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Endogenous deregulation: evidence from OECD countries

Tomaso Duso[a], Lars-Hendrik Röller[b,*]

[a]*Department of Economics, University of Vienna, Vienna, Austria*
[b]*Wissenschaftszentrum Berlin, Humboldt University Berlin, and CEPR, Berlin, Germany*

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Abstract

This paper presents empirical evidence regarding the effect of endogenous deregulation on productivity. We find that treating deregulation across OECD countries as an exogenous event overestimates the competitive impact of deregulation on productivity by as much as 40%.

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JEL classification: D7; L5; L8

1. Introduction

This paper presents empirical evidence regarding the effect of deregulation on productivity in OECD countries. Empirical estimates of this issue are subject to a basic problem: the decision to deregulate is endogenous and may in fact be determined by productivity and other political and institutional factors. The contribution of this short paper is to empirically explore this question.

Due to the simultaneity between deregulation and productivity, we are interested in two separate effects. The first one, the *selection effect*, relates to the impact of productivity on the decision to deregulate. For example, are more productive countries more likely to deregulate? The second effect, the *competition effect*, relates to the impact of deregulation on productivity, i.e. whether deregulation raises productivity. It is this second effect that many empirical studies of deregulation have focused on, while ignoring the first one. See Winston (1993) for a survey.

The main point of this paper is to illustrate that a positive correlation between deregulation and

*Corresponding author. Present address: Wissenschaftszentrum Berlin (WZB), Reichpietschufer 50, D-10785 Berlin, Germany. Tel.: +49-30-2549-1440; fax: +49-30-2549-1442.
E-mail address: roeller@wz-berlin.de (L.-H. Röller).

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productivity can be due to either a positive selection effect or a positive competition effect. Treating the decision to deregulate as exogenous, ignores the selection effect. As a result, the competition effect is biased upwards. Using new data from the OECD as well as other sources we show that considering deregulation as an endogenous event is important, leading to radically different policy conclusions.

2. The cause *and* effect of deregulation

Recent theoretical developments have emphasized the role of political considerations in understanding policies (Persson and Tabellini, 2000). However, there are relatively few empirical studies that explore the consequences of treating policies as endogenous.[1] Of all industries, the telecommunications industry has attracted the most interest (Kaserman et al., 1993; Levy and Spiller, 1996; Donald and Sappington, 1997). The main conclusion from this literature is that political and regulatory institutions matter significantly for the deregulation process.

This short paper shows that treating deregulation as endogenous matters for the assessment of the impact of deregulation.[2] In particular, we do not employ single equation frameworks, which typically assume that deregulation is exogenous. Our basic set-up involves a simultaneous system of two equations: the *policy equation* and the *market equation*. Let the policy decision (in our case deregulation) be denoted by s and let the market outcome (in our case productivity) be denoted by q. The policy equation is given by:

$$s = f(\text{political institutions, regulatory institutions, ideology, } q) + \varepsilon \tag{1}$$

The main objective is to obtain the impact of q on s, which is the *selection effect*. The challenge in estimating (1) is that q is potentially endogenous. This implies that OLS-type estimation will not provide an unbiased assessment of the determinants of policy making. Note that (1) specifies instruments that characterize the political and institutional environment, which is drawn from the political economy literature.

The second equation is the market equation, which accounts for the effect of the deregulation on productivity. Using a reduced form approach,[3] we let q (productivity) be determined by demand, costs, market structure variables (such as the number of firms), as well as s:

$$q = g(\text{demand, costs, market structure, } s) + \nu \tag{2}$$

The main objective is to obtain the impact of s on q, which is the *competition effect*. The problem with estimating (2) by OLS is that s is endogenous and single equation approaches will be subject to a simultaneity bias. Nevertheless, there is much literature in empirical economics that attempts to

[1] Notable exceptions are the empirical contributions of the determinants of policy by Persson and Tabellini (1999). The importance of endogenous policy has recently been pointed out by Besley and Case (2000).

[2] Duso (2003) makes a similar point for price regulatory decisions in the US mobile telecommunications market.

[3] Alternatively, (2) might be more structural. For instance, one could specify a demand equation and a first-order condition, with the policy (s) affecting either or both sides of the market.

estimate equations of the type to which (2) belongs. Policy suggestions based on this kind of analysis are potentially very misleading.

Indeed, the competition and the selection effects can be consistently estimated by considering (1) and (2) jointly. Econometrically, the above set-up provides for an additional set of instruments, namely the political and institutional factors that determine the policy through (1). Given that institutions are rather long lived, they may indeed be strong instruments.

