# Mama Knows (and Does) Best: Maternal Schooling Opportunities and Child Development in Indonesia

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**Abstract**

This paper leverages quasi-experimental variation in increased access to basic formal education, introduced by a large-scale school construction program in Indonesia in the 1970s, to quantify the benefits to the children of women targeted by the program. Novel and rich data allow the analysis of a range of health, cognitive and socio-emotional outcomes for children ages 6 to 8 in 2013. We find that increased maternal access to schooling has positive effects on children's development along multiple developmental outcomes. We also explore pathways of these intergenerational effects. Mothers who were exposed to more schooling opportunities during childhood demonstrate less hostility toward their own children as parents and invest more in their own children's preschool education.

**JEL Codes**: I28; O15; I21; J13; I26; D10
**Keywords**: education, school construction, human capital, health, non-cognitive skills, parenting

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# 1 Introduction

Barriers to schooling have been one of the main obstacles to development across the globe. While the motivation for expanding access to schooling often relies on labor productivity gains, there are reasons to believe that a large portion of returns to such policies materialize within families and across generations. Estimating these spillover effects of education is particularly relevant not only because it affects the accounting of social returns to public investments in education, but because it may influence the design of contemporaneous policies targeting early childhood development, like those focusing on parenting and school readiness. The literature on intergenerational impacts of education is large and very active (see reviews in Holmlund, Lindahl, and Plug (2011) and Haveman and Wolfe (1995)),[1] but also relatively scarce for developing-country contexts where educational attainment levels are far lower.[2] In this paper we take steps towards filling this gap by examining the intergenerational impacts of one of the most prominent schooling-expansion interventions in the developing world, the Indonesia *Sekolah Dasar* INPRES program of the 1970s – which greatly expanded access to schools across rural areas of the country.

We focus on the children of women originally targeted by the INPRES program and who reside in rural areas of Indonesia by the early 2010s. We focus on the expansion of maternal education given the gendered division of labor towards childrearing. Our analyses capitalize on a novel and comprehensive data set on early childhood development that is representative of rural Indonesia, allowing us to examine the impacts of the INPRES program on multiple developmental outcomes for children born to women targeted by the school construction program. Our outcomes encompass effects on health as well as cognitive and socio-emotional skills. This study complements and

[1] The increased accessibility to Scandinavian registry data has led to an explosion of articles on the topic. Some of the most influential work includes the seminal article by S. E. Black, Devereux, and Salvanes (2005) and more recent iterations which exploit policy-induced variation in educational attainment among older generations such as Fischer, Karlsson, Nilsson, and Schwarz (2019) and Suhonen and Karhunen (2019). Chevalier (2004) and Dickson, Gregg, and Robinson (2016) conduct similar analysis using minimum school-age regulations in the U.K., while Maurin and McNally (2008) do so employing variation generated by the French student revolt of 1968. Work focused on the intergenerational impacts of education in the U.S. context using causal inference reasoning can be found in Currie and Moretti (2003), Oreopoulos, Page, and Stevens (2006), Carneiro, Meghir, and Parey (2013).

[2] A notable exception is Andrabi, Das, and Khwaja (2012), who focus on Pakistani women with very low levels of education and their children.

expands on recent studies by Akresh, Halim, and Kleemans (2019) and Mazumder, Rosales-Rueda, and Triyana (2020), which are also based on the same program. Specifically, we examine a broader set of child development outcomes and provide evidence that *parenting practices* are important to the transmission of education impacts across generations.[3] We measure parenting practices both in terms of activities parents carry out with their children and in terms of interactions parents have with their children. Our analyses parallel those that focus on time use data, except that instead of focusing on the amount of time spent with the child (Andrabi et al., 2012; Bono, Francesconi, Kelly, & Sacker, 2016; Kalil, Ryan, & Corey, 2012) we focus on characterizing the *quality* of parent-child interactions.

Our identification strategy follows Esther Duflo's seminal study on the causal impacts of INPRES (Duflo, 2001) by leveraging the timing and geographic (district/kabupaten) differences in intensity of this major school construction project launched in 1973 by the Indonesian government. INPRES led to the construction of 61,807 new primary schools within five years of its launch (Breierova & Duflo, 2004), corresponding to approximately two additional schools per 1000 Indonesian children on aggregate. With this historic context in mind, we use the caregiver survey module collected in 2013 as part of the Indonesia Early Childhood Education and Development (ECED) Project. Importantly, the survey contains detailed information about mothers of young children and captures where mothers were born and whether they had moved from their place of birth before completing primary schooling. As such, we are able to locate where the mothers in our data set grew up and characterize whether they potentially benefited from the expansion of primary education as a result of the INPRES program.

Our empirical estimates confirm that the INPRES program produced significant gains in educational attainment among the mothers in our sample. Mothers who grew up as part of cohorts in districts that were exposed to more intense doses of schooling expansion received an additional 1.3 years of formal education. These effects are particularly strong at lower levels of schooling,

[3] The literature beyond economics establishes parenting practices as a critical mechanism by which parents influence their childrens development (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987; Jenkins & Handa, 2019; Kohn, 1969).

with sizeable increases in rates of primary education completion (14 percentage points (p.p.)) and literacy (15 p.p.). When looking at the children of these women, reduced-form estimates indicate a significant relationship between the intensity of a mother's exposure to the program during childhood and her offspring's shorter- and longer-term health outcomes. Extreme stunting and wasting rates decrease by 2.7 p.p. and 3.9 p.p. respectively, but morbidity (flu/fever/stomach-ache) rates in the last two weeks are not affected. We also find a positive relationship between the intensity of a mother's exposure to the program during childhood and her own child's educational achievement in language by 0.14 standard deviation (s.d.). These results are particularly strong at the lower end of the distribution of performances in language tests. However, we do not find significant impacts on mathematics or cognitive reasoning. When we unpack the test into its component modules – which are arranged by difficulty – we find evidence that children of mothers exposed to INPRES do better on the items focusing on more basic math skills (ordering quantities). Importantly, these children also outperform their peers in terms of pro-social behavior (0.18 s.d.) and social competence (0.22 s.d.).

We examine several pathways posited in the literature on intergenerational effects of education. Increasing access to maternal education improves resources in the form of assortative mating (i.e., more educated partners) and increases household wealth. However, we do not find evidence of impacts via reduced fertility (i.e., quantity-quality trade-off).[4] Above all, and in a novel result, we find that mothers exposed to more education opportunities exhibit different child-caring patterns compared to mothers who are not. Mothers who are exogenously exposed to more intensive school construction investments use less hostile parenting practices and are more likely to send their children to preschools. We argue, therefore, that expansion of maternal education not only leads to increased time and financial investment in their children but also to more effective use of child-rearing time and better child-rearing practices. In doing so, we contribute empirical evidence to the small but growing literature on the economics of parenting (Doepke, Sorrenti, & Zilibotti, 2019;

[4]Since we cannot rule out that partners were directly affected by INPRES policy, all our results are based on reduced-form (intent-to-treat) estimates.

Doepke & Zilibotti, 2017).[5] We also contribute to a broader literature across the social sciences about the importance of early childhood and the long-term impact of parenting practices (Schady, Galiani, & Souza, 2006). For example, the Lancet series on child development assessed a variety of early interventions to improve equity in child development. These reviews find that improvements in parenting practices (such as more responsiveness in feeding infants and young children; encouraging learning, book reading, play activities; using positive discipline; and problem-solving related to children's development, care, and feeding) had positively correlated with children's development (M. M. Black et al., 2017; Engle et al., 2007; S. P. Walker et al., 2011).

Our results on child health outcomes fit well within well-established theoretical frameworks (Grossman, 1972), the literature focused on maternal education in developing countries (Desai & Alva, 1998) as well as with the evidence uncovered in Akresh et al. (2019); Mazumder, Rosales-Rueda, and Triyana (2019); Mazumder et al. (2020) on the same INPRES program. The findings on performance on standardized tests in language and math are largely consistent with results in Andrabi et al. (2012). Finally, our findings on the effect of maternal education on childrens socio-emotional development and school-readiness shed light on new dimensions of the intergenerational impacts of education.

# 2 Data and context

## 2.1 Data sources and sample restrictions

The data used in this paper draw on information collected in the course of an impact evaluation of the Indonesia Early Childhood Education and Development (ECED) Project. The project expanded access to early childhood education and the evaluation focused on the effects on children's school readiness. Data were collected from children, their primary caregivers and a variety of other respondents in 310 villages in 9 districts across Indonesia. Respondents were 11,263 caregivers

[5] Economics of parenting includes seminal work by Weinberg (2001), which focuses on the use of physical punishment and argues that parenting should be factored into economic models of child development. More recent empirical work includes Jenkins and Handa (2019).

who resided in these districts.[6] Among the respondents, 7,982 mothers fully reported on outcomes and attributes that we employ in our models below, including location of her own birth. They represent 171 distinct districts of birth. Our analysis further restricts this sample to women in birth cohorts surrounding the time of the INPRES program implementation (those born between 1966 and 1975), leaving us with 2,118 mothers from 50 different districts of birth. Figure 1 presents the geographic distribution of contemporaneous district of residence (Panel A), as well as the spatial location of districts of birth for both the full sample (Panel B) and the working sample (Panel C).

Previous analysis has compared contemporaneous household level characteristics in the Indonesia ECED data to households observed in the rural subsample of Indonesia's nationally representative National Socioeconomic Household Survey (SUSENAS). Hasan, Hyson, and Chang (2013) report that the education levels of the heads of households, the rates of asset ownership among households, and the quality of construction materials used in the home among the households in the ECED data are comparable to those observed in the SUSENAS. Similar analysis using a village level census reveals that the villages in the ECED data share many characteristics in common with the rest of rural Indonesia. As such, the underlying data from which our analytical sample is drawn share several characteristics in common with households and villages typically found in rural Indonesia.

Our identification strategy described below relies on both the year and location of birth, and this is because the INPRES program followed specific rules for allocation of schooling expansion funds across districts. Therefore, our second source of data is information on construction planned under INPRES reported in Duflo (2001), which identifies the number of schools to be built in each district after 1974. We merge this district-level data to our working sample of 2,118 mothers in the ECED data. Appendix Table A1 reports descriptive statistics for the districts on Duflo (2001) data as well as for districts of birth captured in the working sample.

It is clear from these figures that our working sample represents a set of districts that had a less intensive presence of INPRES schooling expansion relative to Duflo (2001). Nonetheless,

