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Working Paper

Where are the limits of regulation?

Diskussionsbeiträge - Serie A, No. 181

Provided in Cooperation with:

Department of Economics, University of Konstanz

Suggested Citation: Frey, Bruno S.; Ramser, Hans Jürgen (1983) : Where are the limits of regulation?, Diskussionsbeiträge - Serie A, No. 181, Universität Konstanz, Fakultät für Wirtschaftswissenschaften und Statistik, Konstanz

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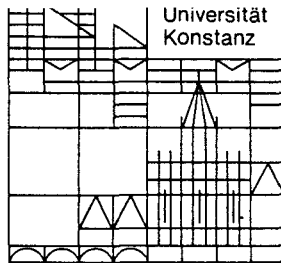
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of Regulation?***

28. NOV. 1983
Bibliothek
1101

Diskussionsbeiträge

Postfach 5560
D-7750 Konstanz

Serie A — Nr. 181
Oktober 1983

12. DEZ. 1983

Weltwirtschaft
-KI-1

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WHERE ARE THE LIMITS OF REGULATION?*

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Hans Jürgen Ramser

Serie A - Nr. 181

Oktober 1983

Serie A: Volkswirtschaftliche Beiträge

Serie B: Finanzwissenschaftliche Arbeitspapiere

Serie C: Betriebswirtschaftliche Beiträge

Summary

Regulation is an important part of government activity. Distinguishing between the intensity of regulation, and the range of regulation, it is possible to show that a utility maximizing government has an incentive to "over-regulate" both in the short and long run, but that there are definite limits to regulatory intensity. Models of the limits of regulation and of the limits of taxation are special cases of a more general model in which government simultaneously uses the intensity of regulation and tax rates as instruments. In this case, it is possible that there is "overregulation" but no "overtaxation".

I. Introduction

Regulation is an important part of government activity (Stigler 1971, Posner 1971, Peltzman 1976), and there is empirical evidence that its size has strongly increased since the War (see e.g. Penoyer 1981). According to Brennan and Buchanan (1980, p. 165/6) "it may be persuasively argued that the interferences with personal freedom reflected in regulatory laws ... present more serious issues than the more indirect extensions of governmental powers by means of the fiscal process and reflected in explicit taxation".

There is thus good reason to be concerned about regulation. The issue is well recognized in the literature, but it is curiously silent when it comes to indicate the limits of regulation. This silence is all the more noteworthy as the fiscal limits of government activity have recently found much attention in the context of the so-called Laffer curve (see e.g. Fullerton 1982, and the important contribution by Buchanan and Lee 1982). When tax revenue is limited either because the tax base shrinks or because constitutional limits are imposed, it is reasonable to assume that government (and public bureaucracy) seeks to

reach its goals by turning to regulation. This substitution effect has been mentioned by some authors (eg. Aranson and Ordeshook 1981, p. 167-8) but the resigned conclusion by Brennan and Buchanan (1980, p. 166) still holds true: "There is little that we can do here than to acknowledge the 'limits of tax limits' in this respect".

This paper seeks to show that (1) there are endogenous limits to regulation, (2) there is "overregulation" (in a way to be defined below), and (3) that the models of the limits of taxation (Laffer curve) and of the limits of regulation are special cases of a more general model in which the government simultaneously taxes and regulates. It is shown that it is possible that government has an incentive to "overregulate" but not to "overtax". This result contradicts Buchanan and Lee's (1982) result that the government "overtaxes", i.e. imposes a tax rate which is on the down-sloping part of the long-run Laffer curve.

The short and long run limits of regulation are discussed in section II. The general model of a simultaneous use of regulation and taxation is developed in section III, and the concluding section IV deals with the relationship between the partial models and the general model.

