The Economics of Parenting Skill and Child Development

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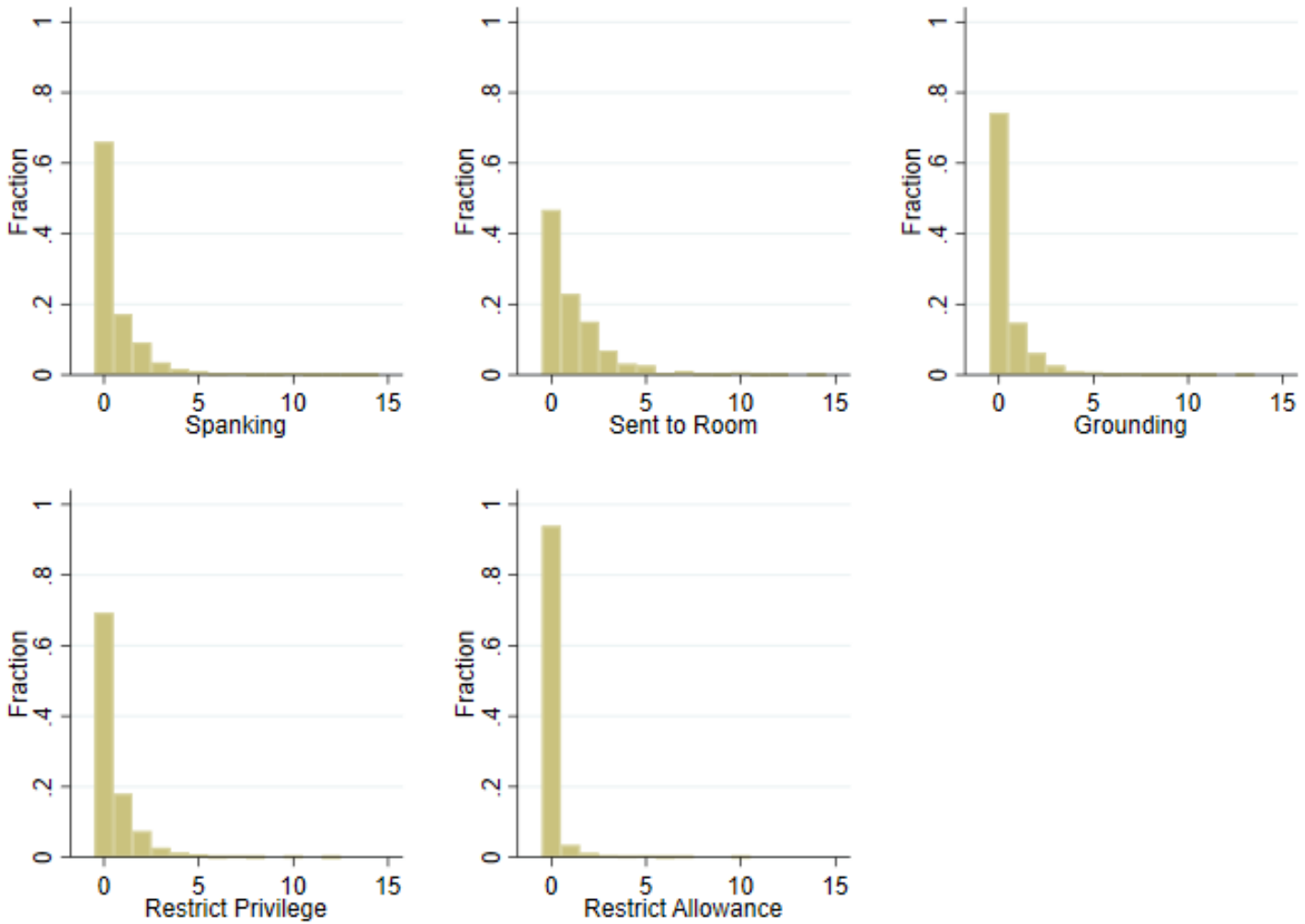
Research Question

- What is the effect of parental punishment on child outcomes?
- Context: everyday parent-child interaction
  - grounding, time-out, corporal punishment
  - not 'costly' incentives such as college/car/rent/bequest
- Child: approx. 6-14. late childhood, early adolescence.

Motivation

1. **Punishment is ubiquitous across households**
2. The effect of punishment is not well understood
3. It can inform economics and policy

Punishment use at child ages 7-8 (National Longitudinal Survey of Youth 1979)



6,10,12,14

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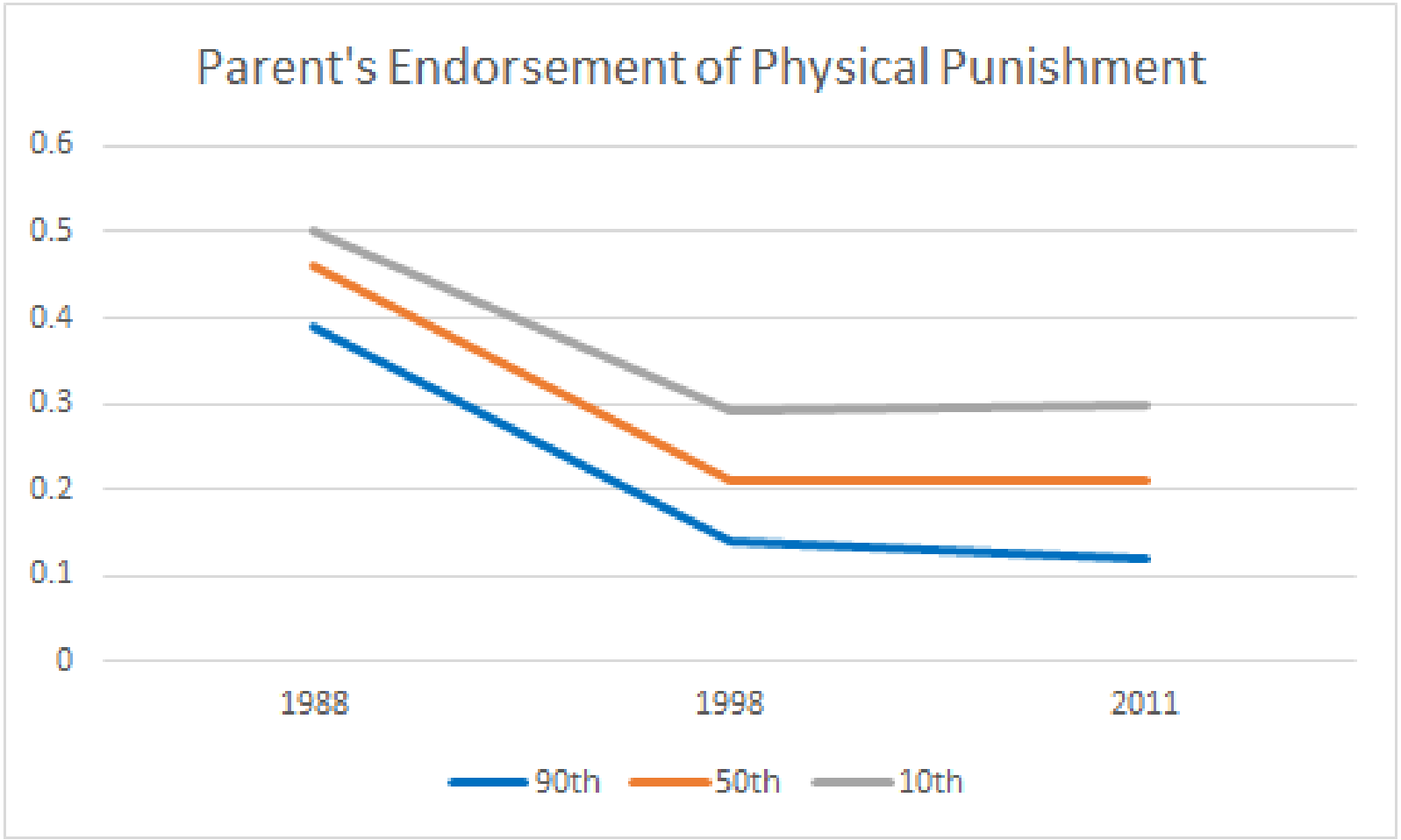

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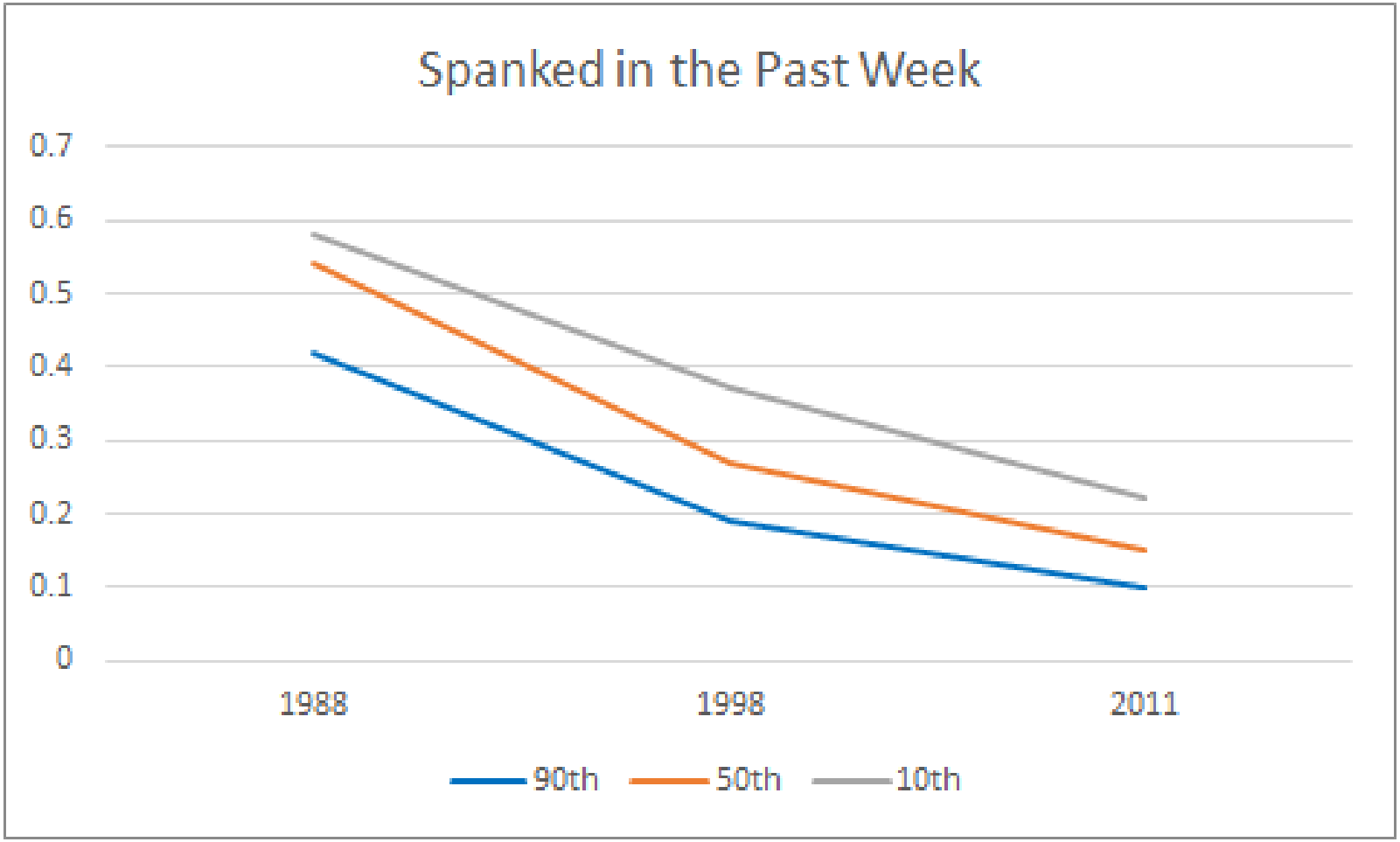

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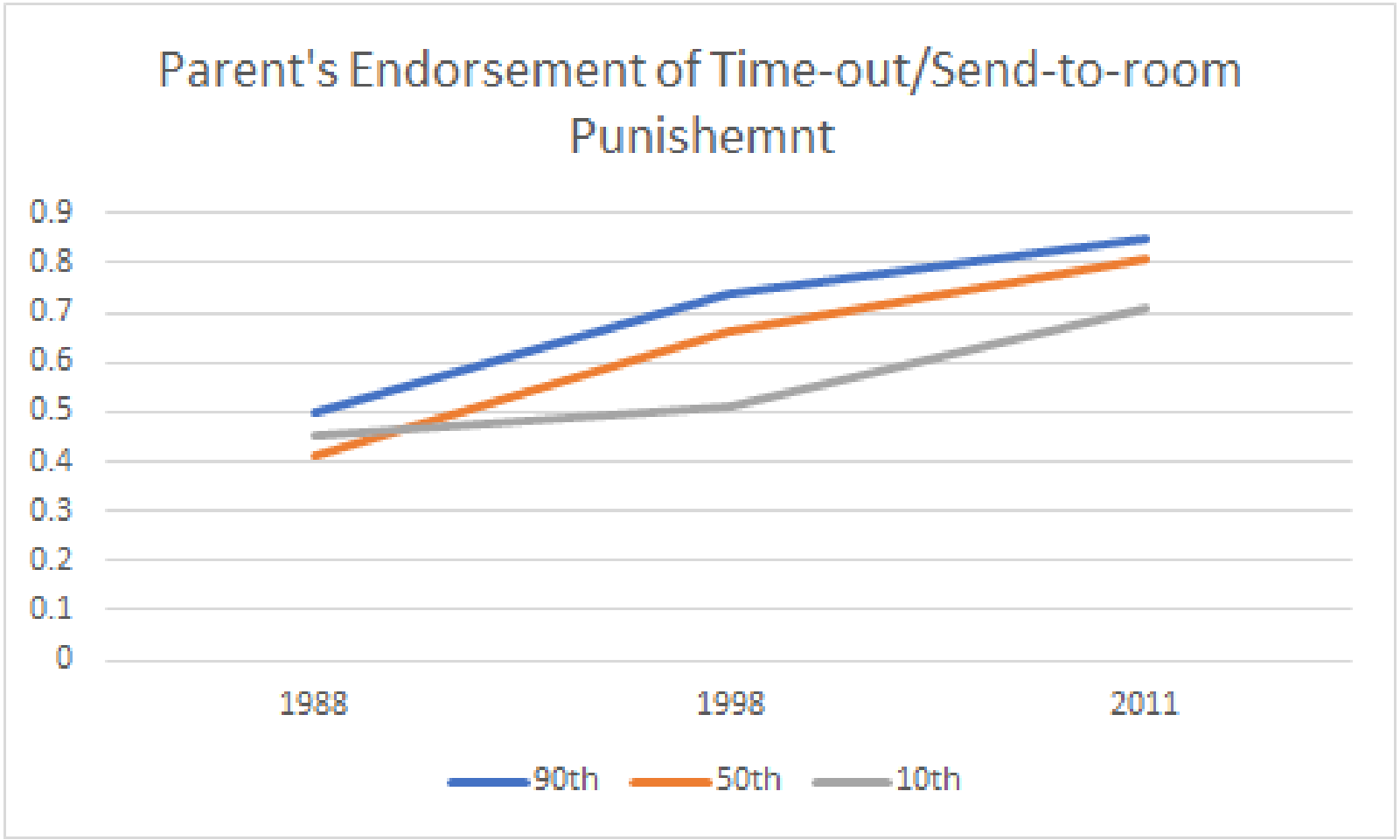