[6] 99.82 percent of primary caregivers were children's mothers

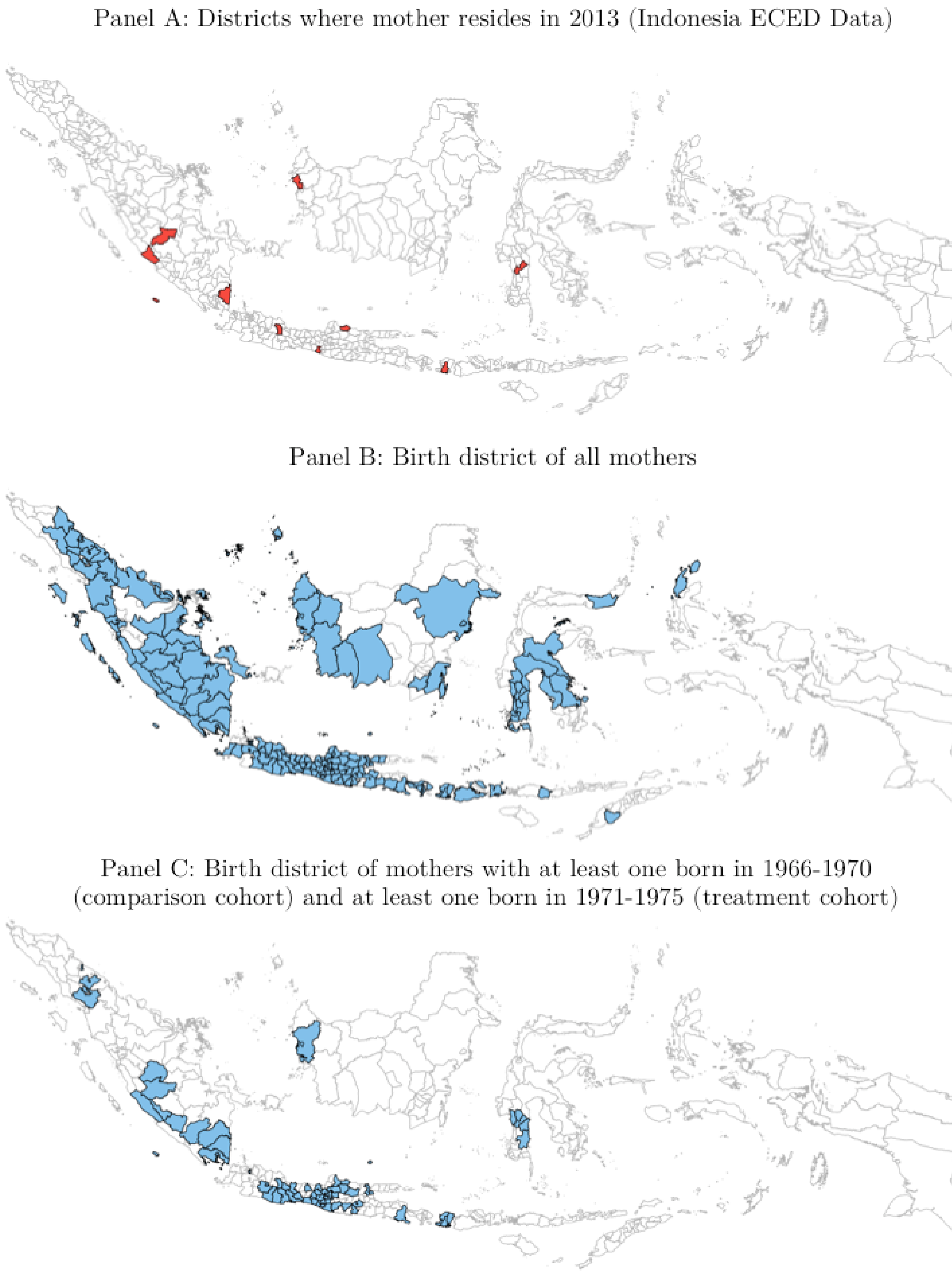


**Figure 1: Map of districts in overall data and in analytical sample**

Notes: Panel A shows the nine districts (red) in the Indonesia ECED Data. Mothers resided in these districts in 2013. Panel B shows the birth districts (blue) of all mothers in the Indonesia ECED Data. 171 districts are represented. Panel C shows the maternal birth districts (blue) in the Indonesia ECED Data with at least one mother born between 1966 and 1970, and at least one mother born between 1971 and 1975. 50 districts are represented. Geographic boundaries in the maps are based on 2010 boundaries in Panel A and 1995 boundaries in Panel B and Panel C.

the working sample still captures 38 districts in which the number of schools planned (per capita) is larger than the equivalent number measured at the national level (1.8 per 1,000). Therefore, we focus on the contrast between mothers born in districts with "intensive" INPRES presence and those born in "non-intensive" INPRES districts. It is important to note that this implies that the mothers exposed to INPRES in our sample are fully "treated" while those in our comparison group are partially "treated". In Table A2 we also show that the variables influencing INPRES allocation of schools across space correspond to the same ones examined in Duflo (2001), and that this relationship is not significantly different in our working sample. INPRES allocation was indeed remedial, targeting districts where more children could be served, where enrollment rates had been lower, and where distances to be traveled (to existing schools) were larger (indirectly measured by population density).

For completeness, we also present the contrast between main demographic characteristics of the full ECED sample and our working sample in Appendix Table A3. It is clear that the main difference between the two comes from the restriction we impose in terms of cohort-of-birth. Therefore, mothers in our working sample are older, slightly less educated (and so are the children's fathers) than those in the full sample. It is important to note that since the ECED evaluation design was based on sampling children between the ages of 6-9, our exercises are indeed drawing from a sample of children with older mothers, larger sibships, and likely higher parity than the overall sample in the Indonesia ECED Project. Given that the mothers in our sample are older, it is more likely that they have completed their fertility when they are interviewed. It is key to take these points into consideration when discussing limitations to the external validity of our results.

Appendix Table A3 reports that in our working sample, mothers are 41 years old on average, with 32 percent being born in years 1966-1970 and 68 percent in years 1971-1975. On average, they have completed 7.4 years of schooling. Approximately 80 percent of them report having completed primary education and being able to correctly read the sentence "rain came late this year" in Bahasa Indonesia. These mothers (who are close to completing their fertility if not so already) report having given birth to 4.3 children on average. Focus children are on average 7.7

years of age and 50 percent of them are boys. In about 9 percent of the cases, the father is reported to not reside in the household with them. This includes those who report that the father is deceased. On average the non-absent father of the child is 4.6 years older than mothers and has completed 7.7 years of schooling (with 79 percent reporting having completed primary school education).

## 2.2 Child development outcomes

We focus on multiple dimensions of a child's development. In doing so we also illustrate the raw differences in outcomes across maternal education and literacy status. We start by focusing on three main indicators of child health: low birthweight, wasting and stunting. For low birth weight we classify all reports of birthweight at and below 2,500 grams.[7] Stunted growth refers to low height for age, when a child is short for his/her age (WHO standardized population) and is an indicator of chronic malnutrition and carries long-term developmental risks. Wasting refers to low weight for height, the process by which acute food shortage and/or disease causes muscle and fat tissue to waste away. This is also known as acute malnutrition because wasting develops in a relatively short period of time in contrast to stunting. In contrast, stunting provides a more long-term measure of nutritional status. These statistics are especially pertinent since stunting in early life is associated with impaired cognitive ability, lower educational attainment, reduced future productivity, earnings potential and greater risk of poverty (Alderman, Hoddinott, & Kinsey, 2006). Indonesians whose growth was stunted in childhood were shorter (by 3.5 cm) and demonstrated lower cognitive function as young adults and had spent fewer years (by 5 months) enrolled in formal education (Giles, Satriawan, & Witoelar, 2020). Lower adult stature and cognitive ability were in turn associated with lower adult earnings in Indonesia (Sohn, 2015).

In Table A4 we report descriptive statistics. 17% of the children are born weighing 2,500 grams or less. Approximately 30% of these children also grow up to be wasted (under 2 standard-

[7]The child's birthweight is based on recall by the mother and when possible verified using the birth registration card. The typical child was 3,106 grams at birth. Digital scales were used for weight measurement and tape measures were used for measuring respondent height. These were then compared to World Health Organization Child Growth Standards and WHO Reference 2007 composite data to assess whether respondents are stunted or wasted.

deviations of the WHO reference population's mean) and 19% to be stunted. We complement this description by looking at the weight-for-age and height-for-age z-scores for groups of children defined by the literacy status of their mothers/caregivers. Figure 2 contrasts kernel-density estimates for these outcomes and reveals a clear shift to the left for these distributions when focusing on children of illiterate mothers. These are meaningful differences which indicate that the children of illiterate mothers are worse off.

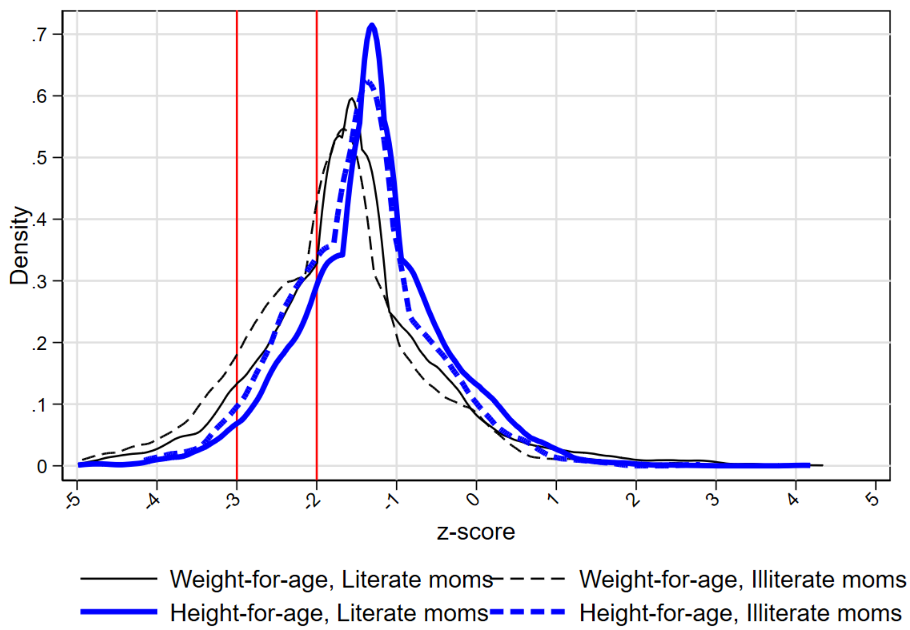


**Figure 2: Child Health by Maternal Literacy**

Notes: Figures based on 7,982 observations in ECED. Vertical lines (in red) represent cut-offs for wasting/stunting (-2) and extreme wasting/stunting.

The ECED survey also collected child outcomes on a battery of cognitive tests and examinations of school-curriculum materials. Children were administered tests to assess their ability in terms of Bahasa Indonesia, mathematics and abstract reasoning. Two versions of the overall test were administered: a shorter test for 6 and 7-year-olds and a longer test for 8 and 9-year-olds. In this paper, we use the common set of items that were included in both versions of the test. We standardized the percentage of correct answers for each test to have a mean of 0 and standard deviation of 1, using the age-specific mean and standard deviation of the entire ECED sample.[8]

The language test consisted of two sections. The first section (match pictures) evaluated children's phonological awareness (i.e., whether they can match pictures that start with a given sound) and letter recognition (i.e., whether they can match pictures that start with a given letter). The second section (mention objects) assessed children's vocabulary skills (i.e., whether they can name the word associated with a given image). The mathematics test included two sections. The first section (summation) evaluated children's ability to add and subtract (i.e., whether they can add to or subtract away from a set of objects). The second section (order numbers) assessed children's ability to recognize patterns (i.e., whether they can order one- to two-digit numbers in ascending and descending order). Finally, the abstract reasoning section was modeled on the Ravens Progressive Matrices. Students were presented with an image that was missing a small section and asked to select the missing pieces from six options, based on color, pattern, and orientation.

Like in the case of health outcomes we see a strong positive gradient between child performance on each of these tests and maternal education. Figure 3 reveals a clear positive gradient between scores and maternal education. When looking at raw scores we see that children of literate mothers get rates of correct responses that are approximately 13.6 p.p. (Language), 15.8 p.p. (Math), and 10.7 p.p. (Reasoning) higher than their peers whose mothers cannot read, for example.

We then turn to the third and final dimension of child development covered in this study: socio-emotional skills. The survey included instruments based on the Strengths and Difficulties Questionnaire (SDQ), in which mothers assess children's behavioral and emotional problems along five dimensions: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behavior problems.[9] While all five sub-scales are typically used when screening for disorders, broader subscales can be used for analytical purposes. This involves combining the emotional and peer subscales into an internalizing subscale and the conduct and hyperactivity subscales into an externalizing subscale (Goodman, Lamping, & Ploubidis, 2010).

[8] Panel A in Table A5 presents descriptive statistics for the raw scores in the working sample (in terms of percentage of correct answers).

[9] As noted in Pradhan et al. (2013), the SDQ is an informant-based assessment of a child used internationally. It has been translated to Indonesian by Wiguna and Hestyanti (2012).