3. Evidence from OECD countries

Our market data are taken from a new OECD database (the OECD International Regulation Database), which includes market information for the mobile telecommunication industry across 24 countries for the period 1993–1997. We use the variable ENTRY, which takes on the value of 1 if the market structure in digital mobile telephony is a monopoly, 2 if a duopoly, and 3 otherwise (Table 1) as our policy variable (s). In terms of market outcome (q), the OECD database reports on a productivity index (PRODUCTIVITY), defined as total subscribers per employee. We use a number of

Table 1
Single and simultaneous equations estimates

	Single equation, OLS estimates		Simultaneous equations, GMM estimates	
	Coefficient	S.E.	Coefficient	S.E.
Policy equation				
GDP			0.3031	0.0816***
Population			0.2234	0.0482***
Majoritarian			0.5240	0.1544***
Presidential			−1.0190	0.1885***
Coalition			0.0154	0.1645
RILE			0.0053	0.0027*
Proreg			−0.1303	0.0351***
Accountability			0.6705	0.1797***
Independence			−0.2302	0.1543
Productivity			0.0083	0.0031***
Market equation				
Constant	3.212	0.851***	1.6894	1.1318
log GDP	−0.136	0.072*	0.2885	0.1003***
log Population	−0.151	0.050**	−0.0575	0.0574
log Investment	0.310	0.131**	−0.3582	0.2076*
Time	0.355	0.047***	0.3995	0.0608***
Entry	0.485	0.101***	0.2475	0.1369*

The dependent variables are ENTRY in the policy equation and log (PRODUCTIVITY) in the market equation. Observations = 78.
For the single equation, OLS estimates $R^2 = 0.5431$, for the GMM estimates R^2 policy = 0.6644, R^2 market = 0.4401.
***, **, and * represent significance at the 1, 5 and 10% levels, respectively.

exogenous variables in (2), which are meant to control for demand and cost conditions: GDP, population, investment per employee, wage expenditure per employee, and a time trend.

In addition, we obtain information on various political and institutional factors across OECD countries, which are used as instruments in (1).[4] These include a dummy variable indicating whether the electoral system is majoritarian or proportional (MAJORITARIAN), a dummy indicating whether the political system is presidential or parliamentary (PRESIDENTIAL),[5] as well as information as to whether the government is a coalition or one-party government (COALITION) (Budge et al., 2001). A second set of instruments are based on agency issues. The OECD database provides information on the accountability of the regulatory agency (ACCOUNTABILITY), defined as a dummy indicating whether there is a report duty—usually to either the legislature or the relevant ministry. There is also information on whether the regulatory decision can be overturned by another body (INDEPENDENCE). The final instrument we use in (1) relates to the government's general ideology, which is frequently used in the political science literature (Budge et al., 2001). RILE is a variable defined as the overall political position of the government in terms of right versus left scale, while PROREG indicates the governments' position in favor of regulation.

Using the above data we now turn to our estimation results. We begin by reporting single-equation estimates of (1), that is we assume that the policy (ENTRY) is exogenous. This implies that we attribute the entire conditional correlation between ENTRY and PRODUCTIVITY to the competition effect, since the selection effect is assumed to be zero.[6] As can be seen in Table 1, the impact of ENTRY is positive and statistically significant, implying that deregulation in the form of market entry raises productivity. As we will see below, this policy conclusion is premature.

Table 1 also reports on the simultaneous estimation of (1) and (2). As can be seen in the policy equation (1), many of the political and regulatory variables are highly significant in terms of explaining deregulation (we can explain more than 66% of the variation). This finding is consistent with other empirical studies cited above. Moreover the signs of the effects are broadly consistent with the theory. Overall, we take these finding as additional evidence indicating the importance of incorporating political economy considerations into the study of policy decisions. Furthermore, the variable PRODUCTIVITY has a positive and significant effect on ENTRY, in other words more productive markets result in more deregulated environments. This implies that the selection effect is positive and significant.

Turning to the market equation estimation (2) in Table 1, we find that the impact of ENTRY on PRODUCTIVITY is positive and significant. In other words, a positive competition effect still exists. However, it is now much smaller than under OLS (reduced from 0.347 to 0.248) and has become statistically less significant. This indicates that the estimate of the competition effect is substantially lower whenever the selection effect is controlled for. In other words, the bias in the estimation of the competition effect due to endogenous policy decisions amounts to almost 40%.

[4] Duso (2002) provides a more complete description of this data.

[5] We would like to thank Persson and Tabellini for providing us with this data. See Persson and Tabellini (1999) for details.

[6] The unconditional correlation between ENTRY and PRODUCTIVITY is very significant. The Kedall tau-b correlation is 0.35 and statistically significant at the 1% level.

4. Conclusion

This paper presents empirical evidence regarding the effect of endogenous deregulation on productivity in OECD countries. Due to the simultaneity between deregulation and productivity, we isolate two separate effects: the *selection* and *competition effects*. Treating the decision to deregulate as exogenous, ignores the selection effect, and attributes the entire positive correlation to the competition effect. In this case, the competition effect is biased upwards.

Empirically, we find that both the selection and the competition effects are positive and significant for OECD deregulation, implying that treating deregulation as an exogenous event overestimates the competitive impact of deregulation on productivity by as much as 40%. These findings suggest that the endogeneity of policy decisions matters significantly for the inferred impact of these policies on market outcomes.

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