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- Effect of punishment is poorly understood
- Parent-child interaction models Detail
  - principal-agent model with financial incentives (Hao et al. 2008); costly monitoring (Cosconati 2009)
  - occupational restriction vs. preference development (Doepke & Zilibotti 2017)
- 'Harshness' predicts bad behavioral outcomes (Dooley&Stewart 2007, Fiorini&Keane 2014)
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  - We aren't sure yet (Ferguson (2013), Spera (2005))

Developmental Psychology on Parent-child Conflict

- "We found that when parents tried to punish the coercive behavior of problem children, the immediate effect was to make things worse!" (Patterson 1976, 1977)
- Parents of delinquent youths
  - explosive, *inconsistent* punishment (Glueck and Glueck, 1950)
  - categorizes more behaviors as problematic (Patterson 1976)
- Child does not internalize parent's values when parents over-react (Grusec & Goodnow 1994)

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Relevant for economics and policy

- More and more, each individual makes parenting decisions jointly with other life-cycle choices
  - labor supply, saving, migration, retirement, etc.
- Punishment/parenting style measures are widely available but under-utilized
  - Punishment - CNLSY, PSIDCDS (US)
  - Inconsistent parenting - GSCF (Chinese), Fragile Families (US), GSOEP (German), LSAC (Australian), NLSCY (Canadian), PSKC (Korean)
  - Interventions that exclusively target parenting - Triple P (analyzed in this study), Family Check-Up, and others
  - Interventions with both parenting and children component - Perry, ABC, IHDP, RIECE (Thailand), Jamaican study, Prepare for Life (Ireland), ChinaREACH

Preview of Presentation

- Research Question: What is the effect of punishment?
- Answer: depends on the **parenting skill** in consistent punishment
- Model
  - Parent observes the child's behavior, and **signals through punishment** child's optimal behavior
  - Parents differ in the **precision** of punishment signal: consistency of punishment use
  - Child learns more efficiently with more consistent punishment
- Experimental data
  - **trained** parents to use discipline more consistently $\rightarrow$ child outcome improvement
  - parenting skill is a causal input
- Tests using observation data
  - effect of punishment depends on the consistency of punishment

Model Primitives

- $t = 1$: Childhood. Child effort a_1, parental investment I, parental punishment signal M.
- $t = 2$: Adulthood. Child effort a_2.
- Human Capital θ_t of the child

$$\theta_2 = g(\theta_1,\ I,\ a_1)$$

  for investment I and child's effort a_1
- Parent chooses μ and φ in

$$M \sim \mathcal{N}\left(\mu,\ s_M^{-1}\right) \text{ (punishment signal)}$$
$$I \sim \mathcal{N}\left(\varphi,\ s_I^{-1}\right) \text{ (investment)}$$

Preferences

- Child's preference

$$-Cost_1(a_1) - \underbrace{(M - a_1)^2}_{\text{punishment}}, \quad t = 1$$

$$\underbrace{\boldsymbol{R}(\theta_2 + \beta_2 \boldsymbol{a_2})}_{\text{outcome}} - Cost_2(a_2), \quad t = 2$$

- Choices: a_1, a_2
- Child is forward-looking, but with beliefs $R \sim \mathcal{N}\left(\rho_1, s_1^{-1}\right)$ and $R \sim \mathcal{N}\left(\rho_2, s_2^{-1}\right)$. Objective
- Beliefs updated after observing parent's behavior

Preferences

- Parent's preference

$$-InvCost(\varphi) + \alpha_1 \left[\underbrace{-Cost_1(a_1) - (M - a_1)^2}_{\text{child's t=1 utility}} \right], \ t = 1$$

$$\alpha_2 \left[\underbrace{\boldsymbol{R}(\theta_2 + \beta_\tau a_2) - Cost_2(a_2)}_{\text{child's t=2 utility}} \right], \ t = 2$$

- Choices: φ, μ $\left(I \sim \mathcal{N}\left(\varphi, s_I^{-1}\right),\ M \sim \mathcal{N}\left(\mu, s_M^{-1}\right)\right)$
- Expectation taken over the realizations of I and M, which then affect the choice of a_2.
- If child knew R, $\varphi^\dagger = \lambda_I R$, $\mu = a_1^\dagger$ (punishment minimized)

Timing

Timing	Period	State		Choice	
		Child's Belief on R	Human Capital	Child's choice	Parent's choice
1	$t=1$	ρ_1 (prior)	θ_1	a_1	-
2	$t=1$	ρ_1 (prior)	θ_1	-	$\mu,\ \varphi$
3	$t=1$	Signals $M \sim \mathcal{N}\left(\mu, s_M^{-1}\right)$, $I \sim \mathcal{N}\left(\varphi, s_I^{-1}\right)$ realized			
4	$t=1$	Human capital produced: $\theta_2 = g\left(\theta_1,\ I,\ a_1\right)$			
		Child's prior belief updated to posterior belief $\rho_2,\ s_2$			
5	$t=2$	ρ_2 (posterior)	θ_2	a_2	-
6	$t=2$	Child outcome generated: $R \times f\left(\theta_2,\ a_2\right)$			

Technology and Beliefs

- Child's long-run outcome, realized at the end of $t = 2$

$$\boldsymbol{R} \times f(\theta_2,\ a_2)$$

- Parent knows the value of R.
- Child's belief:

$$R \sim \mathcal{N}\left(\rho_1,\ s_1^{-1}\right) \text{ (prior)}$$
$$R \sim \mathcal{N}\left(\rho_2,\ s_2^{-1}\right) \text{ (posterior)}$$

Child's belief updated after observing M and I.

Signaling Technology

- At $t = 1$, child chooses

$$a_1^* = \lambda_{M,1} \rho_1$$

whereas optimal (perfect information) choice is

$$a_1^\dagger = \lambda_{M,1} R$$

- Parent responds by choosing μ in punishment signal, by choosing $w \in \mathbb{R}$:

$$\mu = w a_1^\dagger + (1 - w)\, a_1^*$$
$$M \sim \mathcal{N}\left(\mu,\ s_M^{-1}\right)$$

- Punishment:

$$(M - a_1^*)^2$$

Child Belief

- After observing M and I, Posterior belief is

$$\rho_2 = \frac{1}{s_2}\left(s_1\rho_1 + \boldsymbol{s_M}\lambda_{M,1}^2\frac{M}{\lambda_{M,1}} + s_I\lambda_I^2\frac{I}{\lambda_I}\right)$$
$$s_2 = s_1 + s_M\lambda_{M,1}^2 + s_I\lambda_I^2$$

  using 'naive' rules

$$E\left[\frac{M}{\lambda_{M,1}}\right] = R,\ E\left[\frac{I}{\lambda_{I,1}}\right] = R$$

- Same implications for any 'fixed rule' that the child uses Detail
- Higher s_M: ρ_2 responds more to parenting signal
- This is the 'benefit' of punishment.

Signaling Technology

- Parent calculates expected punishment

$$E\left[(M-a_1)^2\right] = \underbrace{s_M^{-1}}_{\text{parenting skill}} + \underbrace{w^2}_{\text{strictness}} \underbrace{\left(a_1^{\dagger}-a_1^{*}\right)^2}_{\text{misbehavior}}$$

- This is the 'cost' of punishment.
- s_M: **parenting skill** in managing parent-child conflict during punishment
  - Low parenting skill: punishment attempt (μ) results in conflict (s_M^{-1}), with low gain through ρ_2

Baseline Model

Theorem

Optimal child effort a_1 and a_2 are increasing in ρ_1 and ρ_2 respectively. Optimal investment φ is increasing in R and $(R-\rho_1)$. Optimal punishment is increasing in w^* and $(R-\rho_1)^2$, where w^* is determined by equation (1).

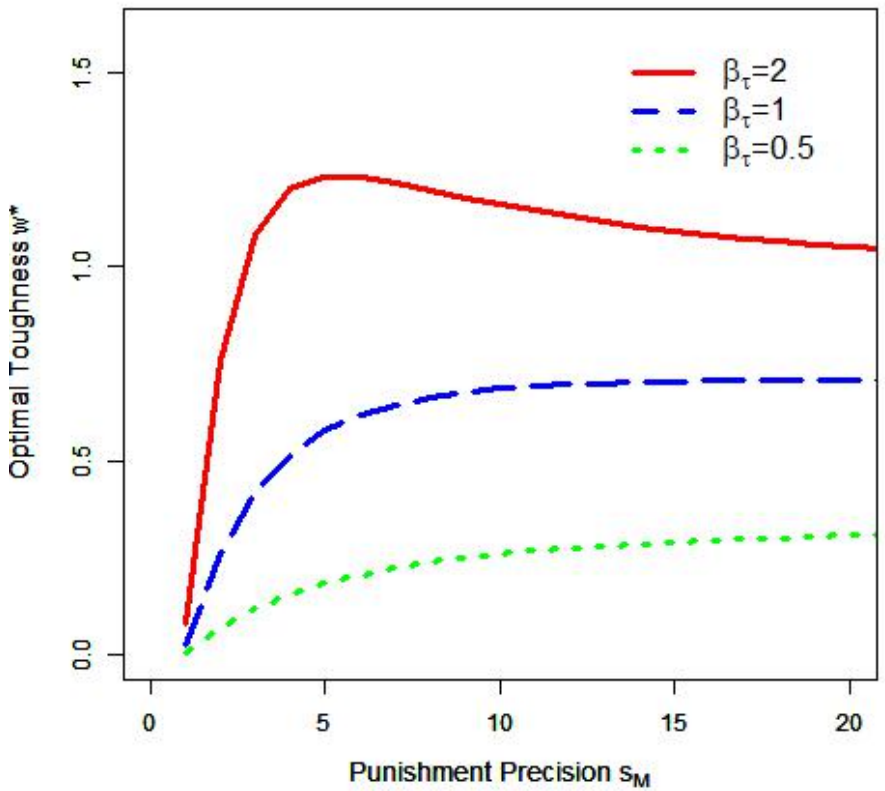
where

$$w^* = \frac{s_1 \Psi_M + s_M \lambda_M^2 \Psi_M}{\frac{\alpha_1}{\alpha_2} + s_M \lambda_M^2 \Psi_M} \tag{1}$$

for functions of model parameters $\Psi_M > 0$, $\Psi_I > 0$, $\lambda_M > 0$. Detail

Baseline Model

- As $s_M \to \infty$, $w^* \to w^{lim} \in (0,1)$
  - w increases as s_M increases (at least initially)
  - When β_τ very high, it can make sense to choose $w > 1$
  - Eventually, as s_M gets very large, w approaches 1



Prediction 1

Proposition

Child misbehavior is more likely to be punished as s_M increases.

$$E\left[(M-a_1)^2\right] = s_M^{-1} + w^2\left(a_1^{\dagger} - a_1\right)^2$$

$$\lim_{s_M \to \infty} E\left[(M-a_1)^2\right] = \left(w^{lim}\right)^2\left(a_1^{\dagger} - a_1\right)^2$$

As s_M increases, s_M^{-1} decreases and w^2 increases.

Prediction 2

Proposition

Child outcome improves in punishment as s_M increases.

- s_M increases $\rightarrow w$ increases $\rightarrow \rho_2$ increases (towards R) $\rightarrow$ a_2 increases (towards $a_2^\dagger$)
- At higher s_M, punishment is the cost of informative signal
- At lower s_M, punishment is noise (parent-chid conflict)
- The effect of punishment on outcome depends on s_M

Prediction 3

Proposition

Child's expectation of own outcome improves in punishment as s_M increases.

- Timing: child observes M, I; parent only knows μ, φ

$$E_{Ch}[\boldsymbol{R}\theta_2] + \beta_\tau E_{Ch}[\boldsymbol{R}a_2] - \frac{\tau E_{Ch}\left[a_2^2\right]}{2}$$

$$= \rho_2 \theta_2 + \rho_2 \beta_\tau a_2 - \frac{\tau a_2^2}{2}$$

Child's expectation moves the same way child's outcome moves.

Summary of Model

- Parent chooses how strict (μ) she is about the child's misbehavior
- Low-skilled (high s_M^{-1}) parent sends inconsistent signal, poor effect on child's posterior belief
- Posterior belief determines child's $t = 2$ effort towards LR outcomes.
- Increasing s_M $\rightarrow$better parenting$\rightarrow$better child outcomes.