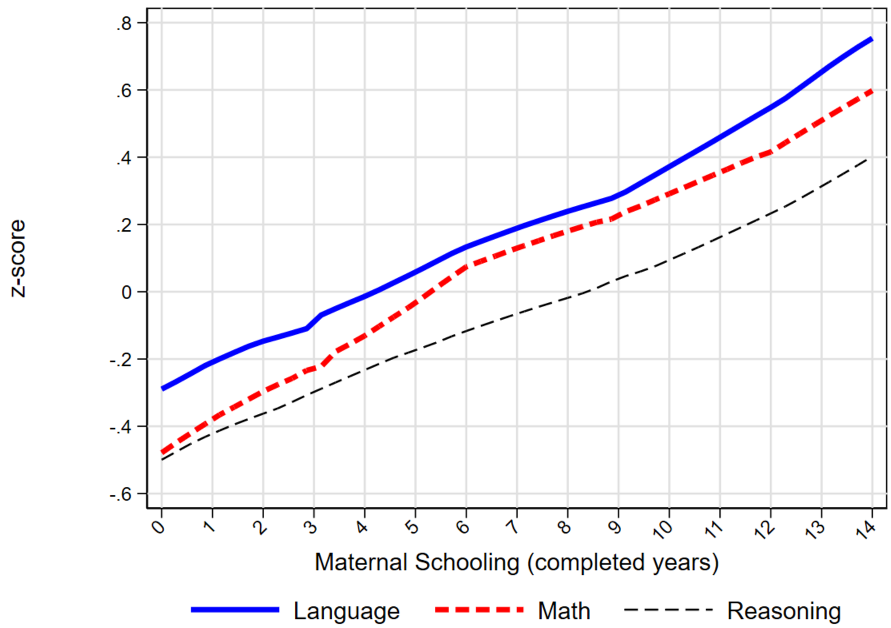


**Figure 3: Child Performance in Cognitive and Curriculum Tests versus Maternal Education**

Notes: Figures based on 7,982 observations in ECED. Lines are local-polynomial fits of degree one.

Internalizing behaviors are negative behaviors focused inward, and can include fearfulness, social withdrawal, and excessive thoughts, feelings and behaviors focusing on physical symptoms such as pain, weakness or shortness of breath (somatic complaints). In contrast, an externalizing behavior is directed outward toward others. Bullying, vandalism, and arson are examples of externalizing behaviors. Studies have found the Strengths and Difficulties Questionnaire (SDQ) to be a good predictor of children's scores on the same instrument one year later (Hasan et al., 2013).

Figure 4 relates the count of difficulties with maternal education (completed years). In this case, there are some interesting differences in the strength of the gradient. Prosocial difficulties (considerate of others people feelings; sharing with other children; helpful if someone is hurt, upset or ill; kind to younger kids; volunteering to help others) are the most strongly associated with maternal education, followed by internalizing and externalizing difficulties, respectively. Illiterate mothers have kids with prosocial difficulties scores 0.23 standard-deviations (s.d.) higher than kids whose moms are literate. The corresponding numbers for internalizing and externalizing difficulties are 0.08 and -0.02 s.d., respectively. These scores were standardized using the age

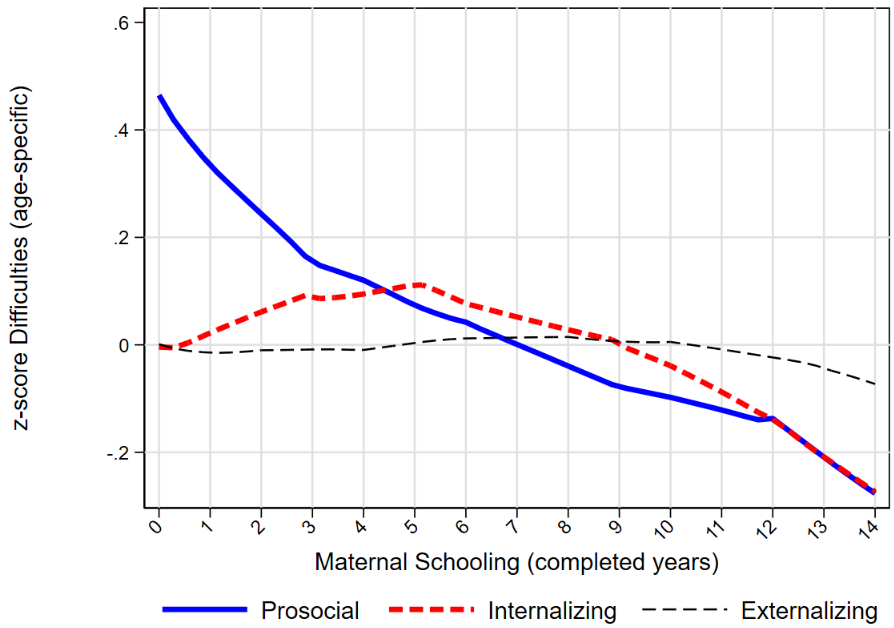


**Figure 4: Child's Strengths and Difficulties versus Maternal Education**

Notes: Figures based on 7,982 observations in ECED. Lines are local-polynomial fits of degree one.

specific group within the full ECED sample. Appendix Table A5 Panel B, reports the descriptive statistics.

The second instrument we employ is the Early Development Instrument, a comprehensive measure of school readiness typically reported on by teachers and parents. In our analysis we compute an average of reports by teachers and caregivers. As described in Hasan et al. (2013), the EDI assesses children's readiness for school across five developmental domains:

i. *Physical health and well-being*. Children who perform well on the physical health and well-being domain are usually dressed appropriately for school activities and do not come to school hungry or tired. They have established a hand preference, are well-coordinated and have well-developed gross and fine motor skills.

ii. *Social competence*. Children who perform well on the social competence domain get along well with other children, are cooperative and self-confident. They show respect for others, follow rules, exercise self-control, and take responsibility for their actions. These children work neatly and independently the majority of the time. Children who score high on the social competence domain are able to solve problems, follow instructions, and easily adjust to changes.

iii. *Emotional maturity*. Children who score high on the emotional maturity domain demonstrate helping behaviors, often spontaneously. They rarely show signs of anxiousness or aggressive or hyperactive behaviors. They concentrate well, do not have temper tantrums, and are not mean to others.

iv. *Language and cognitive skills*. Children who perform well on the language and cognitive skills domain possess basic literacy skills (know how to handle a book, can identify letters, know some letter sounds, are aware of rhyming words, and are able to write their own name). These children are interested in books, mathematics, and numbers, and have good memories. They are able to read and write simple words or sentences. Additionally, these children have basic numeracy skills (can count to 20, recognize numbers and shapes, compare numbers, sort, and classify).

v. *Communication skills and general knowledge*. Children who score high on the communication skills and general knowledge domain can communicate effectively with ease, can tell stories and engage in imaginative play, articulate clearly, and show reasonable general knowledge.

The EDI has well established concurrent and predictive validity in a number of developed economies. In Indonesia the EDI was validated using both the short and long version of the instrument using teacher and parent reports (Brinkman et al., 2017). Data collected on a cohort of 4 year-olds also shows that as children get older their performance on each of the domains goes up and their vulnerability declines (Hasan et al., 2013).

Figure 5 provides a visual depiction of the association between maternal education and child development as reported by teachers and caregivers. Across the board we see a positive relationship between the two variables. Language and cognitive development, communication skills and general knowledge and social competence are dimensions with strongest relationship. Literate mothers have kids with raw social development scores 0.30 s.d. above those of kids whose moms do not read. Language and cognitive development scores are 0.43 s.d. higher, and communication skills and general knowledge scores are 0.26 s.d. higher, respectively.[10] Once again, Appendix

[10]The corresponding numbers for physical health and well-being and emotional maturity are 0.09 and 0.12.

Table A5 reports the descriptive statistics regarding all dimensions (Panel C).

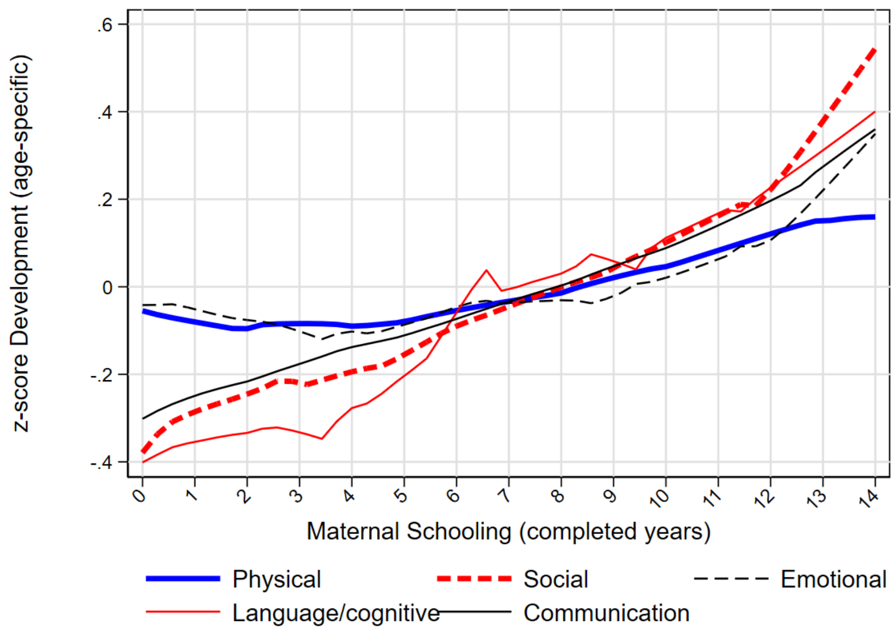


**Figure 5: Childs Early Development versus Maternal Education**

Notes: Figures based on 7,982 observations in ECED. Lines are local-polynomial fits of degree one. EDI is average of mother-reported and teacher-reported scores.

## 2.3 Parenting, child activities and human capital investments

### 2.3.1 Parenting

Given the association between parenting styles and child outcomes posed by the broader child development literature, we make full use of our survey instruments to investigate elements of parenting that may influence child development. In particular, we presume some of these parenting practices can be influenced by the amount of formal education caregivers acquire.[11] We focus on how mothers influence their children's development through their relationships, such as the level of warmth or anger that mothers feel for their children and the kind of discipline that mothers use when children misbehave. These practices are important because children living in an environment with higher-quality parenting are correlated with higher pre-academic skills, better language skills,

[11]Psychology and sociology have a long tradition of associating parenting with socio-economic status (Baumrind, 1991; Kohn, 1969).

more social skills, and fewer behavior problems compared to children exposed to lower quality parenting (NICHD, 2002).

In our survey, mothers were asked to answer a series of questions about their parenting practices. These practices were measured using items describing parent-child relationships adapted from the Longitudinal Study of Australian Children (Zubrick, Smith, Nicholson, Sanson, & Jackiewicz, 2008). The questions covered a range of possible practices. Parenting practices are specific behaviors that parents use in their interactions with their child. These include, for example, using reprimands, giving praise, showing physical affection and setting and keeping with rules for behavior (Bornstein & Zlotnik, 2008; L. O. Walker & Kirby, 2010).[12] Following a recent narrative review of parenting, three hierarchical summary constructs are proposed: warmth, consistency, and hostility (Jansen, Daniels, & Nicholson, 2012). We compute these constructs by calculating within each of them the proportion of items the caregiver responds as having undertaken frequently.

Many dimensions of parenting have been shown to influence child development, although different terms are often used to describe overlapping or similar constructs. Generally, children show better developmental outcomes when exposed to parenting that is high on the dimensions of warmth, consistency, inductive reasoning and self-efficacy and low on the dimensions of irritability, hostility and over-protectiveness (Bayer et al., 2011; Bradley et al., 1989; Chang, Schwartz, Dodge, & McBride-Chang, 2003; Chao & Willms, 2002; Paterson & Sanson, 1999; Pettit & Bates, 1989). Parenting styles are multidimensional categories of behaviors and attitudes which classify parents according to where they lie on the distributions of some specific parenting dimensions (Darling & Steinberg, 1993). One of the most well-known classifications of parenting style is that applied by Baumrind and others (Baumrind, 1991; Darling & Steinberg, 1993; Maccoby & Martin, 1983) defining four parenting styles based around levels of over-controlling and responsive parenting: authoritative (high control, high responsiveness), authoritarian (high control, low responsiveness), indulgent/permissive (low control, high responsiveness), and uninvolved/neglectful

[12]The psychology literature has paid close attention to these practices, particularly in the case of corporal punishment and spanking. See Gershoff and Grogan-Kaylor (2016) for a review and Putnick et al. (2012) for an analysis of data from a cross-section of countries.

parenting (low control, low responsiveness). In the Anglo population in Western societies, authoritative parenting has been most consistently associated with positive socioemotional competence, cognitive and health outcomes in children (Baumrind, 1991; Bornstein & Zlotnik, 2008; Jackson, Henriksen, & Foshee, 1998; Smith, 2011). Some dimensions of parenting are not applicable for all ages (e.g. inductive reasoning is not applicable in infancy), and specific parenting behaviors may be appropriate for some ages but not others (e.g. leaving the child alone in their room may be an appropriate discipline strategy for a preschooler, but not for an infant). As a result, both the broader parenting constructs and the specific items used to assess them needed to be mapped against the ages of intended use. We therefore standardized our measures to the age of the child when estimating econometric models.

