

Ph11 Second Hurdle (2009)

Once upon a time a man named Laffer drew a curve on a paper napkin that influenced the course of national economic policy in the USA in the 1980s. In abbreviated form the argument behind the roughly bell shaped curve was at zero tax rate the government derives zero tax revenue and at 100% tax rate (whatever that means), the government also derives zero tax revenue; thus, except at the peak of the curve, for each derived revenue there are higher and lower tax rates that will produce the same revenue for the government. Laffer's point was that the government might be able to choose a lower tax rate that produces the same tax revenue.

Create a suitable model for the economy and determine whether Laffer's hypothesis is true or false. Make sure the model is sufficiently complex (i.e. non-linear) that it captures the features required to mimic the US economy.

Rules: Clearly state all assumptions made. You may use any reference you like, but you cannot collaborate*. The use of computers, etc. is ok. The hurdles are due before Monday, November 24, 2008 by 5 PM in 212 Sloan Annex.

You can find a description of Ph11 in the Caltech catalog. On the basis of your performance on this and the first hurdle, you may be offered admission to Ph11, which includes pay for summer (2009) research at Caltech at the current SURF rate, which was \$6,000 for ten weeks in 2008. Usually 4-8 students are admitted to Ph11 every year. You do not have to be enrolled in PH10 to be eligible for Ph11.

**For the purpose of this competition, "collaborate" means that you cannot work together with other students, teachers, etc. You cannot ask anyone how you should attack the problem; however, you can ask people about suitable references to techniques that might be applied to the hurdle's solution.*