

# **Arm-Wrestling in the Classroom: The Non-Monotonic Effects of Monitoring Teachers**

Guilherme Lichand

University of Zurich

Sharon Wolf

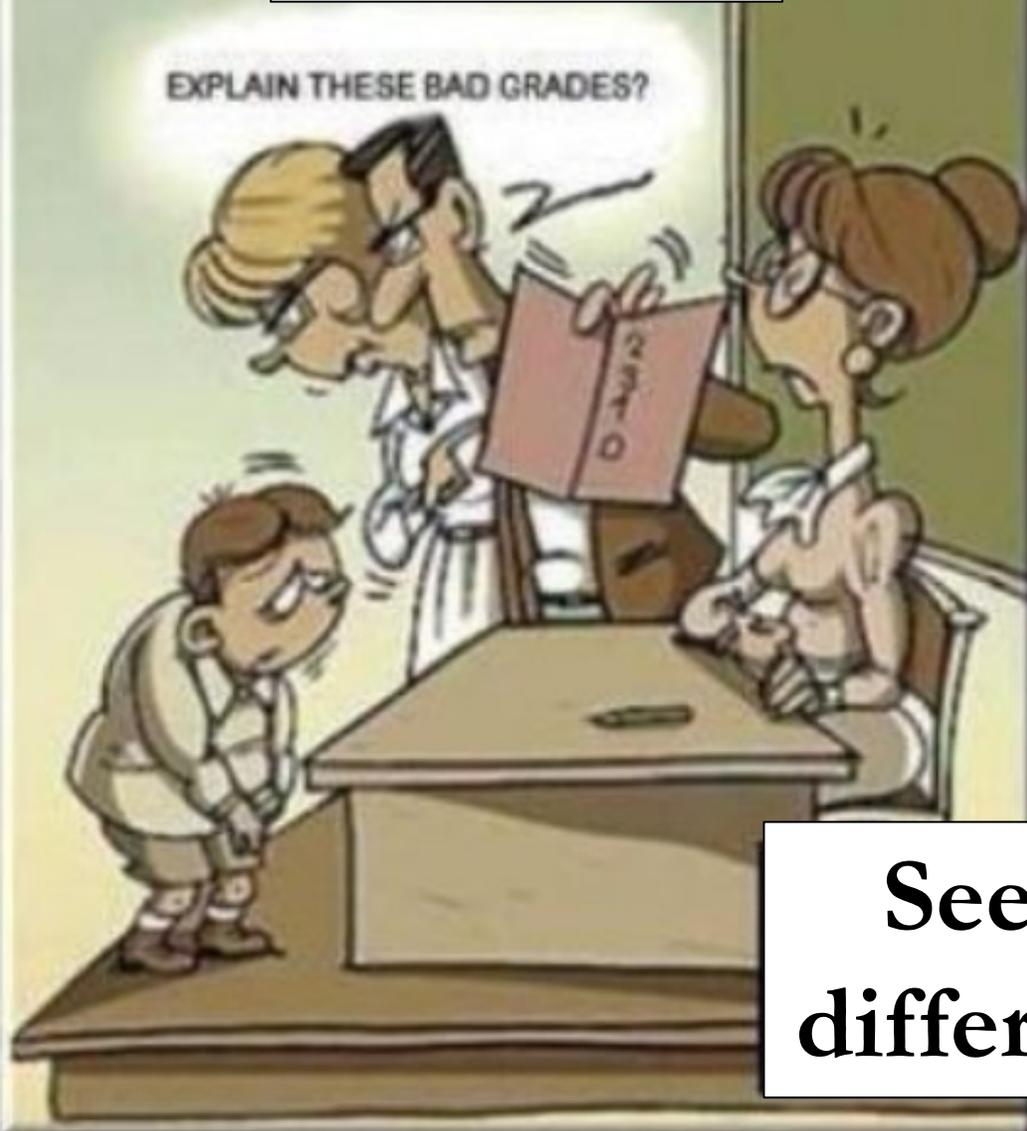
University of Pennsylvania

Society for Research in Educational Effectiveness Webinar

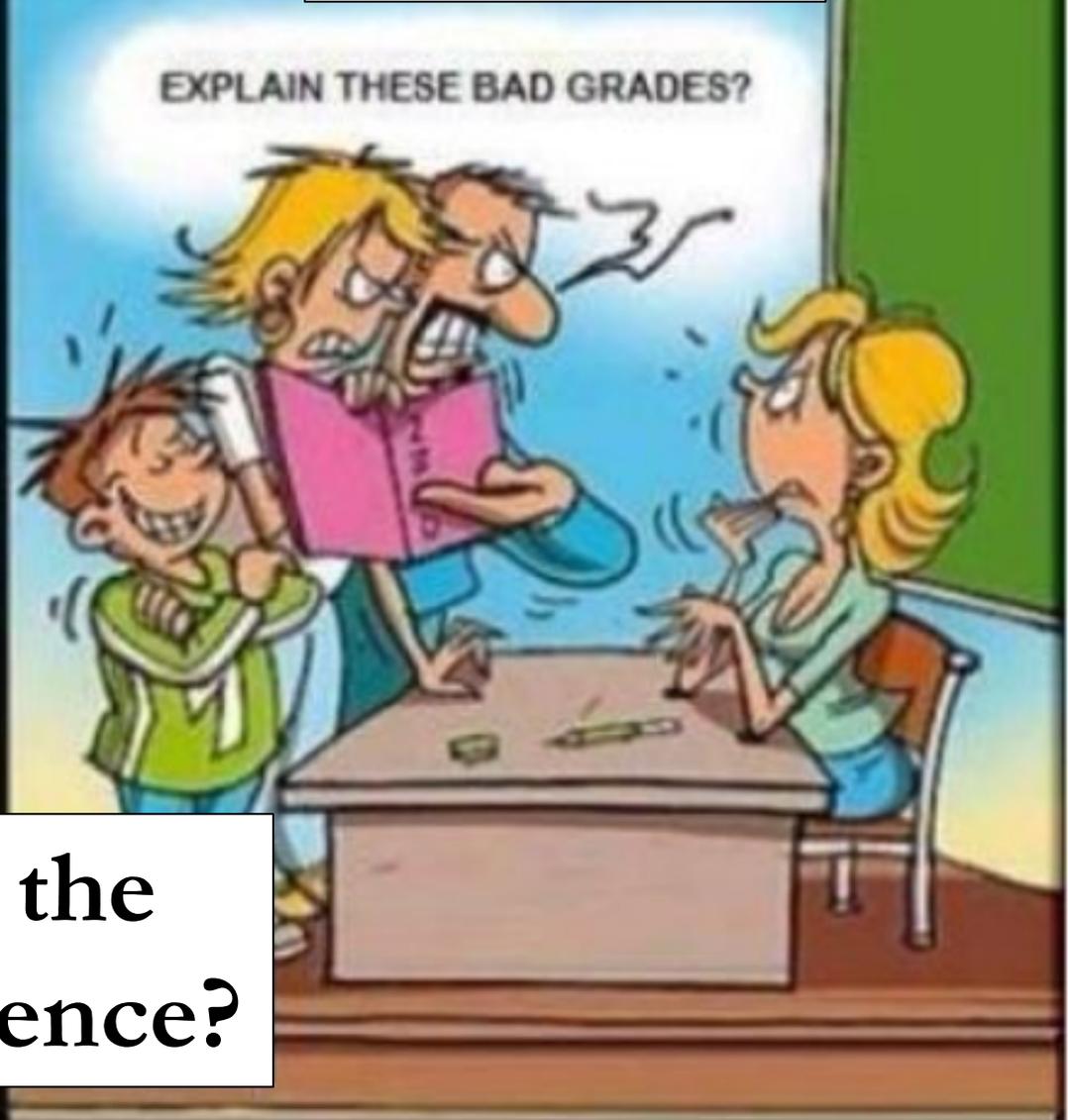
August 5, 2020

\* Study undertaken in partnership with TRECC and generously funded by the Jacobs Foundation Science of Learning initiative. Excellent research assistance by Maite Deambrosi and Julien Christen. Guilherme is a partner and chairman at Movva, the startup powering the intervention evaluated in this study.

**1960's**



**2000's**



**See the  
difference?**

# Teacher accountability in sub-Saharan Africa

- Teacher absenteeism from the classroom is a common problem (on average, 44% of the time; Bold et al., 2017); the causes include many systemic issues.
- Some have called the situation a teacher “motivation crisis” in the region (Moon, 2007).
- Parental monitoring of teachers:
  - Could increase effort and lead to better educational outcomes
  - Or might unintentionally crowd out intrinsic motivation and effort (e.g., Fehr and Gächter, 2000), especially for high-effort teachers