Empirical analysis

- Evidence from observational data (NLSY79, US)
  - Effect of punishment depends on consistency (s_M)
- Evidence from experimental data (Triple P, Germany)
  - Increases s_M: parents becoem more consistent in punishment

Evidence from CNLSY

- Experiment based on small sample in a single German city
- CNLSY: nationally representative US sample
- Mostly born in 1980s. 1986~2014, biennial. Focus: age 5-14.
- Child's education and wage outcomes, at 18-26
- Cognitive and Behavioral Skill measures

Skill Measurement by Factor Analysis

- Theoretical analysis presupposes the existence of **cognitive skill** and **behavioral skill**
  - why are they skill: is developed, can depreciate, and earns market returns
- These are theoretical concepts; not directly observed
- Use measurement model to analyze them, inspired by factor analysis

Linear Measurement Error Model

- Let θ_t denote true skill at time t. Assume $E[\theta_t] = 0,\ Var[\theta_t] = 1$.
- Suppose there are three measures of θ_t available: $M_{1,t}, M_{2,t}, M_{3,t}$.
- Measurement model:

$$M_{j,t} = \mu_t + \alpha_{j,t}\theta_t + \varepsilon_{j,t}$$
$$E[\varepsilon_{j,t}] = 0,\ Var[\varepsilon_{j,t}] = \sigma^2_{jt}$$

- Assume measurement error $\varepsilon_{j,t}$ is independent of other measurement error across measures, and of θ_t.

Identification of Linear Measurement Error Mode

- $Var\left[M_{j,t}\right] = \alpha_{j,t}^2 + \sigma_{j,t}^2$
- $Cov\left[M_{1,t}, M_{2,t}\right] = \alpha_{1,t}\alpha_{2,t}$
- $Cov\left[M_{2,t}, M_{3,t}\right] = \alpha_{2,t}\alpha_{3,t}$
- $Cov\left[M_{1,t}, M_{3,t}\right] = \alpha_{1,t}\alpha_{3,t}$
- Key assumption: $\alpha_{1,t} = 1$.

Identification of Linear Measurement Error Mode

- With $\alpha_{1,t} = 1$, $Cov[M_{1,t}, M_{3,t}] = \alpha_{3,t}$, $Cov[M_{1,t}, M_{2,t}] = \alpha_{2,t}$
-

$$Cov[M_{2,t}, M_{3,t}] = \alpha_{2,j,t}\alpha_{3,i,t}$$
$$\rightarrow \frac{Cov[M_{2,t}, M_{3,t}]}{Cov[M_{1,t}, M_{2,t}]} = \alpha_{3,t}$$

- Then, it is possible to identify each component of $Var[M_{j,t}] = \alpha_{j,t}^2 + \sigma_{j,t}^2$.
- Identification requires at least three measures for each factor under these assumptions.
- If $\varepsilon_{j,t}$, $\varepsilon_{j,t+1}$ are serially independent, then only two measures suffice.
  - $cov(M_{1,t}, M_{1,t+1})$, $cov(M_{2,t}, M_{1,t+1})$, $cov(M_{1,t}, M_{2,t+1})$
  - maintain assumption $\alpha_{1,t} = 1$, $\forall t$

Identification of Linear Measurement Error Mode

- It does not matter much which measure gets $\alpha_{1,t} = 1$ assumption, but one should be consistent.
- There are many estimation methods–MLE, principal component, etc. No clear superiority across them.
- Much more important
  - choice of measures
  - measurement model assumption

Interpretation

- Factors have no natural scale.
- One way to impose meaning:

$$Y = \alpha + \beta \theta_T + \varepsilon$$

  where Y is some outcome of objective interest, such as income or school attendance.
- Then a unit gain in skill is interpretable as β-unit gain in the outcome.
- Not perfect, but that's what we have.

Practical issues in factor analysis

- Caution: are test scores unbiased measurse of cognitive skill?
- Chocolate incentive $\rightarrow$children perform higher on IQ tests
- Obviously, effort is a factor in test performance
- We want to make sure these other factors are balanced in the error term.
- This problem is potentially worse for behavioral/personality measures.
  - much less is understood about behavioral/personality measures

Factor analysis in the current study

- Test score (PIAT)
  - Peabody Individual Achievement Test
  - Math, Reading Recognition, Reading Comprehension – three measures in each period
    - desirable, since measurement error is probably serially correlated within each person
  - Measure of human capital θ_t

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Factor analysis in the current study

- Behavior Problems Index (BPI)
  - child's disobedience at home and at school, aggressive behavior
  - Measure of deviation $\left(a_1^{\dagger} - a_1^{*}\right)^2$
- Subscales
  - Headstrong, Antisocial, Anxious/Depressed, Dependent, Hyperactive, Peer Conflict

Factor analysis in the current study

- Sample questioonnaire (answer 1-5) responded by the parent
- “child cheats or lies” (antisocial)
- “child has sudden changes in mood or feeling” (anxious)
- “child clings to adults” (dependent)
- “child is disobedient at home” (headstrong)
- “child is impulsive or acts without thinking” (hyperactive)
- “child is not liked by other children” (peer problems)
- Responses are summed to form sum scores. Sum scores are measures in factor analysis.

Factor analysis in the current study

- Response bias?
  - impossible to fully account for; use multiple respondents when possible
  - control for some baseline characteristics in the measurement model
- Caution: what do 'behavioral skills' measure?
- Depends on the goal of the analysis: choice, outcome, skill
- Current study examines the effect of parenting on child behavior, with implication for child's future outcomes.
  - skill interpretation is most natural
- Alternative measures: Big 5 personality measure
  - more appropriate for older subjects

NLSY79 Punishment Measure

- "About how many times, if any, have you had to spank [Child First Name] in the past week?"
  - spank / ground / taken away TV or other privileges / taken away allowance / sent to his/her room
- Child chooses $a_1 \rightarrow$Parent responds with $M \rightarrow$Punishment realized as $(M - a_1)^2$. Mother's Response
- binary punishment measure: $\mathbb{M}_{punish,t} = \mathbb{I}\left[(M_{i,t} - a_{i,t})^2 - \varepsilon_{i,t} > 0\right]$

NLSY79 Investment

- I_t: investment measure (HOME score)
- Example:
  - "How many books does child have?"
  - "How often do you read aloud to child?"
  - "How often has any family member taken or arranged to take child to any type of museum?"
  - "Does child have the use of a CD player, tape deck, or tape recorder, or record player at home and at least 5 children's records or tapes?"

NLSY79

- Use measures of parent's human capital (AFQT, Yrs of Educ) to proxy parenting skill
- Human capital forms parenting skill
- Received parenting forms parenting skill
  - Child imitates received parenting to own children
  - Child has more human capital (model)

Descriptive Model

Table: Descriptive Model

	(1) punishment	(2) investment
Log Net HH income	-0.016***	0.037***
	(0.002)	(0.006)
Father presence at home	-0.004	0.172***
	(0.009)	(0.018)
AFQT	-0.041***	0.305***
	(0.006)	(0.014)
firstborn	0.060***	0.290***
	(0.007)	(0.013)
Child is female	-0.069***	0.121***
	(0.007)	(0.015)
BLACK	0.013	0.069
	(0.014)	(0.038)
NON-BLACK, NON-HISPANIC	-0.002	0.187***
	(0.014)	(0.035)
Constant	0.774***	-0.763***
	(0.029)	(0.067)
Observations	8687	8605
R2	0.041	0.270

Prediction 1

- Prediction 1: Child misbehavior is more likely to be punished as s_M increases.
- Expected punishment = signal noise + strictness×child noncompliance
  - $E\left[(M-a_1)^2\right] = s_M^{-1} + w^2\left(a_1^{\dagger} - a_1\right)^2$
- $\mathbb{M}_{punish,t} = \beta_0 + \beta_1 \underbrace{AFQT_i}_{s_M^{-1}} + \underbrace{(\beta_2 + \beta_3 AFQT_i)}_{w^2} \times BPI_{i,t} + X_{i,t}\gamma + \varepsilon_{i,t}$
- Predict $\beta_3 > 0$

Prediction 1

Table: Parenting

	(1) Pun.	(2) Pun.	(3) Inv.	(4) Inv.
BPIxAFQT	0.018***	0.014*	-0.001	-0.009
	(0.004)	(0.007)	(0.009)	(0.011)
BPI	0.143***	0.111***	-0.104***	-0.036***
	(0.004)	(0.007)	(0.008)	(0.011)
AFQT	-0.004	0.000	0.244***	0.000
	(0.006)	(.)	(0.015)	(.)
PIAT	-0.014**	-0.004	0.113***	0.043***
	(0.005)	(0.008)	(0.009)	(0.011)
Observations	22686	22686	23906	23906
Model	RE	FE	RE	FE
R2	0.182	0.133	0.334	0.206

Note: Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. Pun. is any punishment between child ages 8 and 14. Inv. Investment is estimated factor for cognitive stimulation scale for ages 8 through 14. Additional controls include log household net income, indicators for father's presence at home, race, child's birth year, parent's birth year, child's gender and child's birth order. AFQT is parent's AFQT score. BPI is scaled so that higher value indicates more noncompliance.

OtherMeasures

Prediction 2

- Prediction 2: Child outcome improves in punishment as s_M increases
- $y_j = \beta_0 + \beta_1 AFQT_i + (\beta_2 + \beta_3 AFQT_i) \times Pun_{i,t} + X_{i,t}\gamma + \varepsilon_{i,t}$
- X includes household income, indicators for child's race, gender, child's birthyear, parent's birthyear, state and county.
- Prediction: $\beta_3 > 0$

Prediction 2

Table: Child outcomes

	(1) lnWage	(2) lnWage	(3) lnWage	(4) College	(5) College	(6) College
Punishment	-0.392	-0.307	-0.334	-0.182***	-0.189***	-0.211***
	(0.279)	(0.301)	(0.341)	(0.042)	(0.047)	(0.047)
Pun.xAFQT	0.789**	0.746*	0.652*	0.158***	0.172***	0.153***
	(0.283)	(0.310)	(0.329)	(0.037)	(0.040)	(0.045)
AFQT	-0.619	-0.620	-0.513	-0.075*	-0.095*	-0.098*
	(0.321)	(0.344)	(0.348)	(0.036)	(0.040)	(0.042)
Observations	1299	1166	1166	807	734	734
R^2	0.091	0.129	0.177	0.349	0.380	0.434
Adjusted R^2	0.073	0.076	0.062	0.331	0.323	0.312
Model	None	State FE	County FE	None	State FE	County FE

Note: Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. lnWage is log (inverse hyperbolic sine transformation) wage earnings at age 26. College is college attendance status at age 22. Additional controls include indicators for race, child's birth year, parent's birth year and child's gender. Punishment is indicator for any punishment used at ages 8 through 14. Investment is estimated factor for cognitive stimulation scale for ages 8 through 14. AFQT is parent's AFQT score.

Prediction 2

Table: Child skills

	(1) PIAT	(2) PIAT	(3) BPI	(4) BPI
L.punish	0.012	0.022^{+}	-0.063***	0.091***
	(0.009)	(0.013)	(0.012)	(0.017)
L.Pun.xAFQT	0.024**	0.030*	0.003	0.011
	(0.009)	(0.012)	(0.012)	(0.016)
L.Inv.	0.039***	-0.016^{+}	0.049***	-0.010
	(0.005)	(0.008)	(0.008)	(0.011)
Observations	6689	4416	6777	4383
Model	RE	FE	RE	FE
r2_b	0.781		0.658	

Observations are number of parent-child pairs. Standard errors are in parenthesis, clustered at the household level. + p<.1, * p<.05, ** p<.01, *** p<.001. FE estimates Arellano-Bond GMM estimator. PIAT is latent factor estimate from Peabody Individual Achievement Test scores. BPI is latent factor estimate from Behavior Problems Index, scaled so that higher value indicates better behavior. Additional controls include lag of skills, lag of log (inverse hyperbolic sine transformation) household net income, lag of father's presence at home, indicators for race, child's birth year, parent's birth year and child's gender. Punishment is indicator for any punishment used . Investment is cognitive stimulation scale from HOME score. AFQT is parent's AFQT score.

Prediction 3

- Prediction 3: Child's expectation of own outcome increases in punishment as s_M increases
- Measure (age 14): "Looking ahead, how far do you think [Child First Name] will go in school?"
  - leave high school before graduation
  - graduate from high school
  - get some college or other training
  - graduate from college
  - take further training after college

Subjective Expectations

Table: Subjective Expectations

	(1) Mother	(2) Mother	(3) Child	(4) Child
L.Pun.xAFQT	0.011	-0.001	0.023**	0.014
	(0.008)	(0.011)	(0.009)	(0.014)
L.punish	0.009	0.011	-0.000	-0.007
	(0.009)	(0.011)	(0.010)	(0.016)
AFQT	0.087***	0.000	0.027**	0.000
	(0.009)	(.)	(0.008)	(.)
Observations	11155	11155	9371	9371
Model	RE	FE	RE	FE
R2	0.302	0.026	0.154	0.068

Note: Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. Outcome variable: subjective expectation that child will at least graduate 4 yr college. Additional controls include lagged cognitive and behavior factors, indicators for race, child's birth year, parent's birth year and child's gender. Punishment is indicator for any punishment used at ages 8 through 14. Investment is estimated factor for cognitive stimulation scale for ages 8 through 14. AFQT is parent's AFQT score.