We present descriptive statistics on these measures in Panel A of Table A6. There is variation on these practices within our sample, and also that the caregivers we study are over-represented in the bottom of the distribution of these scores. When we examine differences by literacy, we see that women who can read are substantially more likely to show warmth and consistency in their parenting, and less likely to show hostility.

### 2.3.2 Activities

Caregivers were also asked to complete an inventory asking whether or not the child took part in a series of typical play and stimulation activities in the past week. This is akin to the inventory of activities employed by time-use surveys in Attanasio, Cattan, Fitzsimons, Meghir, and Rubio-Codina (2020) and Andrabi et al. (2012). The descriptive statistics are presented in Panel B of Table A6. Across the board we see high level of engagement in stimulating activities, but also substantial engagement in household chores. We also looked at differences between children of literate and of illiterate mothers, and found that, as expected, the former are more likely to be engaged in reading and music-playing (13 p.p.), but also in every other activity (albeit with smaller differences across groups).

### 2.3.3 Investments in human capital

In addition we use information from the section on the child's health history to identify whether the child has received a full set of immunizations by the date of the survey. We also collect information on the types of food consumed in the past week and the number of days in the past week which they consumed each food. Food was categorized into seven groups, following the dietary diversity guidelines from the Food and Agriculture Organization of the United Nations (FAO): (1) grains, (2) vitamin A-rich plant food, (3) other fruits and vegetables, (4) meats, fish, and seafood, (5) eggs, (6) dairy, and (7) oils and fats. This information was then combined into two measures of dietary diversity. The first measure is whether children consumed foods from a minimum number of dietary groups (four or more groups) and the second measure is whether children consumed foods from the maximum number of dietary groups (seven) in the past week.

Finally, we also asked parents to provide enrollment histories for each child from the 2015/2016 school year going back to the 2012/2013 school year. These were used to construct whether or not a child enrolled in a particular time of school service as well as a measure of their cumulative months of enrollment at the time of the survey. Descriptive statistics on all these variables are presented in Table A7.

We see that immunization rates and minimum dietary diversity rates are quite high in this population, yet the majority is not close to getting maximum dietary diversity. Mothers are well aware of pre-school opportunities around them but much fewer of them act on that knowledge on average. Differences between literate and illiterate mothers are sizeable, around 9 p.p. for immunization rates, 5 to 6 p.p. in dietary diversity and about 8.5 p.p. in attendance of pre-schooling institutions (or about 1.1 less months).

## 3 Empirical design and causal identification strategy

Motivated by the correlation between child outcomes and maternal education, as well as by the opportunity to trace changes in maternal access to education with different parenting styles and parental investments, we focus on quasi-experimental variation generated by the INPRES schooling expansion to investigate impacts across generations. Following Duflo (2001), we combine geographic variation in planned school construction intensity (per 1,000 children) with a woman's year of birth in order to formulate a difference-in-differences empirical model. We differ from that seminal article in that we elect to focus on a binary classification of construction intensity per district (above or below the aggregated number of schools per 1,000 children planned for the whole country). Our analysis also focuses on the contrast between two cohorts for which primary school construction would have provided a different treatment dose. In the ECED data, the vast majority of mothers are born after 1957-1962 (the comparison cohort used in Duflo (2001)) because the sampling was based on being mothers to young children in 2013. Thus, our analysis contrasts women born between 1966 and 1970 with those born between 1971 and 1975. Since the timing of construction was variable within districts and older children are unlikely to benefit from newly constructed primary schools, the latter cohort (1971-1975) is expected to have accrued most of the benefits of increased access to elementary education generated by INPRES.

We start by estimating models that confirm the effect of planned school construction on the education of mothers interviewed in 2013. For the effect on the mother's children, we focus on a reduced-form or intent-to-treat analysis because the impact of school construction over the second generation may result from multiple mechanisms. In Figure A1, we reproduce these findings using data from the 2010 Census. The additional data allows us to examine the parallel-trends hypotheses (at least in the dimension of maternal schooling) which sustain our empirical design but, due to aforementioned child-mother age restrictions in our working sample, could not be directly performed.[13] Our full econometric specification based on this reasoning and focused on maternal educational outcomes is as follows:

$$Y_{icd} = \mu_d + \phi_c + \tau Intense_d \times Young_c + \beta' Z_d \times Young_c + \eta_{icd} \quad (1)$$

[13]We also rely on the fact that studies of INPRES utilizing alternative data sources have shown that the parallel trend assumption seems to hold (Akresh et al., 2019; Duflo, 2001; Mazumder et al., 2019, 2020).

where $Intense_d$ is an indicator function for districts where INPRES construction was more intensive than the national level and $Young_c$ flags mothers in 1971 to 1975 birth-cohorts. Fixed-effects for district of birth ($\mu_d$) and year-of-birth ($\phi_c$) guarantee that the parameter $\tau$ is interpreted as a difference-in-differences coefficient. We complement the model with interactions between other district-of-birth characteristics ($Z_d$) and the indicator for belonging to the most exposed cohorts in order to alleviate concerns that other district-of-birth characteristics and not INPRES intensity could explain the results we find.[14] Standard errors are clustered at the district of birth of mothers.

Another potential threat to identification is related to the migration of mothers. In our data, mothers' district of residence in 2013 is limited to the nine rural districts in the Indonesia ECED data. Thus, we may be concerned that migration from high INPRES birth districts to our nine districts reflects particularly aspirational individuals (i.e., those likely to obtain more education and to experience upward geographic mobility) whereas migration from low INPRES birth districts to our nine districts selects on particularly low-aspirational individuals (i.e., those likely to obtain less education and to experience downward geographic mobility). While we cannot directly rule out this possibility, our analysis of migration patterns among mothers in our data suggests that this is unlikely to be a major threat to validity. Figure 6 presents the mobility pattern across districts by whether the district experienced low intensity or high intensity INPRES. Each dot is a birth district, sorted by levels of Human Development Index (a measure of overall development). Birth districts that are more (less) developed are on higher (lower) values of the y-axis. For each birth district, we calculate the median HDI of the district where mothers are residing in 2013. The difference between this median 2013 HDI and the birth district HDI (x-axis) indicates the level of mobility experienced by mothers coming from each birth district. The figure clearly shows similar and consistent migration patterns across low and high intensity INPRES districts: mothers born in higher HDI districts experience larger downward mobility, while mothers born in lower HDI districts experience larger upward mobility. This suggests that differential migration patterns between low and high intensity INPRES districts are unlikely to bias our results.

[14] These are the same robustness exercises conducted in Duflo (2001).

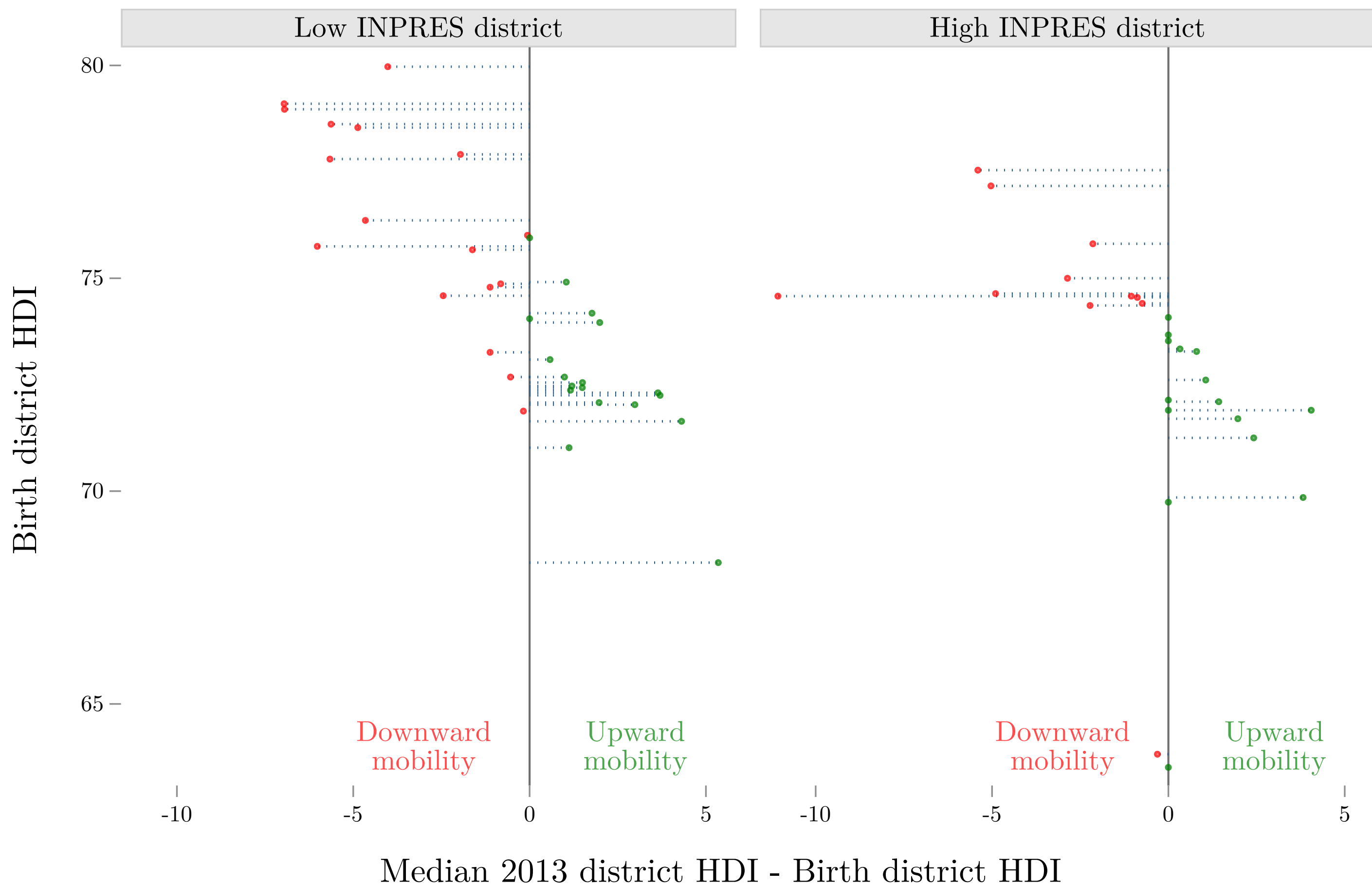


**Figure 6: Migration of mothers across districts**

Notes: Each dot is a birth district in our analysis. The INPRES intensity of each birth district is classified as either low intensity (left) or high intensity (right). The y-axis position of each birth district is determined by the district's Human Development Index (HDI). Higher values of HDI indicate better conditions. The x-axis position of each birth district is the median difference between the HDI of the district where the mother is living in 2013 and the HDI of the district of birth. X-axis greater than 0 indicates upward mobility: the HDI of the district in adulthood is better than the HDI of the district of birth. X-axis less than 0 indicates downward mobility: the HDI of the district in adulthood is worst than the HDI of the district of birth. X-axis of 0 indicates no change in mobility. HDI is measured in 2013 using the Indonesia Database For Policy And Economic Research (INDO-DAPOER).

We expand the empirical model above to investigate the effect of maternal education on children's outcomes. Specifically, we include child level controls ($X_{icd}$) for age and an indicator function for child gender. Therefore, the model taken to the data is:

$$Y_{icd} = \tilde{\mu}_d + \tilde{\phi}_c + \tilde{\tau} Intense_d \times Young_c + \tilde{\beta}' Z_d \times Young_c + \alpha' X_{icd} + \tilde{\eta}_{icd} \tag{2}$$

where the parameter $\tilde{\tau}$ captures the intent-to-treat (ITT) effect of INPRES on children belonging to the second generation. Again, standard errors are clustered at the district of birth of mothers.