# Educational context of Cote d'Ivoire

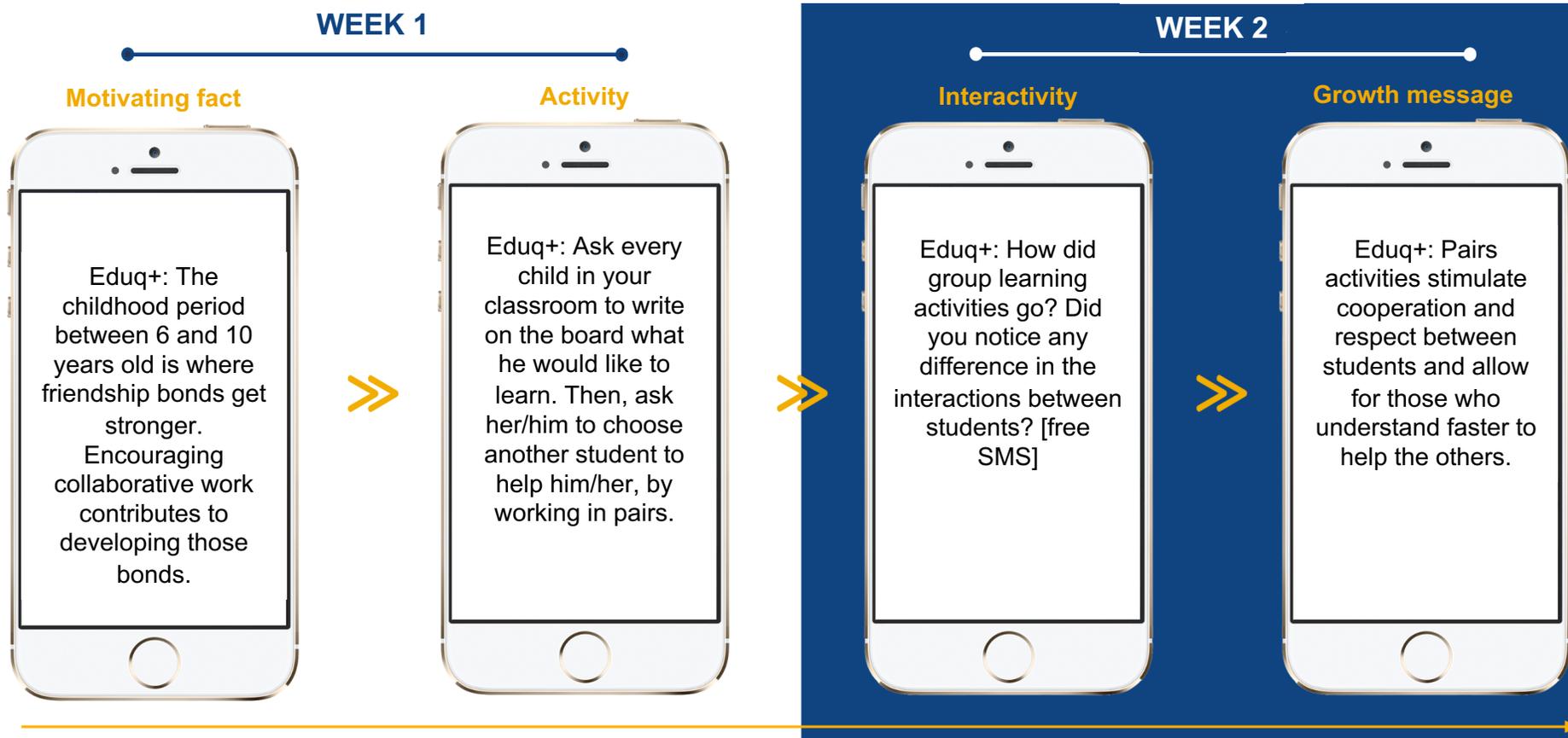
- Ranks 170 of 189 in the Human Development Index (“low” human development)
- Youth literacy rate is 53%; Adult literacy rate 40.5%
- Primary education organized in three cycles: CP (grades 1 and 2), CE (3 and 4) and CM (5 and 6), with assessments for grade progression at the end of each cycle
  - Grade repetition and drop-out rates are high (15% and 4.7% in our sample)
  - Our sample focuses on those final years of each cycle, comprising 2nd, 4th and 6th graders

# Intervention and Partnerships

- Ivorian Ministry of Education and Movva, a social enterprise that implements SMS-based nudge-bots to engender behavior change
- The ***Eduq+ program***:
  - Aims to increase educational engagement and improve children's learning
  - Bi-weekly nudges with information and suggested activities for behavior change to teachers and parents.
  - For teachers, aim at increasing attendance and time-on-task while teaching.
  - For parents, aim at boosting motivation and beliefs about returns to investments in children's education.