II. The limits of regulation

We follow the excellent model constructed by Buchanan and Lee (1982) and distinguish between the short run which equals the government's time horizon, and the long run which takes into account the reaction of the individuals (and firms) to the government's actions.¹⁾ The government is assumed to maximize its utility U which depends positively on the amount of regulation R

$$U = U(R), \quad U' > 0, \quad U'' \leq 0 \quad (1)$$

The government is able to control the intensity of regulation ρ , i.e. the number of regulatory acts for a given range of economic activities, but not the range B over which the regulatory acts are observed. The range of regulation depends on the reaction of the individuals which have the option to exit to unregulated areas, especially to the shadow economy (see e.g. Tanzi 1982, Simon and Witte 1982). The government thus performs its maximization subject to the constraints

$$R \equiv \rho \cdot B \quad (2)$$

$$B = B(\rho, \rho - \rho_0), \quad (3)$$

where $\rho \geq 0$ and ρ_0 in the short run is an exogenously given constant (whose importance will become clear in the long run

analysis). The idea is that the range of regulation shrinks when regulatory activities increase because the individuals have a greater incentive to evade to the unregulated economy (see Frey and Weck 1983). This reaction will be stronger in the long run than in the short run because the individuals need time to adjust. It is useful to split up the regulatory range into a long run component B^L and a short run component B^S :

$$B = B^L(\rho) + B^S(\rho - \rho_0). \quad (4)$$

with $B^{L'} < 0$ and $B^{S'} < 0$. Taking account of (2) it follows that the "amount" of regulation R is

$$R = R^L(\rho) + R^S(\rho, \rho - \rho_0). \quad (5)$$

It is reasonable to assume relation (5) to have the following properties

$$\begin{aligned} R^L(0) &= R^S(\rho, 0) = 0 \\ R^L_{\rho}(0) &> 0, \quad R^S_{\rho} > 0 \\ R^L_{\rho}(\tilde{\rho}) &= 0, \quad \tilde{\rho} > 0 \\ R^L_{\rho\rho} &< 0, \quad R^S_{\rho\rho} < 0 \end{aligned}$$

The regulatory intensity $\tilde{\rho}$ is that intensity which maximizes the amount of regulation R in the long run.

A necessary and sufficient condition for an internally optimal intensity of regulation in the short run $\rho = \rho^* > 0$ for the government to exist is

$$R_{\rho}^1(\rho^*) = R_{\rho}^S(\rho^*, \rho^* - \rho_0) < 0. \quad (6)$$

Our analysis shows

- (1) that for every ρ_0 , there exists a unique interior optimum for the intensity of regulation. The government thus has an incentive to limit the intensity of regulation because going beyond that limit reduces the range over which the regulations are followed so much that the amount of regulation R begins to fall,
- (2) as the optimal regulatory intensity ρ^* is larger than the regulatory intensity $\tilde{\rho}$ which maximizes the long run amount of regulation R^1 , one may speak of "overregulation".²⁾

So far, it has been assumed that the individuals (and firms) do not fully adjust to the intensity of regulation imposed by the government. In the long run, ρ_0 is variable. In the simple case of adaptive adjustment it changes according to

$$\dot{\rho}_0 \equiv \frac{d\rho_0}{dt} = \beta \cdot (\rho - \rho_0), \quad \beta = \text{const.} > 0 \quad (7)$$

Assuming that the government sets its short run optimal intensity of regulation $\rho = \rho^*$, where

$$\begin{aligned} \rho^* &= \Phi(\rho_0) = \rho |R_\rho^1(\rho) = -R_\rho^S(\rho, \rho - \rho_0), \\ \text{with } 1 > \Phi'(\rho_0) > 0, \end{aligned} \quad (8)$$

we have

$$\left. \begin{aligned} \lim_{t \rightarrow \infty} \dot{\rho}_0 &= 0, \\ \lim_{t \rightarrow \infty} \rho^* &\equiv \rho^{**} = \rho |R_\rho^1(\rho^*) = -R_\rho^S(\rho^*, 0) < 0 \end{aligned} \right\} \quad (9)$$

Given any initial ρ_0 , the regulatory intensity ρ^* which is optimal for the government in the short run, converges to a long run regulatory intensity ρ^{**} . It is larger than the regulatory intensity $\tilde{\rho}$ which maximizes the long run amount of regulation ($\rho^{**} > \tilde{\rho}$). There is "overregulation" in the long run.

