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## Is private delivery of public services really cheaper? Evidence from public road maintenance in Denmark \*

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**Abstract.** It is a general finding that cost savings may be obtained by involving the private sector in public service production. This fact should be of particular interest to countries with large public sectors, such as the Scandinavian countries, where private involvement has a large potential. This paper investigates this potential by focusing on the Danish road sector. 275 municipalities are responsible for the maintenance of approximately 60,000 km of Denmark's 70,000 km public roads. The analysis confirms the international evidence: Involving the private sector also seems to make it possible for the public sector to obtain large cost savings in the Scandinavian countries.

### 1. Introduction

Modern welfare states are responsible for the delivery of a wide variety of services to the public. These services are often delivered by national or local government agencies. However, there is seldom any compelling reason why the government should be responsible for the actual delivery of services. Following Savas (1987), a distinction should be made between *providing* public services (clearly a government responsibility) and *producing* public services (less clearly a government responsibility).

Producing public services is a practical matter for which the private sector may often be better equipped. The literature suggests two broad types of reasons why this may be so (see the discussion in Borcharding, Pommerehne and Schneider, 1982; Vining and Boardman, 1992; Domberger and Jensen, 1997). The first is the *ownership* argument which states that the public sector can never be expected to deliver services as efficiently as the private sector. The principal reasons are that public-sector agencies lack incentives to perform efficiently; they often have broad and ill-defined public-service objectives; and they have no “bankruptcy constraint”, i.e. they can go on

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performing poorly without fear of the ultimate sanction of going out of business. The second is the *competition* argument which states that the private sector is forced by competitive pressures to maximize efficiency whereas the public service-producer has a monopoly. According to this argument, the spur of competition is what enhances performance. Monopolies are always inefficient, irrespective of public or private ownership.

However, whether involving the private sector in public service production actually leads to cost savings is, of course, an empirical question. But many studies find this to be the case. Borcharding, Pommerehne and Schneider (1982) survey more than 50 studies from the USA, Germany, Australia, Canada, and Switzerland. They find that the evidence points to private supply of public services being “unequivocally more efficient” (p. 135). Savas (1987: 119–231) surveys a multitude of “most authoritative, empirical studies” (p. 121) mainly from the USA. He concludes that the evidence shows that “the private sector performs so-called public services more efficiently and effectively than government usually can” (p. 223). Domberger and Jensen (1997) survey numerous studies on contracting out from the UK and other Anglo-Saxon countries. They find it “evident from the empirical findings that the savings generated by contracting are substantial” (p. 76). Boyne (1998: 133–167) surveys some forty studies from the UK and the USA on competitive tendering and contracting. Although critical of their quality he concludes that “fairly clear conclusions appear to have been reached by the empirical studies . . . external competition is associated with lower expenditure (p. 177).”

As is evident from these survey-studies, the evidence in favor of using the private sector for producing public services seems impressive. However, a curious asymmetry characterizes the general evidence: While the possible effects of involving the private sector in public service production should be of greatest interest for countries with large public sectors, the evidence is overwhelmingly from countries with relatively small public sectors, such as the USA.

Nowhere is this asymmetry more marked than in Scandinavia. The Scandinavian welfare states are among the world’s largest and almost all public service production is done in-house, i.e. by the national or local government agencies responsible for the provision of the services. This means that the potential for cost savings by involving the private sector should be considerable. But investigating this potential has received very little attention in Scandinavia.

The few Scandinavian studies, which have been undertaken, tend to confirm the international evidence, although not unequivocally so. In Sweden, a study commissioned by the National Board of Health and Welfare surveys 13 studies on the effects of involving the private sector in municipal old age

