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Public versus private economic activity: A new look at school bus transportation

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Introduction

School bus transportation in the United States is a service provided with buses which are owned and operated either by school districts or by private contractors. During the 1979–80 school year, for example, there were approximately 230,000 buses owned and operated by school districts, while about 100,000 buses were owned and operated by private contractors. In all but three states, moreover, some use was made of private contractors.[1]

Despite the large literature in recent years comparing the performance of not-for-profit (public) economic activity with that of for-profit (private) activity, school bus transportation has received little attention.[2] That school bus transportation has not received serious attention is curious, because the conditions under which it is produced are conducive to a good test of the public-versus-private question. Where private contracting exists, the capital cost for market entry is low, typically being limited to the price of a new or used bus. Competition among contractors is open because the assignment of bus routes is typically based on competitive bids. Finally, the regulatory burden is not stringent – the usual case being that buses must meet standard safety requirements and drivers must possess a chauffeur's license and pass a physical examination. This overall simplicity of the production setting means that measured cost differences between public and private bus operation are more likely to be due to the ownership factor than would be the case where different forms of ownership exist in an industry in which other complicating factors affect economic performance.

To our knowledge, the only investigation of school bus transportation along public-versus-private lines in the scholarly literature is an article in this journal by Dale Bails (1979). Bails compared 1976–77 transportation costs (at the county level) in three states he termed public ownership states with the corresponding costs in three other states he termed private owner-

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ship states. While Bails' results support the principle conclusion of the literature that private sector performance tends to exceed that of the public sector, several problems exist with Bails' interstate comparison. First, none of Bails' six states is 'pure' when it comes to public and private ownership – that is, public ownership of buses exists in a *varying* degree in the three states he terms 'private' just as private ownership exists in a *varying* degree in the three states he terms 'public'.[3] Despite this difficulty, Bails' statistical procedure treats costs in the six states as being either *all* public or *all* private based on his prior classification of the states. Whatever the exigencies necessitating such a procedure, they prejudice the results. Second, it is well known that public accounting and regulatory practices differ across states, just as climatic and topographical conditions vary among states. These latter differences introduce extraneous elements into an interstate comparison like that of Bails, elements which Bails does not correct for in his study. The problems with Bails' study together with the lack of attention by other scholars to school bus transportation, despite the fact that the underlying production conditions fit the purposes of public-versus-private study, argue for further investigation of the industry along public-versus-private lines.

Accordingly, this paper examines the effect which the two forms of bus ownership have on school transportation costs, utilizing the experience of Indiana school districts during the 1979–80 school year.[4] Restricting the investigation to a single state like Indiana results in uniformity as far as public accounting procedures, regulatory requirements, and climatic conditions are concerned. With the level of aggregation being the individual school district, this uniformity is achieved without sacrificing the advantages associated with a large sample size – our sample includes almost 300 districts.[5] Moreover, district cost data in Indiana distinguish between costs associated with contractor-owned buses and costs associated with district-owned buses. Contrary to Bails' study, therefore, contractor costs need not be incorrectly ascribed to district-owned buses and vice versa.

The quality of the data base for school transportation in Indiana also enables us to overcome problems that have heretofore plagued other public-versus-private cost comparisons. Bennett and Johnson (1979, 1980), for example, have noted that public accounting procedures are deficient when it comes to incorporating the concept of opportunity cost. Costs which obviously affect the supply price for private economic activity are not included as costs of public activity. This introduces a bias into a straightforward cost comparison. Public accountants in Indiana are no different in this respect. With Indiana school transportation, however, the detailed nature of the information school districts are required to report enables us to overcome some of the conceptual flaws in the data. For example, the model year and seating capacity of all school buses are reported,

from which the forgone interest income on the resale value of district-owned buses and the *economic* depreciation to these buses can be estimated. Adjustments such as these enhance the economic reality of a cost comparison.