III. A general model of the limits of regulation and taxation

Government derives utility both from the amount of regulation R and tax revenue T . When it simultaneously uses two policy instruments, the intensity of regulation ρ and the tax rate τ , the maximization problem is

$$\max_{\rho, \tau} U(R, T), \quad U_i > 0, \quad U_{ij} \leq 0; \quad i = R, T \quad (10)$$

$$\text{s.t. } R \equiv \rho \cdot B, \quad (2)$$

$$T \equiv \tau \cdot B, \quad (11)$$

where B is for simplicity assumed to be both the range over which the government is able to regulate and to tax.³⁾ This range now depends both on the intensities of regulation and taxation

$$B = B(\rho, \rho - \rho_0, \tau, \tau - \tau_0) \quad (12)$$

with $\rho, \tau \geq 0$ and ρ_0, τ_0 exogenously given in the short run.

The range of regulation and taxation may again be split up into a long term and short term component

$$B = B^1(\rho, \tau) + B^S(\rho - \rho_0, \tau - \tau_0) \quad (13)$$

with $B_\rho^1, B_\tau^1 < 0$ and $B_{\rho-\rho_0}^S, B_{\tau-\tau_0}^S < 0$. Taking account of (2) and (11), the amount of regulation is

$$R = R^1(\rho, \tau) + R^S(\rho, \rho - \rho_0, \tau - \tau_0), \quad (14)$$

and tax revenue is

$$T = T^1(\rho, \tau) + T^S(\rho, \rho - \rho_0, \tau - \tau_0), \quad (15)$$

with properties analogous to those given for equation (5).

There exists an internal optimum for the government's short run maximization problem given by $(\rho, \tau) = (\rho^*, \tau^*) > 0$.

The necessary and sufficient condition for this instrument use to be optimal is

$$\begin{aligned} & R_i^1(\rho^*, \tau^*) + \alpha T_i^1(\rho^*, \tau^*) \\ &= -[R_i^S(\rho^*, \rho^* - \rho_0, \tau^* - \tau_0) + \alpha T_i^S(\tau^*, \rho^* - \rho_0, \tau^* - \tau_0)] < 0 \\ & \text{with } \alpha \equiv U_T/U_R > 0, \quad i = R, T. \end{aligned} \quad (16)$$

The analysis shows

- (1) for every (ρ_0, τ_0) , there exists a unique internal optimum for (ρ, τ) . Thus, there are (endogenous) finite limits for both the intensity of regulation and taxation. The government has an incentive not to extend regulatory intensity and the tax rate all too far because it makes the range for both activities shrink,
- (2) as $(\rho^*, \tau^*) > (\tilde{\rho}, \tilde{\tau})$ there is in general both "overregulation" and "overtaxation" (compared to the intensity of regulation $\tilde{\rho}$ and the tax rate $\tilde{\tau}$ which maximize the amount of regulation and tax revenues in the long run).

Taking into account that individuals and firms adjust to regulation and taxation in the long run, ρ_0 and τ_0 become variable. If they adjust adaptively, we have

$$\dot{\rho}_0 = \beta^{\rho}(\rho - \rho_0), \quad (7)$$

$$\dot{\tau}_0 = \beta^{\tau}(\tau - \tau_0), \quad (17)$$

with $\beta^{\rho}, \beta^{\tau}$ const. > 0 .