care. All the surveyed studies show that involving the private sector reduces costs without reducing quality (SoS, 1998: 8–36). The study makes its own investigation of old age care in six municipalities, but finds the evidence inconclusive (SoS, 1998: 37–70). Ohlsson (2000) studies refuse collection in 115 Swedish municipalities and – contrary to conventional wisdom – finds public provision to be cheaper than private. In Norway, Rattsø and Sørensen (1998: 63–65) survey the scanty evidence. They find this to be inconclusive, but still think that “the potential for cost reductions is large” (p. 65). In Denmark, a few studies have been undertaken. Kristensen (1983) investigates public fire protection and finds that the savings from contracting with a private fire service are “next to incredible” (p. 4). This result is interesting because there is only one private company offering fire services in Denmark. This suggests that a shift in ownership may be sufficient to enhance performance. Christoffersen et al. (2000) investigate school cleaning in 189 Danish municipalities and find that contracting out this service makes it possible to cut costs by almost 30 per cent. PLS-consult (1997a: 73–89) examines twenty allegedly representative cases of contracting out by Danish local governments in the period 1994–96. Considerable cost savings were obtained in all cases, except one. In a collaborative project, the five Nordic National Competition Authorities survey the evidence on the effect of subjecting municipal refuse collection and old age care in their countries to competition. They conclude that “experience ... shows that municipalities may obtain large budget improvements which in many cases also constitute efficiency gains for society” (Nordiske Konkurrencemyndigheder, 1998: 40).

In sum, the Scandinavian evidence overall suggests that involving the private sector in public service production may lead to cost savings. But the evidence remains indicative, rather than conclusive. With a few notable exceptions it relies on examinations of selected cases whose representativeness may be questioned. The following analysis tries to make a more systematic evaluation. It focuses on a government area which has received little attention in Scandinavia and elsewhere, namely the local road sector which is ideally suited for this kind of analysis (an argument to be developed below). The analysis confirms the international evidence: Involving the private sector does indeed seem to make it possible for the public sector to obtain large cost savings. The data do not make it possible to identify the precise reasons for enhanced performance when the private sector is involved, but some thoughts on the relative importance of ownership and competition will be offered in the concluding section.

## 2. Private involvement in public road maintenance in Denmark

Denmark has approximately 71,500 km public roads. According to the Danish public road act (LBK 671) the political responsibility is divided among the three tiers in the Danish public sector. The central government is responsible for 1,600 km national roads (primarily motorways). The counties are responsible for 10,000 km regional roads, and the municipalities are responsible for 59,900 km local roads (Vejdirektoratet, 1999). The main principle of the public road act is that the central government, the counties and the municipalities exercise their political responsibility independently of each other. The public road owners decide themselves the extent and quality of their roads, and the central government has no legal role as a supervising authority. Independence is also the main principle in financial matters. The central government, the counties and the municipalities are financially responsible only for their own roads and finance these by own taxation. The central government does not allocate any grants for counties or municipalities in the road area. In sum, the road area is characterized by considerable autonomy at each of the three levels in the Danish public sector.

The analysis focuses on the municipalities in order to make it possible to compare a large number of relatively similar entities. Further, the analysis focuses on road *maintenance*, not road *construction*. The reason is that road construction is almost fully contracted out to private companies, whereas private involvement in road maintenance varies considerably across municipalities. Road maintenance is thus better suited for comparative analysis.

In theory, road maintenance has a great potential for involving the private sector. Municipal road maintenance as a public service primarily consists of maintaining the asphalt surfaces of local roads (but other services such as snow clearing during the Winter and maintenance of pavements, cycle paths, signs, traffic lights and road shoulders are also included). All of these services are amenable to standardized specification, and thus for involving the private sector.

In practice, the potential – in a Danish context – is less obvious. The asphalt industry in Denmark is notorious for its cartel-like conditions. Due to large transportation costs, asphalt needs to be produced not too far from where it is used. This means that production must take place within Denmark (or northern Germany which, however, is an untried option). Nine companies produce asphalt in Denmark. Six of these companies are involved in various cooperative arrangements. The four largest companies produce 75 per cent of all asphalt. Laying out asphalt on roads is done by twenty private companies, but 80–90 per cent is done by the production companies themselves. The Danish Competition Authority characterizes competition in the asphalt

industry as “very weak” and finds that “tacit collusion” takes place among the asphalt companies (Konkurrencestyrelsen, 1999: 3–4; see also Dahl and Petersen, 1993).

These market conditions mean that prices are probably higher than they would be under full competition. Cost savings from involving private companies in municipal service do thus probably not show their full potential in the road sector. However, the market conditions in the asphalt industry probably have a larger impact on expenditure on road construction than road maintenance because maintaining roads involves more than asphalt work (cf. above). But they probably still have a moderating influence. This fact makes the following analysis a conservative one. Cost savings from involving the private sector in the road area are less plausible than in areas where more competitive conditions are found. If cost savings – despite this fact – can still be found in the road area, this would be powerful evidence in favour of involving the private sector more generally in public service production.