Because school bus transportation in Indiana is funded and provided at the local school district level, this public/private investigation represents a case where an important degree of competitive pressure exists on public ownership. Should any school district inefficiently provide transportation, that district's residents have the option of moving to another district. This introduces an element of market pressure on district-owned systems, pressure which would be less strong were transportation funded and provided by a higher level of government. Indiana's school transportation system corresponds, therefore, to Niskanen's (1968, 1971) suggestion that some of the advantages frequently associated with private provision of goods and services can be obtained by increasing the degree of competition either between or within governmental units. This competition can be fostered, argues Niskanen, by increasing the number of governmental units and by allowing these units to produce products currently produced by other governmental units. In addition, one would expect that where private provision coexists with government provision (as is the case with Indiana school transportation), further competitive pressures on public decision makers would be present. To the extent this competition exists, it should lessen any cost advantage associated with private ownership. Indeed, a recent article by Caves and Christensen (1980) contends that public ownership is not inherently more costly than private ownership. According to Caves and Christensen, the frequently observed cost inefficiency associated with public ownership is the result of a lack of competition, not public ownership per se. Caves and Christensen examine recent experience of the two Canadian railroads – one publicly owned and the other privately owned – and present results that support their argument. The competition that exists in Indiana makes its school transportation a good example by which additional evidence can be brought to bear on this issue of public-versus-private cost differences in a competitive setting.

Indiana school bus transportation – institutions and data

Local school districts in Indiana have the option of providing school bus transportation with buses which are owned by the district and driven by district employees or with buses which are owned and operated by private contractors. Both ownership arrangements are used in the state; in fact, some districts utilize the two arrangements simultaneously. Where contracting exists, the assignment of bus routes is on a competitive-bid basis.[6]

During the 1979–80 academic year, 305 Indiana districts transported students. The sample size for this investigation, however, is 275. The exclusion of 30 districts was the result of: (1) one district – Indianapolis – was preparing for court ordered busing for desegregation purposes, (2) seven districts did not report information on their bus routes, and (3) twenty-two districts used buses for which ownership of the chassis and body was split between the district and a private contractor – that is, the district owned the body and a contractor owned the chassis or vice versa. The latter 22 districts were not included, because we knew of no way to separate transportation costs between body and chassis. Of the 275 districts involved in the investigation, 144 provided transportation solely with district-owned buses; 49 districts utilized private contractors exclusively; and 82 districts utilized both district-owned and contractor-owned buses.

All rules and standards, as well as the detailed financial and bus route information which school districts are required to report each year, are a matter of public record. Transportation expenditures are reported by school districts under nine budget lines. These budget lines record all expenditures in the following areas: Service Area Direction, Vehicle Operation, Monitoring Services, Vehicle Servicing and Maintenance, Purchase of School Buses, Insurance on Buses, Insurance on Pupils, Contracted Transportation Services, and Other Pupil Transportation Services. The expenditures recorded for each of the nine budget areas include everything from salaries and supplies to purchased services used in that area. The detail of these records is such that even the time spent administering, managing, and supervising the operation of district-owned systems is included as a salary cost under its own budget line – namely, Service Area Direction. The reader will note that what appear to be commonly ignored costs in most public-versus-private studies are included in our cost estimates for district-owned buses. It also should be noted that the costs of operating privately owned buses are contained under their own budget line – namely, Contracted Transportation Services.[7] The bus-route data include, inter alia, the ownership status of the bus assigned to each of the district's routes, the seating capacity and model year of each bus, the length of each route, and the number of students transported on each route.[8]

The degree of homogeneity among Indiana school districts favors a comparison of costs based on the ownership factor. As noted above, the regulations applicable to buses and their drivers are uniform for all districts and are independent of ownership status of the bus. The accounting procedures for reporting both transportation expenditures and bus-route data are the same for all districts. The topography and weather conditions of Indiana are similar throughout the state. Additionally, there is no striking rural/urban dichotomy in the state with the exception of Indianapolis, which, as earlier noted, is not included in the study for other reasons.

Adjustments to the data

The model year and capacity data for buses are useful for cost calculations, because these data make it possible to include opportunity cost elements in the cost estimates of public ownership. An estimate of the forgone interest income associated with district ownership is computed from the resale value of district-owned buses.[9] Such forgone interest income is properly a part of the cost of public provision of transportation, even though official public accounting procedures do not include it as a cost. Of course, the expenses of purchasing new school buses, if any, in the 1979–80 school year are excluded from our cost estimates for district-owned bus systems. The correct cost figure is the cost of the capital for the one year only – forgone interest income. Forgone interest income on the resale value of contractor-owned buses is an implicit cost which is reflected in contractor bid prices. The market value of the district-owned bus stock in our sample was estimated at approximately $37,000,000. At an interest rate of 10%, inclusion of the estimated forgone interest income (3.7 million dollars) increases the estimated total costs of district ownership by 6.1%.

