction

The capture theory of regulation states that regulatory agencies are captured by the industries they are supposed to regulate. Stigler's article is a seminal piece which suggests that industries may seek regulation in order to block entry so that the economic rents for the incumbent firms are guaranteed. This idea is now considered a cornerstone of Chicago-school industrial economics. The regressions Stigler presented in that paper were admittedly simple, but were presented for illustrative purposes. The purpose of this paper is to extend the example of motor trucking industry on pp. 7-10 of Stigler's paper by adding two interaction terms. The reason for including two interaction terms and their implications are discussed in section II.

Before 1925, the areas of operation of the motor trucking industries were mostly within cities since road conditions and strength of the trucks were not conducive for long-distance freight movements. By 1930 these problems were removed to a great extent and it was estimated that the share of the trucks in the intercity freight movement was 4 percent (in terms of ton miles). The railroad industry was enjoying monopoly before 1930 so far as the intercity freight movement was concerned. Railroad Industry realized the emergence of a possible competitor in motor trucking in 1930 and quickly they sought for state regulation to keep them from being adversely affected by the new trucking industry. In the early 1930's not only the dimensions of the trucks were regulated by all states but also limitations on weight of the trucks were imposed. In fact the control over trucking by weight limitations was much more pervasive.

The objective of this paper is to see whether the weight limitations on the trucks serve the purpose of the different special interest groups, especially the railroad industry. In section II different models are specified. The empirical results are analyzed in section III and finally in section IV concluding remarks are made.

II. Model

Two measures of weight limits on trucks--4 wheel trucks (X_1) and 6 wheel trucks (X_2)--are considered here.[1] Stigler (1971) considered the following three variables to determine the pattern of weight limits on trucks.[2]

(1) The agricultural interests would be served if the states with a substantial number of trucks on farms only allow the entry of heavy trucks. Therefore, for each state, trucks per 1000 of agricultural population (X_3) is constructed to serve as one of the explanatory variables.

(2) The longer the rail haul is, the less competitive the trucks are to railroads. Therefore, average length of railroad haul of freight (miles) for each state (X_4) is the second variable.

(3) Heavier trucks would be permitted to those states which have better highway system. The third variable is the percentage of each state's highways that had a high-type surface (X_5).

The following two models are used by Stigler (1971)

$$X_1 = a_1 + b_1X_3 + c_1X_4 + d_1X_5 + u_1,$$

$$X_2 = a_2 + b_2X_3 + c_2X_4 + d_2X_5 + u_2,$$

where u_1 and u_2 represent random error terms.

Stigler only looked at the effect of X_3 on X_1 (or X_2) keeping X_4 and X_5 fixed (same is true for X_4 and X_5). In other words, he did not consider the interaction terms. It is possible that the interaction terms may have an effect on the weight limits on trucks. Two relevant interaction terms are constructed in the following.

(1) $X_6 = X_4 * X_5$ (length of average railroad haul with better highway system).

(2) $X_7 = X_3*X_5$ (trucks on farms per 1,000 agricultural labor force with better highway system).

The point is that regulation often benefits special interest groups at the cost of general public who is rationally ignorant. The legislators whose objective is to maximize votes do not always provide all the benefits of the regulation that the special interest group wants. The special interests would like to receive benefits as long as the marginal benefits to them of regulation are positive. The legislators weigh the marginal political gains from granting benefits to special interest groups against marginal political costs. Though the general public is rationally ignorant of many costs that they incur because of the activities of the legislators but some marginal political costs associated with acting against one group will remain. Therefore the optimal amount of regulation that the legislature will grant to the special interest groups is the amount where the marginal political value of granting the benefits equals the marginal political costs. This optimal amount is less than the most desired amount that the special interest groups want.

It is, therefore, necessary to construct some interaction variables that take into account the behavior of special interest group and rationally ignorant general public. Two such interaction terms--X_6 and X_7--are created in this paper.[3]

Adding these two interaction terms the above two models become the following

$$X_1 = a_1 + b_1X_3 + c_1X_4 + d_1X_5 + e_1X_6 + f_1X_7 + u_1.$$

$$X_2 = a_2 + b_2X_3 + c_2X_4 + d_2X_5 + e_2X_6 + f_2X_7 + u_2.$$

In the above models [(1), (2), (3), and (4)] all the variables are in level. In other words, the relationship is linear. But we do not know what kind of relationship holds between the explanatory variables and dependent variables. Because of that, another specification of the above models are used where all the variables are expressed in natural logarithms.