Alternative Explanations

- Alternative explanations should be able to account for both experimental and observational data
- Principal agent model with cost of punishment (Weinberg (2001)
  - Incentive leads to better child outcomes. Inconsistent with negative effect of punishment
- Ineffective incentive use due to poor parental monitoring (Akabayashi (2006))
  - Poor monitoring can lead to too little incentive transferred relative to chlid behavior (maltreatment)
  - Experimental evidence: program is about how to interact with the child once misbehavior is observed.
  - CNLSY: parent's HC might be positively correlated with parental monitoring ability
    - strong enough to compensate longer hours of work

Alternative Explanations

- Costly incentive use when the parent has private information about child's productivity (Benabou Tirole (2003))
  - Incentive never announced/used when the parent thinks child is highly productive, since incentive is wasted
  - For punishment, logic is reversed: costly punishment is never announced/used when the child is unproductive
    - In this case, announcing the use of punishment actually sends positive signal
  - Then, we expect less punishment on average when the child is always misbehaved
  - Contrary to empirical evidence and psychology literature

MoreTest

Alternative Explanations

- Parental incentive with heterogeneous child ability (Cosconati (2009, 2013))
  - Children with more baseline human capital endogenously chooses more effort
    - Can be nested into signaling model's prior belief ρ_1.
  - Implication: Parent's universal restriction of child's time allocation ("curfew") benefits children with low human capital
  - Is punishment restriction of child's time allocation?
  - If so, frequent punishment means child's time use is more heavily controlled

Alternative Explanations

Table: Child outcomes

	(1) Wage	(2) Wage	(3) Wage	(4) College	(5) College	(6) College
punish_l	-0.050	0.173	-0.247	-0.110	-0.099	-0.133
	(0.387)	(0.467)	(0.495)	(0.058)	(0.063)	(0.070)
cogXpunish	0.424	0.408	0.571	0.132**	0.145**	0.191**
	(0.306)	(0.361)	(0.371)	(0.050)	(0.054)	(0.063)
AFQT	0.138	0.099	0.137	0.046	0.043	0.031
	(0.146)	(0.167)	(0.187)	(0.026)	(0.030)	(0.031)
Observations	868	778	778	583	530	530
R^2	0.115	0.163	0.267	0.399	0.426	0.515
Adjusted R^2	0.086	0.084	0.113	0.374	0.350	0.361
Model	None	State FE	County FE	None	State FE	County FE

Note: Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. lnWage is log (inverse hyperbolic sine transformation) wage earnings at age 26. College is college attendance status at age 22. Additional controls include log net household income, father's presence at home, indicators for race, child's birth year, parent's birth year and child's gender. Punishment is indicator for any punishment used at ages 8 through 14. Investment is estimated factor for cognitive stimulation scale for ages 8 through 14. AFQT is parent's AFQT score.

Alternative Explanations

Table: Child skills

	(1) PIAT	(2) PIAT	(3) BPI	(4) BPI
L.punish	0.012	0.040^{+}	-0.087***	0.105**
	(0.019)	(0.022)	(0.024)	(0.038)
L.Pun.xAFQT	0.025	0.061**	-0.010	0.012
	(0.021)	(0.023)	(0.026)	(0.038)
L.Inv.	0.022*	-0.016	0.035**	-0.001
	(0.010)	(0.013)	(0.013)	(0.022)
Observations	1569	1115	1570	1094
Model	RE	FE	RE	FE
R2	0.669		0.661	

Note: Sample consists of below-sample-average child human capital at age 5-6. Observations are number of parent-child pairs. Standard errors are in parenthesis, clustered at the household level. + p<.1, * p<.05, ** p<.01, *** p<.001. FE estimates Arellano-Bond GMM estimator. PIAT is latent factor estimate from Peabody Individual Achievement Test scores. BPI is latent factor estimate from Behavior Problems Index, scaled so that higher value indicates better behavior. Additional controls include lag of skills, lag of log (inverse hyperbolic sine transformation) household net income, lag of father's presence at home, indicators for race, child's birth year, parent's birth year and child's gender. Punishment is indicator for any punishment used . Investment is cognitive stimulation scale from HOME score. AFQT is parent's AFQT score. ChildHC is child's average PIAT score between ages 8 and 14.

Experimental Evidence

- Treatment: Parents **trained** on how to use punishment while avoiding conflict
- Training when child age 3-6, only parent involved
- Parenting measured for 4yrs: age 4-10
- Outcome measured at 10yrs: age 13-16
- Curriculum: Level 4 Triple P, implemented in Germany, 2000-2001

Who were in the program?

- Parents who had child between age 3-6 and spoke German
- Volunteered to participate in the program prior to randomization
  - not nationally representative
  - knew they needed/wanted better parenting, lacked knowledge/skill
- 477 households in 33 preschools at baseline Desc.Stat.

What were they trained to do?

- Parents are trained to
  - give clear, calm instructions
  - back up instructions with consequences (punishment)
  - state the reason a3nd rules for punishment
  - avoid using vague instructions
  - avoid allowing multiple chances to the child before punishing
- Identify and ignore trivial resistance from the child
- Example: 'Quiet Time'

Measures

- Selected measures of harsh parenting
  - "When there is a problem with my child, things get out of control and I do things I regret"
  - "I yell at the child"
  - "If my child does something I do not like, I let it pass easily"
  - "I threaten with things that I know I won't do"
- Interpreted as a **direct measure** of parenting skill s_M

Measures

- Child outcome: child's problematic (externalizing) behavior in adolescence
  - "argue too much"
  - "do not obey parents"
  - "do not obey at school"
  - "often get into trouble for fighting"
- Typical measures of noncognitive skill
- A dimension of a_2

Harsh Punishment, 1-4 yr follow up

Table: Effect on Harsh Punishment

	(1)	(2)
Parenting Training	-0.563***	-0.543***
	(0.123)	(0.070)
Observations	463	462
R^2	0.050	0.202
Adjusted R^2	0.048	0.188
Control	X	O

Note: Response of parenting measures. Error terms clustered at preschool level. Controls include: baseline child behavior, single mother status, mother's education, neighborhood quality, indicator for participation incentive, indicator for group setting.

Harsh Punishment, 1-4 yr follow up

Table: Effect on Harsh Punishment

	(1)	(2)	(3)	(4)
Parenting Training	-0.555***	-0.558***	-0.405	-0.575***
	(0.115)	(0.112)	(0.366)	(0.089)
Observations	267	195	130	319
R^2	0.253	0.145	0.288	0.212
Adjusted R^2	0.233	0.113	0.241	0.191
Control	O	O	O	O
ParentEduc	Less than HS	HS or more		
Income			Poverty	Not in Poverty

Note: Response of parenting measures. Error terms clustered at preschool level. Poverty status means monthly income less than 2000DM at baseline. Controls include: baseline child behavior, single mother status, mother's education, neighborhood quality, indicator for participation incentive, indicator for group setting

Child Outcome, 10 yr follow up

Table: Effect on Child's Problematic Behavior, 10yrs

	(1)	(2)
Parenting Training	-0.217^{+}	-0.257*
	(0.129)	(0.140)
Observations	358	353
R^2	0.008	0.040
Adjusted R^2	0.005	0.018
Control	X	O

Note: Error terms clustered at preschool level. Controls include: baseline child behavior, single mother status, mother's education, neighborhood quality, indicator for participation incentive, indicator for group setting. Outcome is child externalizing behavior at 10 yr follow up.

Child Outcome, 10 yr follow up

Table: Effect on Child's Problematic Behavior, 10yrs

	(1)	(2)	(3)	(4)
Parenting Training	-0.177	-0.353*	-0.134	-0.284+
	(0.164)	(0.185)	(0.309)	(0.168)
Observations	187	166	72	270
R^2	0.075	0.044	0.265	0.030
Adjusted R^2	0.039	0.002	0.172	0.000
Control	O	O	O	O
ParentEduc	Less than HS	HS or more		
Income			Poverty	Not in Poverty

Note: Response of parenting measures. Error terms clustered at preschool level. Poverty status means monthly income less than 2000DM at baseline. Controls include: baseline child behavior, single mother status, mother's education, neighborhood quality, indicator for participation incentive, indicator for group setting

Child Outcome, Immediately after the Program

Table: Pre-Post Effects

	(1) Harsh Parenting	(2) Problematic Behavior
Parent Training	-0.594***	0.052
	(0.052)	(0.613)
Observations	466	466
R^2	0.223	0.622
Adjusted R^2	0.210	0.615
Control	O	O

Note: Standard errors clustered at preschool level. Outcomes measured immediately after the program.

IPW

Conclusion

- A model of raising a child
  - material investment
  - parent's skill
- A model of noncognitive skill production: subjective belief on the returns to effort
- Punishment: a way to shape child's behavior (noncognitive skill)
- Parenting skill determines the effect of punishment on child's behavior (noncognitive skill)
- Common measure of parenting is a causal input to child HC: harshness, inconsistency
- Evidence-based policy recommendation: don't tell/restrain parents, teach parents
- Implication for policy evaluation: household response to policy may depend on parenting skill

Parent-child Interaction

- In psychology:
  - Parenting style (Baumrind (1966))
  - Emotional climate (Darling&Steinberg (1993))
  - Reinforcement mechanism (Granic&Patterson (2006))
- In economics:
  - Incentive to the child (Weinberg (2001), Hao et al. (2008), Cosconati (2009))
  - Preference formation vs. choice restriction (Doepke&Zilibotti (2018))
  - Guided learning (Lizzeri&Siniscalchi (2008))
  - Costly engagement (Cunha (2015), Cobb-Clark et al. (2018)) Return

Triple P Descriptive Statistics

	Control	Intervention 1	Intervention 2	p-value
Problematic Behavior	-0.216	-0.055	0.157	0.21
Poverty Status	0.074	0.050	0.637	0.59
Mother graduated HS	0.553	0.541	0.228	0.87
Single Mother	0.106	0.049	0.192	0.17
Low Neighborhood	0.234	0.242	1.000	0.97
Middle Neighborhood	0.426	0.296	0.000	0.64
High Neighborhood	0.340	0.462	0.000	0.66
Individual Session	0.000	0.000	0.574	0
No Participation Incentive	0.000	0.000	0.320	0
Sample Size	94	186	197	
Number of Clusters	7	11	15	

Note: Internvention 1 refers to the first study with both the intervention and the control group. Intervention 2 refers to the second study which randomized on participation incentive and individual setting. Problematic behavior is a baseline measure of Child Behavior Checklist externalizing behavior subscale at baseline, normalized to be mean 0 and standard deviation 1 in the sample. A household is defined to as in poverty status if it makes less than 2,000 Deutsche Marks in monthly household income, where the exchange rate is approximately 1 DM $\approx$ 0.54 USD in 2001-2002. High school graduation equaled 1 if respondent's last degree attained was upper secondary or attended college. Low, middle and high neighborhood quality scale is constructed using objective kindergarten social structure index (OKS). The scale is based on the rate of unemployment, number of families on welfare, number of immigrants and quality of housing in the particular neighborhood (Base (1995)). Fifth column is the p-value from the two-sided t-test against the null of zero in regressing the baseline variable on the training recipiency status, conditional on the indicator for belong in the second study.

Return

Alternative Explanations

Table: Intervention Effect with Inverse Probability Weighting

	(1) Harsh parenting	(2) Harsh parenting	(3) Problematic behvior	(4) Problematic behvior
Parent Training	-0.577***	-0.542***	-0.216+	-0.238*
	(0.146)	(0.073)	(0.131)	(0.138)
Observations	449	449	342	342
R^2	0.045	0.227	0.008	0.054
Adjusted R^2	0.043	0.213	0.005	0.032
Control	X	O	X	O

Note: Error terms clustered at preschool level. Controls include: baseline child externalizing behavior, single mother status, mother's high school graduation status, neighborhood quality index, participation incentive recipiency, and indicator for individual training setting. Weights are the inverse of the predicted probability of child outcome being measured at 10 year follow up. This probability is estimated by logit model with predictors including intervention group indicator, poverty status indicator, indicator for being in the second study, baseline child externalizing behavior, mother's high school graduation status, single mother status and neighborhood quality index.

Return

Other implications

1. Parent's expectation of child outcomes become more accurate as s_M increases.
2. Parenting from first to second generation predicts parenting from second to third generation NLSY79
3. Change in the parent's belief in R shifts increases investment NLSY79
4. Punishment use falls over child's age, and falls faster for parents with more parenting skill
    1. For moderate punishment, there is a 'cross'
    2. Corporal punishment use declines steadily across all ages

Subjective Expectations

Table: Education Attainment

	(1) somecol22	(2) somecol22	(3) somecol22
Mother expects at least 4yr college	0.256***	0.263***	0.243***
	(0.032)	(0.034)	(0.036)
Mother.xAFQT	0.086**	0.081*	0.078*
	(0.031)	(0.033)	(0.035)
Child expects at least 4yr college	0.097**	0.076	0.077
	(0.035)	(0.040)	(0.043)
Child.xAFQT	0.028	0.034	0.011
	(0.038)	(0.044)	(0.048)
AFQT	0.007	0.009	0.018
	(0.036)	(0.043)	(0.045)
Observations	1040	936	936
Adjusted R^2	0.352	0.345	0.345
Model	RE	State FE	County FE

Note: Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. Expectation: child will at least graduate college. Additional controls include lagged cognitive and behavior factors, indicators for race, child's birth year, parent's birth year and child's gender. AFQT is parent's AFQT score.