The extent to which municipalities involve the private sector in road maintenance has been surveyed by the Danish National Competition Authority. Table 1 shows how many municipalities treat the laying out of asphalt as in-house operations, i.e. do this by use of municipal personnel and equipment. Table 1 shows that road *construction* is almost fully entrusted to the private sector. In contrast, road *maintenance* is done as in-house operations in almost all municipalities, at least to some extent. As the Competition Authority dryly notes: “It may be questioned how rational for society it is that the public sector treats these tasks as in-house operations at the municipal level” (Konkurrencestyrelsen, 1999: 47).

The Danish Competition Authority’s survey shows that while almost all municipalities do some kind of asphalt work as in-house operations (cf. Table 1), all municipalities also let external entrepreneurs do at least some parts of their asphalt work. The external entrepreneurs are almost always chosen after some kind of tendering process (Konkurrencestyrelsen, 1999: 43–49). These data thus show that all municipalities have some experience in involving the private sector in the road area.

### 3. Empirical analysis

In this section I analyze whether involving the private sector in local road maintenance leads to cost savings. With five exceptions, all the Danish 275 municipalities are included in the analysis.<sup>1</sup> Costs are measured as expenditure on road maintenance per meter road. Expenditure is measured in gross terms (corresponding to categories 1–3 in Table 2 below) and includes all types of local current road expenditure.<sup>2</sup> In 1999 municipal road expenditure varied

Table 1. Asphalt work done in-house by Danish municipalities, 1999

Type of asphalt work	Number of municipalities which do in-house asphalt work	Per cent
Construction of new roads	24	9
Reconstruction of strengthening courses on existing roads	30	11
Reconstruction of wearing courses on existing roads	23	9
Surface treatment	4	1
Minor types of renovation	161	61
Patch work	234	89

*Note.* The table includes the 264 municipalities (out of the total of 275) which answered the Competition Authority's questionnaire.

Source: Konkurrencestyrelsen (1999).

Table 2. Types of transaction in Danish municipal road accounts

	Road maintenance Municipal 1999-account (mill. DKK)
1. Wages to municipal personnel	1,559
2. Purchase of goods	1,068
3. Purchase of external services	1,336
– of which: <i>Entrepreneurial services</i>	915
– of which: <i>Other external services</i>	377
4. Road-specific income	–540
Sum	3,423

Source. Statistics Denmark

from DKK 17 to DKK 435 per meter and had an average level of DKK 73 per meter.

Private involvement is measured as the amounts spent on *external services* in local accounts. This is a measure which allows systematic comparisons in space and time. Municipalities use a uniform account system specified by the Ministry of the Interior according to which both current and capital expenditure must be registered according to type of transaction (Ministry of the Interior, 2000). This system makes possible a detailed break-down of

municipal expenditures. Table 2 shows the types of transaction which are used in the road sector and the municipal amounts spent in 1999.

In local accounts, external services are subdivided into two main categories, cf. Table 2: Entrepreneurial services and “other” external services. These two categories constitute the most precise registration of the amounts, municipalities spend on services from the private sector. Entrepreneurial services include all municipal expenditure on repair and maintenance which is not done by municipal personnel. “Other” external services include expenditure on all other types of services not done by municipal personnel such as auditing and transportation (Ministry of the Interior, 2000). Taken together, entrepreneurial services and “other” external services comprise all municipal expenditure spent on services delivered by external actors. Within Danish social science and public administration they are widely used as a measure of private involvement in municipal activities (see e.g. Christensen and Pallesen, 2001; Christiansen, 1998; Ministry of Finance, 1991; Ministry of Finance and Ministry of the Interior, 1995; Ministry of the Interior, 1994; PLS-consult, 1997).<sup>3</sup>

However, it should be kept in mind that purchase of external services is not a measure of privatization or contracting out. It simply measures the extent to which external services have been purchased – whether or not this is the result of a privatization process, because municipal services have been contracted out, or because private solutions are preferred out of habit. Cost savings should be easier to obtain by inviting tenders before purchasing services from private companies. But the data do not make it possible to focus on these cases. All purchases from external actors are included. This fact also makes the following test a conservative one. If it is possible to obtain cost savings by use of external services, it is a powerful argument in favor of using the private sector for public service provision. The cost savings should be even larger if only instances of purchases after a tendering process were included in the analysis.