Because economic depreciation represents the decline in an asset's market value, economic depreciation to each district-owned bus was calculated by comparing its 1979–80 resale value with the 1979–80 resale value of a bus which is one year older. Although official financial data include a depreciation estimate for district-owned buses, it is a 10-year, straightline calculation based on purchase price. In calculating the costs of public ownership, our estimates of economic depreciation were substituted for official figures. The estimated economic depreciation is approximately 2.5 million dollars greater than the state's accounting depreciation – 8.42 million as compared to 5.97 million dollars. Substituting economic depreciation for the state's depreciation figure increases the total estimated cost of district ownership by 3.9%.

Neither private contractors nor school districts are required to pay either state or local excise (property) taxes on their school buses (Indiana Code, b). Hence, no adjustment in public ownership costs to include an estimate of forgone tax revenue implicit in public ownership is necessary. District-owned buses are exempt from an annual vehicle registration fee; however, contractor-owned buses are *not* exempt (Indiana Code, b). The fee is $20.25 per bus. Forgone registration fees implicit in district ownership amount to $106,118, inclusion of which increases the total estimated cost of district ownership by about .2%.

Finally, there is an additional opportunity cost element which should be included in the cost figures for public ownership – but we do not have the appropriate data for its inclusion. The buses must be stored when not in use. Because a private firm would have a vacant lot for this purpose and

a school district using district-owned buses would no doubt use school property, the forgone rental value of the school property should be included in the cost figures for public ownership. No records of the amount of public land used for storing school buses by each school district, however, are available. Nevertheless, given what we know about the size of school buses and the value of land in the state of Indiana, we suspect that inclusion of this forgone rental value would increase the total estimated cost of district ownership by a fairly small amount. Its *exclusion* from our cost figures, therefore, should have a trivial impact on our results.

Measurement of transportation services

Besides developing an accurate estimate of costs, one must also determine what measure of output will be used. One common measure of output for transportation services is the concept of a trip (Harrison, 1974). With respect to school bus transportation, a bus trip would be one bus traveling from the first morning pick-up point, continuing through the entire route to school, starting at school in the afternoon, and continuing through the entire route until the last student has disembarked. In other words, the service being provided is transportation of a busload of students from home, to school, and back home at the end of the day.

The average length of a trip obviously varies among districts, just as each district's figure for students transported per trip varies among districts. To capture these aspects of output, the trip can be standardized in terms of length and number of students transported. To this end, we computed the average trip length for each school district in the sample. The school districts were then grouped into five different trip length categories based on the frequency distribution of average trip lengths. Each trip group contains, therefore, only school districts with similar average trip lengths.[10] The average number of students transported per trip within each trip group also was calculated for the purpose of further comparison.

Given these dimensions of output, this paper offers four estimates of cost – annual cost per trip, annual cost per mile, annual cost per student, and annual cost per student-mile. (Where a student-mile equals one student traveling one mile.) The four cost estimates are calculated for both the composite of all school districts and each of the five trip groups. For our analysis of the cost differences between public and private operation of school buses, we utilize two of the cost estimates – cost per trip and cost per mile. These two estimates are utilized because, with minor exceptions, the number of students transported per trip is not statistically different between public and private bus systems within the five trip groups. It follows that cost per trip and cost per mile would be accurate indicators of cost

differences when the student dimension of output does not differ by ownership status. Nevertheless, we have included the other two cost estimates in the next section of this paper.

As long as the cost-per-trip comparisons are confined to similar average trip lengths, the output being provided by the two ownership arrangements is reasonably homogeneous. A cost-per-mile comparison within trip groups should be an even more accurate indicator of cost differences because each comparison is in terms of a more standardized unit – a mile. A cost-per-mile comparison across the entire sample loses the homogenizing influence of trip group but does retain the common unit of output.[11]

To determine more accurately the relative cost of public and private bus ownership, it would be desirable to include a quality component in the measure of output. Several things suggest themselves in this case – traffic accidents, bus breakdowns, and punctuality in terms of pick-up and disembarking times. Although the number of traffic accidents involving school buses is published, Indiana law prohibits release of the names of drivers and vehicle owners involved in traffic accidents. Thus, it is not possible to distinguish between contractor-owned and district-owned bus accidents.[12] No official records are kept concerning punctuality or breakdowns. Finally, official records show that district-owned buses were on average one and one-half years newer than contractor-owned buses during the 1979–80 academic year.[13] Although this might support a contention that district-owned buses were providing superior transportation, in all our contacts with bus dealers we were told that for a given model year, contractor-owned buses are usually cleaner and better maintained. Consequently, no quality adjustments are included in our cost comparisons.

