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## Analysis of the Impact of School Consolidation on Student Transportation Cost

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*BRIEF*

**Analysis of the Impact of School Consolidation  
on Student Transportation Cost**

Analysis by

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January 2007

As districts consolidate schools through the construction of new schools or the transfer of students from one school to another a question arises concerning the net change in cost for that district. It is sometimes hypothesized that reductions in construction and operations costs from consolidation are generally offset by increases in transportation costs. This claim presupposes that, in fact, school consolidation generally results in an increase in transportation costs. But does it? On the one hand, some of the students may have to be transported farther to attend school, leading to an increase in costs. On the other hand, having a single destination may provide an opportunity for efficiencies in routing and bus usage. At the request of the Maine State Board of Education, the Center for Education Policy, Applied Research, and Evaluation (CEPARE) at the University of Southern Maine conducted an analysis of transportation costs. More specifically this analysis addressed the following research question: Do student transportation expenditures tend to change following school consolidation, and if so, is it generally an increase or a decrease?

### **Data and Methods**

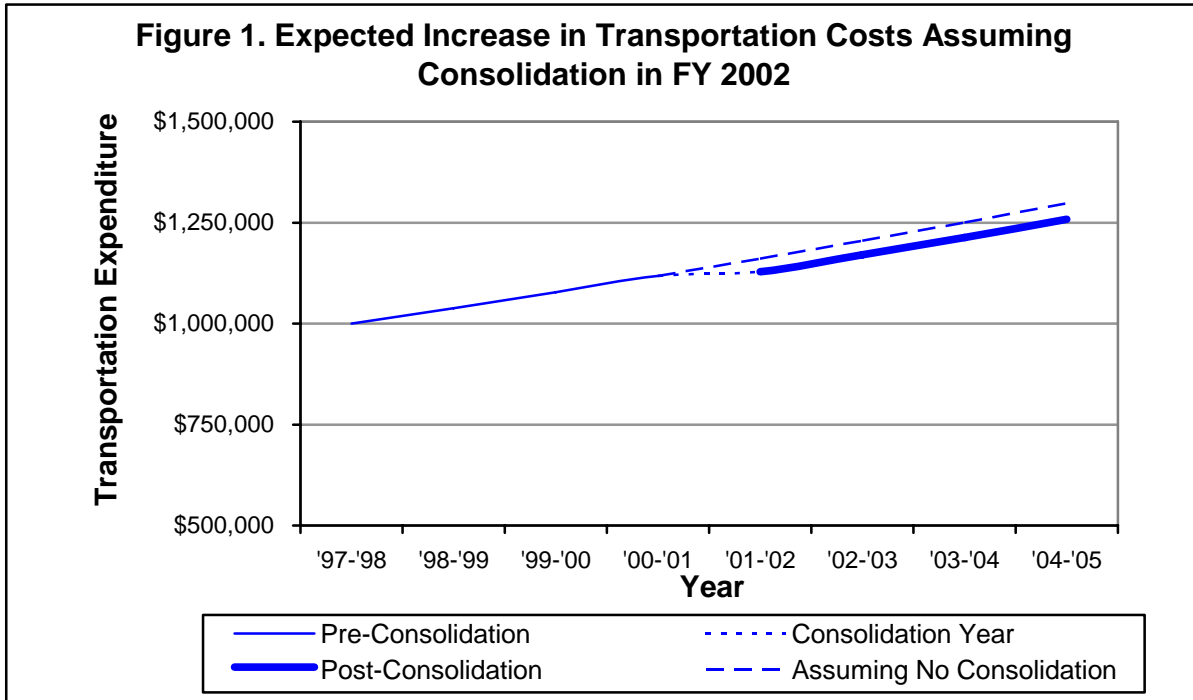
The analysis entailed an examination of student transportation costs for SAUs that have consolidated through new school construction. School Administrative Units (SAUs) on the State Board of Education's list of approved school consolidation projects between 1999-00 and 2004-05 were evaluated to determine if a school consolidation had already taken place, and if so, when. This was done through the examination of the Maine State Department of Education (MSDOE) School Master lists for 2000 through 2005. Although limited in number, thirteen SAUs were found to have implemented school consolidations by the 2004-05 school year. Of these thirteen, eleven were the result of school construction projects. The school consolidations in Gorham and Waldoboro were not the result of school construction. For purposes of this analysis, student transportation operating expenditures were defined to include

extracurricular and vocational transportation and are net of bus purchases and sales, and community service revenues. Expenditure data were adjusted for inflation, based on the Consumer Price Index (CPI-U), to 2004-05 dollars. Transportation expenditures before and after school consolidation for each of the 13 SAUs where school consolidation took place were analyzed by the examination of graphs and by a commonly used statistical procedure known as multiple regression.

