

# Parental Paternalism and the Intergenerational Transmission of Patience<sup>\*</sup>

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## 1 Introduction

Parents frequently decide for their children. Moreover, parents are crucial for children's development of skills and preferences, and hence, their long-term success. One skill of particular importance for various economic outcomes (e.g., educational attainment or savings) is patience, i.e., how individuals make intertemporal decisions. In particular, the recent experimental literature on time preferences documented the importance of time inconsistencies in intertemporal decisions, illustrated, e.g., by hyperbolic  $\beta$ - $\delta$ -discounting models. Up to date, these two strands of the literature – the role of parents on children's skill development and the analysis of time preferences – remain largely separate. Yet, by deciding for and raising their children in a particular way, parents foster the development of time preferences.

In this project, we study how parents and children make intertemporal decisions for themselves, and how parents decide for their children. In addition, we develop a novel behavioral measure of parental paternalism, that is, parents' tendency to overwrite their children's decisions. We embed our experiment in a larger panel study conducted in rural Bangladesh. More specifically, for a subset of the villages recruited as part of the panel study, we conduct an additional wave with our experiment.

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As part of the experiment, all household members take part in a series of decisions using convex time budgets to measure experimentally both parents' and children's time preferences. In addition, parents also make real decisions for their children. In our experiment, we randomize the child with which mothers and fathers are matched allowing us to study differences by gender or age of the child. Moreover, we develop a novel measure of the degree of parental paternalism.

In this document, we specify our primary research questions, define key outcome measures, and lay out the main empirical specifications.

## 2 Sample

We embed our experiment in a larger panel study in rural Bangladesh. More specifically, we aim to interview 600 households from three districts in Bangladesh, that were already part of previous data collections. From each household, we aim to sample both parents and up to two children between 6 and 16 years. More specifically, if there are more than two children in this age range, we always recruit the youngest and oldest child between 6 and 16 years. Given that the average family has 1.7 children in the relevant age-range, this results in approximately 1,000 children participating in our study.

For the experiment and the collection of the data, we partner with ECONS (Evaluation and Consulting Service Ltd.), a survey company based in Dhaka, Bangladesh, with experience in conducting surveys as well as randomized control trials that also collected the remaining data of the panel study. Importantly, due to the panel structure and previous experiments, participating households are more likely to trust that potential future payments arising from our study are indeed paid.

## 3 Experimental Design

Our experiment has three key features. First, parents make real choices for their children. Second, we develop a novel measure of the degree of parental paternalism. Third, employing a series of convex time budgets for both own and paternalistic decisions, we can estimate structural parameters of hyperbolic discounting models both for own decisions as well as paternalistic decisions and study their relation and intergenerational transmission.

### 3.1 Convex Time Budgets

In our experiment, subjects take part in a series of 12 intertemporal decisions using convex time budgets. More specifically, they distribute stars (our experimental currency) between sooner and later payments. By varying the date of the sooner payment ( $t = \text{today}$ , in one month), the date of the later payment ( $t + k = \text{in one month}$ , in two months), as well as the gross interest rate between sooner and later stars ( $1 + r = 1, 1.33, 1.5, 2$ ), we can characterize an individual's (quasi-hyperbolic) discounting behavior.

Subjects fill out three sets of four decision sheets. Each set is characterized by different payout dates and delays. In particular, the following three combinations  $(t, t + k)$  are implemented: (today, in one month), (in one month, in two months), (today, in two months). Table 1 illustrates the four different decision sheets that were implemented for each  $(t, t + k)$  combination.

Table 1: Overview of Decision Sheets

Decision Sheet	$t$	$t + k$	Endowment ( $m$ )	Gross int. rate ( $1 + r$ )	Options $(s_t, s_{t+k})$				
					(1)	(2)	(3)	(4)	(5)
1	today	1 month	8	1	(8, 0)	(6, 2)	(4, 4)	(2, 6)	(0, 8)
2	today	1 month	12	1.33	(9, 0)	(6, 4)	(3, 8)	(2*, 9)	(0, 12)
3	today	1 month	12	1.5	(9, 0)	(6, 3)	(4, 6)	(2, 9)	(0, 12)
4	today	1 month	8	2	(4, 0)	(3, 2)	(2, 4)	(1, 6)	(0, 8)
5	1 month	2 months	8	1	(8, 0)	(6, 2)	(4, 4)	(2, 6)	(0, 8)
6	1 month	2 months	12	1.33	(9, 0)	(6, 4)	(3, 8)	(2*, 9)	(0, 12)
7	1 month	2 months	12	1.5	(9, 0)	(6, 3)	(4, 6)	(2, 9)	(0, 12)
8	1 month	2 months	8	2	(4, 0)	(3, 2)	(2, 4)	(1, 6)	(0, 8)
9	today	2 months	8	1	(8, 0)	(6, 2)	(4, 4)	(2, 6)	(0, 8)
10	today	2 months	12	1.33	(9, 0)	(6, 4)	(3, 8)	(2*, 9)	(0, 12)
11	today	2 months	12	1.5	(9, 0)	(6, 3)	(4, 6)	(2, 9)	(0, 12)
12	today	2 months	8	2	(4, 0)	(3, 2)	(2, 4)	(1, 6)	(0, 8)