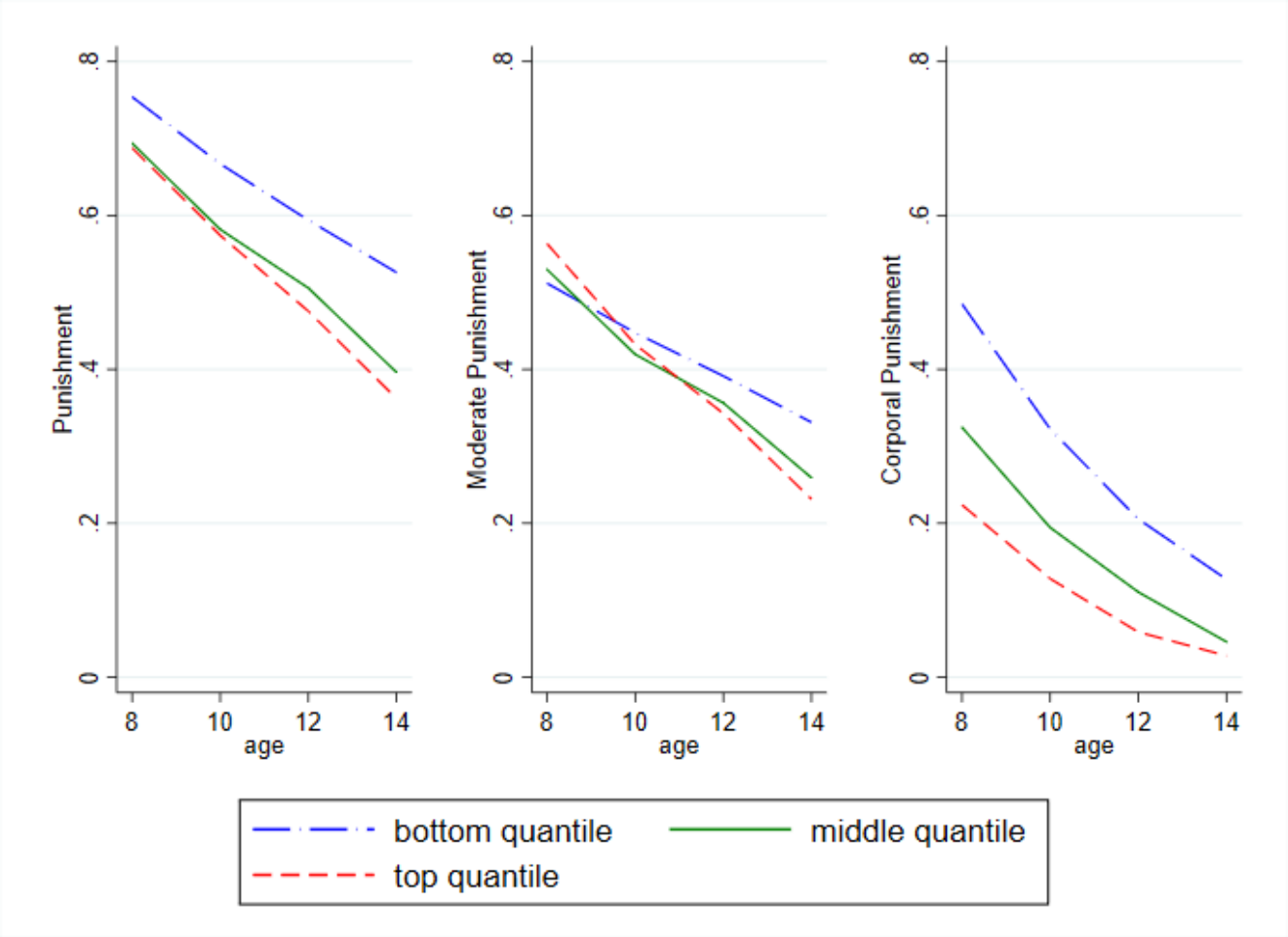
Subjective Expectations

Table: Education Attainment

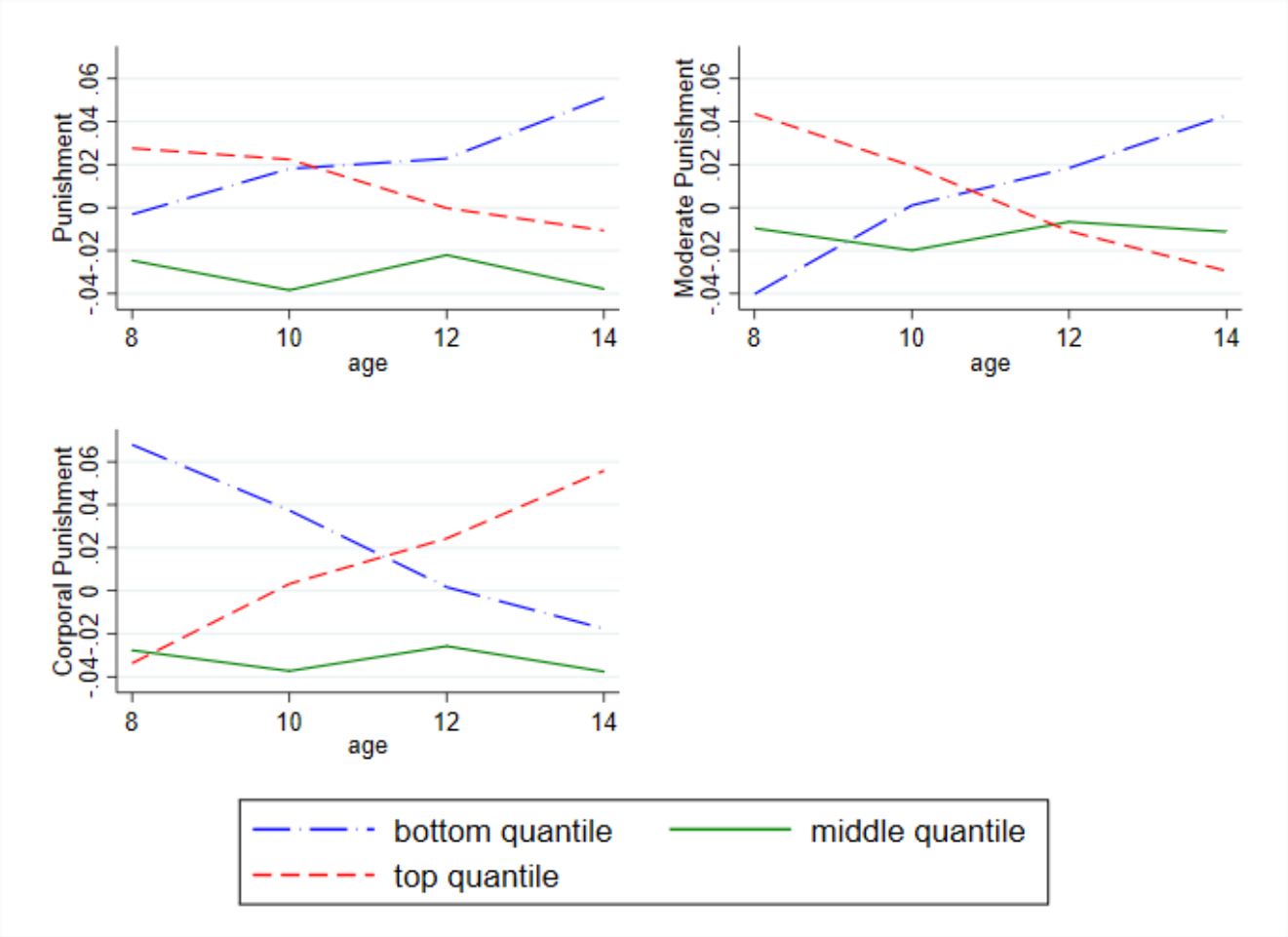
	(1) hsgrad20	(2) hsgrad20	(3) hsgrad20
Mother expects at least HS grad	0.277	0.323	0.253
	(0.223)	(0.250)	(0.180)
Mother.xAFQT	0.252	0.286	0.405*
	(0.244)	(0.255)	(0.178)
Child expects at least HS grad	0.707***	0.694***	0.776***
	(0.055)	(0.060)	(0.062)
Child.xAFQT	0.162	-0.015	-0.005
	(0.136)	(0.086)	(0.106)
AFQT	-0.389	-0.245	-0.383*
	(0.274)	(0.233)	(0.190)
Observations	869	786	786
Adjusted R^2	0.149	0.134	0.149
Model	RE	State FE	County FE

Note: Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. Expectation: child will at least graduate HS. Additional controls include lagged cognitive and behavior factors, indicators for race, child's birth year, parent's birth year and child's gender. AFQT is parent's AFQT score.

Parenting dynamic



Parenting dynamic



Intergenerational implication

- Prediction: received parenting predicts giving parenting
- Literature: intergenerational transmission of grooming behavior among rats

Intergenerational implication (NLSY79)

Table 15: Parental Investment

	(1) Reads to	(2) Reads to	(3) Reads to	(4) Plays with	(5) Plays with	(6) Plays with
Investment	0.069*	0.062	0.069	0.053*	0.053	0.051
	(0.031)	(0.036)	(0.040)	(0.027)	(0.035)	(0.038)
Moderate Pun.	0.134*	0.151*	0.176*	0.100	0.151*	0.147*
	(0.056)	(0.062)	(0.071)	(0.051)	(0.059)	(0.072)
Corporal Pun.	0.028	0.019	-0.026	0.005	0.008	-0.012
	(0.052)	(0.061)	(0.073)	(0.050)	(0.063)	(0.066)
PIAT	-0.084**	-0.070*	-0.058	-0.026	0.009	0.076
	(0.030)	(0.034)	(0.045)	(0.029)	(0.035)	(0.045)
BPI	0.017	0.046	0.041	0.016	0.029	0.008
	(0.025)	(0.027)	(0.030)	(0.023)	(0.026)	(0.032)
AFQT	0.065*	0.056	0.056	0.007	0.026	-0.059
	(0.032)	(0.039)	(0.044)	(0.032)	(0.039)	(0.045)
Observations	402	355	355	358	317	317
R^2	0.166	0.256	0.447	0.172	0.303	0.455
Adjusted R^2	0.063	0.025	0.077	0.056	0.059	0.038
FixedEffect	None	State FE	County FE	None	State FE	County FE

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Intergenerational implication (Triple P)

Table: Received Parenting to Giving Parenting

	(1)	(2)	(3)	(4)
Received parenting	0.118^{+}		0.116^{+}	
	(0.064)		(0.062)	
Warmth		-0.020*		-0.019*
		(0.008)		(0.008)
Control		0.017		0.017
		(0.016)		(0.016)
Observations	265	268	265	268
R^2	0.120	0.132	0.120	0.132
Adjusted R^2	0.100	0.108	0.100	0.108

Note: Error term clustered at preschool level.

Objective Functions

- Child's objective in $t = 2$:

$$\max_{a_2} E_{Ch2}\left[-Cost_2\left(a_2\right) + R\left(\theta_2 + \beta_2 \boldsymbol{a_2}\right)\right]$$

- Child's objective in $t = 1$:

$$\max_{a_1} E_{Ch1}\left[-Cost_1\left(\boldsymbol{a_1}\right) - \left(M - \boldsymbol{a_1}\right)^2 + \delta\left(-Cost_2\left(a_2\right) + R\left(\theta_{\boldsymbol{2}} + \beta_2 a_2\right)\right)\right]$$

- $E_{Ch2}\left[R\right] = \rho_2,\ E_{Ch1}\left[R\right] = \rho_1$

Objective Functions

- Parent's objective:

$$\begin{aligned}
&\max_{\varphi,\mu} -InvCost(\varphi) + \alpha_1 E_{Par}[\text{Child's t=1 utility}] \\
&+ \alpha_2 \delta E_{Par}[\text{Child's t=2 utility}] \\
\equiv &\max_{\varphi,\mu} -InvCost(\varphi) \\
&+ \alpha_1 E_{Par}\left[-Cost_1(a_1) - (M - a_1)^2\right] \\
&+ \alpha_2 \delta E_{Par}[-Cost_2(a_2) + R(\theta_2 + \beta_2 a_2)]
\end{aligned}$$

- φ affects θ_2 and a_2, at the cost of $InvCost(\varphi)$
- μ affects a_2, at the cost of $(M - a_1)^2$
- a_1 is given from the parent's perspective. Return

Classical Approach

- Suppose $\mu^* = w\lambda_M R + (1-w)\, a_1$.
- Signal:

$$M \sim \mathcal{N}\left(\mu,\ \frac{1}{s_M}\right)$$
$$\tilde{M} \equiv \frac{M-(1-w)\, a_1}{w\lambda_M}$$
$$\sim \mathcal{N}\left(R,\ \frac{1}{w^2\lambda_M^2 s_M}\right)$$

- Child must know $w\lambda_M$ to extract information on R.
  - w cannot be a unique function of R (Benabou&Tirole (2003))
- Alternative: mixed strategy–lose tractability, need further abstraction
- Alterantive: naive child (Lizzeri&Siniscalchi (2008))–restrictive, not implausible, can be relaxed

Detail for Symmetric Punishment

- Symmetric functional form for punishment
  - negative signal for too low effort
  - negative signal for too much effort
- Do parent ever send negative signal for too much effort?
  - Definitely in many parts of the world, history, subgroups (female, minority, caste, etc.)
  - How about modern (and Western) world?
  - 'Family Culture': (Dahl, Kostol, Mostad (2014); Vance (2016))
  - Some people definitely discourage (not encourage) their children from working hard, for various reasons
  - Kegon Tan (2018, ongoing work): "parent's encouragement for college attendance correlates with other measures of investment"
- Symmetricity is convenient. Implication unchanged for *some* asymmetricity

Detail for Symmetric Punishment

- Completely asymmetric, so only low effort is punished?
- $-p(\bar{a}-a) = pa - constant$.
- Perfectly paternalistic, highly skilled parent can arbitrarily increase the severity and achieve good results
- Perfectly paternalistic, low-skilled parent can arbitrarily increase the severity and compensate in signaling
- Inconsistent with anecdotal evidence
  - Tiger Mother (Amy Chua's case) – highly skilled and paternalistic
  - Ultimately lowered her discipline severity
  - Low skilled parent using severe punishment–>good results?
- Baseline model: parent assumes child isn't doing enough: $a_1 < a_1^{\dagger}$.
  - Parent should lower punishment as child improves
  - Perfectly paternalistic, high-skilled parent do not impose infinite punishment Return

Detail for Perfect Information Model

- $a_1^{\dagger} = \lambda_{M,t} R,\ \lambda_M = \frac{\delta \beta_a}{v}$ Return
- $a_2^{\dagger} = \lambda_{M,2} R,\ \lambda_{M,2} = \frac{\beta_\tau}{\tau}$
- $\varphi^{\dagger} = \lambda_I R,\ \lambda_I = \frac{\alpha_2 \delta \beta_I}{c}$

Expected Punishment

- Expected Punishment Return

$$
\begin{aligned}
& E\left[(M-a_1)^2\right] \\
=& E\left[(M-\mu+\mu-a_1)^2\right] \\
=& E\left[(M-\mu)^2+2(M-\mu)(\mu-a_1)+(\mu-a_1)^2\right] \\
=& var(M)+(\mu-a_1)^2 \\
=& s_M^{-1}+\left(wa_1^{\dagger}+(1-w)a_1-a_1\right)^2 \\
=& s_M^{-1}+\left(wa_1^{\dagger}-wa_1\right)^2 \\
=& s_M^{-1}+w\left(a_1^{\dagger}-a_1\right)^2 \\
=& s_M^{-1}+w\lambda_M^2(R-\rho_1)^2
\end{aligned}
$$

Expected Punishment

- For investment:

φ choice	Learning Signal $E\left[\frac{M}{\lambda_M}\right]$
$\varphi^\dagger$	$\frac{\varphi^\dagger}{\lambda_I} = R$
$\varphi \in \mathbb{R}$	$R + \frac{\varphi - \varphi^\dagger}{\lambda_I}$

- Investment signal precision $s_I \lambda_I^2$ Return

Sophisticated child

- Sophistication level k of child, parenting w_k^*, φ_k^*
- $k = 0$: Child believes $E[M] = a_1^\dagger$. Parent chooses w_0^*
- $k = 1$: Child believes $E[M] = w_0^* a_1^\dagger + (1 - w_0^*) a_1$. Parent choose w_1^*.
- $k = 2$: Child believes $E[M] = w_1^* a_1^\dagger + (1 - w_1^*) a_1$. Parent choose w_2^*.
- Levels of w_k^*, φ_k^* may change with k. Comparative statics remain the same.
  - Even when $w_{k-1}^* = w_k^*$.
- As $k \to \infty$, w_k^* and φ_k^* tend to increase (until natural limit)
  - As k increases, harder to change child's belief Return
- $a_1^* = \lambda_M \rho_1$ for any k (!)

