#### Philadelphia Household Travel Survey Project Evaluation

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**Purpose:**

The purpose of this assignment is to employ and understand some of the methods of project evaluation. The first five questions refer to a cost-benefit analysis exercise on the following page. You will need to make choices about what to include and what to exclude from the analysis.

1. Make a list of the important economic costs and benefits.
2. Assuming a discount rate of 0.04, what is the economic net present value (NPV) of the project after 30 years?
3. Change the discount rate to 0.06 and describe how the evaluation changes.
4. Are there any costs or benefits that you could not quantify?
5. How do these unquantifiable costs and benefits stack up against your NPV?
6. Using the 2012 Philadelphia household travel survey, estimate the total time (use Model\_TravTime instead of Survey\_TravTime) that people spend traveling (include weights) and the average time people spend traveling.
7. Do the same calculation as above, but only for cyclists. What percent of total estimated travel time is accounted for by cycling?
8. Draw a speed-flow diagram for a major one-way two-lane urban arterial. Label both the X axis and Y axis clearly and with numeric values. Indicate where on the diagram levels of service A through F go.
9. Estimate how many people in total move through the space at maximum capacity by: car, large bus, small bus, and bicycle. Show your work.
10. Estimate an average hourly wage for each person (total household income/total hours worked in a year). (Use the HOURS data from the person file and assume 48 weeks of work per year. Use the midpoint method to switch income from a qualitative variable to a quantitative one.)

**CBA Exercise for questions 1 through 5**

You’ve been tasked with assessing the economic impacts of a new road project in your region. Your regional travel modelers have forecast that the new road will save 15 minutes on 2 million trips over the course of a year. With an average wage rate of $30 per hour, you estimate that each hour saved is worth approximately $15 for a total benefit to passengers of $7.5 million per year. Assume that the number of trips that save 15 minutes will increase by 5% per year.

The road will cost approximately $140 million and take 1 year to build. Each year, furthermore, you will need to pay $1 million in operating costs. The costs of road maintenance will increase by 3% per year, due to rapid inflation in road materials and increased wear-and-tear.

Of the $140 million investment, $80 million will go to good, local jobs that will further encourage local economic activity. Regional economists estimate a 1.15 multiplier effect, meaning that each dollar spent on the project leads to another 25 cents spent on secondary parts of the economy. Unfortunately, planners have estimated that congestion during road construction will create 800,000 hours of delay from year 0 to year 1. They also estimate that the project will generate $300 million in new investments along the road as new retail and housing developments come online. Finally, the project is projected to increase vehicle-miles traveled by 4 million per year (same number in year 1 as year 10), with an estimated environmental cost of 12 cents per vehicle miles.

Some local advocates have argued that the highway will divide a poor neighborhood from an important job center and a few rural communities have complained that the highway will ruin the rural nature of their community and block their views. Many residents of both communities, however, have declared that the new highway will help them to access more jobs and opportunities.