THE PANEL HURDLE MODEL

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ABSTRACT

The “double hurdle” model is extended to the panel data context. The “first hurdle” determines whether the agent is a potential participant/contributor/consumer; the “second hurdle” determines the extent of participation/contribution/consumption in each task/round/wave, conditional on the first hurdle being passed. The parameters of the two hurdle equations are estimated by full information maximum (simulated) likelihood. Four applications are considered.

Firstly, evidence from an experiment investigating the “house money effect” in the context of a public goods game is reconsidered. Here, the two assumed “types” are free-riders, and potential contributors. The effect of house money is seen to be significant in the first hurdle: specifically, house money makes a subject more likely to be a potential contributor. Hence we find that the effect of house money is more than just an effect on behaviour; it has the effect of changing a subject from one type to another. This result is potentially important in the external validity debate.

Secondly, we consider the decision to “punish” in a public goods game. When subjects are given the right to invest in “punishment” of co-players who behave unfavourably, they tend to punish rarely; the majority never punish. The first hurdle – i.e. the potential to punish – is determined by subject characteristics such as age and gender; the second hurdle – i.e. the amount invested in punishment of a given co-player in a given round – is determined largely by that co-player’s contribution relative to the group average.

The third application is to a large panel data set on cigarette consumption in Mexico. The first hurdle is the decision to be a smoker; the second hurdle determines consumption in each wave. Both equations contain many significant effects. There are significant differences between waves, providing evidence of the efficacy of anti-smoking legislation in Mexico.

The final application is to a large data set on child schooling in Bhutan. The first hurdle determines whether a household invests in education. The second hurdle determines the expenditure on schooling for each individual child within a household.