Detailed Expression for Parenting Choices

$$E\left[(M-a_1)^2\right] = s_M^{-1} + w^{*2}\lambda_M^2(R-\rho_1)^2$$

$$\varphi^* = \varphi^\dagger + \Psi_I(R-\rho_1)$$

$$a_1^* = \lambda_{M,1}\rho_1,\ a_2^* = \lambda_{M,2}\rho_2$$

- $\Psi_M = \delta\frac{1}{2}\frac{\beta_\tau^2}{\tau}\frac{s_M}{s_2^2}\frac{1}{\mathscr{B}+1}$, $\mathscr{B} \equiv \left(\frac{\alpha_2\delta}{c}\frac{\beta_\tau^2}{\tau}\right)\left(\frac{\partial}{\partial\varphi}\rho_2^e\right)^2$, $\frac{\partial}{\partial\varphi}\rho_2^e = \frac{s_I\lambda_I^2}{s_2\lambda_I}$.
- $\Psi_I \equiv \frac{\mathscr{B}}{1+\mathscr{B}}\frac{1}{s_I\lambda_I} \times \left[s_1 + s_M\lambda_M^2(1-w^*)\right]$
  - $1-w^*$ component comes from substitution in ρ_2.
- As $s_M \to \infty$, $\Psi_M \to 0$ and $s_M\lambda_M^2\Psi_M \to \delta\frac{1}{2}\frac{\beta_\tau^2}{\tau}$. Therefore

  $$w^* \to \frac{\delta\frac{1}{2}\frac{\beta_\tau^2}{\tau}}{\frac{\alpha_1}{\alpha_2}+\delta\frac{1}{2}\frac{\beta_\tau^2}{\tau}} \in (0,1)$$

- $\frac{\delta\frac{1}{2}\frac{\beta_\tau^2}{\tau}}{\frac{\alpha_1}{\alpha_2}+\delta\frac{1}{2}\frac{\beta_\tau^2}{\tau}} \to 1$ as $\beta_\tau \to \infty$.
- As $s_I \to \infty$, $\Psi_I \to 0$. Return

What happens without learning channel?

- No learning channel –> punishment useless
- Parent always knows optimal investment level
- Contrary to evidence on expectation (this paper), psychological literature, parent information (Cunha Elo Culhane 2013)
- Still need to explain what harshness is

Parent using send-to-room

Table: Send-to-Room Use

	(1)	(2)	(3)
PIAT	-0.013**	-0.013	0.002
	(0.004)	(0.008)	(0.009)
BPI	-0.121***	-0.131***	-0.110***
	(0.004)	(0.007)	(0.008)
Constant	0.473***	0.662***	0.507***
	(0.025)	(0.044)	(0.053)
Observations	8149	3676	3120
R2	0.088	0.086	0.053

Model (1) is for the entire sample. Model (2) is for the parents who uses send-to-room in response to tantrum. Model (3) is for the parents who uses spanking in response to tantrum. Observations are number of parent-child pairs. Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. SRM: mother responds to child tantrum with . SPK: mother responds to tantrum with .

Return

Parent using spanking

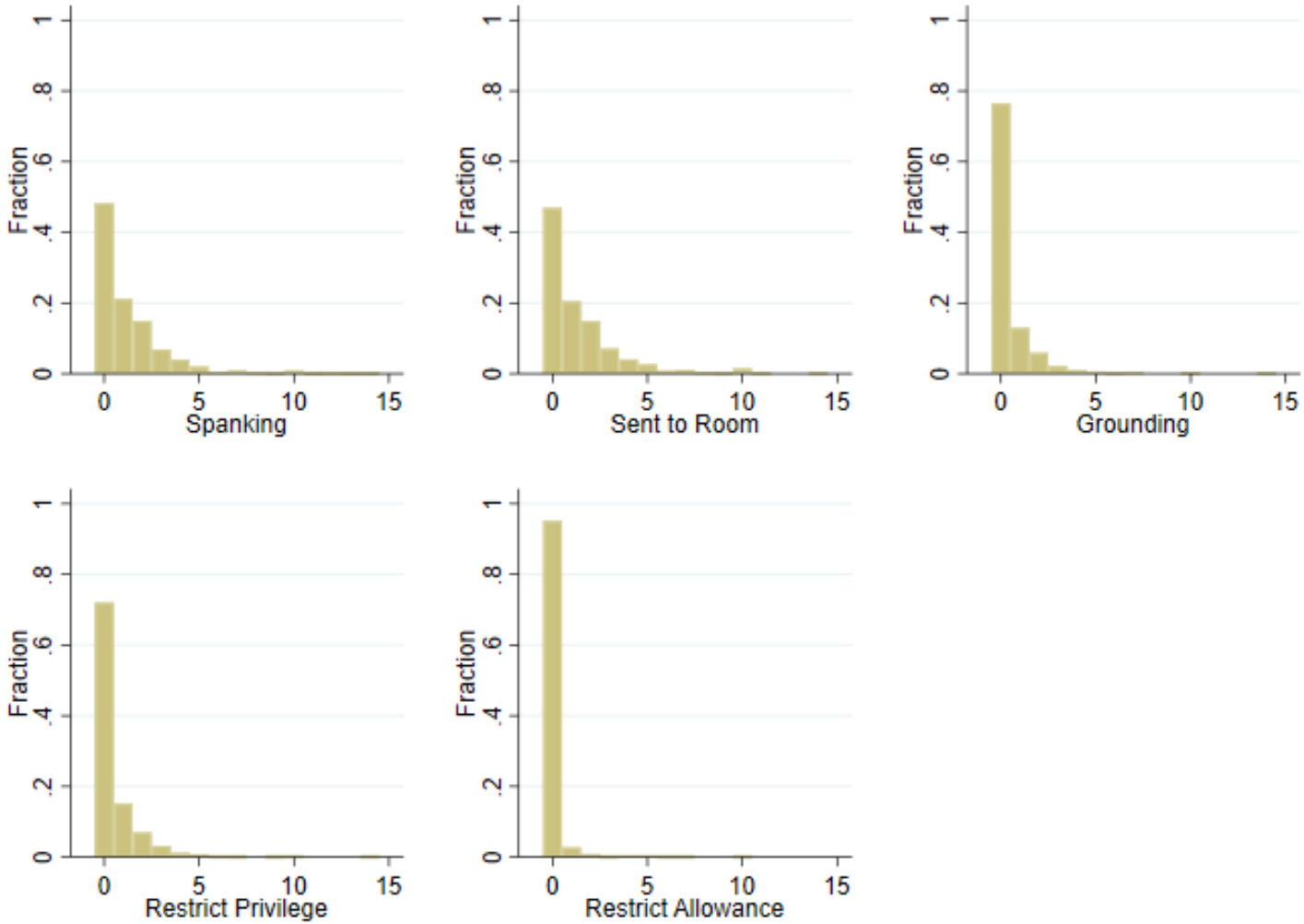
Table: Spanking Use

	(1)	(2)	(3)
PIAT	-0.055***	-0.039***	-0.014
	(0.003)	(0.007)	(0.008)
BPI	-0.107***	-0.106***	-0.135***
	(0.003)	(0.006)	(0.007)
Constant	0.394***	0.373***	0.552***
	(0.020)	(0.037)	(0.051)
Observations	8444	3679	3140
R2	0.157	0.098	0.102

Model (1) is for the entire sample. Model (2) is for the parents who uses send-to-room in response to tantrum. Model (3) is for the parents who uses spanking in response to tantrum. Observations are number of parent-child pairs. Standard errors are in parenthesis, clustered at the household level. * p<.05, ** p<.01, *** p<.001. SRM: mother responds to child tantrum with . SPK: mother responds to tantrum with .