# Background

- The phone-based nudge program to teachers:



# Background

- The phone-based nudge program to caregivers/parents:



# Research design

- 296 classrooms in 100 public schools in the Aboisso and Bouaffle regions
- School cross-randomized trial<sup>a</sup> with schools / classrooms assigned to:
  - Parent messages only (N = 24 schools, 70 classrooms)
  - Teacher messages only (N = 26 schools, 74 classrooms)
  - Parent messages plus teacher messages (N = 25 schools, 78 classrooms)
  - Control (no intervention; N = 25 schools, 74 classrooms)

<sup>a</sup>Our trial was pre-registered in the AEA Registry (AEARCTR-0003385)

# Measures

1. Classroom administrative data on grade repetition and dropouts
2. Surveys with children and parents, and teachers at baseline (Oct 2018) and follow-up (June 2019)
3. Follow-up data collected in October 2019 on teachers' career plans, parents' and teachers' beliefs about returns to inputs by each party, and their best-response functions in response to the other party's inputs.

# Estimation strategy: Intent-to-Treat

## 1. *OLS Models*

$$Y_{cs} = \alpha + \beta_1 \text{Teachers}_s + \beta_2 \text{Parents}_s + \beta_3 \text{Both}_s + \epsilon_{cs}$$

## 2. *OLS models with individual fixed-effects*

$$Y_{icst} = \alpha + \beta_1 \text{Teachers}_s + \beta_2 \text{Parents}_s + \beta_3 \text{Both}_s + \theta_i + \epsilon_{icst}$$

- Clustered standard errors at the classroom level across all specifications
- For outcome variables based on multiple questions (such as scales for parental engagement), we combine different variables using summary measures to deal with family-wise error rates, following Kling, Liebman and Katz (2007), following our pre-analysis plan

# Treatment Impacts

Student dropout rates

Heterogeneous impacts by baseline teacher effort

Parent, child and teacher inputs

Table 1—Treatment effects on student dropout rates

	All grades (1)	CP2 (2)	CE2 (3)	CM2 (4)
Parents	-0.0247*** (0.0095)	-0.0147 (0.0153)	-0.0286 (0.0177)	-0.0316* (0.0166)
Teachers	-0.0223** (0.0094)	-0.0086 (0.0151)	-0.0270 (0.0175)	-0.0318* (0.0163)
Both	-0.0032 (0.0092)	-0.0017 (0.0150)	-0.0038 (0.0173)	-0.0041 (0.0159)
Control group mean	0.0468	0.0458	0.0515	0.0428
Parents = Both [p-value]	0.0228	0.3928	0.1598	0.0948
Teachers = Both [p-value]	0.0398	0.6453	0.1830	0.0859
Observations	296	100	100	96
R-squared	0.0364	0.0121	0.0441	0.0676

*Note:* Parents = 1 in schools where only parents are nudged, and 0 otherwise; Teachers = 1 in schools where only teachers are nudged, and 0 otherwise; and Both = 1 in schools where both parents and teachers are nudged, and 0 otherwise. Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

