Public versus private production and economies of scale

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Abstract The cost of producing the same good often differs substantially for public and private producers. We investigate the effect of organization in a case where the production technology is simple: The cleaning of Danish schools. Three forms of organization are used: Decentral municipal, central municipal or private. For small schools the organizational form has little impact on cost. For larger schools decentral municipal production is the most expensive. On average centralization reduces costs by 5%, while privatization reduces costs by 30%. Similar cost differences are reported in the literature for other cases, but it is a new result that the cost differences are due to economies of scale. Public choice theories predict that cost differences are due to ownership or competition. We find evidence that both theories help explain the cost differences.

Keywords Competition · Cost function · Non-parametric regression · Ownership · Scale effects

JEL classification: C14, D78, H72, L33

1 Introduction

This paper compares public and private production in the case of cleaning, where the production technology is simple. Our data set covers 1081 Danish primary schools. They are
owned by the municipalities, which have full freedom to decide how they are cleaned. Three forms of organization are used: Most are cleaned by the municipality itself, either decen-
trally at the level of the individual school or by a central organization. The rest are cleaned
by private companies. It is analyzed how the three forms influence cleaning costs for a given
cleaning quality, and furthermore we test two public choice theories about public and private
production: The ownership and the competition theory.

School cleaning is produced by a simple technology with a low capital-labor ratio. The
cleaning business has a fast circulation of personnel, and new technologies are rapidly dis-
seminated. Therefore our data are treated as a set of observations of one cost function with a
fixed capital-labor ratio. It is estimated conditional on form of organization, cleaning quality,
scale and municipal characteristics.

For larger schools we find systematic cost differences due to organization: Private cleaning
is cheapest, while decentral municipal cleaning is the most expensive. A key prediction is
that if cleaning at all schools was privatized, it could lead to savings of roughly 25% of the
present costs, corresponding to the salary of about 1000 new school teachers.

The cost difference between publicly and privately produced cleaning arises from differ-
ences in the ability to exploit economies of scale. This finding extends and refines the standard
result found in the literature of an average cost difference of almost 30% in favor of private
production. For surveys on empirical studies of private versus public production see, for ex-
ample, Borcherding, Pommerehne, and Schneider (1982), Domberger and Jensen (1997) and
Vickers and Yarow (1988). Only few studies have been made for Denmark, see Kristensen

Why public producers do not exploit the economies of scale may be explained by two
basic public choice theories, namely that it is due to differences in either competition or
ownership. They are not mutually exclusive, and they are empirically difficult to distinguish.
The two theories are expressed in a form that can be tested empirically, and the evidence
shows that both explanations are valid.

Section 2 presents the two theories and develops testable implications. The data and
institutional factors are described in Section 3. The results from the cost function estimation
are reported in Section 4. Section 5 contains the test of the public choice theories and Section
6 has a policy analysis. Finally, Section 7 discusses the historical reasons for the results. The
Appendix contains details of the nonparametric estimation, bootstrapping and derivation of
specific confidence bands.

2 The ownership and competition theories

The ownership or property rights explanation focuses on the owner’s incentives to minimize
costs. Private production has owners who are residual claimants, while the residual claimants
in public production are much more vaguely defined. Private producers thus have a much
larger interest in knowing and controlling costs. The modern theory of ownership goes back
to Alchian (1969), see Pejovich (1997) for a survey.

To test the ownership explanation, a measure of the incentives of the owners to minimize
cost is needed. Our measure is the fraction of the population (of voting age) in the relevant
region that depends upon the public sector, either as employee or recipients of a social
payment meant to replace income. This measure is termed the welfare coalition ($w$), though
it is, of course, only a potential coalition. The higher the welfare coalition, the harder it is
for politicians to pursue cost saving policies in the public sector and, thus, a higher cost
of production is to be expected. Therefore the ownership explanation is consistent with the