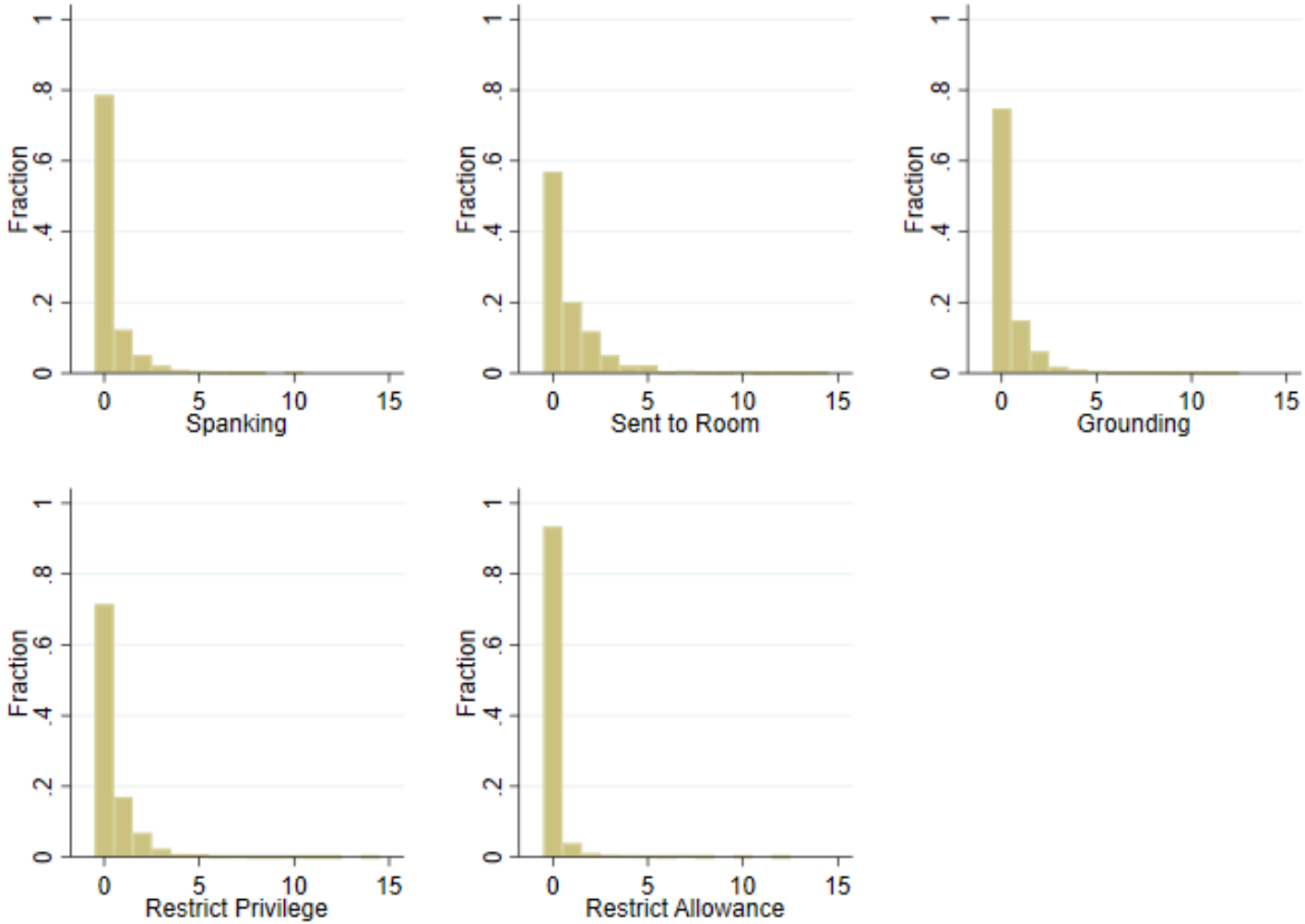
Return

Punishiment use at child age 6



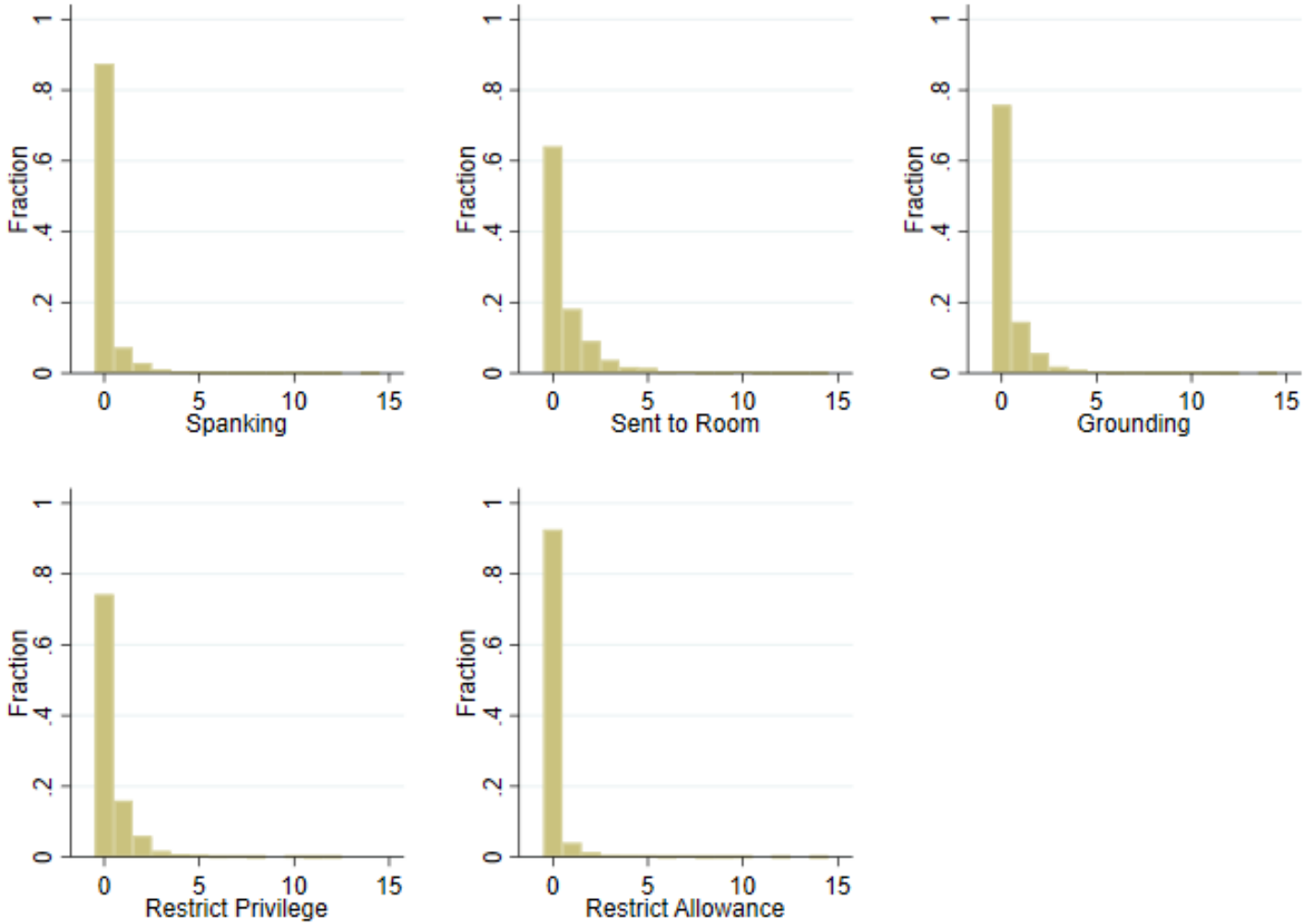
8

Punishiment use at child age 10



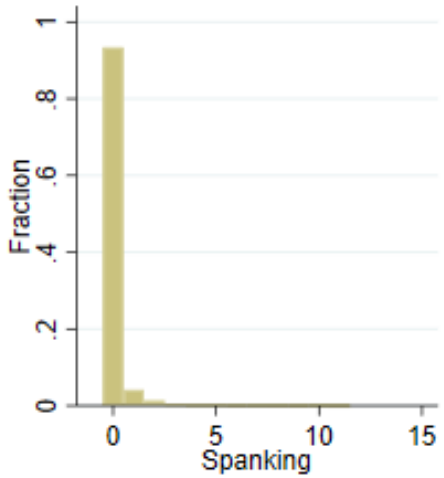
8

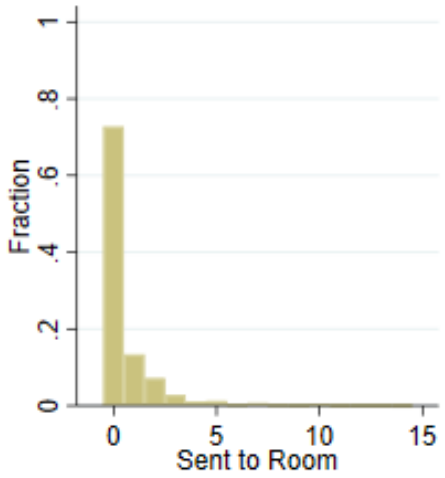
Punishiment use at child age 12

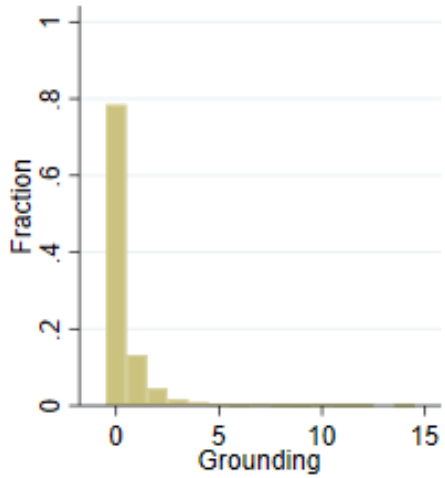


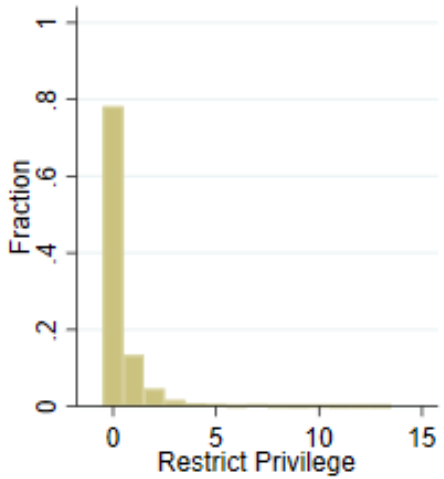
8

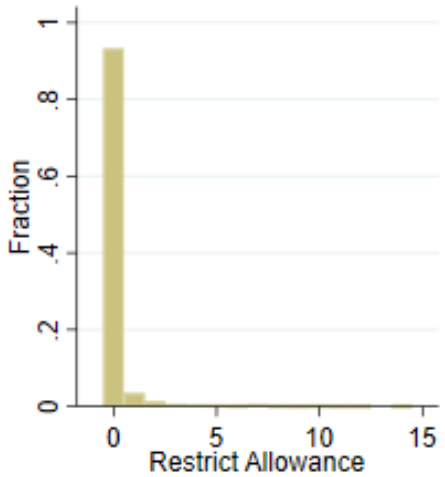
Punishiment use at child age 14





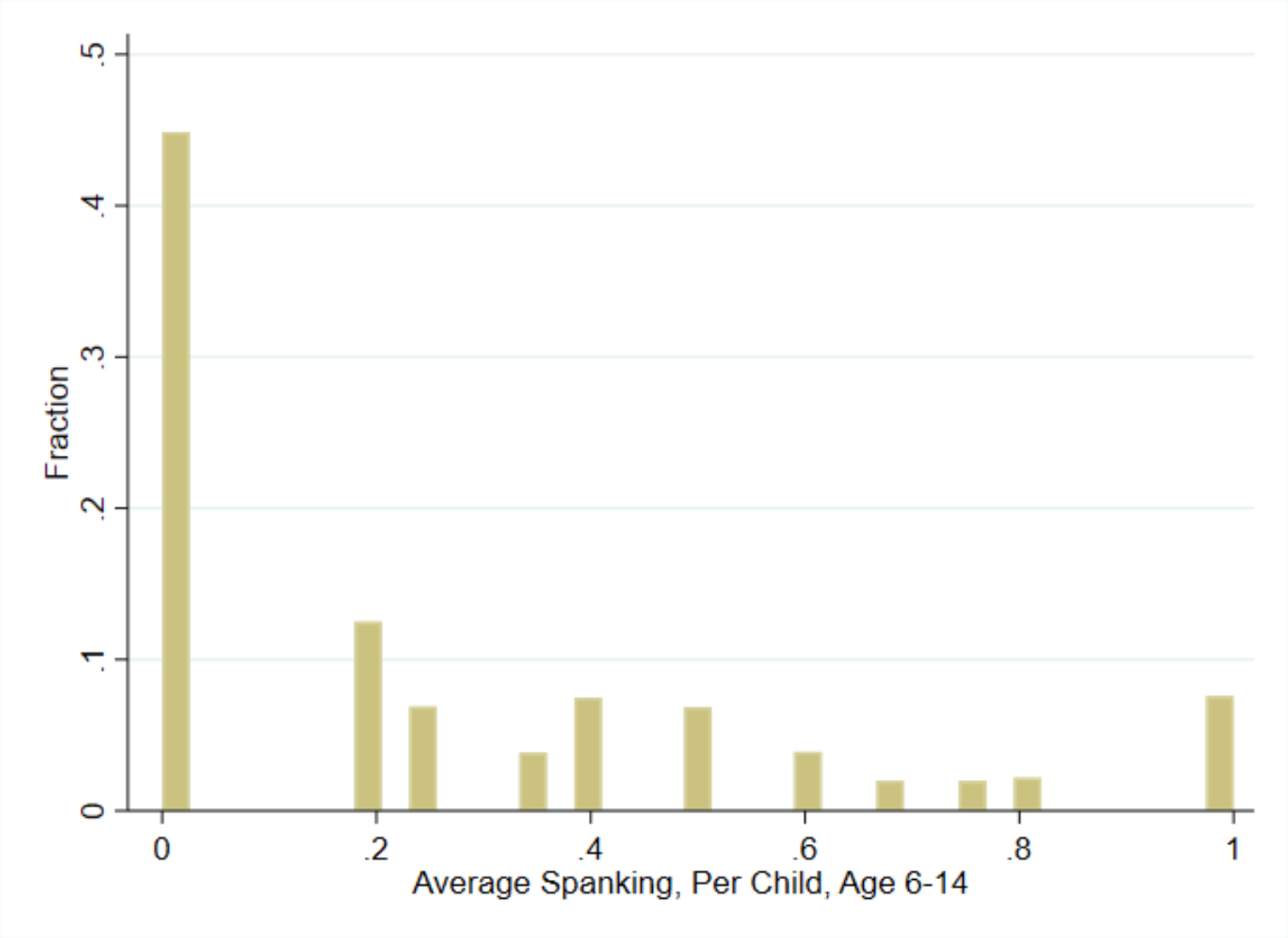




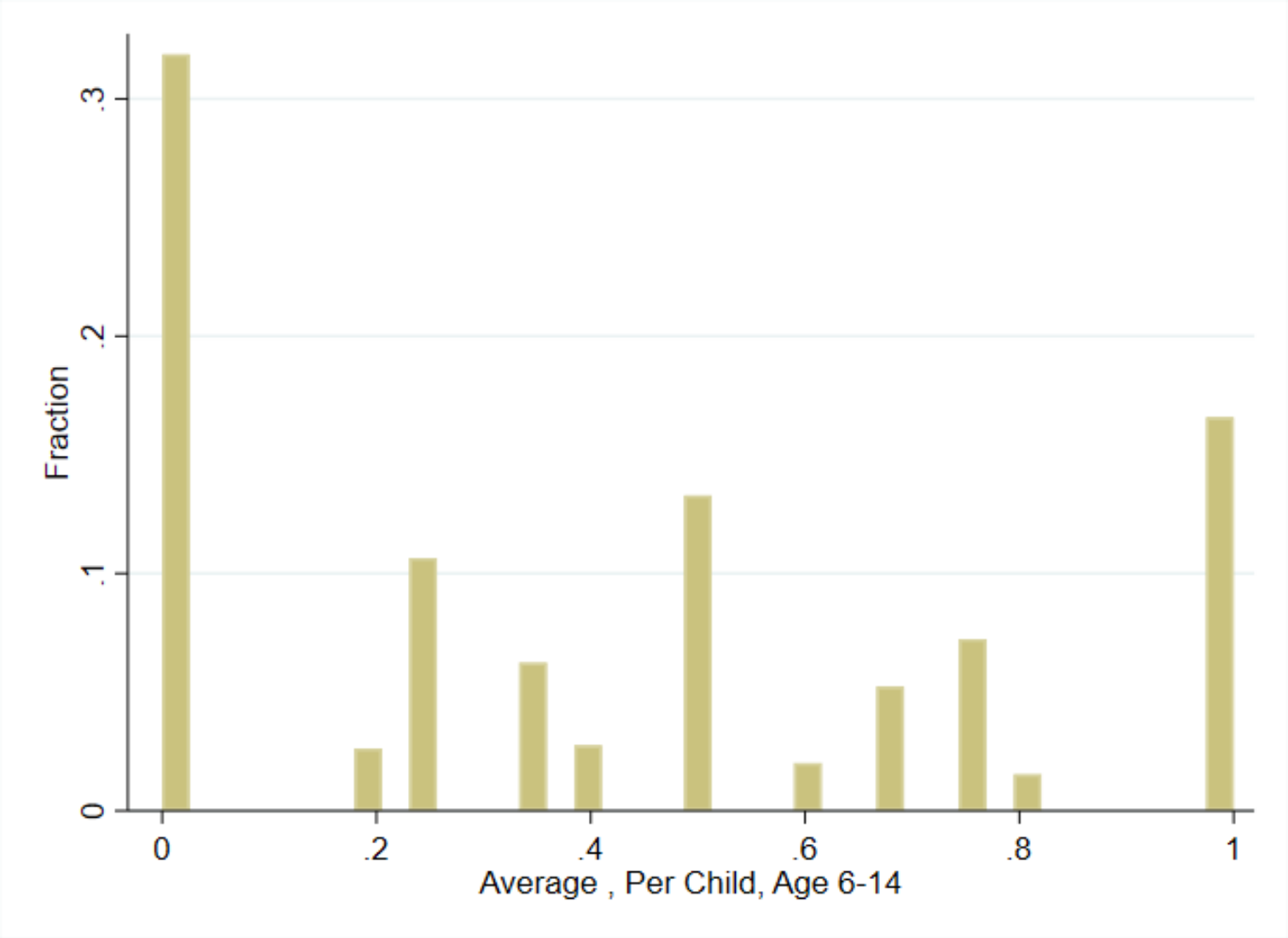


8

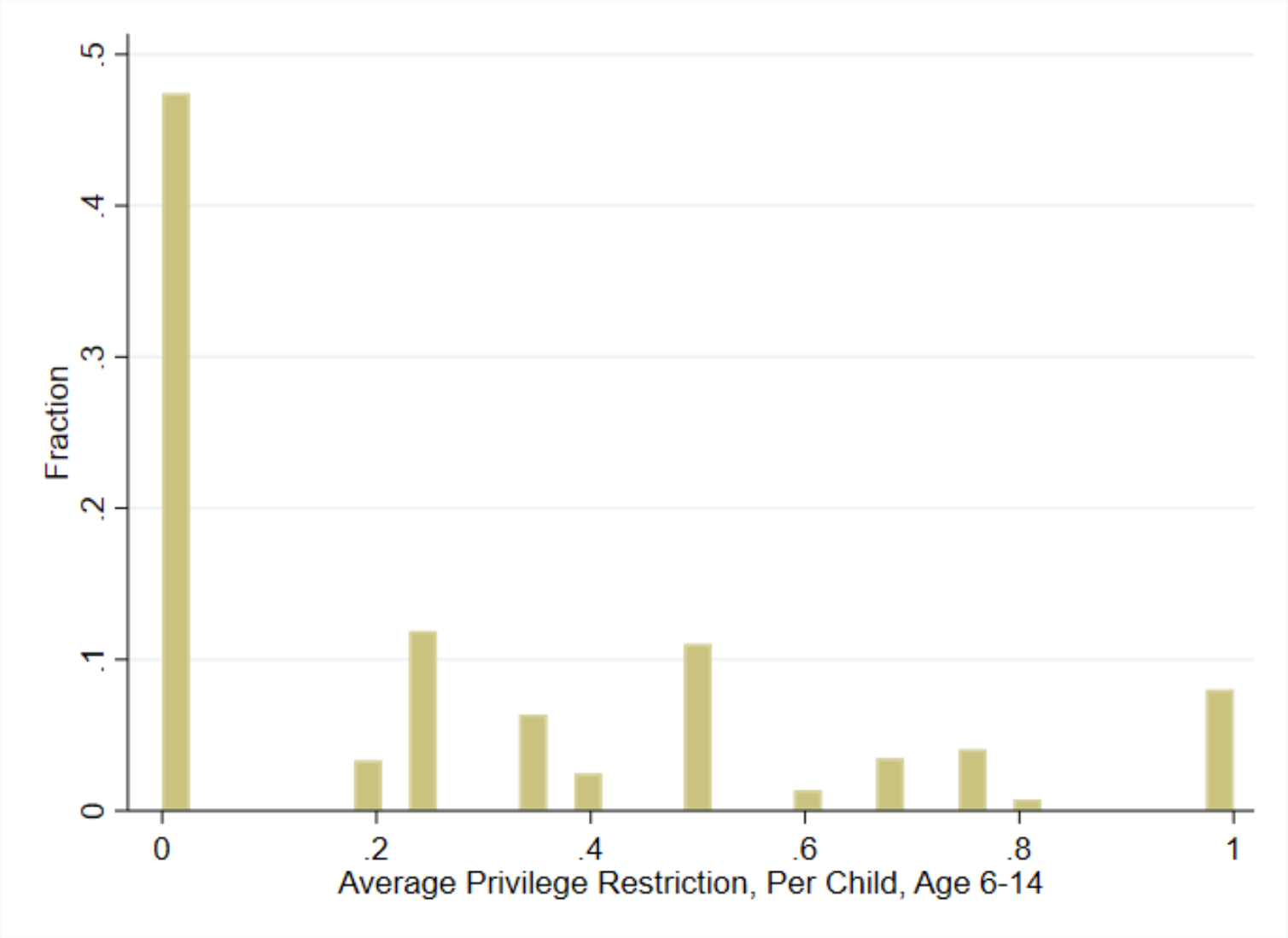
Spanking



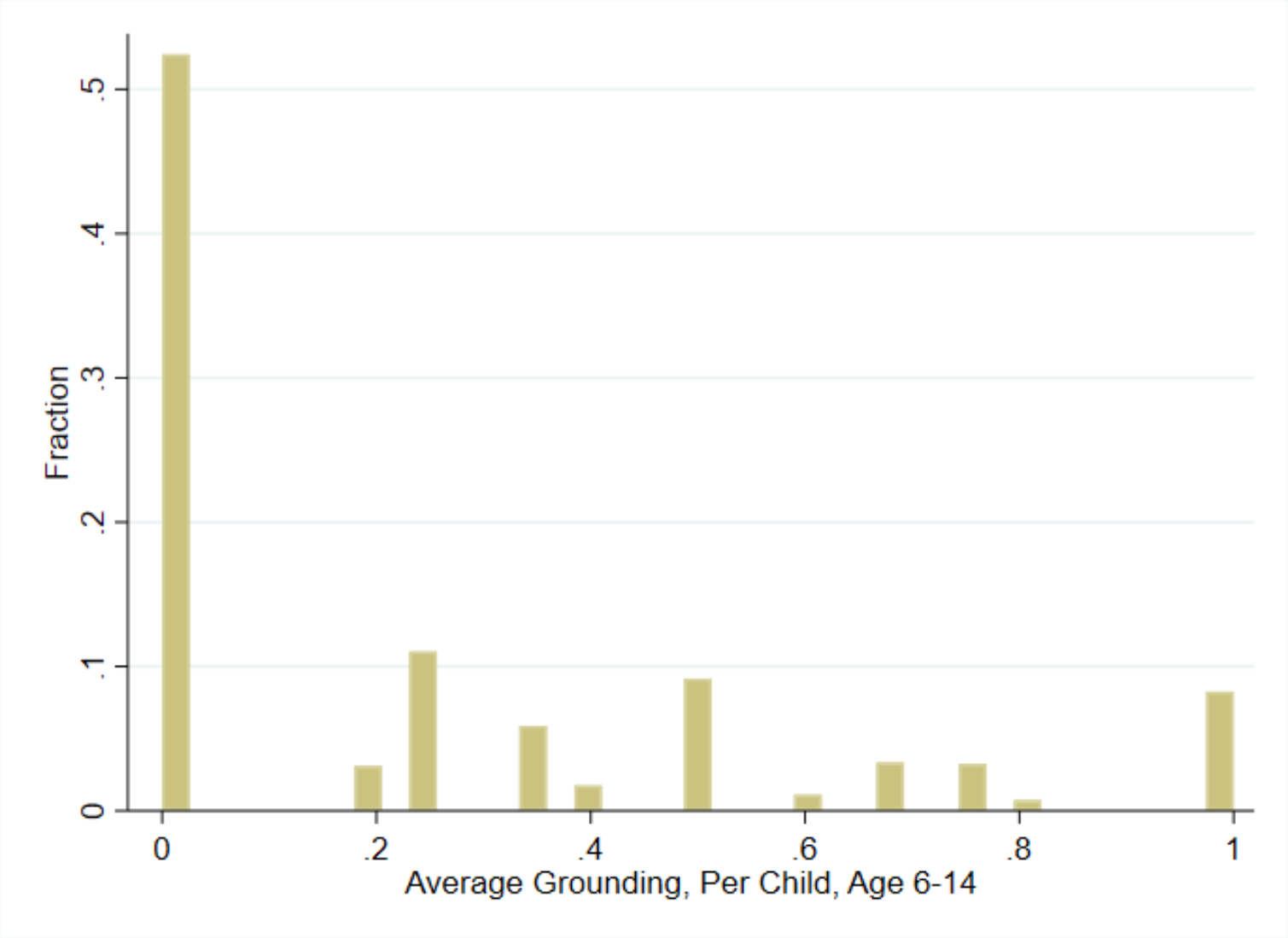
Send-to-room



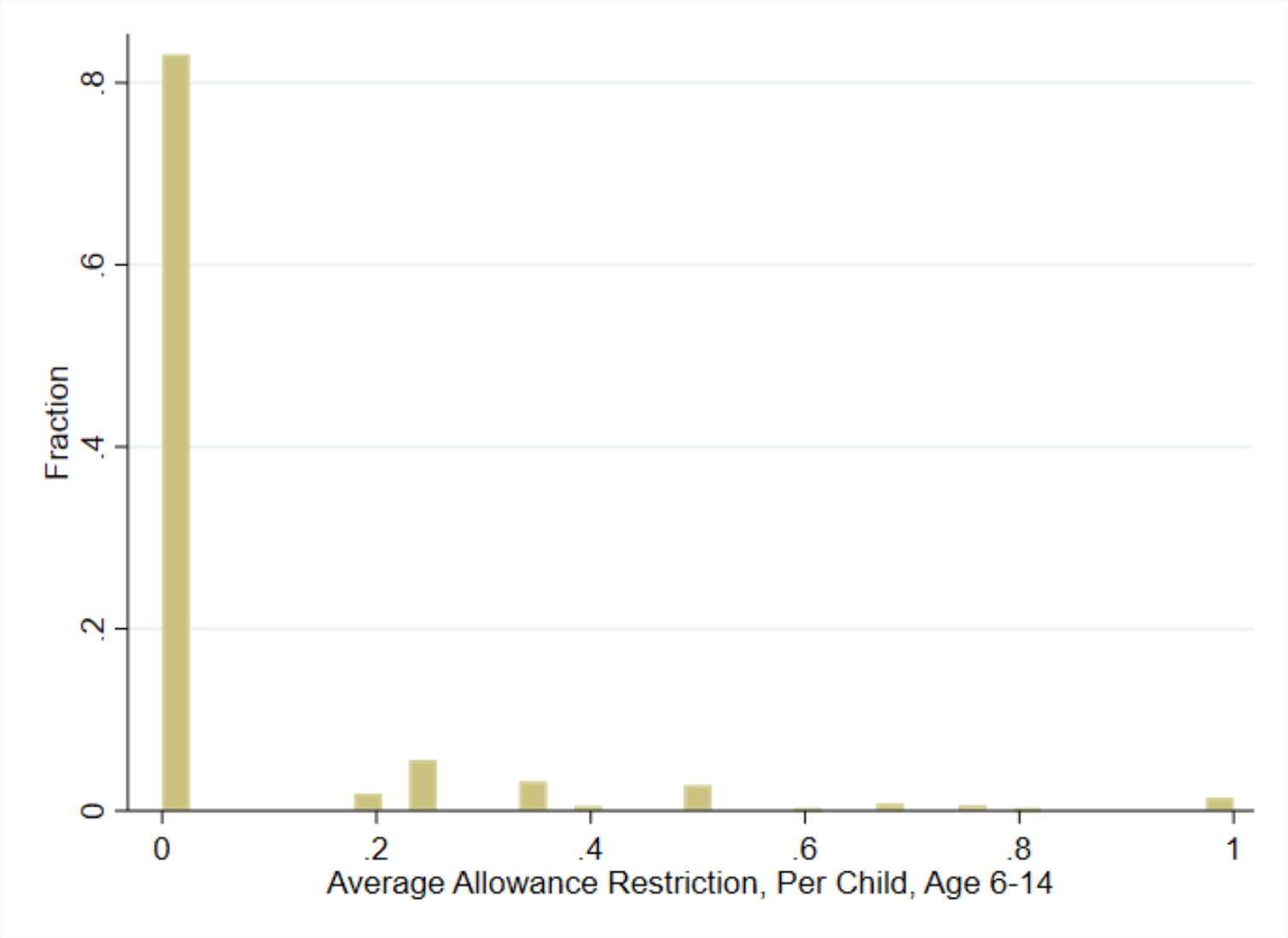
Privilege restriction



Grounding


Fraction
0
.1
.2
.3
.4
.5
0
.2
.4
.6
.8
1
Average Grounding, Per Child, Age 6-14

Allowance restriction



Alternative Explanations

Table: Parental Punishment

	(1) Pun.	(2) Spanking	(3) SentToRm	(4) Privilege	(5) Grounding	(6) Allowance
MotherExp.x.BPI	0.013	-0.010	0.010	-0.007	-0.015	-0.016*
	(0.010)	(0.009)	(0.011)	(0.010)	(0.009)	(0.007)
BPI	0.138***	0.086***	0.117***	0.110***	0.109***	0.050***
	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
Mother expectation	-0.020+	-0.015+	-0.005	0.003	-0.022*	-0.003
	(0.011)	(0.009)	(0.011)	(0.010)	(0.010)	(0.006)
Observations	13408	13358	12599	12618	12638	12562
R2	0.131	0.136	0.101	0.086	0.156	0.093

Note: Standard errors are in parenthesis, clustered at the household level. + p<.1 * p<.05, ** p<.01, *** p<.001. Pun. is any punishment between child ages 8 and 14. Additional controls include log household net income, indicators for father's presence at home, race, child's birth year, parent's birth year, child's gender and child's birth order. AFQT is parent's AFQT score. BPI is scaled so that higher value indicates more noncompliance.