Finally, in order to emphasize impacts at particular points of the distribution of the dependent variable, we estimate linear probability models with quantile indicator variables replacing continuous measures of the outcomes on the left-hand side of these models.[15]

# 4 Results

## 4.1 INPRES and maternal education

Table 1 summarizes the impact of school construction on maternal education. For each panel, the cells in columns 1, 2 and 3 illustrate the simple two-by-two tables of our difference-in-differences identification strategy. Mothers' birth districts are classified in terms of school construction intensity as either "high INPRES" (column 1) or "low INPRES" (column 2).[16] Mothers belong to low exposure cohorts born between 1966-1970 or to high exposure cohorts born between 1971-1975. Recall that by design, school construction planned under INPRES was more intense in districts where school enrollment rates were low. Therefore, for both cohorts, mothers born in districts with low INPRES intensity have higher levels of educational attainment (Panel A), primary school completion rate (Panel B) and literacy rate (Panel C) than mothers born in districts with high program intensity. While educational outcomes remained similar across birth cohorts in low INPRES

[15] For the case of maternal education we use the same strategy to identify particular ranges in years of education affected by INPRES.

[16] As shown in Appendix Table A1, the difference between the number of schools constructed per 1,000 children in high and low intensity districts is 1.10.

districts, there were large improvements in educational outcomes over time in high INPRES districts. Thus, the difference-in-differences yields positive impacts of school expansion on maternal education.

**Table 1: School construction and maternal education – levels, differences, and diff-in-diff**

| | High INPRES | Low INPRES | Difference in Differences | | | Robustness Checks | |
|---|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
| *Panel A: Years of Education* | | | | | | | |
| 1966-1970 Birth Cohort | 5.776 | 9.411 | | | | | |
| | (0.609) | (0.447) | | | | | |
| 1971-1975 Birth Cohort | 6.773 | 9.155 | | | | | |
| | (0.562) | (0.510) | | | | | |
| Difference | 0.997 | -0.255 | 1.253 | 1.049 | 1.064 | 1.242 | 1.133 |
| | (0.192) | (0.177) | (0.258) | (0.261) | (0.306) | (0.481) | (0.500) |
| | | | | [0.016] | [0.008] | [0.024] | [0.052] |
| *Panel B: Completed Primary Education (Yes=1)* | | | | | | | |
| 1966-1970 Birth Cohort | 0.631 | 0.939 | | | | | |
| | (0.086) | (0.022) | | | | | |
| 1971-1975 Birth Cohort | 0.766 | 0.935 | | | | | |
| | (0.080) | (0.020) | | | | | |
| Difference | 0.135 | -0.004 | 0.139 | 0.121 | 0.133 | 0.142 | 0.143 |
| | (0.030) | (0.021) | (0.036) | (0.039) | (0.041) | (0.074) | (0.074) |
| | | | | [0.040] | [0.012] | [0.152] | [0.096] |
| *Panel C: Literate (Yes=1)* | | | | | | | |
| 1966-1970 Birth Cohort | 0.633 | 0.934 | | | | | |
| | (0.051) | (0.028) | | | | | |
| 1971-1975 Birth Cohort | 0.79 | 0.937 | | | | | |
| | (0.058) | (0.017) | | | | | |
| Difference | 0.157 | 0.003 | 0.154 | 0.13 | 0.132 | 0.154 | 0.142 |
| | (0.030) | (0.020) | (0.035) | (0.033) | (0.039) | (0.063) | (0.066) |
| | | | | [0.008] | [0.016] | [0.044] | [0.076] |
| *Controls (D-in-D's)* | | | | | | | |
| District and year of birth FE's | | | NO | YES | YES | YES | YES |
| Treated cohort interaction with school-aged children in 1973 (ln scale) | | | NO | NO | YES | YES | YES |
| Treated cohort interaction with enrollment *per capita* in 1971 (ln scale) | | | NO | NO | NO | YES | YES |
| Treated cohort interaction with 1970's sanitation program | | | NO | NO | NO | NO | YES |
| Sample | 674 | 1,444 | 2,118 | 2,118 | 2,118 | 2,118 | 2,118 |

Notes: Standard-errors in parentheses are clustered at the district of birth. Wild-bootstrap significance p-values in brackets.

Our preferred model specification in column 5 shows that mothers exposed to higher doses of the INPRES program completed an additional 1.1 years of education, improved primary completion rate by 13.3 percentage points, and increased literacy rates by 13.2 percentage points. Moreover, Figure 7 shows that the school construction led to significant impacts on educational attainment across all years in primary school.[17] Our treatment effect is substantially larger than the estimates in Akresh et al. (2019); Duflo (2001); Mazumder et al. (2019, 2020). However, larger estimates are expected given that our study focuses on mothers living in rural Indonesia in adulthood. Given negative selection into rural areas in developing countries (Young, 2013), mothers in our study are those who are particularly disadvantaged. These disadvantages are clear from the low levels of education among mothers born in high INPRES districts. In our sample, mothers born in the high intensity districts have an average of 5.8 and 6.8 years of education in the low and high exposure birth cohorts (respectively). In contrast, the educational attainment of high INPRES districts in Akresh et al. (2019); Duflo (2001); Mazumder et al. (2019, 2020) is over 8 years across birth cohorts.

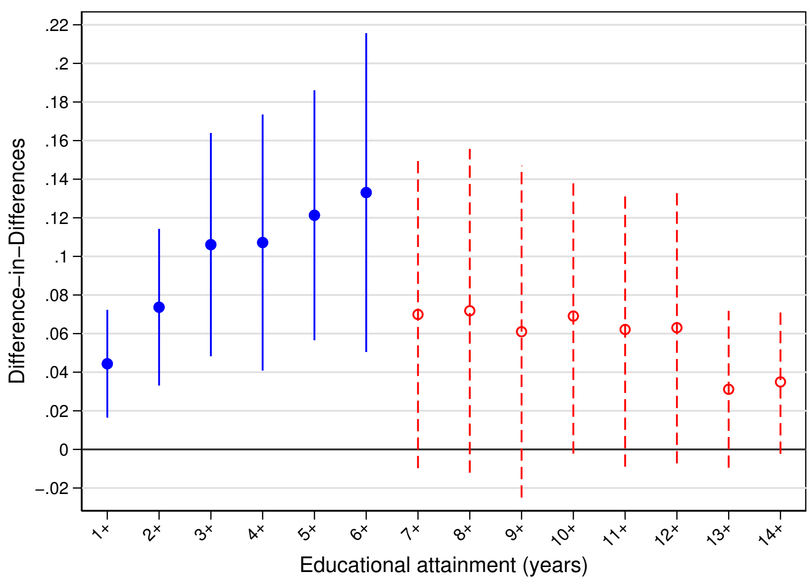


**Figure 7: Difference-in-differences by maternal educational attainment**

Notes: Figures based on 2,118 observations in ECED. These are point estimates of the difference-in-differences coefficient in a sequence linear probability models. All models control for (ln) of school-aged population in maternal district of birth around 1973 (interacted with "treated cohort").

[17]The null results for secondary education in Figure 7 is consistent with the fact that the school construction project expanded access to primary school education but not more advanced levels of schooling.

Our identification strategy assumes that there are no omitted time-varying and district-specific variables that are correlated with school construction. A key threat to identification is if improvements in educational attainment among mothers in high intense INPRES districts simply reflect mean reversion. This is plausible since program intensity was directly determined by enrollment rates in 1972. Another key threat to our identification assumption is if other governmental interventions occurred during the same time and used similar allocation as the school construction program. For example, the second largest government program during this period was for water and sanitation (Duflo, 2001). Thus, our diff-in-diff estimates may be upwardly biased if it confounds the effect of school construction with mean reversion that would have occurred in the absence of the program or with other government interventions.

To assess mean reversion, we estimate a model that includes an interaction between high exposure birth cohort and enrollment rates in 1971. Similarly, we check the sensitivity of our treatment effect estimates to other major government programs during the same period by estimating a model that includes an interaction between high exposure birth cohort and the intensity of the water and sanitation program. The inclusion of these interaction increases our treatment effect from 1.064 (column 5) to 1.242 (column 6) and 1.133 (column 7), which suggests that mean reversion and omitted programs are not likely to be driving our main results. We also report a wild bootstrap p-value to account for the somewhat small number of clusters (50 birth districts) in our sample. The large impact of school construction on maternal education in our sample underscores the importance of expanding educational opportunities for women in rural areas, who are often the most marginalized members of society.

## 4.2 Children's outcomes

Having established the impact of school construction on maternal education, we next turn to the intent-to-treat impacts on children's outcomes. Table 2 reports on health at birth in Panel A. Column 1 presents difference in differences estimates which control for caregiver district and year of birth fixed effects as well as child gender and child's age fixed effects. Column 2 adds an interac-

## Table 2: Maternal education and children's health outcomes

| | 1966-1970 Maternal Cohort High INPRES Mean | High-Low INPRES Gap | Difference in Differences [1] | [2] | [3] |
|---|---|---|---|---|---|
| *Panel A: Health at birth* | | | | | |
| Child's birthweight (grams) | 3,076.8 | -44.6 | 44.07 | 37.01 | 37.21 |
| | | | (45.93) | (44.68) | (44.44) |
| | | | [0.456] | [0.480] | [0.464] |
| Low birthweight incidence (%) | 20.5 | 8.7 | 0.20 | 0.47 | 0.42 |
| | | | (2.84) | (2.79) | (2.77) |
| | | | [0.916] | [0.736] | [0.980] |
| *Panel B: Health in infancy* | | | | | |
| Child was sick in past fortnight (cough/flu/fever/stomach ache) (%) | 57.4 | 1.1 | -2.32 | -2.07 | -2.02 |
| | | | (4.36) | (4.29) | (4.33) |
| | | | [0.664] | [0.656] | [0.668] |
| Child's weight-for-age (WHO z-score) | 1.64 | -0.30 | 0.09 | 0.10 | 0.10 |
| | | | (0.09) | (0.09) | (0.09) |
| | | | [0.456] | [0.420] | [0.460] |
| Child is wasted (%) | 33.5 | 13.4 | -3.95 | -4.26 | -4.45 |
| | | | (3.85) | (3.82) | (3.83) |
| | | | [0.408] | [0.364] | [0.404] |
| Child is extremely-wasted (%) | 8.7 | 4.7 | -3.61 | -3.90 | -3.94 |
| | | | (2.04) | (1.97) | (1.97) |
| | | | [0.148] | [0.108] | [0.112] |
| Child's height-for-age (WHO z-score) | 1.41 | -0.30 | 0.14 | 0.15 | 0.15 |
| | | | (0.07) | (0.07) | (0.07) |
| | | | [0.072] | [0.056] | [0.080] |
| Child is stunted (%) | 20.7 | 8.1 | -2.58 | -2.76 | -2.96 |
| | | | (2.32) | (2.32) | (2.31) |
| | | | [0.188] | [0.244] | [0.224] |
| Child is extremely stunted (%) | 4.6 | 1.5 | -2.55 | -2.68 | -2.72 |
| | | | (1.25) | (1.23) | (1.22) |
| | | | [0.064] | [0.048] | [0.048] |
| *Controls (D-in-D's)* | | | | | |
| Caregiver district and year of birth FE's | | | YES | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | | | NO | YES | YES |
| Child gender | | | YES | YES | YES |
| Child-age FE's | | | YES | YES | NO |
| Child's age (linearly, in months) | | | NO | NO | YES |

Notes: Sample is 2,118 children. Standard-errors in parentheses are clustered at the district of maternal birth. Wild-bootstrap significance p-values in brackets.

tion term for whether the mother is from the treated cohort and the number of school age children in 1973. Column 3 replaces the child's age fixed effects with a linear term for the child's age. Estimates are shown with empirical standard errors as well as p-values derived from a wild-bootstrap. Each table also includes two columns which contain reference values to ease in interpreting the magnitudes of the point estimates. The column labeled "1996-1970 maternal cohort high INPRES mean" reports the average value of the outcome among least likely to be exposed (comparison cohort) mothers in districts that received an intensive dose of INPRES. The column labeled "1996-1970 maternal cohort high-low INPRES gap" reports the difference between high and low INPRES districts among comparison cohort mothers.