### **Results**

The analysis revealed that when adjusted for inflation, gross student transportation operating expenditures were found to increase by an average of 3.8% in years preceding consolidation, 0.9% in the year immediately following consolidation, and 3.7% thereafter. Graphs of individual SAU expenditure changes are included in Appendix A, where one may notice that there are substantial fluctuations in transportation expenditures and that some SAUs experienced expenditure increases during the year of consolidation while others experienced expenditure decreases. Figure 1, on the next page, provides the aggregate information for the 13 SAUs. As may be seen in the figure, post-construction costs, represented by a solid line, are below predicted transportation costs assuming no consolidation.

The results of regression analysis may be used to generalize from the 13 cases examined to predict what might happen in similar cases of consolidation. The most likely predicted annual increase in transportation expenditure is the same as the actual average change: 3.8% before consolidation, 0.9% in the year of consolidation, and 3.7% after consolidation. However, because of year to year fluctuation in reported transportation expenditures (see the graphs for individual SAUs, Appendix A) and the limited amount of data examined (7 years of increases  $\times$  13 SAUs = 91 data points), it is unlikely that annual changes will equal these numbers exactly. We can be confident, however, that most increases for similar cases will fall within a defined range around these numbers, a range described in terms of confidence intervals.



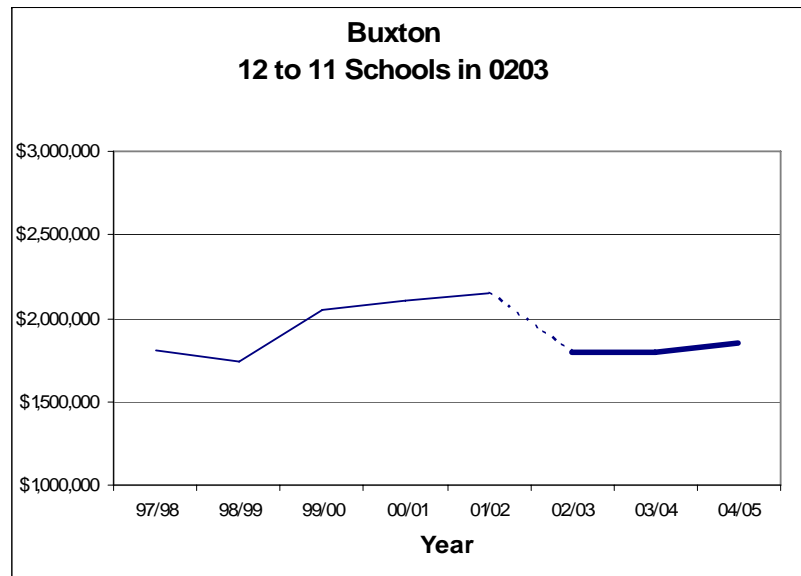
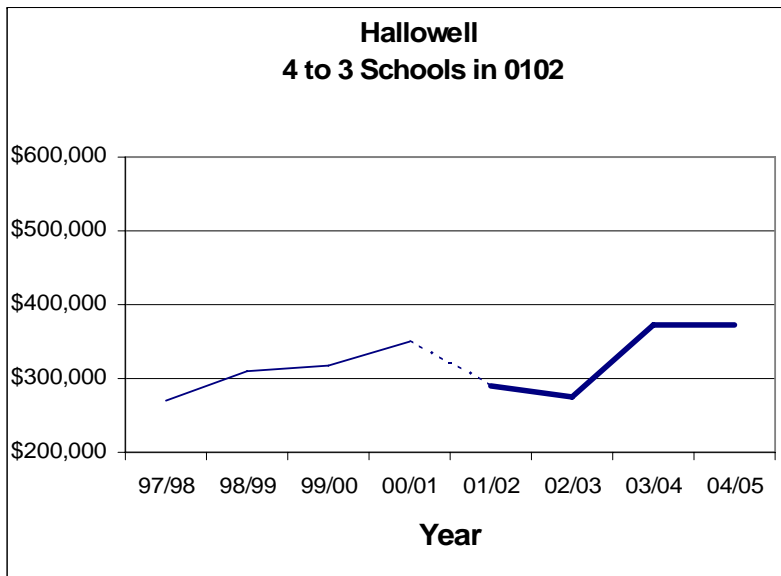
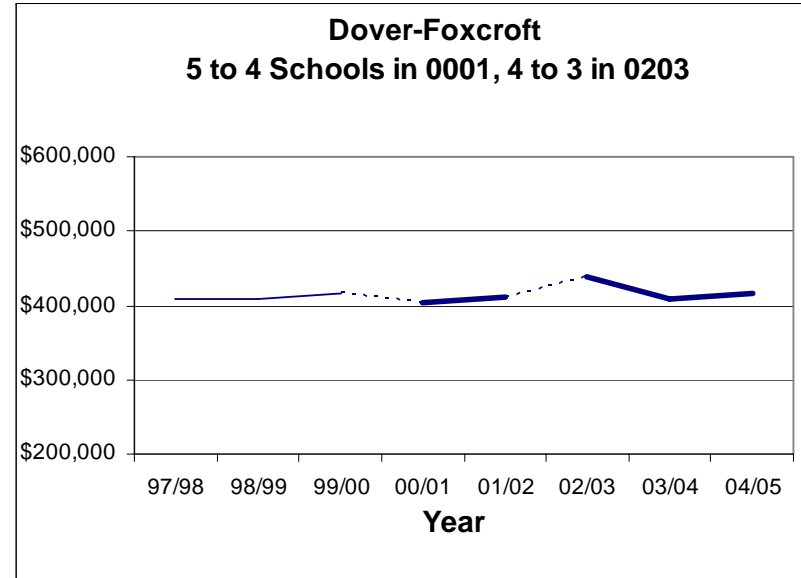
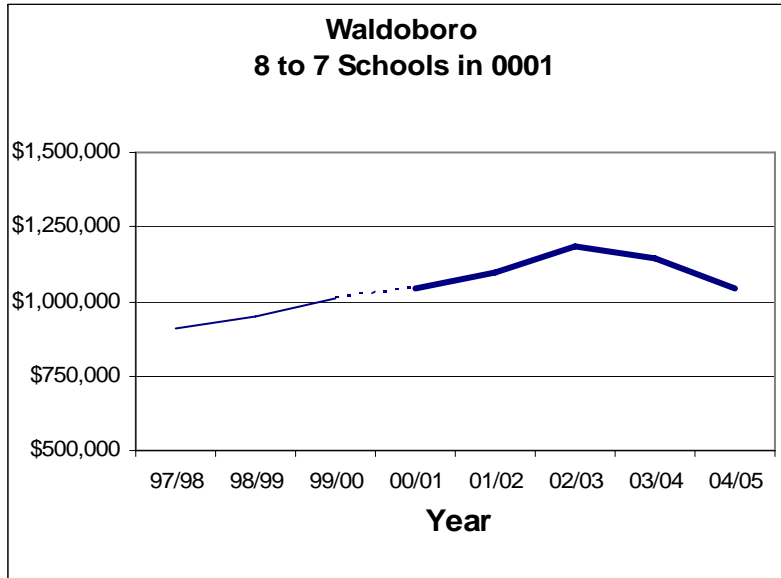
Actual average annual increases are displayed in Table 1, on the next page, along with two sets of confidence intervals. The confidence interval of -16.5% to +24.2% on the first row, for example, means that in cases similar to the 13 examined we can be 95% confident that the annual change in transportation expenditures before consolidation will be somewhere between a decrease of 16.5% and an increase of 24.2%. This is a relatively broad range, because year to year fluctuation makes individual increases hard to predict with precision. However, *average* increases can be predicted much more precisely than *individual* increases: the much narrower confidence interval of +1.3% to +6.4% on the first row means that if there are a large number of consolidations similar to the 13 examined, we can be 95% confident that the average annual pre-consolidation change in transportation expenditures will be an increase of between 1.3% and 6.4%.