Notes: This table presents the different choices for each decision sheet. The four decision sheets differ in their endowment  $m$ , which equals the maximum number of stars in the later period. Each of the four decision sheets is played three times for different combinations of earlier ( $t$ ) and later dates ( $t + k$ ). In particular, the following three combinations  $(t, t + k)$  are implemented: (today, in one month), (in one month, in two months), (today, in two months). The fourth option on the second decision sheet was displayed as two stars. In all our analyses, we will use the value of 2.25 as this corresponds to the linear budget line. Note that if a respondent preferred this option to the four other options, she will also prefer to get slightly more stars earlier, holding the later stars constant to the remaining options.

Since we want to keep the experimental task simple to facilitate understanding of underage subjects, we limit the number of stars to integer numbers. This implies that we need to round one option of the decision sheet with a gross interest rate of 1.33. In our analysis, we will code the number of stars paid sooner as  $2.25 ((m - s_{t+k}) / (1 + r)) =$

$(12 - 9)/1.33 = 2.25$  instead of 2 as indicated on the decision sheet. In other words, we use the number of stars as indicated by a linear budget line. The corresponding numbers are indicated with asterisks in Table 1.

We tell subjects in advance that at most one of their decisions is actually paid out and will be determined by rolling dies. When explaining the task, enumerators frequently pause and ask control questions. If subjects do not answer these questions correctly, the instructions for the corresponding part are repeated.

### 3.2 Own Choices, Paternalistic Choices, Measuring Parental Paternalism

All respondents at first take decisions for themselves. After finishing the decisions for themselves, parents additionally are asked to make choices for each of their children and we elicit their beliefs about the children's choices using the same set of decision sheets. To incentivize parents' choices for children and to implement a measure of parental paternalism, we implement the following mechanism: Whether parents overwrite the choices of their children depends on the roll of a die and parents can spend money to buy additional sides of the die to make the implementation of their choices more likely. The more money they spend, the more likely it is their choices are implemented for their children. More specifically, parents receive an endowment of 100 Taka for this part and can spend 10 Taka to buy an additional side of the die that determines whether their decisions will be implemented. Table 2 relates the amount spent to the numbers on the die that implement the parents' decisions.

Table 2: Paternalism measure

Amount spend	Endowment less amount spend	Numbers implementing parent's decisions
Taka 0	Taka 100	1
Taka 10	Taka 90	1, 2
Taka 20	Taka 80	1, 2, 3
Taka 30	Taka 70	1, 2, 3, 4
Taka 40	Taka 60	1, 2, 3, 4, 5
Taka 50	Taka 50	1, 2, 3, 4, 5, 6

If the number one is rolled, the parents' choices are implemented for the child. Parents receive an endowment of 100 Taka for this part and can spend 10 Taka to buy an additional side of the die that implements their decision. Thus, by spending 50 Taka, they can ensure that their decisions for the child are implemented. We repeat this procedure for each of up to two children taking part in the experiment. In

addition, parents receive one additional star worth 20 Taka if their belief about one randomly determined choice of the child is correct.

This setup allows us to incentivize parents' choices for children and yields a measure of parental paternalism (whether and how much parents spend to buy additional sides on the die). Moreover, we intend to explore the discrepancy between parents' beliefs and their paternalistic choices for their children as a second measure of paternalism.

### 3.3 Randomization, Matching, and Payoffs

Only one of the 12 decision sheets is paid out and determined by the roll of a 12-sided die. Moreover, we randomly match parents to children, who potentially overwrite the decisions of their children. Table 3 illustrates the matching depending on the family structure and the roll of a 6-sided die.<sup>1</sup>

After the matching, a 12-sided die determines the decision sheet that is used to determine the final payoffs. Stars are converted to Bangladeshi Taka at the end of the experiment. We use exchange rates that are age-specific, announced at the beginning of the experiment, and shown in Table 4. Moreover, all subjects receive one star paid out today as a compensation for their participation.

### 3.4 Further Data

In addition to the experimental data, we collect some more background information for an exploratory analysis of potential reasons for parents' paternalistic behavior. Furthermore, we will lever the panel dimension to merge data from other waves (e.g., to obtain parental education, household income, family structure).

