Minimize Regulations to Regulate – Extending the Lucas Critique

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ABSTRACT

Lucas (1976) had argued that interventionist policies macroeconomics may fail because policies themselves affect the optimal behaviour of private agents and hence the associated response parameters. We extend Lucas argument and propose that highly controlled and regulated environment leads to misinterpretation of official statistics and therefore distort policy predictions based on such information. In a way policies will have predictability in a more open and less regulated environment.

Key Words: Lucas Critique, Policy Distortion, Regulation.
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I. Introduction

In a celebrated paper Lucas (1976) highlighted the idea behind macroeconomic policy evaluation in a rather non-conventional way. Nature of government policies dictates the optimal behaviour of agents. For example, a temporary tax relief works very differently from a permanent tax relief as far as individual saving behaviour is concerned. Therefore, aggregate revenue implications of a tax cut cannot depend on a unique value of the response parameter of the agent. While running regressions for evaluation of policies, one must make sure that the coefficients are consistent with the optimizing behaviour of the participants. Such arguments have changed the face of research in macroeconomic policy making[*].

The purpose of this paper is to extend Lucas argument in the context of highly controlled and regulated environment. Where private agents have all the incentive and scope to "misreport" transactions. Official statistics is based on such misreporting and therefore policy predictions based on such information are bound to be erroneous. Policies themselves affect the nature of information that flows to the government and hence such information is not independent of regulations. An implication of such an assertion is that policies should work better in a relatively open and unregulated environment. In a way these points towards possible "paradox" – for better regulatory policies one should make sure that there is not much regulatory control. We shall highlight our concern with two examples, one on tax evasion and

[*] Lindé (2001) in an interesting paper proposes an alternative framework to test the validity of Lucas's critique and vindicates the existence of such problems in macroeconomic policy making[1].

the other on devaluation and exports. Section II studies these cases. Section III concludes.

II. Two Examples

Example 1: Tax Evasion

Let Y be true income of an individual. With e as effort, the income generating function is given by

$$Y = Y(e), Y' > 0, Y'' < 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots (1).$$

$\tilde{Y}$ represents reported income and t is the tax rate. In the tax evasion framework the individual maximises the following problem[2].

Consider a standard for evasion model where the government is concerned about the impact of lower taxes on tax-renames. Typical taxpayer solves the following problem.

$$\underset{(e,\tilde{y})}{\text{Max}}\ \Omega(e, \tilde{y}) = \left(y(e) - t\tilde{y}\right) - pF[y(e) - \tilde{y}] - c(e) \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where p is of auditing, F is penalty function with F (0) = 0, F′ > 0, F′′ > 0.

First Order Conditions:

$$\frac{\delta\Omega}{\delta e} = Y'(e) - pF'.Y'(e) - c'(e) = 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$\frac{\delta\Omega}{\delta\tilde{Y}} = -t + pF' = 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots (4).$$

Second Order Conditions are also satisfied by given comparative statistics.

Let e^* and $\tilde{Y}^*$ solve equations (3) and (4).

It can be easily checked that

$$\frac{d\tilde{Y}}{dt} = \frac{\Delta e}{\Delta} < 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

where $\Delta e \equiv \frac{\delta^2 \Omega}{\delta e^2} < 0$ and $\Delta = [Y''(e) - c''(e)](-pF'') > 0$.

As t goes down $\tilde{Y}$ goes up.

Also $\frac{de}{dt} \equiv \frac{-pF'' Y'(e)}{\Delta} < 0$

and $\frac{dY(e)}{dt} \equiv \frac{-pF'' Y'(e)^2}{\Delta} < 0$.

As t goes down e and Y(e) go up as well.

But as t goes down [from equation (4)] we know that in equilibrium pF' must go down as well. Since $F'' > 0$, this will imply $[Y(e) - \tilde{Y}]$ must go gown. Since to start with $Y(e) > \tilde{Y}$, growth in Y(e) must be overcompensated by a growth in the reported income $\tilde{Y}$. This leads to the following proposition.

Proposition I: The official statistics will overestimate the growth in income following a tax cut.

Proof: See the discussion above.

A drop in t not only raises Y by raising 'e', it also raises $\tilde{Y}$ and by more than a rise in Y, thus the growth effect is overestimated.

As the extent of intervention comes down i.e., as t decreases $\tilde{Y}$ more closely approximates Y(e), thus the "overestimation" effect becomes less significant. The way we have let up the model it must be the case that,

$$\Omega^0(e^0, \tilde{Y} = Y(e^0)) < \Omega^*(e^*, \tilde{Y}^*) \text{ .... (6)}$$

where e^0 solves

$$(1\text{-}t)\, Y'(e^0) = c'(e^0) \text{ as } F = 0 \text{ for } \tilde{Y} = Y \text{ .... (7).}$$

Equation (6) suggests that it is worthwhile to evade tax.

Let us introduce a fixed cost of evasion $Z > 0$.