Private involvement in road maintenance varies considerably across municipalities. Table 3 shows the variation in 1999. On average private sector involvement equals 33 per cent, but there is considerable variation around this average. There is also variation across time although the individual years are correlated. Table 4 shows a correlation matrix for the period 1987–1999. In the following analysis both the spatial and the temporal variation will be utilized to investigate the effect of involving the private sector.

The analysis includes a number of control variables:



Table 3. Private involvement in municipal road maintenance in 1999

	Entrepreneurial services and "other" external services as percentage of all municipal expenditure on road maintenance
Mean value	33
Standard deviation	12
Minimum value	.37
Maximum value	80
N	270

Source. Statistics Denmark

Table 4. Correlation matrix of private involvement in road maintenance 1987–1999 (Pearson's R)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1987	1												
1988	.766	1											
1989	.715	.717	1										
1990	.653	.688	.765	1									
1991	.611	.640	.701	.786	1								
1992	.584	.593	.658	.745	.817	1							
1993	.550	.550	.624	.685	.775	.789	1						
1994	.583	.569	.613	.654	.709	.745	.803	1					
1995	.573	.542	.618	.626	.707	.730	.807	.841	1				
1996	.556	.529	.611	.621	.690	.741	.782	.795	.866	1			
1997	.470	.488	.556	.556	.542	.574	.609	.742	.672	.655	1		
1998	.492	.474	.559	.563	.596	.642	.724	.747	.780	.831	.737	1	
1999	.398	.398	.469	.453	.507	.535	.604	.637	.693	.712	.632	.779	1

Source. Statistics Denmark

- *Commuters*: The number of commuters indicates the wear and tear of roads. Prior research has already shown this to be related to road expenditure in Denmark (Houlberg, 1999: 19). In a UK setting, Nicholson and Topham (1975) have used bus and train trips with similar results.
- *Road-specific income*: The dependent variable is measured in gross terms. Since municipalities often maintain private roads or central gov-

ernment roads for payment, road-specific income is included to control for these activities.

- *Length of roads*: When the dependent variable is expenditure per meter road, the length of roads measures economies of scale. Prior Danish research has already shown this to be the case in the road sector (Mouritzen, 1991: 111; Ministry of the Interior, 1998: 195). Therefore, a negative relationship is expected.
- *Economic resources*: Prior research has already established that rich municipalities spend more on roads than poor municipalities (Ministry of the Interior, 1984: 89; Mouritzen, 1991: 111; Nicholson and Topham, 1975; Hoggart, 1984).
- *Urbanization*: A high degree of urbanization indicates the need for and the usage of roads. Nicholson and Topham (1975) and Hoggart (1984) measure the same phenomenon by use of congestion variables.
- *Partypolitics*. Prior Danish research has not been able to find any relationship between road expenditure and local politics (Mouritzen, 1991: 111). In the UK, Nicholson and Topham (1975: 21) also found political variables insignificant. In contrast, Sharpe and Newton (1984: 180–196) found that Labour control exerts a significant, negative effect on local road expenditure. These studies all test for additive party effects. Hoggart (1984) argues that political factors should have mediative rather than additive effects, but finds little evidence of either in the road area. Boyne (1996: 130–31; 143–145) argues that although theoretically more convincing mediative party effects generally find weaker empirical support than additive effects in local government studies. In a Danish setting the same argument is made by Mouritzen (1991: 97). Against this background I will include party politics as an additive control variable and expect socialist municipalities to spend less on roads than bourgeois ones.

Since changes in the explanatory variables cannot be expected to have an instantaneous effect, the models to be analyzed have a lag of one year between the explanatory variables and the response variable. This also ensures that causation runs in only one direction in the analyses. The only exception to this approach is road-specific income where a quick relationship is expected since this variable measures payment for work done for other public or private road owners.

The spatial dimension of private involvement is analyzed in Table 5 which shows the result of annual cross-sectional analyses in the period 1988–1999 (the period for which data is available).