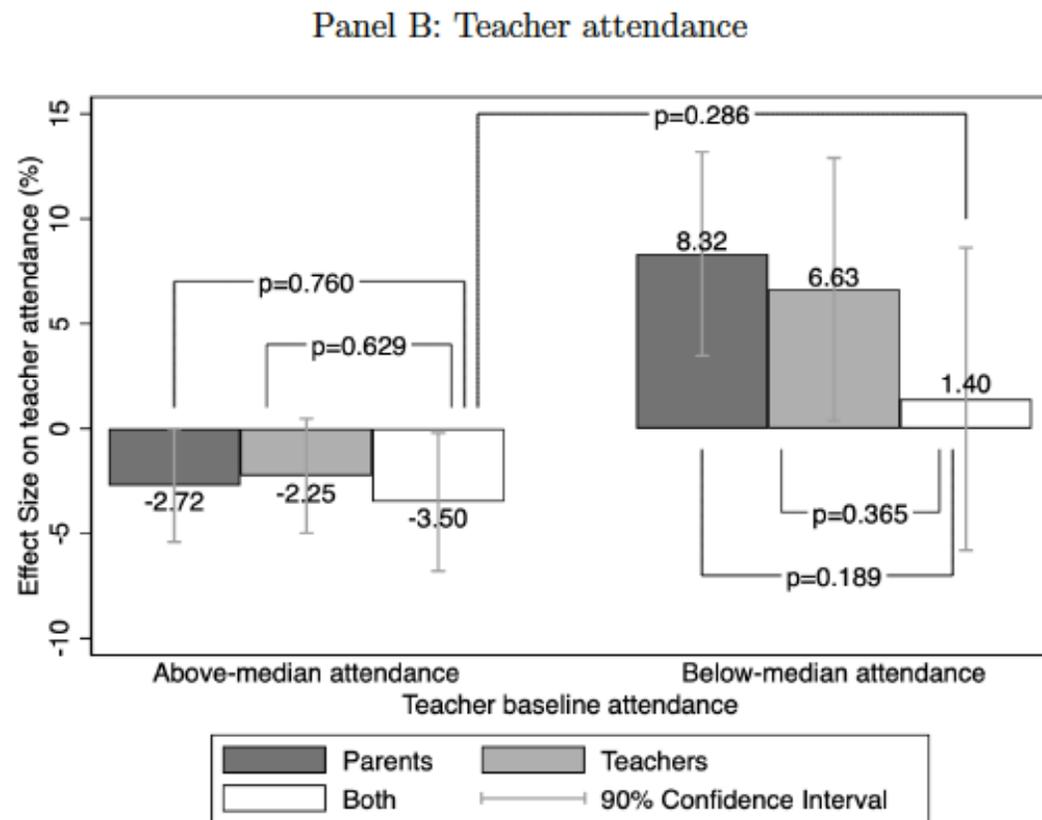
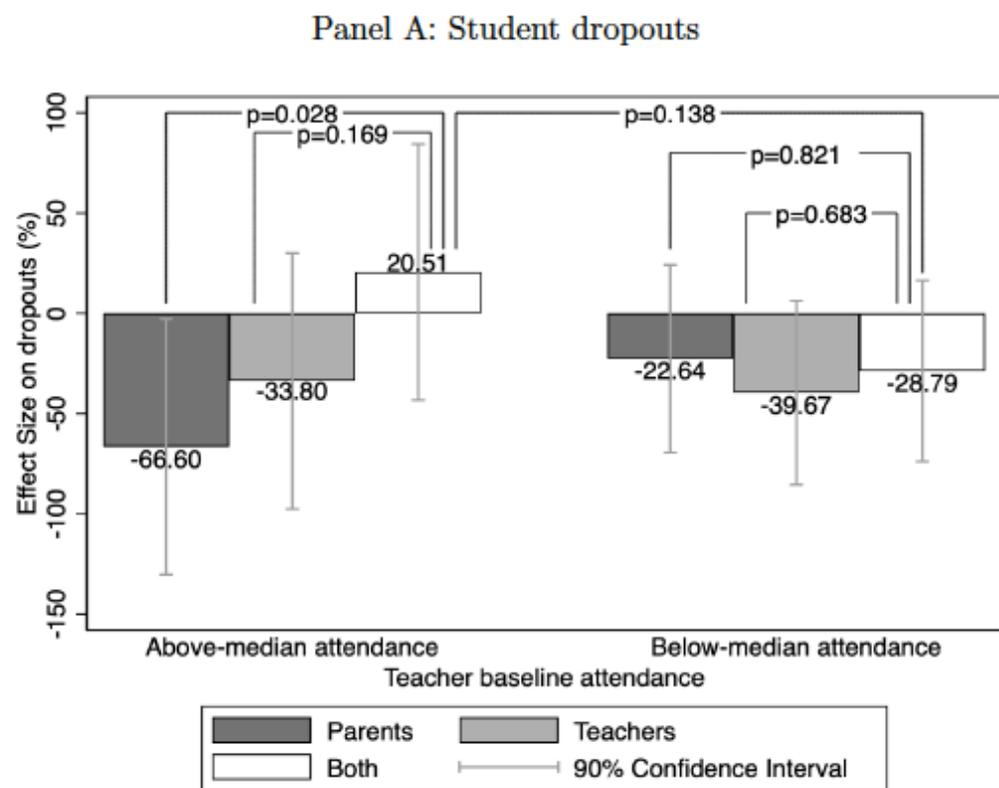


Figure 1. Heterogeneous treatment effects of monitoring on teacher attendance and student dropouts, by teachers' median baseline attendance

*Note:* In Panel A, student dropouts available only at the classroom-level. In Panel B, teacher attendance stands for the share of days on which teachers were in the classroom over the 2 weeks prior to the survey, according to students. Median of teachers' baseline attendance is 90.37%. Dark grey bars stand for treatment effect sizes of nudging parents independently; light grey bars, those of nudging teachers independently; and white bars, those of nudging both concurrently. P-values shown in dark brackets.