**Table 1: Results of Regression Analysis —  
Average Annual Change in Transportation Expenditures**

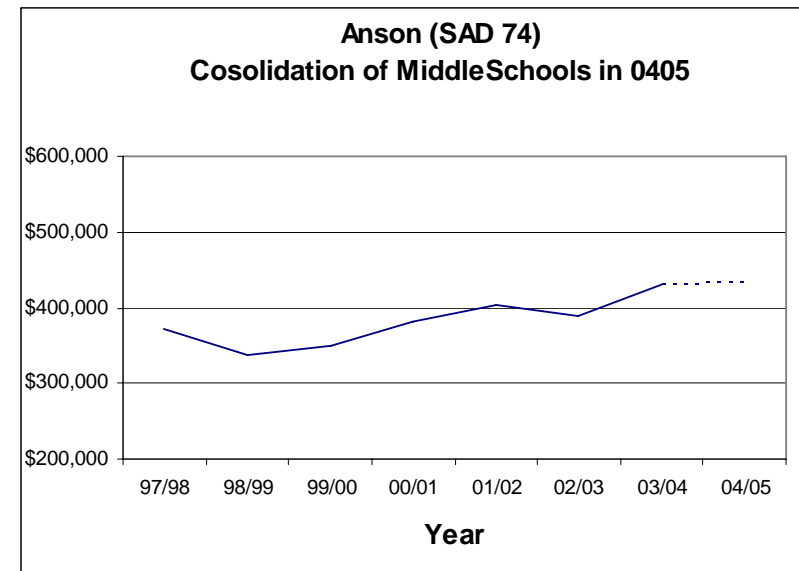
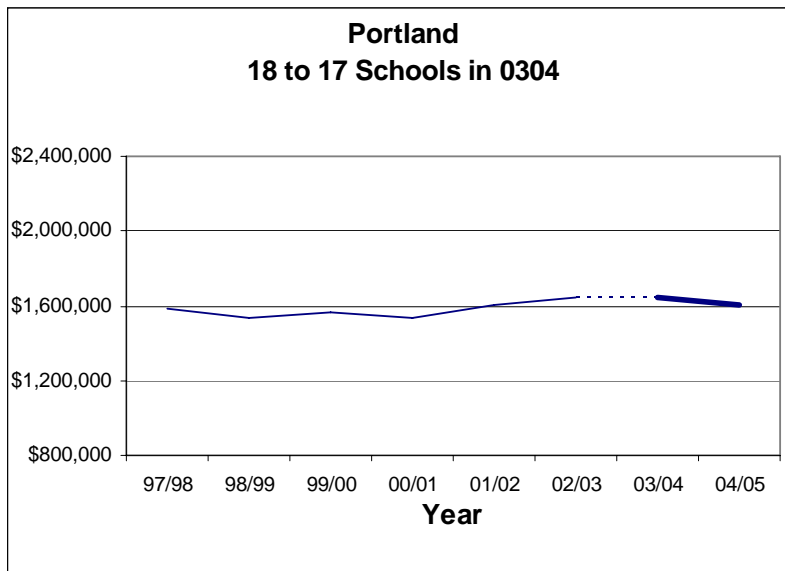
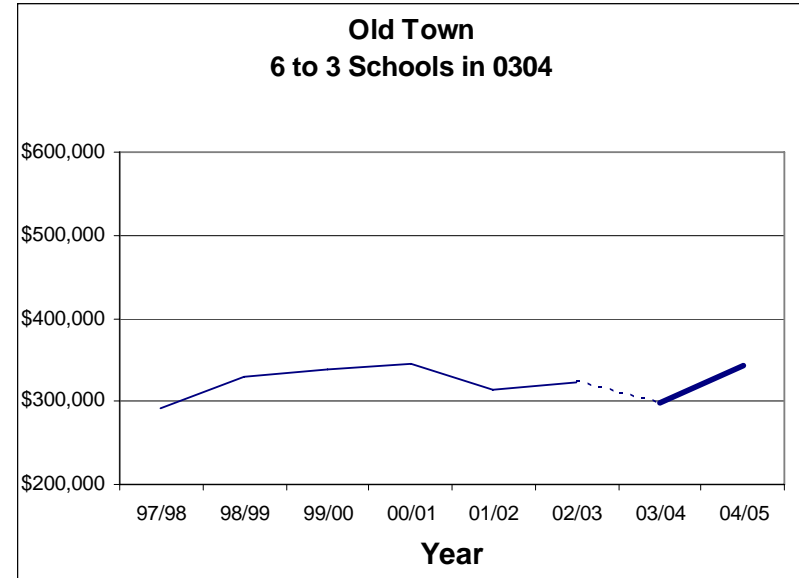
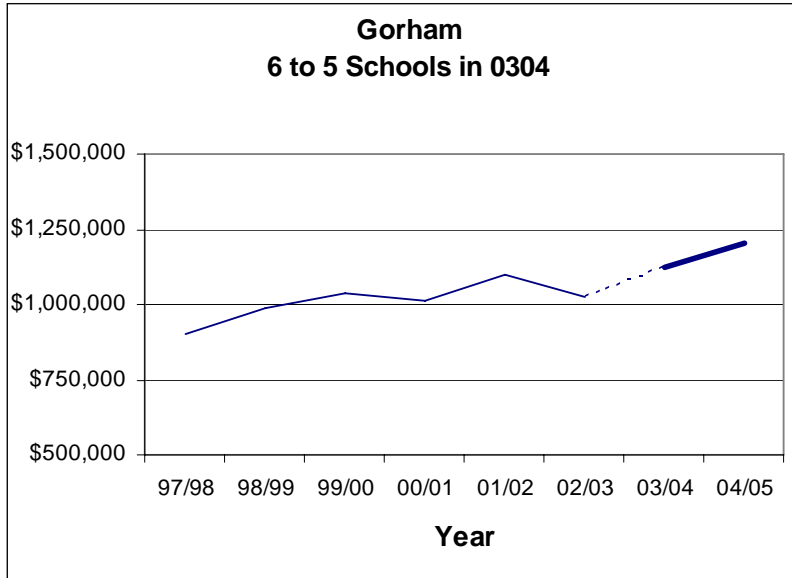
<b>Time Period</b>	<b>Actual Average Change</b>	<b>95% Confidence Interval for Predicting Individual Annual Changes</b>	<b>95% Confidence Interval for Predicting <i>Average</i> Annual Change</b>
Before Consolidation	+3.8%	-16.5% to +24.2%	+1.3% to +6.4%
Year of Consolidation	+0.9%	-20.0% to +21.9%	-4.5% to +6.4%
After Consolidation	+3.7%	-17.1% to +24.5%	-1.4% to +8.8%