Table 5. Annual cross-sectional analyses of the impact of private involvement on road expenditure – 1988–1999

Year	Involve- ment of private sector	Control variables:						Intercept	R <sup>2</sup> (adj.)	F	N
		Commuters	Road- specific income	Length of roads	Economic resources	Urban- ization	Party politics				
1999	-.506***	.945***	.141***	-2.107***	.539***	.060***	-9.363**	3.7	.78	139.0***	270
1998	-.286**	1.054***	.140***	-1.952***	.986***	.055***	-9.712**	-64.9**	.80	157.4***	270
1997	-.475***	.922***	.132***	-1.684***	.975***	.054***	-7.286**	-53.9**	.81	168.4***	270
1996	-.442***	.962***	.144***	-2.074***	.918***	.054***	-9.817***	-34.5	.81	169.0***	270
1995	-.534***	.932***	.132***	-1.886***	.891***	.054***	-9.290**	-32.6	.80	158.0***	270
1994	-.324**	.924***	.167***	-1.826***	.803***	.054***	-7.476*	-30.0	.80	150.6***	270
1993	-.281*	1.082***	.156***	-1.479***	.806***	.053***	.004	-49.9**	.80	155.4***	270
1992	-.459***	.828***	.101***	-1.547***	.970***	.055***	.334	-48.0***	.82	175.5***	270
1991	-.345**	.908***	.112***	-1.680***	.839***	.059***	.545	-35.7*	.81	164.1***	270
1990	-.411**	.629***	.008***	-1.507***	.708***	.093***	-.985	-13.0	.82	172.3***	270
1989	-.503***	.190*	.009***	-1.714***	.726***	.109***	-2.084	7.6	.83	184.1***	270
1988	-.618***	.604***	.116***	-1.386***	.902***	.100***	-2.922	-24.2	.84	203.4***	270
Pooled <sup>1</sup>	-.111***	.152***	.028***	-.194***	.162***	.004	-.715	-11.3***	.96	–	3,240

\*\*\*  $p < .01$ ; \*\*  $p < .05$ ; \*  $p < .10$

Dependent variable: Municipal gross expenditure on roads in DKK per meter road. Entries in the table are unstandardized regression coefficients (ordinary least squares). All monetary variables are measured in constant 1999-kroners so coefficients are comparable across years. See technical appendix for specification of variables.

<sup>1</sup>The pooled regression includes a lagged dependent variable (not shown) as an extra control variable to correct for autocorrelation (Durbin-Watson: 2.038). Significance levels are calculated from panel corrected standard errors.

Table 5 shows that there is indeed a negative relationship between private involvement in road maintenance and expenditures on road maintenance. This relationship is found in all years and it is statistically significant in all years at the 10 pct. level or better. The coefficient for private involvement in Table 5 varies across years. In the pooled regression the coefficient is  $-.111$ . This result indicates that an increase of, say, ten percentage points in private involvement on average leads to a cost reduction of DKK 1.11 per meter road. This is equivalent to a reduction of 2 per cent of the average road expenditure level of DKK 73 per meter road. In other words, the potential savings from involving the private sector are substantial. The control variables generally show the expected relationship to road expenditure. The two variables measuring expenditure need (number of commuters and the degree of urbanization) are positively related to road expenditure. Road-specific income is also positively related to road expenditure. This is as expected since road-specific income is typically payment for maintenance of private roads or central government roads. The length of roads is negatively related to road expenditure which confirms that economies of scale exist in the road sector. The effect of party politics is not stable across time. In the first part of the period it is not significantly related to road expenditure, but in the latter part a significant, negative relationship occurs. This means that socialist municipalities, as expected, tend to spend *less* on roads than bourgeois ones.

The temporal dimension of private involvement in municipal road maintenance is analyzed in Table 6 which shows the result of a pooled regression analysis of *changes* in the variables from Table 5 (first order differences). The question here is: Does a change in the level of private involvement lead to a reduction in road expenditure levels? The analysis has the same lag structure as in Table 5, i.e. there is a lag of one year between the explanatory variables (except road income) and the response variable.

Table 6 shows that there is also a statistically significant negative relationship between private involvement in road maintenance and expenditures on road maintenance when the relationship is measured across time. The coefficient is of the same magnitude as in Table 5.