While the point estimates indicate that the birthweight was higher for children born to mothers exposed to larger doses of the program relative to those born to mothers exposed to smaller doses of the program, the point estimates are not statistically significant. Similarly, the program did not have statistically significant impacts on the incidence of low birthweight.

Panel B reports on health in infancy and finds that there are no significant impacts of the program on whether children were sick in the past fortnight. Weight-for-age and whether the child is wasted are also similar. When looking at extreme wasting, there is some evidence that children of mothers exposed to larger doses of the program are less likely to be extremely wasted. Given the average prevalence of extreme wasting (8.7%) the point estimate is substantial at -3.9. However, the p-value is 0.11. In contrast, the evidence is stronger for children's height-for-age. The program increased height-for-age by 0.15 s.d. Give the sample mean in the high INPRES district, this translates to a 10% increase in height-for-age. The program seems to have been particularly effective at reducing extreme stunting rates (2.72 p.p.). Given that 4.6% of children born to mothers from high INPRES districts are extremely stunted, the effect is substantial.

## Table 3: Maternal education and children's cognitive skills

| | 1966-1970 Maternal Cohort | | Difference in Differences | | |
|---|---|---|---|---|---|
| | High INPRES Mean | High-Low INPRES Gap | [1] | [2] | [3] |
| Language (school curriculum) [age-specific z-score] | 0.08 | -0.63 | 0.154 | 0.148 | 0.137 |
| | | | (0.077) | (0.082) | (0.078) |
| | | | [0.052] | [0.096] | [0.096] |
| Child in bottom quartile of age-specific language score dist. (%) | 39.4 | 28.9 | -10.700 | -10.975 | -10.921 |
| | | | (3.061) | (3.055) | (3.110) |
| | | | [0.016] | [0.008] | [0.008] |
| Mathematics (school curriculum) [age-specific z-score] | 0.04 | -0.60 | 0.098 | 0.097 | 0.090 |
| | | | (0.119) | (0.112) | (0.119) |
| | | | [0.524] | [0.512] | [0.528] |
| Child in bottom quartile of age-specific math score dist. (%) | 33.7 | 25.0 | -4.587 | -4.938 | -4.961 |
| | | | (5.900) | (5.959) | (6.017) |
| | | | [0.492] | [0.556] | [0.528] |
| Cognitive reasoning [age-specific z-score] | -0.11 | -0.48 | 0.069 | 0.056 | 0.055 |
| | | | (0.081) | (0.073) | (0.078) |
| | | | [0.428] | [0.456] | [0.520] |
| Child in bottom quartile of age-specific cognitive reasoning score dist. (%) | 35.8 | 16.1 | 1.872 | 2.210 | 2.169 |
| | | | (3.404) | (3.267) | (3.353) |
| | | | [0.632] | [0.600] | [0.676] |
| *Controls (D-in-D's)* | | | | | |
| Caregiver district and year of birth FE's | | | YES | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | | | NO | YES | YES |
| Child gender | | | YES | YES | YES |
| Child-age FE's | | | YES | YES | NO |
| Child's age (linearly, in months) | | | NO | NO | YES |

Notes: Sample is 2,118 children. Standard-errors in parentheses are clustered at the district of maternal birth. Wild-bootstrap significance p-values in brackets.

Table 3 follows the same format as the previous table and reports the impact of the program on an array of cognitive assessments in the next generation. On the test of Bahasa Indonesia, children of mothers exposed to high doses of the program scored 0.14 s.d. higher than children of those exposed to low doses of the program. These are substantial effects given that the difference between comparison cohort mothers in high and low INPRES districts is -0.63 s.d. This suggests that INPRES helped close the pre-existing gap in education between high and low INPRES districts.

When examining the bottom end of the test score distribution, there is even stronger evidence of the lasting impacts of maternal exposure to INPRES. Children of treated mothers are 11 p.p. less likely to be in the bottom quartile. This is the equivalent to 38% of the gap between comparison cohort mothers in high and low INPRES districts.

Tests of mathematics do not reveal similar results. The point estimates are smaller and not significant. However, when we unpack the test into its component sections and assess children's performance on the two segments of the test separately, we find evidence to suggest that children of treated mothers were more likely to do better at the basic skill of ordering numbers. We find, for example, that the effect measured on this part of the exam is equivalent to 0.19 s.d. (p-value 0.072) using the same specification of column 2 in Table 3. The effects are insignificant and close to zero for the addition section of the exam, on the other hand. Together these results are aligned with the fact that the impacts are concentrated on the lower end of the outcome distribution.

Finally, there is no evidence that maternal exposure to INPRES improves children's cognitive reasoning skills, based on a test using the Raven's progressive matrices. This is not surprising, since these skills are likely not generated by exposure to more investment in educational activities.

Table 4 and Table 5 present the impacts on children's socio-emotional skills. For the Strengths and Difficulties Questionnaire (SDQ), there is no significant impact on children's internalizing behavior or externalizing behavior.[18] However, children whose mothers had more access to schooling have less pro-social behavior problems by 0.18 s.d. For context, the gap between high and low INPRES districts is 0.32 s.d.

[18]Recall that the SDQ is scored such that lower scores indicate better child development outcomes. For pro-social behavior problems we reverse the way the SDQ is usually scored.

## Table 4: Maternal education and children's socio-emotional difficulties (SDQ)

| | 1966-1970 Maternal Cohort High INPRES Mean | High-Low INPRES Gap | Difference in Differences [1] | [2] | [3] |
|---|---|---|---|---|---|
| Prosocial behavior score (reversed) [z-score] | 0.06 | 0.32 | -0.17 | -0.184 | -0.183 |
| | | | (0.071) | (0.071) | (0.071) |
| | | | [0.092] | [0.048] | [0.072] |
| Child in top quartile of age-specific prosocial difficulty dist. (%) | 39.9 | 14.1 | -4.746 | -5.155 | -5.132 |
| | | | (3.205) | (3.131) | (3.121) |
| | | | [0.256] | [0.208] | [0.228] |
| Internalizing score (emotional and peer problems) [z-score] | -0.09 | -0.19 | 0.013 | 0.015 | 0.016 |
| | | | (0.106) | (0.107) | (0.106) |
| | | | [0.904] | [0.916] | [0.928] |
| Child in top quartile of age-specific internalizing difficulty dist. (%) | 28.7 | -8.9 | -1.138 | -0.98 | -0.915 |
| | | | (5.125) | (5.093) | (5.013) |
| | | | [0.820] | [0.868] | [0.868] |
| Externalizing score (behavioral and hyperactivity) [z-score] | -0.10 | -0.20 | -0.037 | -0.055 | -0.054 |
| | | | (0.091) | (0.085) | (0.085) |
| | | | [0.692] | [0.532] | [0.520] |
| Child in top quartile of age-specific externalizing difficulty dist. (%) | 30.5 | -7.5 | -0.778 | -1.51 | -1.512 |
| | | | (4.807) | (4.371) | (4.433) |
| | | | [0.920] | [0.732] | [0.756] |
| *Controls (D-in-D's)* | | | | | |
| Caregiver district and year of birth FE's | | | YES | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | | | NO | YES | YES |
| Child gender | | | YES | YES | YES |
| Child-age FE's | | | YES | YES | NO |
| Child's age (linearly, in months) | | | NO | NO | YES |

Notes: Sample is 2,118 children. Standard-errors in parentheses are clustered at the district of maternal birth. Wild-bootstrap significance p-values in brackets.

The Early Development Instrument (Table 5) corroborates the findings from the SDQ. The coefficients on four out of the five EDI domains are practically small and statistically insignificant. However, there is a substantial positive effect on children's social competence. Children of mothers who were exposed to high doses of the program have 0.2 s.d. higher social competence than children of mothers who were exposed to low doses of the program. The children are 8 p.p. less likely to be in the bottom quartile of the EDI domain distribution for their age. This is equivalent to 72% of the gap between high and low INPRES districts.

# Table 5: Maternal education and children's school readiness (EDI)

| | 1966-1970 Maternal Cohort | | Difference in Differences | | |
|---|---|---|---|---|---|
| | High INPRES | High-Low INPRES | | | |
| | Mean | Gap | [1] | [2] | [3] |
| Physical health and well-being | 0.05 | 0.12 | -0.047 | -0.039 | -0.038 |
| | | | (0.087) | (0.086) | (0.088) |
| | | | [0.616] | [0.644] | [0.700] |
| Child in bottom quartile of age-specific physical health and well-being (%) | 28.7 | -4.0 | -3.651 | -4.393 | -4.319 |
| | | | (4.618) | (4.446) | (4.655) |
| | | | [0.440] | [0.372] | [0.368] |
| Social competence | -0.07 | -0.19 | 0.198 | 0.219 | 0.217 |
| | | | (0.069) | (0.064) | (0.065) |
| | | | [0.012] | [0.000] | [0.000] |
| Child in bottom quartile of age-specific social competence (%) | 30.3 | 11.1 | -7.549 | -8.075 | -8.081 |
| | | | (2.474) | (2.229) | (2.223) |
| | | | [0.052] | [0.004] | [0.024] |
| Emotional maturity | 0.09 | 0.12 | 0.061 | 0.086 | 0.085 |
| | | | (0.062) | (0.053) | (0.052) |
| | | | [0.332] | [0.100] | [0.160] |
| Child in bottom quartile of age-specific emotional maturity (%) | 25.5 | -4.6 | -1.077 | -2.075 | -2.022 |
| | | | (2.666) | (2.685) | (2.720) |
| | | | [0.688] | [0.416] | [0.440] |
| Language and cognitive development | -0.08 | -0.14 | -0.029 | -0.016 | -0.017 |
| | | | (0.084) | (0.083) | (0.084) |
| | | | [0.700] | [0.880] | [0.876] |
| Child in bottom quartile of age-specific language/cognitive development (%) | 30.5 | 8.3 | -4.322 | -4.774 | -4.655 |
| | | | (3.301) | (3.341) | (3.293) |
| | | | [0.264] | [0.132] | [0.220] |
| Communications and general knowledge | -0.03 | -0.14 | 0.033 | 0.045 | 0.043 |
| | | | (0.072) | (0.072) | (0.074) |
| | | | [0.628] | [0.528] | [0.592] |
| Child in bottom quartile of age-specific commun./knowledge (%) | 33.0 | 1.6 | 3.054 | 2.413 | 2.55 |
| | | | (3.749) | (3.824) | (3.692) |
| | | | [0.456] | [0.600] | [0.584] |
| *Controls (D-in-D's)* | | | | | |
| Caregiver district and year of birth FE's | | | YES | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | | | NO | YES | YES |
| Child gender | | | YES | YES | YES |
| Child-age FE's | | | YES | YES | NO |
| Child's age (linearly, in months) | | | NO | NO | YES |

Notes: Sample is 2,118 children. Standard-errors in parentheses are clustered at the district of maternal birth. Wild-bootstrap significance p-values in brackets.

## 4.3 Mediators

Next, we examine several channels of transmission between maternal education and child development. We begin by examining characteristics of the children's father. The two columns in Table 6 differ only in that column 2 adds an interaction between the treated cohort and the number of school-aged children in 1973. The program did not affect the presence of fathers in the household and age of fathers. However, there is evidence that mothers who were exposed to higher doses of the program have children with more educated men. The program increased educational attainment of fathers by three-quarters of a year and primary school completion rate of fathers by 8 p.p. This lends some evidence to assortative mating as one channel of transmission for the benefits of exposure to INPRES. Yet, we cannot rule out the possibility that fathers were directly affected by INPRES themselves when growing up.

In terms of fertility, there is no program effect on the number of live births. Nor is there any impact on the likelihood that mothers are working outside the household. However, there is clear evidence that mothers exposed to larger doses of the program are in wealthier households by about 0.18 s.d. The data also suggest that mothers exposed to larger doses of the program are 10 p.p. less likely to be in the bottom quartile of the wealth distribution.