III. Results

The data used in this paper is the same as used by Stigler (1971).[4] The results of the regression models are reported in Table 1 and Table 2. In Table 1 all the variables are in levels and in Table 2 all the variables are in natural logarithms.

In models (1) and (2) (Stigler's specification) X_3, X_4, and X_5 are statistically significant and each of them works in the expected direction. X_4 is the only variable which is statistically significant in all the specifications of the model. Therefore, the regulation on weight serves the purpose of the railroad industry to restrict competition. The sign of X_6 is negative and significant when dependent variable is X_1 (when dependent variable is X_2, though the sign is negative but it is insignificant). In model (3), the sign of X_4 is still positive even though the sign of X_6 is negative. The implication is that the benefit from the optimal amount of regulation provided by the legislature is less than the amount wanted by the railroad industry since the legislature will have to take care of the political costs.

To find out the importance of the interaction terms, X_6 and X_7, (that is, whether they have any influence on the dependent variables or not) the following F statistic is computed.

$$F = \frac{(RSS_R - RSS_{UR})/\text{number of restrictions}}{RSS_{UR} \;/\; \text{number of degrees of freedom}},$$

where, RSS_{UR} = Unrestricted residual sum of squares from model (3); RSS_R = Restricted residual sum of squares from model (1).

Null hypothesis (H_O): e = f = 0

$$F = \frac{(313820713 - 250112212)/2}{(250112212)/40} = 5.09$$

The computed value of the F statistic is greater than the tabulated value ($F_{2,40} = 3.23$) at the 5 percent level of significance. Therefore X_6 and X_7 have influence on X_1 at the 5 percent level of significance.[5]

IV. Conclusion

Regulation benefits special interest groups at the expense of the rationally ignorant general public. But the optimum amount of regulation the legislature grants the special interests is less than the amount most desired by them.

Notes

1 Stigler (1971) considered the same two measures of weight limits on trucks.
2 See Stigler (1971, pp. 8, 20) for more explanation of these variables.
3 X_3 and X_4 represent the special interest group variables for agriculture and railroad industry respectively. On the other hand, X_5 represents rationally ignorant general public.
4 See Stigler (1971, pp. 19-20).
5 Here all the variables are in levels. When the

Table 1
Dependent Variable: X_1 (or X_2)

	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	14316.79*	10341.53*	11927.17*	11039.15
	(6.09)	(1.57)	(4.27)	(1.26)
X_3	27.94*	43.75**	20.11**	35.14
	(3.58)	(2.00)	(2.18)	(1.22)
X_4	23.97*	26.51*	40.20*	81.50**
	(2.53)	(2.97)	(3.74)	(2.42)
X_5	244.17*	251.76	979.88**	57.13
	(3.11)	(1.15)	(1.81)	(0.03)
X_6			-4.38**	-0.56
			(-2.37)	(-0.10)
X_7			0.36	1.72
			(0.23)	(0.36)
R^2	0.4767	0.2432	0.5824	0.2484

Note: (*) denotes significance at the 1 percent level and (**) denotes significance at the 5 percent level.

Table 2
Dependent Variable: ln (X_1) [or ln (X_2)]

	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	8.62*	7.03*	7.46*	6.51*
	(18.69)	(7.26)	(16.97)	(5.57)
ln (X_3)	0.13*	0.17*	0.04	0.04
	(5.08)	(3.16)	(1.19)	(0.49)
ln (X_4)	0.16**	0.48*	0.44*	0.68*
	(1.94)	(2.80)	(5.41)	(3.14)
ln (X_5)	0.02**	0.03	1.04*	0.22
	(1.99)	(1.02)	(3.51)	(0.28)
ln (X_6)			-0.23*	-0.12
			(-4.89)	(-1.04)
ln (X_7)			0.04**	0.10
			(1.75)	(1.54)
R^2	0.4232	0.2827	0.6725	0.3479

Note: (*) denotes significance at the 1 percent level and (**) denotes significance at the 5 percent level.

dependent variable is X_2 then X_6 and X_7 do not have any influence.

References

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