The control variables in Table 6 are generally not as powerful predictors as in Table 5. The variables which do not end up significant are almost time-invariant: Length of roads and urbanization show almost no variation across time in the period under investigation. Party politics is measured as change to either bourgeois or socialist mayor (no change is used as reference category). Such changes have only happened in 158 of the almost 3,000 cases. It is hardly surprising that time-invariant variables cannot contribute to an explanation of variation across time. The rest of the control variables show some variation across time and all end up significant with the expected signs.

Table 6. Pooled regression analysis of the impact of 1 year changes (first order differences) in private involvement on changes in road expenditure 1988–1999

	Model 1	Model 2
Change in involvement of private sector:	-.160***	-.158***
<i>Control variables:</i>		
Change in commuters	.444***	.441***
Change in road-specific income	.054***	.054***
Change in length of roads	-.394	
Change in economic resources	.094***	.094***
Change in urbanization	.002	
Change in party politics (to bourgeois mayor)	1.102	
Change in party politics (to socialist mayor)	.339	
Intercept	-.8***	-.7***
R <sup>2</sup> (adj.)	.10	.10
F	39.9***	79.6***
Durbin-Watson	2.191	2.189
N	2,970	2,970

\*\*\*  $p < .01$ ; \*\*  $p < .05$ ; \*  $p < .10$

Dependent variable: Change in municipal gross expenditure on roads in DKK per meter road. Entries in the table are unstandardized regression coefficients (ordinary least squares). In model 2 all insignificant control variables have been dropped one by one until only significant ones remain. See technical appendix for specification of variables.

#### 4. What about quality?

So far the analyses have demonstrated that private involvement in municipal road maintenance is associated with lower road expenditure. However, it is still unresolved whether reduced expenditure levels are due to higher efficiency or lower quality standards. Real cost savings only occur in the former case. If municipalities use the opportunity to cut service standards when the private sector is involved, savings are not due to higher efficiency in the private sector but simply to a lower quality of service being produced. It seems imperative to somehow hold quality levels constant when investigating the effects of involving the private sector.

Unfortunately, it is not possible to make a systematic analysis of this question on the scale of Tables 5 and 6. However, a test on a minor scale can be performed. Starting in 1998 the Danish national government's Road Directorate began to collect data on the quality of municipal roads in

collaboration with the association of municipal technical managers. The data are summarized in a quality index which measures the extent to which the following types of defects are found in local roads:

- cracks in road edge
- cracks in road surface
- crackles
- potholes
- subsidings
- patches

The index varies from 0 (critical quality) to 10 (perfect quality) (Kommunalteknisk Chefforening and Vejdirektoratet, 1999). In 1998, when the data collection started, 21 municipalities volunteered to participate. In 1999, the number rose to 53 of which 43 contributed enough data to create the quality index (Kommunalteknisk Chefforening and Vejdirektoratet, 2000).<sup>4</sup>

It is possible to rerun the regression model from Table 5 on this subset of municipalities in 1999 and include the quality index as an extra control variable. In this way it should be possible to see whether the relationship between private involvement and reduced road expenditure is really spurious, i.e. caused by a reduction of quality standards. The subset of municipalities does not constitute a random sample of the population of 273 municipalities. But it does not deviate too much from the population in terms of the variables included in the regression model in Tables 5 and 6, cf. Table 7.

Table 8 shows the result of the regression analysis of the subset of 42 municipalities in 1999. The analysis uses the same lag structure as in Tables 5 and 6. Compared to the 1999-analysis in Table 5 and to the column in Table 8 without the quality variable (model 1), the most important result is that involvement of the private sector is still negatively and significantly related to road expenditure. The hypothesis that involvement of the private sector leads to real cost savings thus survives the control for quality standards. Table 8 further shows that quality is significantly related to expenditure levels. Quality costs! Increasing quality by one unit on the quality index ranging from 0–10 costs DKK 10.5 per meter road. The control variables all keep their signs in Table 8, although some of them are not statistically significant in this subset.