Return

Alternative Explanations

- Parenting style as investment (Cobb-Clark et al. (2018), Cunha (2015))
  - better parenting style is more costly to the parent in cognitive 'resource'
  - Application to punishment: non-harsh punishment is more 'costly' than harsh punishment
- Prediction: parents punish more consistently when they have more resources
- Test using variables that could drain parent's cognitive

Alternative Explanations

Table: Parental Punishment

	(1) Pun.	(2) Pun.	(3) Pun.	(4) Pun.	(5) Pun.
BPI	0.188***	0.100***	0.055	0.106***	0.109***
	(0.047)	(0.008)	(0.036)	(0.007)	(0.007)
BPIxHrs.Wrk	-0.006				
	(0.005)				
BPIxFullTime		0.025*			
		(0.010)			
BPIxHHIncome			0.005		
			(0.003)		
BPIxSelfEsteem				-0.002	
				(0.007)	
BPIxLocusOfControl					0.001
					(0.007)
Observations	4048	7952	8020	7818	7941
Model	FE	FE	FE	FE	FE
R2	0.109	0.140	0.133	0.134	0.131

Note: First column is restricted to the mothers who work full time. BPI is Behavior Problems Index and measures the child's problematic behavior reported by the parent. Hours of work is the average daily hours of work of the parent, calculated by yearly hours of work divided by 261. Full time status is defined by working more than 7.5 hours per day based on the average hours of work. Log household net income is deflated to 2000 and calculated using inverse hyperbolic sine transformation. Self esteem measure is Rosenberg scale measured in 1980, normalized to be mean zero and standard deviation 1. Locus of control measure is Rotter scale measured in 1979, normalized to be mean zero and standard deviation 1. All models account for individual fixed effect. Results with random effect model is