## 4 Data Analysis

In this section, we lay out our main research questions and how we intend to answer the questions. In particular, we specify our main specification used throughout the analysis, but want to note that the present document does not preclude additional

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<sup>1</sup>The matching procedure depends on the family structure, i.e., the number of parents and children taking part in the experiments, and on the roll of a 6-sided die. Importantly, both situations in which a child's own decisions are implemented as well as in which one of the parents has the possibility to overwrite the child's choices are implemented with positive probabilities. Similarly, parents are either paid their own decisions or they are paid based on their decisions in the paternalistic part. Specifically, in the latter they receive an endowment of 100 Taka less the amount they spend on buying additional sides on the die that determines whether their choices are implemented for their child, and receive 20 Taka if their belief about their child's choice is correct.

Table 3: Random Matching of Parents and Children

<i>Payoff Table 1: Family of one parent and one child</i>			
Num.	Mother/Father		Child 1
1	Own choices		Own choices
2	Own choices		Own choices
3	Own choices		Own choices
4	Choices for C1		M/F's choices for C1
5	Choices for C1		M/F's choices for C1
6	Choices for C1		M/F's choices for C1

  

<i>Payoff Table 2: Family of two parents and one child</i>			
Num.	Mother	Father	Child 1
1	Own choices	Own choices	Own choices
2	Own choices	Own choices	Own choices
3	Choices for C1	Own choices	M's choices for C1
4	Choices for C1	Own choices	M's choices for C1
5	Own choices	Choices for C1	F's choices for C1
6	Own choices	Choices for C1	F's choices for C1

  

<i>Payoff Table 3: Family of one parent and two children</i>				
Num.	Mother/Father		Child 1	Child 2
1	Own choices		Own choices	Own choices
2	Own choices		Own choices	Own choices
3	Choices for C1		M/F's choices for C1	Own choices
4	Choices for C1		M/F's choices for C1	Own choices
5	Choices for C2		Own choices	M/F's choices for C2
6	Choices for C2		Own choices	M/F's choices for C2

  

<i>Payoff table 4: Family of two parents and two children</i>				
Num.	Mother	Father	Child 1	Child 2
1	Own choices	Choices for C1	F's choices for C1	Own choices
2	Own choices	Choices for C2	Own choices	F's choices for C2
3	Choices for C1	Own choices	M's choices for C1	Own choices
4	Choices for C2	Own choices	Own choices	M's choices for C2
5	Choices for C1	Choices for C2	M's choices for C1	F's choices for C2
6	Choices for C2	Choices for C1	F's choices for C1	M's choices for C2

Notes: This table illustrates the within household randomization and matching depending on the household structure. “Own choices” means that one of the respondent’s own CTB decisions are paid out. “Choices for C1/C2” means that parents receive an endowment of 100 Taka, can spend up 50 Taka to increase the chance that their decisions are implemented for the children, and receive 1 star worth 20 Taka if their belief about one randomly chosen decision of the child is correct. “M/F's choices for C1/C2” means that child 1 or 2's own choices may be overwritten by the respective parent's paternalistic choices, and one randomly determined decision sheet is paid out. Child 1 always refers to the older of the two children taking part in the experiment (or the only child).

analyses (e.g., using additional data from other waves of the panel) or robustness checks. Instead, we want to use this document to specify our main variables of interest.

Table 4: Exchange Rates of Stars in Money

Age	1 Star is worth
6-7 years	4 Taka
8-9 years	6 Taka
10-11 years	8 Taka
12-13 years	10 Taka
14-15 years	12 Taka
16-17 years	15 Taka
Above 17 years and adults	20 Taka

## 4.1 Main specification

We follow Andreoni and Sprenger (2012) and posit a time separable CRRA utility function with quasi-hyperbolic  $\beta$ - $\delta$ -discounting in our main specification and estimate this model using our experimental data from the convex time budgets. Therefore, our main outcome of interest is the amount of stars,  $s_t$ , allocated to the sooner payment date  $t$  rather than a later date  $t + k$ . More specifically, we begin with a utility function

$$U(s_t, s_{t+k}) = \frac{1}{\alpha} (s_t - \omega_1)^\alpha + \beta \delta^k \frac{1}{\alpha} (s_{t+k} - \omega_2)^\alpha \quad (1)$$

with  $\beta$  being the present bias parameter,  $\delta$  the standard discounting parameter, and  $\alpha$  characterizing the curvature of the utility function. The parameters  $\omega_1$  and  $\omega_2$  are Stone-Geary parameters that we will set to zero in our main specification. The budget constraint is given by

$$(1 + r)s_t + s_{t+k} = m. \quad (2)$$

Maximizing the utility function (1) subject to the budget constraint (2) yields an intertemporal demand for  $s_t$  given by:

$$s_t = \begin{cases} \frac{1}{1+(1+r)(\beta\delta^k(1+r))^{\frac{1}{\alpha-1}}} \omega_1 + \frac{(\beta\delta^k(1+r))^{\frac{1}{\alpha-1}}}{1+(1+r)(\beta\delta^k(1+r))^{\frac{1}{\alpha-1}}} (m - \omega_2) & \text{if } t = 0 \\ \frac{1}{1+(1+r)(\delta^k(1+r))^{\frac{1}{\alpha-1}}} \omega_1 + \frac{(\delta^k(1+r))^{\frac{1}{\alpha-1}}}{1+(1+r)(\delta^k(1+r))^{\frac{1}{\alpha-1}}} (m - \omega_2) & \text{if } t > 0 \end{cases} \quad (3)$$

which we will estimate using non-linear least squares using

$$s_t = \frac{\omega_1 + (m - \omega_2)(\beta\delta^k(1 + r))^{\frac{1}{\alpha-1}}}{1 + (1 + r)(\beta\delta^k(1 + r))^{\frac{1}{\alpha-1}}} \times \mathbb{1}\{t = 0\} \\ + \frac{\omega_1 + (m - \omega_2)(\delta^k(1 + r))^{\frac{1}{\alpha-1}}}{1 + (1 + r)(\delta^k(1 + r))^{\frac{1}{\alpha-1}}} \times \mathbb{1}\{t > 0\} + \epsilon_t. \quad (4)$$

Here,  $\epsilon_t$  is an error term clustered by individual. As mentioned above, in our main specification, we will restrict  $\omega_1$  and  $\omega_2$  to zero. Moreover, when estimating the discounting parameters  $\beta$  and  $\delta$  on an individual level, we will also restrict  $\alpha$  to the value we estimate on the aggregate level to limit the parameters that we need to estimate on an individual level to two.<sup>2</sup>

We will estimate equation (4) for three different outcomes: (i) own allocations, (ii) parents' allocations for their children, and (iii) parents' beliefs about children's allocations.

**Research Question 1:** *How do parents and children make intertemporal decisions for themselves?*

We are particularly interested in the estimates of  $\beta$ ,  $\delta$  and how they vary across different subgroups (e.g., fathers and mothers, boys and girls, by age group).

**Research Question 2:** *What do parents belief about intertemporal decisions of their children and what decisions do they implement for them?*

To answer this question, we use the nonlinear least squares model above and estimate it for parents' paternalistic decisions as well as their beliefs. We then compare the estimated parameters across specifications. We will estimate the specification pooled for mothers and fathers as well as separately by, e.g., parental and child gender.

In addition, we want to explore how paternalistic decisions vary between those who spend money to increase the probability of overwriting their children's choices and those who do not spend money. Relatedly, we want to explore the differences between parents' beliefs and their paternalistic decisions.

In a next part, we want to lever the individual-level estimates and study the intergenerational correlation in preference parameters. To do this, relate preference

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<sup>2</sup>In principle, we could also – and will for robustness – try to estimate  $\alpha$  on the individual or household level. Yet, due to the small number of observations per individual, we worry that estimates will not converge and thus prefer the restricted version to retain a larger sample.

parameters  $\delta$  and  $\beta$  of children with their parent's counterparts leading to the following research question:

**Research Question 3:** *How are preferences of children and parents related?*

To shed light on the intergenerational correlation of preferences, we run regressions of the following form:

$$p_i^{child} = \gamma_0 + \gamma_1 p_i^{adult} + X_i' \gamma_2 + \epsilon_i \quad (5)$$

in which  $p_i^{child}$  and  $p_i^{adult}$  denote the preference parameter ( $\beta$  or  $\delta$ ) of the child and adult in household  $i$ , respectively. In some specifications, we will add a vector of control variables,  $X_i$ , to control for, e.g., child's gender and age, household size, parental education, household income, and district fixed effects. To account for correlated shocks across siblings as well as the fact that our preferences are generated regressors, we will bootstrap standard errors. We run the specifications separately for mothers and fathers to test for heterogeneity. In addition, we want to check whether the transmission differs by, e.g., child gender, child age group (6-9 years, 10-12 years, 13-16 years), or parental paternalism. In addition, we will provide descriptive results of the intergenerational correlation of allocation decisions.

## 4.2 Exploratory Research Questions

In addition to these questions, we will also explore exploratory research questions in an appendix or follow-up paper such as:

- How accurately are parents' beliefs about children's choices? Do they differ by, e.g., parental or child gender?
- What determines paternalistic behavior of parents? Do parents of two children decide for both of their children similarly? If they decide differentially, which characteristics predict this behavior?
- How do parents' paternalistic intertemporal decisions relate to their own decisions (i.e., do parents prescribe their own decisions for their children?)?
- Are gender differences in time preferences similar for children and adults?
- How does our measure of paternalism relate to parents' parenting styles?