Results

The results for the five trip groups are presented in Tables 1–5. Each table presents estimates based on those school districts whose average length of trip is similar. The first two columns in each table present the sample means computed from those school districts that operate only district-owned buses (column 1) and the sample means for those districts that transport their students solely by contracting with private firms (column 2). The third and fourth columns in each table present sample means for school districts that use public and private buses simultaneously. With respect to the third and fourth columns, a given school district may appear in different tables if the public and private portions of its joint system fall in different trip groups. The last two columns present the means of the combined samples – that is, the school districts from columns 1 and 3 are combined to yield column 5 and the school districts from columns 2 and 4 are combined to yield column 6.

Table 1. Annual cost estimates and other characteristics for school districts in first trip group

Variable	Type of system					
	(1) Public only	(2) Private only	(3) Public part of joint system	(4) Private part of joint system	(5) Combined public	(6) Combined private
Mean cost per trip ($)	3839.68	3938.40	4073.96	3213.32[a]	3934.29	3442.29[c]
Mean cost per mile ($)	312.56	318.34	347.47	271.85[b]	326.66	286.53[c]
Mean cost per student ($)	129.25	148.57	130.68	101.14[c]	129.83	116.12
Mean cost per student-mile ($)	.166	.117	.631	.455	.354	.348
Average length of trip (miles)	12.3	13.2	12.1	12.1	12.2	12.4
Average number of students per trip	31.0	28.9	36.3	33.1	33.2	31.8
Number of observations	31	6	21	13	52	19

[a] The difference between the means is significant at the .01 level.
[b] The difference between the means is significant at the .05 level.
[c] The difference between the means is significant at the .10 level.
Source: See text.

Table 2. Annual cost estimates and other characteristics for school districts in second trip group

Variable	Type of system					
	(1) Public only	(2) Private only	(3) Public part of joint system	(4) Private part of joint system	(5) Combined public	(6) Combined private
Mean cost per trip ($)	4980.48	4724.05	5827.74	5090.06	5257.14	4983.31
Mean cost per mile ($)	261.13	255.03	311.57	269.04	277.60	264.95
Mean cost per student ($)	147.41	113.74[a]	152.08	145.37	148.94	136.15
Mean cost per student-mile ($)	.179	.314	.511	.368	.287	.352
Average length of trip (miles)	19.2	18.5	18.9	19.2	19.1	19.0
Average number of students per trip	34.9	44.0[b]	42.0	40.0	37.2	40.9
Number of observations	33	7	16	17	49	24

[a] The difference between the means is significant at the .01 level.
[b] The difference between the means is significant at the .05 level.
Source: See text.

Table 1 contains the estimates for school districts with the shortest average trip. Note that although there are no statistically significant differences between any of the three pairs of samples for length of trip and number of students transported, statistically significant differences in the cost estimates are present. For the cost-per-trip and cost-per-mile estimates, the cost is significantly less for the private portion of joint systems. There are no significant cost differences between exclusively public and private districts. However, when the samples are combined, private ownership is less costly than public ownership.

The estimates for the second trip group are in Table 2. Although all cost-per-trip and cost-per-mile figures are less for private ownership than for public ownership, none of the differences is statistically significant. However, this is one of the few cases where students per trip matters. Note from the ownership categories in columns 1 and 2 that privately owned buses transport significantly more students than district-owned buses. This suggests that, although the cost-per-trip and cost-per-mile estimates are not significantly different, cost savings from private ownership might exist.

Table 3 presents the results for school districts in the third trip group. This sample of 74 school districts shows no statistically significant differences for trip length and students transported, but does show significant cost differences. All cost estimates from the first two rows are less for private ownership than for public ownership, with four of the six differences statistically significant. Of the five trip groups, this group presents the strongest support for lower costs for private ownership.

The results for the fourth trip group presented in Table 4 are somewhat mixed. There are no significant differences among the subsamples as far as length of trip and number of students transported are concerned. The cost estimates upon which this paper focuses contain only two significant differences. The reader will note, however, that these two differences favor private ownership.