*Table 7.* Mean values on variables used in regression models: Population vs. subset of 42 municipalities

	Mean value in population 270 municipalities (1999)	Mean value in 42 municipalities for which road quality index is available (1999)
Expenditure on road maintenance	73	72
Private involvement in road maintenance	33	33
Commuters	41	39
Road-specific income	76	83
Length of roads	19	17
Economic resources	129	129
Urbanization	194	215
Party politics	.4	.5

*Note.* See technical appendix for specification of variables.

## 5. Conclusion and some further thoughts

The analysis in this paper demonstrates that involving the private sector in Danish public road maintenance leads to cost savings without loss of quality. However, while the data allow this fact to be stated with some certainty, they do not make it possible to identify the precise reasons why this is so.

As noted in the introduction, the literature suggests that involving the private sector in public service production may lead to cost savings because of the difference in ownership and/or a difference in competitive pressures. If the ownership argument is correct, private involvement in road maintenance leads to cost savings because inefficient (public) road maintenance is replaced by efficient (private) road maintenance. If the competition argument is correct, the causal logic is different. Cost savings may be obtained because a (public) monopoly is replaced by (private) companies operating under competitive pressures. In this case, the arguments boil down to the same implication: Private production is efficient whereas public production is inefficient. But, according to the competition argument, cost savings may also be obtained by subjecting the public sector to competitive pressures, i.e. the public sector may be expected to produce efficiently if incentives are correctly manipulated. One method may be competitive tendering. As the threat of being contracted out gains in credibility, public agencies may start producing efficiently.

Table 8. Regression analysis of municipal road expenditure per meter road in 1999 (control for quality)

	Model 1: Full model without control	Model 2: Full model with control	Model 3: Reduced model with control
	for quality	for quality	for quality
Involvement of private sector:	-.833**	-.922***	-.856***
<i>Control variables:</i>			
Commuters	.967*	1.125**	1.515***
Road-specific income	.063	.039	
Length of roads	-2.745***	-2.588***	-2.818***
Economic resources	.606	.861*	.994**
Urbanization	.021	.018	
Party politics	-12.323	-6.877	
Road quality		8.671**	10.474***
Intercept	27.2	-80.1	-120.9*
R <sup>2</sup> (adj.)	.76	.79	.79
F	19.7***	20.1***	31.2***
N	42	42	42

\*\*\*  $p < .01$ ; \*\*  $p < .05$ ; \*  $p < .10$

Dependent variable: Municipal gross expenditure on roads in DKK per meter road. Entries in the table are unstandardized regression coefficients (ordinary least squares). In model 3 all insignificant control variables have been dropped one by one until only significant ones remain. See technical appendix for specification of variables.

Two detailed Danish case studies of competitive tendering in the road maintenance area may shed some light on the relative merits of the ownership and competition arguments in the road area. The first case study examines the effects of contracting out the maintenance of regional roads in the county of Ringkøbing in Western Denmark in 1994 (PLS-consult, 1997b: 259–282). After a tendering process the complete maintenance of all regional roads were transferred from the county to a private company which took over the 30 county employees working with road maintenance. This resulted in annual savings for the county of DKK 800,000 (equal to 2.5 per cent of the county's road maintenance budget) without any apparent loss of quality. The main reason for enhanced performance seemed to be a more efficient utilization of the labour force. Road maintenance is highly seasonal with work loads increasing in the Winter due to snow clearing. The private company was better



able to make sensible use of the employees in the Summer time due to the multifaceted nature of the company's undertakings. This case thus suggests that *ownership* matters.

The second case study examines the effects of inviting tenders for the maintenance of regional roads in the county of Nordjylland in Northern Denmark in 1994 (PLS-consult, 1997b: 283–296). In this case the county invited tenders for seven different tasks within the road maintenance area: Maintenance of bridges, maintenance of road shoulders, snow clearing, maintenance of white linings on roadways, maintenance of road signs, maintenance of trees and bushes, and the supply of road salt in the Winter. Four of these tasks were contracted out while three were won by the county's own road division. The case study finds that efficiency in the county's own road division increased after the contracting out of the four tasks. In other words, this case study suggests that when tenders are invited for road tasks and when the private sector is let in in some areas, this may force down costs in the areas remaining under public responsibility. This case thus suggests that *competition* matters. In sum, although more research is clearly needed to settle this question, the above evidence suggests that the reason for increased performance when the private sector is involved in public road maintenance may be due to a combination of ownership and competition factors. Both of the above situations are compatible with the empirical patterns uncovered in this paper.