Table 7 allows us to capture a novel feature of the data - detailed information on behaviors related to parenting. We examine three aspects of parenting: warmth, consistency and hostility. The point estimates for warmth and consistency are small and statistically insignificant. However, we find program effects on parental hostility. Mothers who were exposed to larger doses of the program are much less likely to be in the bottom quartile of the parental hostility distribution. These point estimates are fairly large. The mean prevalence of parental hostility in high INPRES districts is 34.4% while the point estimate is -9.3 p.p. This suggests that exposure to INPRES led to a 27% reduction in the likelihood that mothers are in the bottom quartile of the parental hostility distribution. In practice, this means that the program improved parenting practices by reducing the most hostile parenting behaviors.

**Table 6: Maternal education and mating pattern, fertility & household wealth**

| | Difference in Differences | |
|---|---|---|
| | [1] | [2] |
| Father not in household (includes deceased) (Yes=1) | 0.019 | 0.002 |
| | (0.035) | (0.028) |
| | [0.696] | [0.952] |
| Father's age (in years) [if present] | -0.759 | -0.941 |
| | (1.119) | (1.038) |
| | [0.680] | [0.652] |
| Father's schooling (in years) [if present] | 0.661 | 0.733 |
| | (0.334) | (0.277) |
| | [0.204] | [0.068] |
| Father completed primary ed. (Yes=1) [if present] | 0.084 | 0.085 |
| | (0.033) | (0.030) |
| | [0.060] | [0.080] |
| Mom's total number of live births | -0.055 | 0.013 |
| | (0.227) | (0.200) |
| | [0.844] | [0.972] |
| Mom currently working outside household (Yes=1) | -0.030 | -0.031 |
| | (0.044) | (0.051) |
| | [0.520] | [0.584] |
| Household wealth index (z-score) | 0.154 | 0.178 |
| | (0.084) | (0.085) |
| | [0.116] | [0.080] |
| Household in bottom quartile of wealth dist. (Yes=1) | -0.089 | -0.105 |
| | (0.035) | (0.039) |
| | [0.040] | [0.032] |
| *Controls (D-in-D's)* | | |
| Caregiver district and year of birth FE's | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | NO | YES |

Notes: Standard-errors in parentheses are clustered at the district of birth. Sample is 2,118 observations, except for estimates conditional on father presence (1,926 observations). Wild-bootstrap significance p-values in brackets.

## Table 7: Maternal education and parenting practices

| | 1966-1970 Maternal Cohort | | Difference in Differences | | |
|---|---|---|---|---|---|
| | High INPRES | High-Low INPRES | | | |
| | Mean | Gap | [1] | [2] | [3] |
| Parenting warmth | -0.03 | -0.20 | 0.002 | 0.005 | 0.008 |
| | | | (0.062) | (0.063) | (0.063) |
| | | | [0.976] | [0.896] | [0.896] |
| Parenting in bottom quartile of age-specific warmth scale (%) | 35.1 | 9.8 | -0.895 | -0.963 | -1.181 |
| | | | (3.055) | (3.126) | (3.060) |
| | | | [0.828] | [0.728] | [0.764] |
| Parenting consistency | -0.13 | -0.23 | -0.042 | -0.045 | -0.046 |
| | | | (0.104) | (0.104) | (0.104) |
| | | | [0.704] | [0.712] | [0.692] |
| Parenting in bottom quartile of age-specific consistency scale (%) | 33.9 | 9.0 | 1.193 | 1.089 | 1.056 |
| | | | (2.940) | (2.932) | (2.930) |
| | | | [0.704] | [0.696] | [0.704] |
| Parenting hostility (reversed) | 0.05 | 0.05 | 0.102 | 0.107 | 0.107 |
| | | | (0.109) | (0.110) | (0.110) |
| | | | [0.428] | [0.360] | [0.344] |
| Parenting in bottom quartile of age-specific reversed hostility scale (%) | 34.4 | 1.6 | -8.999 | -9.548 | -9.303 |
| | | | (3.886) | (4.338) | (3.929) |
| | | | [0.064] | [0.080] | [0.056] |
| *Controls (D-in-D's)* | | | | | |
| Caregiver district and year of birth FE's | | | YES | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | | | NO | YES | YES |
| Child gender | | | YES | YES | YES |
| Child-age FE's | | | YES | YES | NO |
| Child's age (linearly, in months) | | | NO | NO | YES |

Notes: Sample is 2,118 children. Standard-errors in parentheses are clustered at the district of maternal birth. Wild-bootstrap significance p-values in brackets.

In addition to effects on parenting practices, we investigate whether the school expansion improved maternal engagement in different activities with their children in Table 8. With the exception of playing music, the point estimates on all other activities – ranging from reading to storytelling to household chores – are small and statistically insignificant. Children of mothers exposed to larger doses of the program are 8 p.p less likely to report having played music with their mothers in the last week. This corresponds to a 12% reduction in music activities in high INPRES districts.

We examine investments made in children's human capital in Table 9. We do not find that the school construction affected children's immunization rates. This is likely due to the growing global awareness around the importance of immunizations as well as the big push for ensuring immunizations by the government of Indonesia around 2013 (World Health Organization, 2013). This is underscored by the high immunization rates in the high INPRES districts (83%) as well as the relatively small gap between high and low INPRES districts.

We also examine children's dietary diversity. 95% of children born to mothers from high INPRES districts meet the minimum requirements of dietary diversity. Consequently, it is not surprising that we do not detect effects of the school construction on children's diet. Similarly, there are no differences in terms of maximum dietary diversity.

Finally, we examine effects on investments in children's education. Mothers who were exposed to larger doses of the program are 8 p.p. more likely to know the location of the closest pre-school. This effect size translates to a 12% increase in knowledge of preschools among high INPRES districts. Likewise, the program led to a 5 p.p increase in the children ever-attending a pre-school. Given that only 28% of mothers in the high INPRES districts report that their child ever-attended preschool, the point estimate is a substantial increase of 20%. Lastly, the program improved the next generation's early education investments by inducing longer months of enrollment in preschool by 31%.

## Table 8: Maternal education and child activities inventory

| | 1966-1970 Maternal Cohort | | Difference in Differences | | |
|---|---|---|---|---|---|
| | High INPRES Mean | High-Low INPRES Gap | [1] | [2] | [3] |
| Child read books/magazines last week (Yes=1) | 0.84 | 0.00 | -0.018 | -0.014 | -0.014 |
| | | | (0.035) | (0.035) | (0.035) |
| | | | [0.616] | [0.716] | [0.708] |
| Child told tale/story last week (Yes=1) | 0.40 | 0.17 | -0.05 | -0.045 | -0.044 |
| | | | (0.032) | (0.031) | (0.031) |
| | | | [0.128] | [0.164] | [0.192] |
| Child drew last week (Yes=1) | 0.91 | 0.05 | -0.034 | -0.031 | -0.029 |
| | | | (0.016) | (0.016) | (0.017) |
| | | | [0.096] | [0.108] | [0.124] |
| Child played music last week (Yes=1) | 0.68 | -0.09 | -0.091 | -0.082 | -0.081 |
| | | | (0.041) | (0.039) | (0.039) |
| | | | [0.020] | [0.036] | [0.028] |
| Child played with toys last week (Yes=1) | 0.90 | 0.01 | -0.076 | -0.070 | -0.069 |
| | | | (0.026) | (0.026) | (0.026) |
| | | | [0.072] | [0.084] | [0.100] |
| Child did household chores last week (Yes=1) | 0.59 | -0.07 | -0.022 | -0.003 | -0.004 |
| | | | (0.030) | (0.035) | (0.035) |
| | | | [0.496] | [0.868] | [0.864] |
| Child played outdoors last week (Yes=1) | 0.86 | -0.09 | 0.018 | 0.011 | 0.011 |
| | | | (0.020) | (0.021) | (0.021) |
| | | | [0.404] | [0.656] | [0.712] |
| *Controls (D-in-D's)* | | | | | |
| Caregiver district and year of birth FE's | | | YES | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | | | NO | YES | YES |
| Child gender | | | YES | YES | YES |
| Child-age FE's | | | YES | YES | NO |
| Child's age (linearly, in months) | | | NO | NO | YES |

Notes: Sample is 2,118 children. Standard-errors in parentheses are clustered at the district of maternal birth. Wild-bootstrap significance p-values in brackets.

## Table 9: Maternal education and children's human capital investment

| | 1966-1970 Maternal Cohort | | Difference in Differences | | |
|---|---|---|---|---|---|
| | High INPRES Mean | High-Low INPRES Gap | [1] | [2] | [3] |
| *Panel A: Health* | | | | | |
| Child has been immunized | 0.83 | -0.12 | -0.012 | -0.011 | -0.011 |
| | | | (0.023) | (0.023) | (0.023) |
| | | | [0.704] | [0.612] | [0.584] |
| Child receives minimum dietary diversity (Yes=1) | 0.95 | -0.01 | -0.008 | -0.008 | -0.008 |
| | | | (0.013) | (0.013) | (0.013) |
| | | | [0.624] | [0.656] | [0.596] |
| Child receives maximum dietary diversity (Yes=1) | 0.32 | -0.02 | 0.08 | 0.082 | 0.082 |
| | | | (0.062) | (0.063) | (0.062) |
| | | | [0.408] | [0.464] | [0.512] |
| *Panel B: Education* | | | | | |
| Mother knows closest day-care/pre-school (Yes=1) | 0.66 | -0.30 | 0.08 | 0.081 | 0.081 |
| | | | (0.029) | (0.029) | (0.030) |
| | | | [0.008] | [0.024] | [0.012] |
| Child ever attended day-care/pre-school (Yes=1) | 0.28 | -0.17 | 0.041 | 0.053 | 0.055 |
| | | | (0.035) | (0.035) | (0.035) |
| | | | [0.236] | [0.176] | [0.108] |
| Months child attended day-care/pre-school | 4.04 | -2.62 | 1.009 | 1.227 | 1.265 |
| | | | (0.501) | (0.496) | (0.501) |
| | | | [0.088] | [0.072] | [0.036] |
| *Controls (D-in-D's)* | | | | | |
| Caregiver district and year of birth FE's | | | YES | YES | YES |
| Treated cohort interaction with # school-aged children in 1973 (ln scale) | | | NO | YES | YES |
| Child gender | | | YES | YES | YES |
| Child-age FE's | | | YES | YES | NO |
| Child's age (linearly, in months) | | | NO | NO | YES |

Notes: Sample is 2,118 children. Standard-errors in parentheses are clustered at the district of maternal birth. Wild-bootstrap significance p-values in brackets.

# 5 Conclusion

The evidence presented in this paper should reaffirm to policy makers the critical role of ensuring access to education for all. The evidence shows that there are lasting benefits – not just to the women who acquire greater schooling but to a wide array of developmental markers for their children. We find significant and meaningful evidence of intent-to-treat effects not only in terms of long-run health status (extreme stunting and to a lesser extent extreme wasting) but also in terms of cognitive outcomes (language and mathematics scores in early grades of primary school) as well as in terms of children's socio-emotional development (measured using both the SDQ and the EDI).

We find evidence to support the fact that the effects of maternal education operate through a multitude of related and self-reinforcing pathways. Treated mothers are likely to belong to better resourced households. Importantly, treated mothers engage in better parent-child interactions. They are much less likely to be hostile and violent towards their children. This is consistent with the psychology literature showing associations between parental usage of physical punishment and the social-emotional development of their children. In our study, mothers who had greater access to schooling also chose to send their children to pre-school at higher rates and for a longer period of time. Taken together, our results highlight a causal link between maternal schooling and how mothers behave as caregivers.

Overall, our findings on the intergenerational effects of education on children's developmental outcomes fit well within the literature focused on maternal education in developing countries (Andrabi et al., 2012; Desai & Alva, 1998) as well recent studies on the same INPRES program (Akresh et al., 2019; Mazumder et al., 2019, 2020). Our result on children's socio-emotional development is a novel contribution to the economics literature on intergenerational effects of schooling and reaffirms the strong causal effect of education on subsequent generations. As countries grapple with the global learning crisis (World Bank, 2018, 2019), investments in access to and quality of education will continue to be of paramount importance. These investments will reap returns not only for those who receive them directly, but also for generations to come.