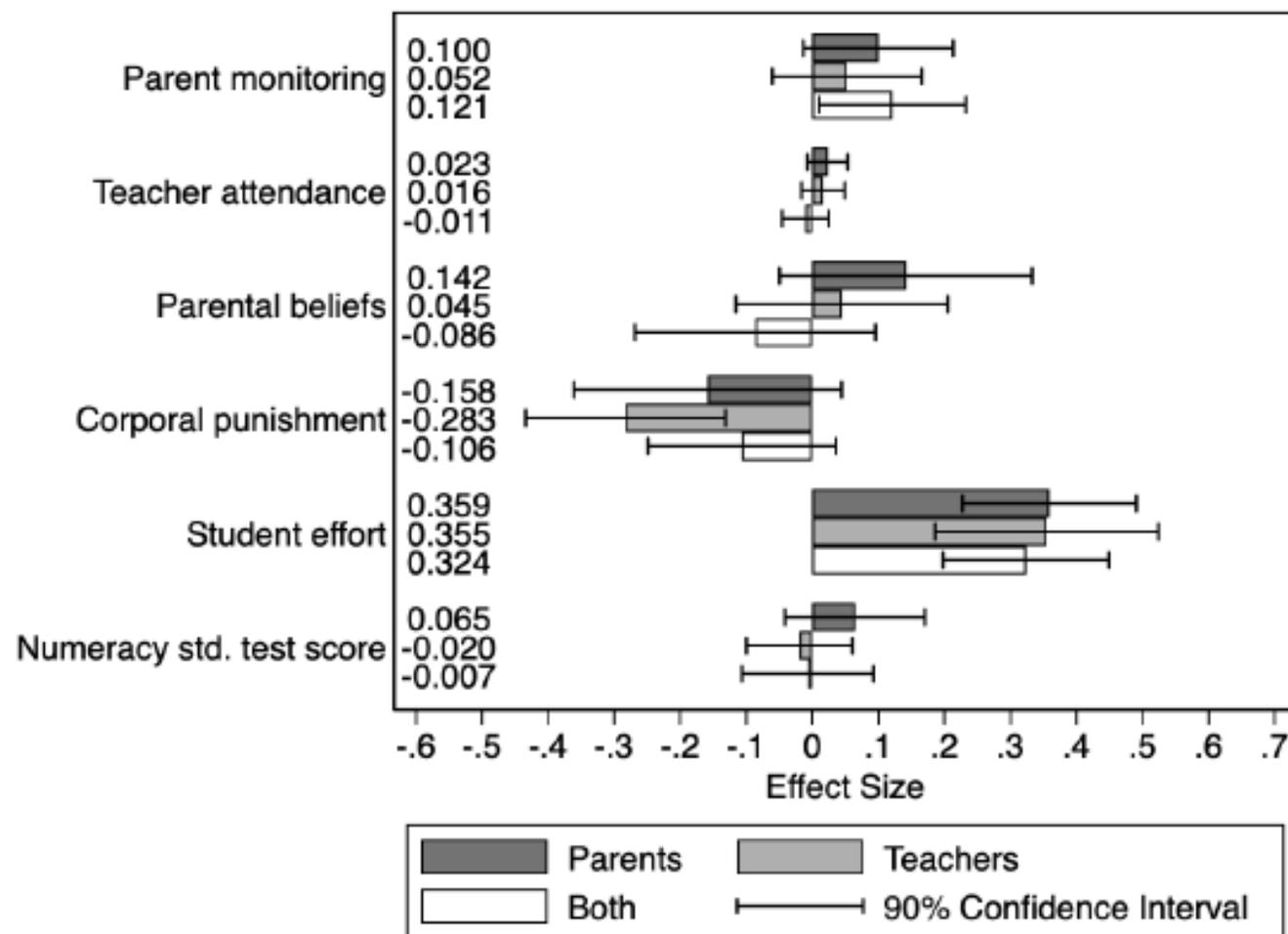


Figure 2. Treatment effects on parents', teachers' and children's inputs

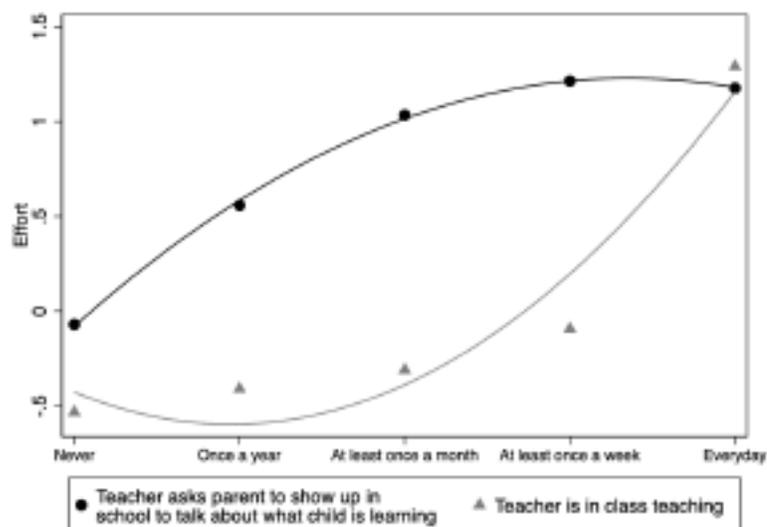
*Note:* Effect sizes are reported for intention-to-treat estimates, with student fixed-effects for all outcomes except parent monitoring. For this outcome, we use survey responses from the extra follow-up (CP2, CE2, CM2). Parent monitoring = 1 when teachers report that the caregiver of the typical child in their classroom last year showed up in school “Sometimes” or “Always”, and 0 otherwise. Teacher attendance stands for the share of days on which teachers were in the classroom over the 2 weeks prior to the survey, according to students. Parental beliefs are measured with respect to their child’s grade in mathematics. Dark grey bars stand for treatment effect sizes of nudging parents independently; light grey bars, those of nudging teachers independently; and white bars, those of nudging both concurrently. Standard errors clustered at the classroom level.

# Follow-up Analysis

Parents' and teachers' best-response functions