In summary, the initial analysis of the recent history of approved school consolidations found no evidence that school consolidation results in significant transportation cost increases. In most cases transportation costs decreased – or increased at a reduced rate – in the first year of consolidation and then, in the years immediately following completion of the new school construction, returned to annual increases similar to those experienced before consolidation.

Appendix A  
 Student Transportation Expense in 2004-05 Dollars

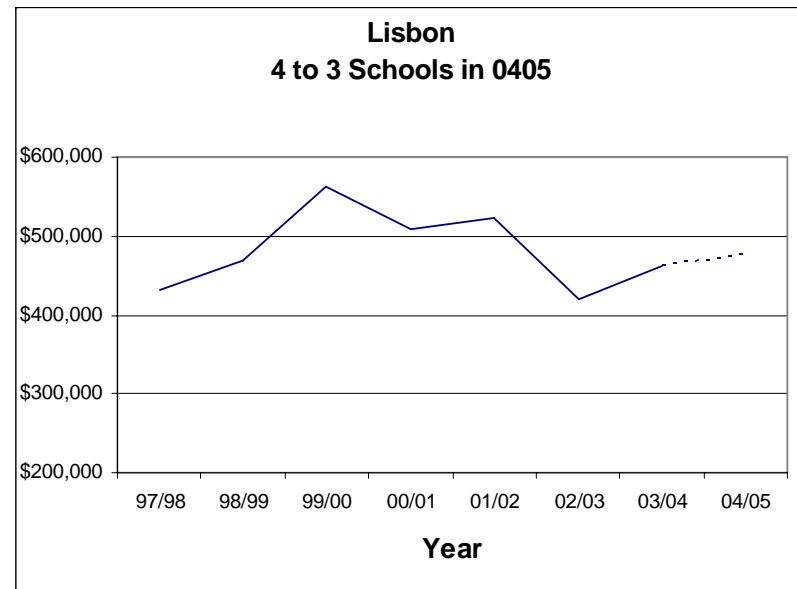
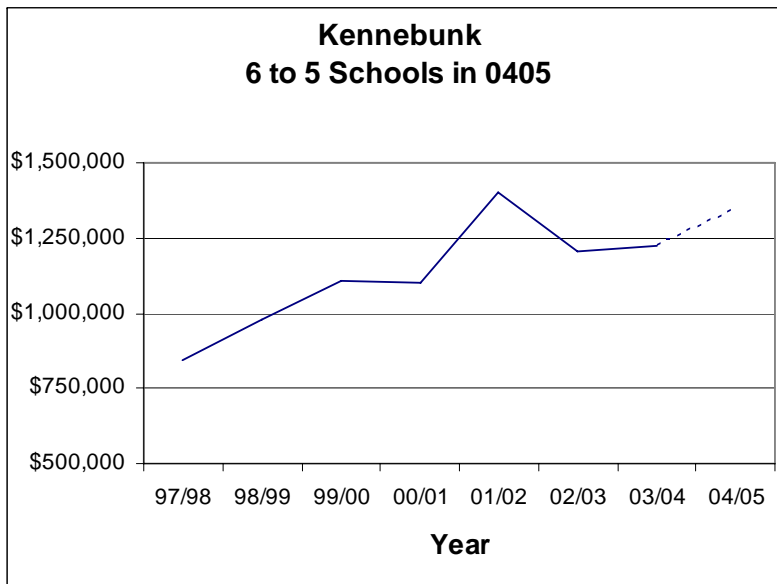
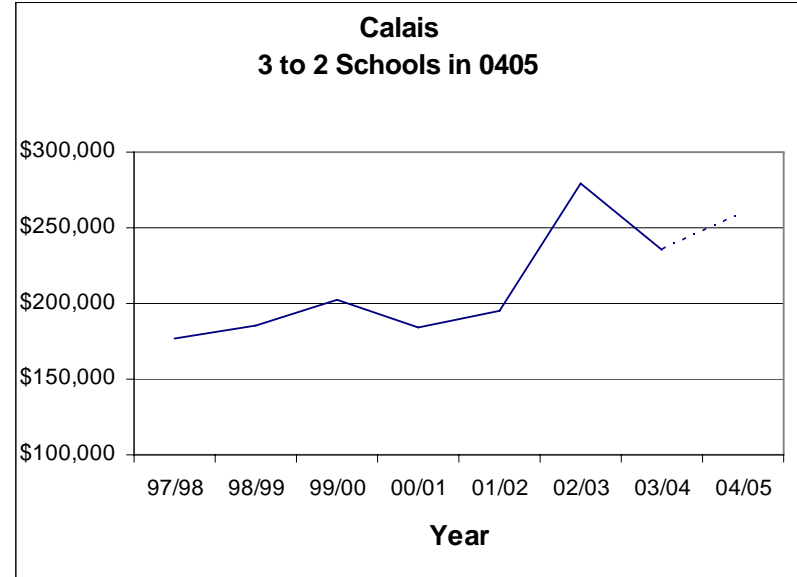
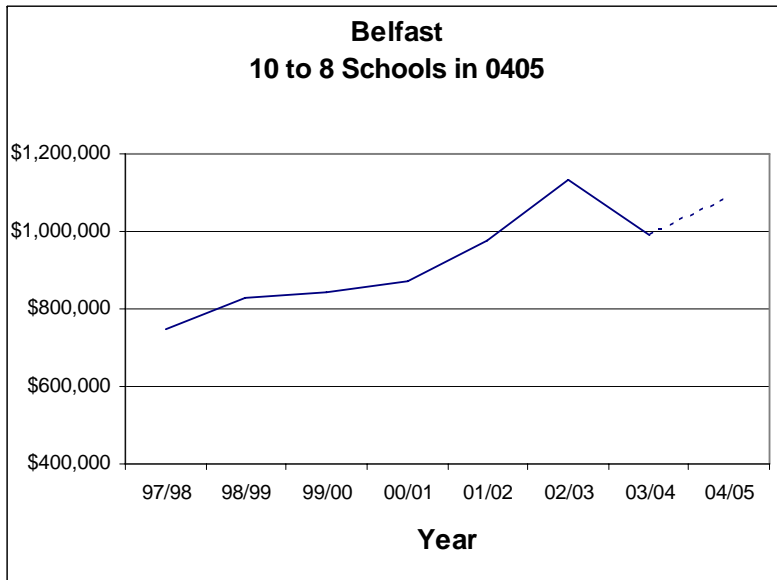


Appendix A  
Student Transportation Expense in 2004-05 Dollars





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