Using the short run optimal values of the instruments,

$$\rho = \rho^* = \Phi^{\rho}(\rho_0, \tau_0) \quad (18)$$

$$\tau = \tau^* = \Phi^{\tau}(\rho_0, \tau_0) \quad (19)$$

it follows that

$$\left. \begin{aligned} \lim_{t \rightarrow \infty} \dot{\rho}_0 &= \lim_{t \rightarrow \infty} \dot{\tau}_0 = 0 \\ \lim_{t \rightarrow \infty} (\rho^*, \tau^*) &= (\rho^{**}, \tau^{**}) \end{aligned} \right\} \quad (20)$$

with (ρ^{**}, τ^{**}) as the solution of

$$\begin{aligned} R_i^l(\rho^*, \tau^*) + \alpha T_i^l(\rho^*, \tau^*) = \\ - [(R_i^s(\rho^*, 0, 0) + \alpha T_i^s(\tau^*, 0, 0))] < 0, \\ i = \rho, \tau. \end{aligned} \quad (21)$$

For any initial (ρ_0, τ_0) , the short run optimal intensities (ρ^*, τ^*) converge to the long run optimal intensities of regulation and taxation $(\rho^{**}, \tau^{**}) > (\tilde{\rho}, \tilde{\tau})$. There is "overregulation" and "overtaxation" in both the short and long run.

IV. Relationship of partial and general models

We can distinguish two partial models, one considering regulation only (r-model presented in section II), the other considering taxation only (the Buchanan-Lee or t-model). The general model constructed in section III contains the two partial models as special cases. The r-model partially optimizes the general model, keeping the tax rate $\tau = \bar{\tau}$ constant. The t-model keeps the rate of regulation $\rho = \bar{\rho}$ constant. The partial models are, except by chance, suboptimal (in addition to the general tendency for an excessive use of the two instruments) because the full steering capacity is not taken advantage of.

Focusing on the long run results, be (ρ^{**}, τ^{**}) the government's optimal policy when the use of ρ and τ is simultaneously maximized (general model), and $\tau_{\ddagger}^{**}(\bar{\rho})$ the government's optimal tax policy with exogenously given (or forgotten or unknown) regulatory intensity $\bar{\rho}$. It is possible to show

$$\tau_{\ddagger}^{**} \left\{ \begin{array}{l} \geq \\ < \end{array} \right\} \tau^{**} > \bar{\tau} \quad \text{for } \bar{\rho} \left\{ \begin{array}{l} \leq \\ > \end{array} \right\} \rho^{**} > \bar{\rho}. \quad (22)$$

When the exogenously given regulatory intensity $\bar{\rho}$ is larger than the fully optimal ρ^{**} , which in turn is larger than the regulation maximizing $\bar{\rho}$, according to (21) it follows that $\tau_{\ddagger}^{**} < \tau^{**}$. It is then possible that moreover $\tau_{\ddagger}^{**} < \bar{\tau}$. A combination of "overregulation" ($\rho^{**} > \bar{\rho}$) is thus compatible

with "undertaxation" ($\tau_t^{**} < \tilde{\tau}$). This result contradicts the result by Buchanan and Lee that the (same utility maximizing) government always "overtaxes", i.e. sets a higher tax rate than that which maximizes long run tax revenues.

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Footnotes

* We are grateful to helpful discussion with Werner W. Pommerehne, Gebhard Kirchgässner, Friedrich Schneider and Hannelore Weck-Hannemann. Frey acknowledges financial support by the Swiss National Fund (Project 1.430-0.81).

1. However, an algebraic and not geometric analysis is used so that the more general model of section III can be constructed.
2. Thus, $\rho^* > \tilde{\rho} = [\rho | R_{\rho}^1(\rho) = 0] > 0$. The term "overregulation" only refers to the regulatory intensity which is maximizing the amount of regulation R in the long run. Clearly, this need not correspond to any "socially optimal" intensity of regulation.
3. For other purposes it may be useful to distinguish between the range of regulation B_R and the tax base B_t .