The estimates in Table 5 are for school districts with the longest average trip. The cost estimates from the first two rows contain only one statistically significant difference. Table 5 contains the only other cases where students per trip matters. Where private ownership is significantly less costly, it is transporting significantly fewer students. In columns 3 and 4 where there is no significant cost difference, private contractors are transporting significantly more students. These results would have to be viewed as mixed.

In summary, Tables 1 through 5 contain 60 cost comparisons. There are five different trip groups each containing four different cost estimates. The sample of school districts within each trip group is divided into public-versus-private comparisons for two subsamples in addition to a comparison for the entire sample for each trip group. The cost estimates of

Table 3. Annual cost estimates and other characteristics for school districts in third trip group

Variable	Type of system					
	(1) Public only	(2) Private only	(3) Public part of joint system	(4) Private part of joint system	(5) Combined public	(6) Combined private
Mean cost per trip ($)	6615.38	6427.70	6957.10	5680.13[b]	6759.66	6041.02[b]
Mean cost per mile ($)	260.91	247.93	276.95	228.03[b]	267.68	237.64[b]
Mean cost per student ($)	152.31	139.34	152.04	136.82	152.20	138.04[b]
Mean cost per student-mile ($)	.213	.225	.583	.317	.369	.272
Average length of trip (miles)	25.3	25.9	25.1	25.0	25.2	25.4
Average number of students per trip	44.8	48.0	46.3	42.2	45.4	45.0
Number of observations	26	14	19	15	45	29

[b] The difference between the means is significant at the .05 level.
Source: See text.

Table 4. Annual cost estimates and other characteristics for school districts in fourth trip group

Variable	Type of system					
	(1) Public only	(2) Private only	(3) Public part of joint system	(4) Private part of joint system	(5) Combined public	(6) Combined private
Mean cost per trip ($)	7686.54	6444.22[a]	7535.18	8267.92	7640.78	7660.02
Mean cost per mile ($)	237.76	198.18[a]	228.06	243.72	234.83	228.54
Mean cost per student ($)	158.02	158.23	165.45	165.21	160.26	162.88
Mean cost per student-mile ($)	.181	.291[b]	.463	.241[a]	.266	.258
Average length of trip (miles)	32.4	32.9	33.3	34.1	32.7	33.7
Average number of students per trip	49.7	44.7	49.1	50.9	49.5	48.9
Number of observations	30	10	13	20	43	30

[a] The difference between the means is significant at the .01 level.
[b] The difference between the means is significant at the .05 level.
Source: See text.

Table 5. Annual cost estimates and other characteristics for school districts in fifth trip group

Variable	Type of system					
	(1) Public only	(2) Private only	(3) Public part of joint system	(4) Private part of joint system	(5) Combined public	(6) Combined private
Mean cost per trip ($)	10,318.36	9344.11[b]	8802.14	9542.77	9785.63	9460.53
Mean cost per mile ($)	232.09	212.37	191.56	196.09	217.85	202.82
Mean cost per student ($)	180.41	198.81[c]	221.73	186.42	194.93	191.55
Mean cost per student-mile ($)	.264	.392	.682	.255[a]	.411	.312
Average length of trip (miles)	44.9	44.4	48.0	49.8	46.0	47.5
Average number of students per trip	58.2	47.5[a]	40.6	52.9[a]	52.0	50.6
Number of observations	24	12	13	17	37	29

[a] The difference between the means is significant at the .01 level.
[b] The difference between the means is significant at the .05 level.
[c] The difference between the means is significant at the .10 level.
Source: See text.

privately owned bus systems are less than those for publicly owned systems 43 times. The cost differences are statistically significant 16 of the 43 times. For cost per mile, private bus systems are less costly than public bus systems in 12 of 15 comparisons. These differences are statistically significant in five cases. For cost per trip, private bus systems are less costly than public bus systems in 11 of 15 comparisons. These differences are significant in six cases. Where cost-per-mile and cost-per-trip estimates for public ownership are less, the differences are never statistically significant.