Heterogeneous effects of nudges to parents on dropout rates

Panel A: Parents



Panel B: Teachers

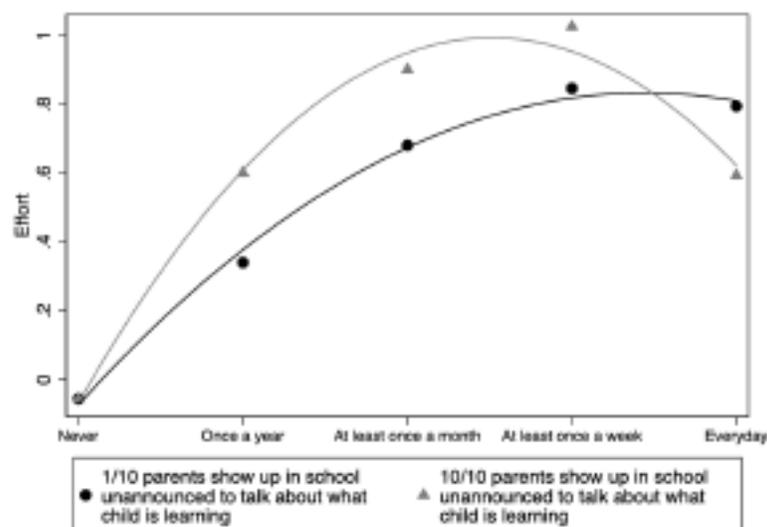


Figure 3. Parents' and teachers' best-response functions

*Note:* Panel A: “During the last school year, how would your involvement in the education of [CHILD] have changed if [CHILD]’s teacher had asked you to come to school [FREQUENCY] to talk about what [CHILD] was learning?”; “During the last school year, how would your involvement in the education of [CHILD] have changed if [CHILD]’s teacher had been present in school teaching [FREQUENCY]?”. Parents could answer on a scale from 1 to 5, where 1 means “decrease a lot” and 5 means “increase a lot”. The effort measure standardizes their answers to each question.

Panel B: “How would your effort in teaching your classroom last year have changed in case 1 (10) out of 10 PARENTS had showed up in school unannounced [FREQUENCY] to talk about what their child is learning?”. Teachers could answer on a scale from 1 to 5, where 1 means “decrease a lot” and 5 means “increase a lot”. The effort measure standardizes their answers to each question.