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# Appendix

**Table A1: Maternal Birth-District Characteristics**

| | Full INPRES data [Duflo, 2001] | | | Working sample | | |
|---|---|---|---|---|---|---|
| | Mean | SD | N | Mean | SD | N |
| Intensive INPRES intervention (Yes=1) | 0.54 | | 287 | 0.44 | | 50 |
| District school enrollment in 1971 (per population) | 17.8 | (9.70) | 287 | 16.5 | (7.77) | 50 |
| Schools planned (count) | 222.6 | (172.90) | 287 | 316.2 | (166.56) | 50 |
| Schools planned (per 1,000 children) | 2.10 | (1.07) | 287 | 2.03 | (0.88) | 50 |
| Schools planned (per 1,000 children) in Intensive Districts | 2.77 | (1.03) | 155 | 2.46 | (0.50) | 22 |
| Schools planned (per 1,000 children) in Non-Intensive Districts | 1.32 | (0.30) | 132 | 1.36 | (0.23) | 28 |

Notes: Working sample restricts birth districts to be those of mothers either born between 1996 and 1970 or between 1971 and 1975. "Intensive INPRES" districts are defined as having school planned per 1,000 children above the equivalent indicator but measured at the national level (1.8 per 1,000).

**Table A2: Determinant of INPRES Construction Placement District-level**

| | Full INPRES data [Duflo,2001] Ln(# schools planned) | | | Working sample Ln(# schools planned) | | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| Ln(Children in District in 1973) | 0.77 | 0.75 | 0.75 | 0.81 | 0.79 | 0.81 |
| | (0.026) | (0.025) | (0.028) | (0.072) | (0.073) | (0.074) |
| Ln(Enrollment rate in 1971) | | -0.33 | -0.32 | | -0.50 | -0.47 |
| | | (0.074) | (0.075) | | (0.110) | (0.109) |
| Ln(Child-population density) | | | -0.01 | | | -0.03 |
| | | | (0.012) | | | (0.014) |
| R-squared | 0.76 | 0.78 | 0.78 | 0.74 | 0.82 | 0.83 |
| N | 287 | 287 | 287 | 50 | 50 | 50 |

Notes: Standard-errors in parentheses are based on infinitesimal jackknife procedure (Eicker-White Robust).

**Table A3: Sample characteristics: Mothers, children, fathers and households**

| | ECED sample | | Working sample | |
|---|---|---|---|---|
| | Mean | SD | Mean | SD |
| *Maternal demographics and education* | | | | |
| Mother's age | 34.6 | (6.46) | 41.3 | (2.66) |
| Mother was born 1966-1970 (Yes=1) | 0.09 | | 0.32 | |
| Mother was born 1971-1975 (Yes=1) | 0.20 | | 0.68 | |
| Mother's schooling (years) | 7.6 | (3.53) | 7.4 | (3.94) |
| Mother has complete primary ed. (Yes=1) | 0.83 | | 0.79 | |
| Mother can read (Yes=1) | 0.87 | | 0.80 | |
| *Focus child demographics* | | | | |
| Child's age | 7.6 | (0.92) | 7.7 | (0.91) |
| Child is male (Yes=1) | 0.50 | | 0.50 | |
| *Family composition and wealth* | | | | |
| Father not in household (includes deceased) (Yes=1) | 0.09 | | 0.09 | |
| Father's age (if in household) | 39.7 | (7.60) | 45.9 | (5.61) |
| Father was born 1966-1970 (Yes=1) | 0.18 | | 0.38 | |
| Father was born 1971-1975 (Yes=1) | 0.25 | | 0.24 | |
| Father's schooling (if in household) | 7.9 | (3.63) | 7.7 | (4.04) |
| Father completed primary ed. (if in household) (Yes=1) | 0.85 | | 0.79 | |
| Sibship size (includes focus child) | 4.1 | (1.89) | 4.3 | (1.96) |
| Household wealth index (z-score) | 0.12 | (0.91) | 0.18 | (0.95) |
| Bottom quartile of wealth (%) | 25.0 | | 24.9 | |
| N | 7,982 | | 2,118 | |

**Table A4: Child health outcomes**

| | Working sample | |
|---|---|---|
| | Mean | SD |
| Child's birthweight (grams) | 3,104.7 | (534.6) |
| Child's low-birthweight (Yes=1) | 0.17 | |
| | | |
| Child was sick in past fortnight (cough/flu/fever/stomach ache) (Yes=1) | 0.57 | |
| | | |
| Child's weight-for-age (WHO z-score) | -1.55 | (1.10) |
| Child is wasted (Yes=1) | 0.30 | |
| Child is extremely wasted (Yes=1) | 0.08 | |
| | | |
| Child's height-for-age (WHO z-score) | -1.31 | (0.89) |
| Child is stunted (Yes=1) | 0.19 | |
| Child is extremely stunted (Yes=1) | 0.03 | |
| | | |
| N | 2,118 | |

**Table A5: Child cognitive/curricular materials outcomes, socio-emotional/behavioral development and school readiness**

| | Working sample | |
|---|---|---|
| | Mean | SD |
| *Panel A: Reasoning/curricular materials* | | |
| Language score (% correct) | 64.7 | (28.5) |
| Math score (% correct) | 67.5 | (29.1) |
| Cognitive reasoning score (% correct) | 44.1 | (24.4) |
| *Panel B: Strengths and Difficulties Questionnaire (SDQ) - higher scores mean more difficulties* | | |
| Prosocial behavior score (reversed) [0-10] | 2.61 | (1.81) |
| Internalizing score (emotional and peer problems) [0-20] | 6.09 | (2.98) |
| Externalizing score (behavioral problems and hyperactivity) [0-20] | 7.51 | (2.57) |
| *Panel C: School Readiness (EDI) - higher scores mean more developed child* | | |
| Physical health and well-being [0-10] | 9.32 | (0.93) |
| Social competence [0-10] | 7.59 | (1.63) |
| Emotional maturity [0-10] | 7.02 | (1.43) |
| Language and cognitive development [0-10] | 9.21 | (1.54) |
| Communication and general knowledge [0-10] | 6.27 | (2.19) |
| N | 2,118 | |

**Table A6: Parenting and Activity Inventory**

| | Working sample | |
|---|---|---|
| | Mean | SD |
| *Panel A: Parenting* | | |
| Warmth (share frequent) | 0.68 | (0.33) |
| Lowest Quartile of Warmth Distr. (%) | 31.9 | (46.6) |
| Consistency (share frequent) | 0.35 | (0.21) |
| Lowest Quartile of Consistency (%) | 30.7 | (46.2) |
| Hostility (reversed) (share frequent) | 0.83 | (0.17) |
| Lowest Quartile of Hostility (reversed) (%) | 35.4 | (47.8) |
| *Panel B: Child activities* | | |
| Child read books/magazines (Yes=1) | 0.84 | (0.37) |
| Child told tale/story (Yes=1) | 0.32 | (0.47) |
| Child drew (Yes=1) | 0.89 | (0.31) |
| Child played music/sang (Yes=1) | 0.70 | (0.46) |
| Child played with toys (Yes=1) | 0.89 | (0.32) |
| Child did household chores (Yes=1) | 0.64 | (0.48) |
| Child played outdoors (Yes=1) | 0.88 | (0.32) |
| N | 2,118 | |

**Table A7: Human Capital Investments**

| | Working sample | |
|---|---|---|
| | Mean | SD |
| *Panel A: Health* | | |
| Child has been immunized (Yes=1) | 0.87 | (0.34) |
| Child receives minimum dietary diversity (Yes=1) | 0.96 | (0.20) |
| Child receives maximum dietary diversity (Yes=1) | 0.34 | (0.47) |
| *Panel B: Education* | | |
| Mother knows closest day-care/pre-school (Yes=1) | 0.77 | (0.42) |
| Child ever attended day-care/pre-school (Yes=1) | 0.37 | (0.48) |
| Months child attended day-care/pre-school | 5.34 | (8.10) |
| N | 2,118 | |

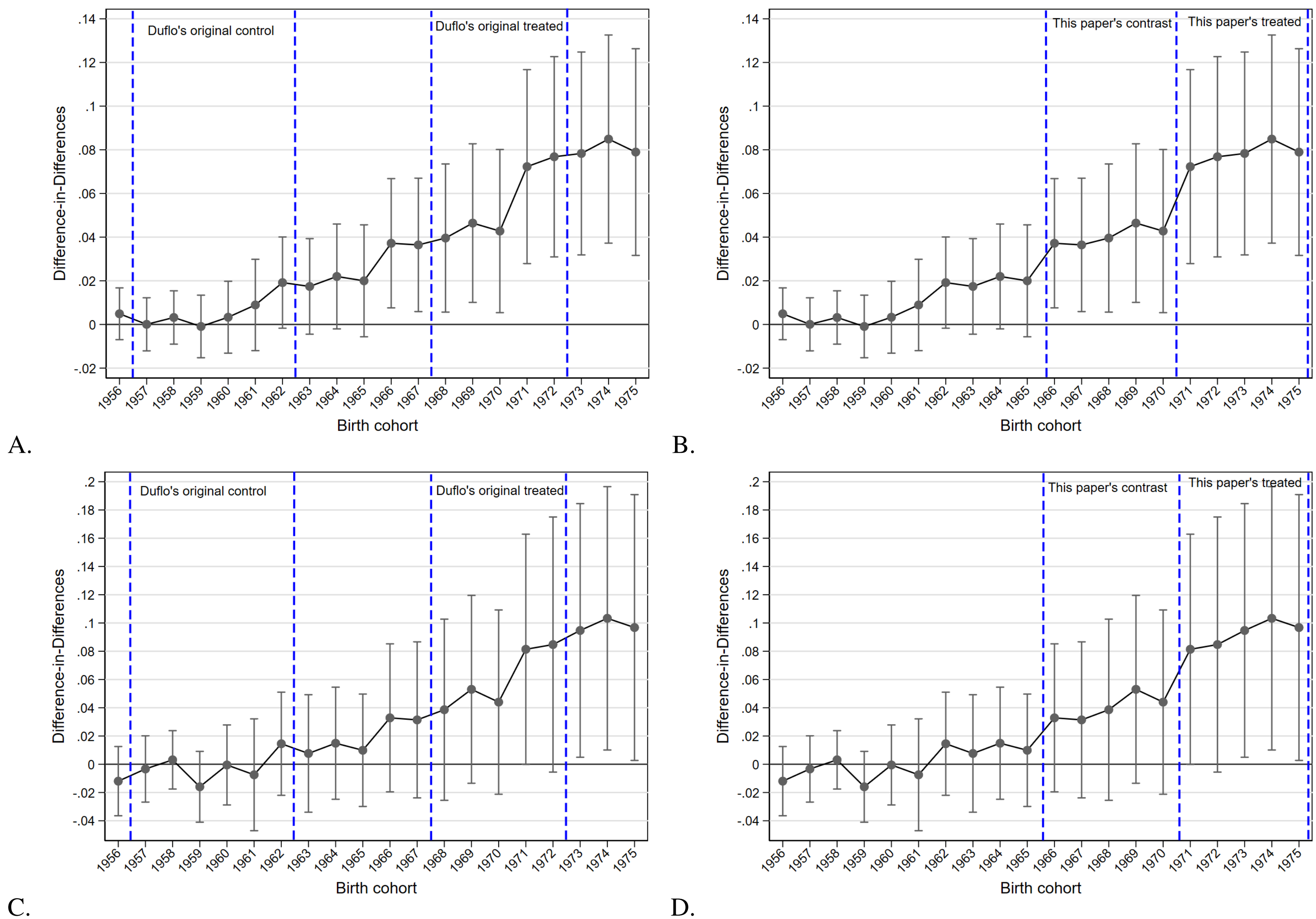


**Figure A1: Year-by-year difference-in-differences estimates of primary school completion by women (relative to 1951-1955 cohorts)**

Notes: 99% confidence intervals displayed. Panels A and B estimate based on full sample of 287 districts of birth represented in Duflo (2001). Panels C and D estimate based on the 50 birth districts represented in our main analysis sample. Due to limitations imposed by maternal age in 2013 we base our estimates on a contrast cohort that was likely partially affected by INPRES, which Duflo (2001) completely removed from her analysis. Additional variation seen in this figures motivates our design.