Invoking the envelope theorem we know that

$$\frac{d\Omega^0}{dt} = Y(e^0) \text{and} \frac{d\Omega^*}{dt} = \tilde{Y}^* \text{ .... (8).}$$

Therefore,

$$\frac{d(\Omega^* - \Omega^0)}{dt} = -\tilde{Y}^* + Y(e^0) \text{ .... (9).}$$

Since e* solves equation (3) and e^0 solves the case with $Y = \tilde{Y}$, $e^0 > e^*$ as $F' > 0$ and $Y'' < 0$, $F'' > 0$, $C'' > 0$. Therefore, with $Y' > 0$,

$$\frac{d(\Omega^* - \Omega^0)}{dt} = -\tilde{Y}^* + Y(e^0) > 0 \text{ .... (10).}$$

No tax evasion equilibrium will be the outcome iff $\Omega^* - \Omega^0 > Z$ .... (11).

We also know that

$$\underset{t \to 0}{Lt}\, (\Omega^* - \Omega^0) = 0 \text{ .... (12).}$$

Therefore, $\ni \underline{t}$ s.t. $\forall\, t \leq \underline{t}\;\; \Omega^* - \Omega^0 \leq Z$.

Proposition II: For sufficiently low tax rates, i.e., with restricted intervention, Y = Ỹ and official statistics will provide the correct information.

Minimising regulations help because the incentive to misreport transactions is also minimised and the government has better information to formulate policies.

Example 2: Devaluation and Exports

It is well known that over valued exchange rate leads to "black market" in foreign exchange. Several developing countries have perused the policy of exchange control leading to a substantial gap between market rate and official rate of exchange. This also acts as a tax on exports and conventional wisdom suggests that devaluation should promote exports.

In an extended model one can make y endogenous as a function of "effort" which in turn will depend on income tax. In such a model lowering t will raise the optimal effort and hence y. Thus the tax policy will have an impact on true income. However, one should note that the income reported to the official source will contain the 'true' impact of a tax cut on y as well as a "reduction" in the extent of "misreporting". Thus the growth impact of a decline in t will definitely be overestimated a result similar to the one derived in simpler model we have discussed. Marjit et al (2000), Biswas and Marjit (2002) have shown in the context of India that devaluation in the past mostly affected "reported" export earnings while "actual" exports did not show any spectacular jump. They used trade data of both India and its trading partners to reach such a conclusion. Later same fact was experienced for several countries.

The problem facing a typical exporter, earning X amount of foreign exchange looks like

$$\lambda Xe + (1-\lambda)XE - pF[(1-\lambda)X] \qquad (13)$$

where λ fraction is declared officially earning e amount of local currency per unit of foreign currency and $(1-\lambda)X$ is sold in open market, illegally to obtain E per unit, E > e. Again the agent faces punishment in case apprehended, $F' > 0, F'' > 0$. Maximizing (4) with respect to $(1-\lambda)$, one gets the following F.O.C. [S.O.C. is satisfied, as $F'' > 0$]

$$(E-e) = pF' \qquad (14)$$

Devaluation reduces the gap between the official rate and the black market rate, narrowing (E - e), the open market premium. This will imply lower $(1-\lambda)$ and higher λ. The official statistics will reflect a "growth in export earnings" even when 'λ' the true amount remains unchanged. λX stands for the reported earnings. Therefore, if one concludes that devaluation promotes exports, it will be incorrect. Any regression relating exports to exchange rate must control for the changes in behavioural parameters. Note that in case of no intervention λ should be 1 and the reported statistics should capture reality. Similarly, arguments can be developed with tariffs and subsidies.

International trade statistics allows one to look at trade values from the exporter's as well as importer's point of view by measuring the value sent and value received.

In a recent paper Biswas and Marjit (2002) argue that, in case of India, the gap between c.i.f. and f.o.b. values are much larger than the so-called transport costs and

such "difference" is related to the announced policies. The problem of over-invoicing and under-invoicing of trade transactions is a well-known topic [Bhagwati (1974)]. Such misreporting is a natural outcome of regulatory controls. What we argue here is that this is a natural example of 'Lucas Critique'. Thus the Lucas Critique is not only a macro issue, but is a general warning to policy calculations where there are ample scope for pollution in officially gathered information.

III. Concluding Remarks

Lucas (1976) 's seminal contribution has changed the way macro-econometric models are designed to analyse policy questions. What we argue demonstrates that the same logic applies in the context of microeconomic policy making as well. Regulations, justified or unjustified based on pure economic reasons, distort the quality of information obtained by the state. Therefore, policy predictions are bound to be fallacious when substantial regulatory controls are in place. As controls are removed reported transactions start getting closer to actual transactions uplifting the potential quality of policy exercise. Paradoxically policies work better when the extent of regulatory control is kept at its minimum.

Footnotes:

1. Also refer to Sims (1982), Engle et al (1983), Ball (1999), Fuhrer (1997) in this context.

2. For standard approach to the tax evasion refer to Allingham and Sandmo (1972), Srinivasan (1973), Yatzhaki (1974), Erard and Feinstein (1994), Andreoni et al (1998) etc.

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