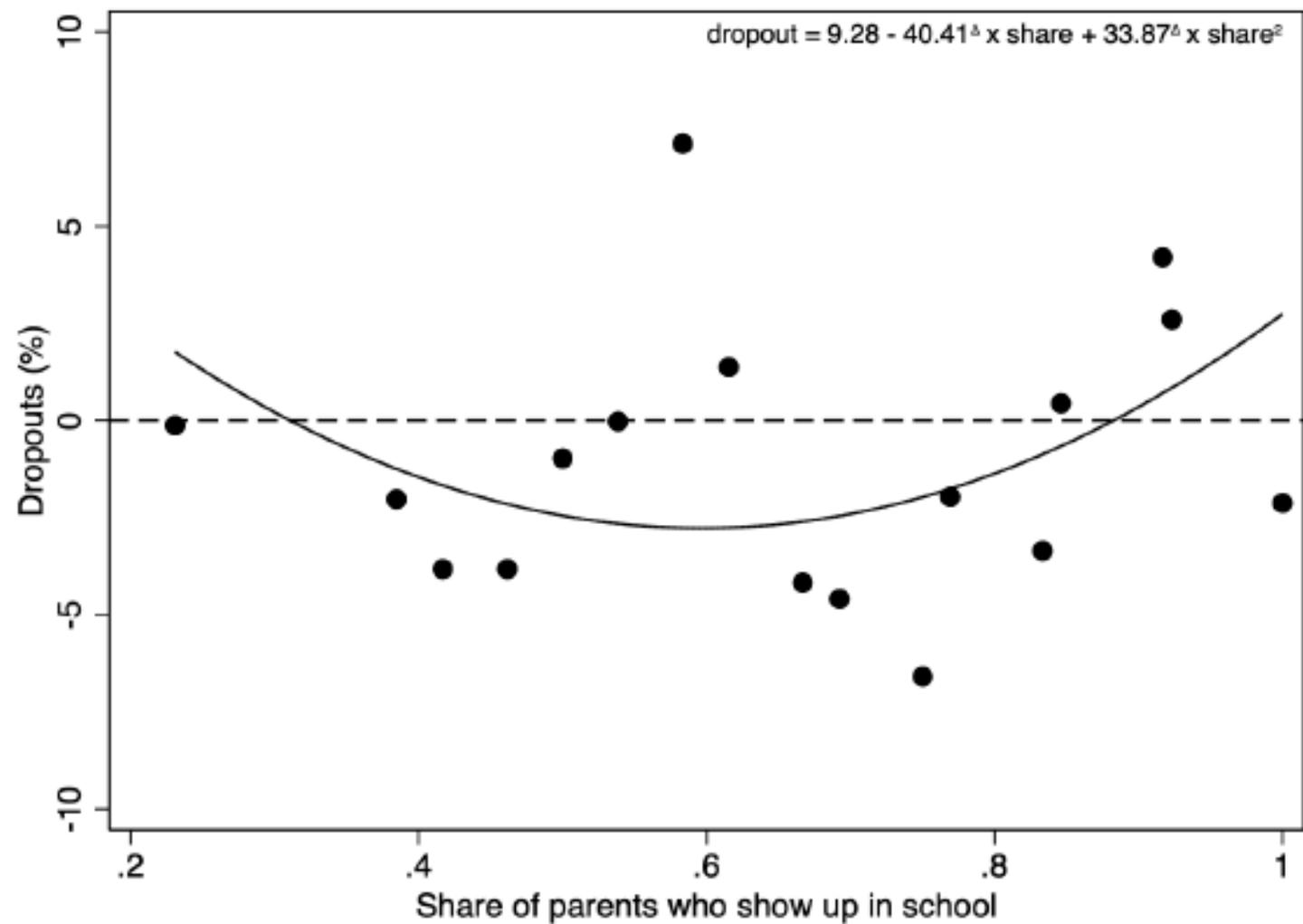


Figure 4. Heterogeneous treatment effects of nudges to parents on dropouts

*Note:* Bin-scatter plot of students' dropouts as a function of the share of parents who show up in school regularly, within the sub-sample of schools where only parents receive nudges. The outcome is normalized with respect to the control group mean. Dropouts come from administrative data. The share of parents who show up in school is the classroom-level average of children who answer affirmatively to the end line survey question "Did your primary caregiver showed up in school to talk to your teacher at least once a week?". Estimated coefficients are reported on the upper-right corner;  $\Delta$   $p < 0.15$ .

# Conclusions and Implications

- Monitoring teachers' effort either directly or through parent engagement decreased school dropouts but combining both failed to improve outcomes.
  - Matches qualitative evidence about frustrated interactions between teachers and parents (Wolf, 2020; Chikutuma, 2017), and lab-based experimental findings where high monitoring levels decreased worker productivity (Dickenson and Villeval, 2008).
- Future teacher monitoring interventions should be cautious not to demotivate teachers, particularly high-effort teachers.
  - Adaptations may include targeting a smaller share of parents in the community or moderating the extent to which parents are encouraged to approach teachers.
- Intervening with teachers might require eliciting their beliefs about their effort first in order to target programs more effectively.

Thank you

[guilherme.lichand@econ.uzh.ch](mailto:guilherme.lichand@econ.uzh.ch)

[wolfs@upenn.edu](mailto:wolfs@upenn.edu)



Working Paper