The cost comparisons for the entire sample of 275 school districts appear in columns 5 and 6 of Table 6. The first four columns of Table 6 compare the 193 exclusive-ownership systems and the 82 joint-ownership systems. The estimated cost per mile for the 226 districts in which public ownership exists is $268.99, while the corresponding estimate for the 131 districts in which private ownership exists in $239.94. That is, public ownership is approximately 12% more costly than private ownership. The difference is statistically significant at the .001 level. It is interesting to note that in the absence of our implicit cost adjustments, the 12% cost per mile differential for the entire sample shrinks to a 1 to 2% differential. This is true because our adjustments increase the state's cost figures for publicly owned buses by more than 10%. Transportation officials relying on the state's cost data would not note a striking public/private differential, and thus would not be confronted with persuasive reasons for preferring one ownership arrangement over the other. Perhaps this explains the fact that various degrees of public/private ownership persist in Indiana.

The costs per mile are $262.45 and $238.70 for districts that operate only public systems and only private systems, respectively. The difference between these two estimates is significant at the .05 level. The same cost estimates for the public and private parts of joint systems are $280.48 and $240.68, respectively, and this difference is significant at the .01 level. Thus, the cost of operating public buses exclusively is approximately 10% greater than operating private buses exclusively and the cost of operating the public part of joint systems is approximately 16% greater than operating private portions.

For each ownership breakdown in Table 6, average trip length and students per trip are greater with private ownership. Only the difference in trip length is significant. Also, because of the wide variation in trip length across all school districts, a comparison of cost per trip for the entire sample and the two aggregate subsamples would be inappropriate.

A cost comparison which maximizes geographic and administrative homogeneity would be one which compares the public portion of a joint system with the private portion in the same district. In the 82 districts that operate joint systems, 67% of the estimates of cost per mile are lower for their private portion. In 52% of the districts, the cost per student is less

Table 6. Annual cost estimates and other characteristics for the entire sample

Variable	Type of system					
	(1) Public only	(2) Private only	(3) Public part of joint system	(4) Private part of joint system	(5) Combined public	(6) Combined private
Mean cost per trip ($)	6483.49	6597.10	6382.52	6598.68	6446.86	6598.09
Mean cost per mile ($)	262.45	238.70[b]	280.48	240.68[a]	268.99	239.94[a]
Mean cost per student ($)	152.10	155.23	159.75	150.14	154.88	152.05
Mean cost per student-mile ($)	.197	.279[b]	.578	.318[a]	.335	.303
Average length of trip (miles)	25.9	29.3[b]	25.5	29.1[c]	25.7	29.2[a]
Average number of students per trip	42.8	44.3	42.4	44.6	42.7	44.5
Number of observations	144	49	82	82	226	131

[a] The difference between the means is significant at the .01 level.
[b] The difference between the means is significant at the .05 level.
[c] The difference between the means is significant at the .10 level.
Source: See text.

in the private portion; and in 73% of the districts, the cost per student-mile is less in the private portion. This direct comparison for joint systems provides additional evidence for lower private sector cost in school transportation.

Concluding remarks

Thomas Borcherding (1977), in commenting on the public-versus-private literature, offered the generalization that removal of an activity from the private to the public sector will double its unit costs of production. The results of this paper obviously are not consistent with Borcherding's 'rule of two' generalization. At the same time, however, the 12% cost-per-mile differential in favor of private ownership indicated by the results for the overall sample is not a trivial sum in absolute terms. The cost-per-mile differences in favor of private buses contained in the five trip groups are not trivial either, nor is the direct evidence from the 82 joint systems. In attempting to assess the results, much depends on the perspective against which they are judged.

Several factors suggest themselves concerning the 'smallness' of the differential. First, school bus transportation is a part of the education budget. Despite the lack of incentives implicit in public ownership, competition within the educational bureaucracy for a limited budget can result in 'abnormally' low cost public ownership. Second, and related to the first, is the fact that public and private ownership are in close proximity to each other – sometimes within the same school district. This proximity may lead to additional competitive pressures on public ownership. That school district residents can relocate based on school transportation considerations adds to this competitive pressure. To the extent that these first and second factors account for the smallness of the differential, our statistical results are consistent with the hypothesis that it is not public ownership per se that produces more costly public operations but, rather, the lack of effective competition. Third, although the contracting system is administered through open, competitive bidding, the district administrator responsible for the process has no direct claim on a dollar saving realized by the process. One would think that actual bid prices might be lower if the administrator's incentive to secure a lower bid price were greater. Finally, note that school bus transportation is technologically simple. Thus, private owners have less room to be innovative and entrepreneurial, meaning a reduced differential between public and private ownership.