What are the broader lessons of this paper? It should be kept in mind that the paper's analyses of the impact of involving the private sector are conservative. First, the market conditions in the Danish asphalt industry are far from competitive. Second, the empirical indicator for private involvement used in the paper is not a measure of privatization or contracting out. It simply measures the extent to which external services have been purchased – whether or not this is the result of a privatization process, because municipal services have been contracted out, or because private solutions are preferred out of habit. Cost savings should be easier to obtain by inviting tenders before purchasing services from private companies. But the data did not make it possible to focus on these cases. All purchases from external actors are included. The cost savings should be even larger if only instances of purchases after a tendering process were included in the analysis.

There thus seems to be an argument for involving the private sector more systematically in public service production, also in the Scandinavian welfare states. Cost consciousness is, of course, not the only value to be pursued by public authorities. But the burden of proof should lie with those who want to sacrifice cost considerations. What is to be gained by keeping technical tasks such as road maintenance within the realm of the public sector? Phrasing the question this way also indicates the limits of the argument. It should not be

taken too far. Public services in the road area are technical and amenable to standardized specification and thus for involving the private sector. These basic conditions are less clearly met in many other areas, particularly the core welfare areas of social security, education and health care. In these areas the case for involving the private sector may be less obvious.

## Notes

1. The two metropolitan municipalities of Copenhagen and Frederiksberg are not included because, as the only municipalities in the country, they have both municipal and county responsibilities in the road area. Three municipalities (Albertslund, Lyngby-Tårnby, Tårnby) are excluded from the analysis because they end up as extreme (positive) outliers in all models. A closer inspection of these municipalities reveals that in the case of Albertslund and Lyngby-Tårnby the extreme values are caused by a very long network of cycling and walking paths the maintenance of which is registered as road expenditure. Once a control for these path systems is made, these two municipalities take on normal values. However the data needed for this control are only available for a subset of the municipalities (Kommunalteknisk Chefforening, 1. kreds 1998). In the case of Tårnby, the extreme values are caused by a long network of private roads which – in contrast to other municipalities – are partially maintained by the municipality at no cost to the private road owners.
2. Local road expenditure comprises the so-called main account no. 2 in the municipal account system. Being the most aggregate measure of road expenditure this definition is robust to account changes in the 12 year period covered by the analysis.
3. Entrepreneurial services and “other” external services are not a perfect measure of involvement of the private sector since external actors also comprise some public sector agencies such as public utilities. This fact should be kept in mind when evaluating absolute levels of private involvement. For analyses of differences in levels among municipalities and changes in levels across time it is of minor importance.
4. The 43 municipalities include Lyngby-Tårnby which is excluded from the analysis, cf. note 1. So only 42 municipalities are included in the quality control test.

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### **Technical appendix: Specification of variables in regression analyses in Tables 5, 6 and 8**

*Municipal road expenditure per meter road* (dependent variable): Main account 2, transaction type 1–4 in municipal budget and account system. Sub-transaction type 4.7 excluded to avoid double-counting due to inter-municipal payments. Measured in DKK per meter road. Source: Statistics Denmark.

*Involvement of private sector*: External services as percentage of gross road expenditure. See Table 3 in text (and the associated text).

*Commuters*: Measured as percentage of population. Source: Statistics Denmark.

*Road-specific income*: Income on main account 2 in municipal budget and account system. Measured in DKK per inhabitant. Source: Statistics Denmark.

*Length of roads*: Measured in meter per inhabitant. Source: Vejdirektoratet (1999).

*Economic resources*: Net revenue in thousand DKK per inhabitant from all types of general income sources (interest, loans, block grants, equalization, personal income tax, corporate income tax, property tax) divided by the personal income tax rate. Source: Statistics Denmark.

*Urbanization*: Measured as inhabitants pr. square kilometer. Source: Statistics Denmark.

*Party politics*: Dummy-variable (0 = bourgeois mayor; 1 = socialist mayor). Source: *Kommunal Aarbog* (var. years).

*Road quality*: Index ranging from 0–10 measuring the quality of roads. See text in relation to Tables 6 and 7. Source: Kommunalteknisk Chefforening and Vejdirektoratet (2000).