Parental Reputation and School Performance

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Extended Abstract

1 Introduction and Motivation

The role of parenting, traditionally the object of study of developmental psychologists has been garnering increasing attention by economists. It is becoming more common to model parent-child interactions with the tools of game theory. However, empirical work that takes these game-theoretic models to the data is in its infancy. In this paper we formulate and estimate a reputation game between a parent who threatens punishment upon bad school performance and their children who choose costly study effort to reduce their punishment odds, while at the same time, try to figure out whether their parent is lenient or harsh. We use the estimated model to investigate the role parenting plays in determining the school performance of children.

2 The Data

We use longitudinal data from the NLSY-C. We observe histories of play across households. In particular, we observe measures of school performance and eventual punishments for each sibling within these households over time. We also have measure of ability for each child. This allows us to control for what is to be expected from each them in terms of school performance.

3 The Model

Our model features a game between a parent and her children. Children differ in ability and care about their grades net of effort cost. They also suffer when punished. Kids are assumed to be myopic. There are two types of parents. A strategic/soft parent and a myopic/tough parent. The population of parents is split among these two types. A parent derives utility from kids' grades, and disutility from punishing upon bad grade. The two types differ in their mean disutility from punishment and the disutility from punishment is

subject to a period-specific shock . There are two possible grades and effort is a binary choice. The cost of effort is subject to an i.i.d. shock every period. A child gets low grades with a probability that depends on his ability and her effort. The information structure is as follows: The parent knows its type and its shock to disutility from punishment. The child knows the effort exerted towards the achievement of good grades and the shock to the disutility from effort. Children's abilities and the history of punishments and grades are public information. All children in a given household share the same beliefs about parental type.

Each child lives multiple periods and they may overlap with each other. In each period,

1. each child observes her effort shock and chooses whether to make effort
2. grades are realized.
3. the parent observes her punishment disutility shock and chooses whether to punish if low grade is observed. (If all kids get high grade, no action is taken.)

At each period the parent derives utility from the grades attained by her children weighted by their ability and suffers a disutility cost from punishment. The period utility for each child depends positively on a good grade outcome, negatively on study effort and negatively on punishment (if punished in the event of low grades).

4 Solution and Estimation

Given the structure of the model we can solve out for each player's optimal strategy. These strategies are characterized by cutoffs for each of the relevant shocks. Given a vector of structural parameters, these cutoffs can be solved for numerically via backwards recursion from the last round of the game in which the youngest sibling plays for the last time against the parent. The solution to the reputation game is then embedded in an estimation algorithm that recovers the structural parameters of the game using data from households in which this game is assumed to be played.

5 The Role of Parenting

With the estimated model in hand we are well equipped to answer interesting questions regarding the role parenting plays in determining school performance. In particular, we quantify by how much (if anything) the threat of punishment induces an increase in effort and a corresponding improvement in measures of school performance. We also quantify the important role uncertainty about parental type plays in these parent-child interactions. In particular, we compute school performance under a hypothetical world in which parental type is known to be "soft" or "lenient". We expect the estimated model to allow us shed more light on some of the findings in the literature on birth order effects in school performance.