On the other side of the ledger, it remains that private ownership appears less costly. To explain the estimated cost differences in this study in an economic sense is to explain where the lack of incentive effects in public ownership find their outlets in terms of higher costs. Two primary factors

appear to be responsible for the 'largeness' of the cost differential. First, as stated earlier, district-owned buses in Indiana are newer than contractor-owned buses. Capital costs related to public ownership – forgone interest income and economic depreciation – are, therefore, greater than these costs for private ownership. To the extent that this newer age structure is not indicative of higher quality output, it follows that school district officials, who do not have a direct claim on the benefits of economizing on capital, are providing higher capital cost transportation. Second, trip lengths for district-owned buses are shorter than the trip lengths of contractors. With declining cost per mile as trip length increases, shorter trip lengths imply higher cost per mile. Again, district officials and public bus drivers have less incentive to efficiently design bus routes served by district-owned buses; whereas one would expect the input of private contractors to impact favorably on the design of private routes.

Even though the results of this study do not support the Borcherding generalization, they are still strong enough to have important public policy implications. The fact that almost 70% of school buses in the United States are district owned and to the extent that Indiana cost experience approximates that of the other states, substantial dollar savings could result from privatizing the provision of school bus transportation.

NOTES

1. Summary data for school bus transportation for all states are contained in National Association of State Directors of Public Transportation Services (1982).
2. Because there are several excellent review articles dealing with the public-versus-private literature (Bennett and Johnson, 1980; Borcherding, Pommerehne, and Schneider, 1982; De Alessi, 1980; and Spann, 1977), this paper does not review the literature. Readers interested in a detailed literature review are referred to these articles.
   In Bails' *private* ownership states – Minnesota, New Mexico, and South Dakota – the proportion of buses *owned and operated by public school districts* in 1976–77 was 43%, 13%, and 73% respectively. Similarly, in Bails' *public* ownership states – Kansas, Missouri, and Oregon – the proportion of buses *owned and operated by private contractors* in 1976–77 was 21%, 34%, and 27% respectively. With respect to miles traveled and/or number of bus routes, the split between public and private buses in all of Bails' states except South Dakota roughly corresponds to the ownership split. For South Dakota, the ownership split overstates the degree to which district-owned buses account for bus routes and miles traveled. For these and other data on school bus transportation in Bails' six states, the reader is referred to Minnesota State Department of Education (1977), New Mexico State Department of Education (1977), South Dakota Department of Education (1977), Missouri Department of Elementary and Secondary Education (1977), and Oregon Department of Education (1977). Copies of relevant sections from these state publications will be furnished to readers on request.
4. At the time we began this study, data for the 1979–80 school year were the most recent available. It is our understanding that there has been no change in the public-private composition of bus transportation in Indiana since 1979–80.

5. In Indiana, school districts are called school corporations. Nevertheless, we will use the more common term – school district – throughout this paper.
6. All regulations and standards are contained in Indiana Code (a), Indiana Department of Public Instruction (1978), and Indiana State Police (1981). All school buses and drivers are subject to the same safety and licensing standards.
7. The published cost data include transportation costs associated with special education (handicapped and vocational). The data and results in this paper correspond to these data. However, we also conducted the investigation *without* special education transportation costs and the results were similar.
8. Bus route and financial data for all districts are contained in Indiana Department of Public Instruction (1979, 1980a, 1980b, 1980c).
9. There is no such thing as a 'blue book' for school buses with which to calculate resale values. Consequently, these values were estimated on the basis of a survey of several bus dealers in Indiana. From this survey, we developed a table of resale values by model year and bus capacity. The table is available from the authors on request.
10. The ranges for the five trip groups are as follows: (1) 7.35 – 15.62 round trip miles; (2) 15.76 – 22.45 round trip miles; (3) 22.52 – 28.86 round trip miles; (4) 28.89 – 38.38 round trip miles; and (5) 38.36 – 86.10 round trip miles.
11. For a detailed discussion of unit cost estimation for bus transportation, the interested reader should see Roess (1974).
12. The published figures show that in 1979–80 there were 650 traffic accidents involving school buses. In these accidents, 134 pupils were injured.
13. The average age – model year – of the 5,198 district-owned buses was calculated at 1973.8, while the average age of the 2,453 contractor-owned buses was calculated at 1972.3. The difference between these two means is statistically significant.

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