Measuring the Critical Window for Cognitive Skill Formation and Physical Development in Nicaragua

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Sector(s): Gender, Health, Social Protection

Location: Nicaragua

Sample: 368 boys across 42 villages in Nicaragua

Target group: Children Children under five Mothers and pregnant women Men and boys Rural population

Outcome of interest: Student learning Cognitive development Health outcomes Nutrition

Intervention type: Cash transfers Early childhood development Conditional cash transfers

AEA RCT registration number: AEARCTR-0001083

Partner organization(s): Inter-American Development Bank (IDB), International Initiative for Impact Evaluation (3ie), National Science Foundation (NSF)

In Nicaragua, researchers compared the cognitive and health outcomes of boys whose families received conditional cash transfers in the first three years of their lives to those who received the transfers later. Exposing boys to the program during the first 1,000 days of life led to better cognitive, though not physical, outcomes seven years after the transfers stopped, relative to boys who received transfers slightly later in their lives.

Policy issue

In many developing countries, young children suffer from delays in cognitive development that can have serious consequences for them as adults. Schooling and vocational training may have limited success if children do not have adequate cognitive and social skills at early ages; and the first 1,000 days of a child's life are thought to be a critical window for both cognitive skill formation and physical development. Many parents in the developing world lack the financial resources to provide the food, education, and healthcare necessary to ensure proper development during this time period. There is a large amount of literature showing substantial impacts of conditional cash transfer (CCT) programs, which offer families cash grants conditional on attendance at school or preventive health visits, on poverty reduction, nutritional outcomes, and health. However, there are inconclusive results as to whether these short-term changes in child health and nutrition translate into long-run effects, and whether children benefit more from these additional resources at different periods in their lives.

Context of the evaluation

In 2000, the government of Nicaragua launched a CCT program, called Red de Protección Social (RPS), that provided transfers to poor, rural households. The cash transfers, which were worth approximately 18 percent of pre-program household consumption,

were delivered every other month to a designated female caregiver within each household. The transfer had both a health and an education component. The health transfer was provided to all households as long as the designated caregiver attended health educational workshops every other month and took their children who were younger than 5 years old to receive regular, preventative healthcare check-ups. These check-ups were provided free of charge by RPS health providers. An education transfer was also available for households with children ages 7–13 who had not yet completed fourth grade, and was contingent on those children's enrollment and regular attendance at school.

In May 2000, 42 municipalities in central and northern Nicaragua were randomly assigned to either the first phase (the 'early treatment') or the second phase (the 'late treatment') of the program. The 21 early-treatment localities became eligible for the program and received their first transfers in November 2000. Households in these localities were eligible for cash transfers for three years, receiving the last transfer in late 2003. Meanwhile, the 21 late-treatment localities were phased into the program at the beginning of 2003. Households in the late treatment localities were also eligible to receive three years' worth of cash transfers and the program ended in late 2005.



A woman and child look out from a window of a concrete home in Nicaragua.

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Details of the intervention

Researchers conducted an evaluation comparing outcomes among boys whose families received the RPS transfers in the first three years of their lives to those who received RPS later. In 2010 (10 years after the start of the program in the early treatment group), researchers conducted a long-term follow-up survey with 171 boys in the early treatment group and 197 boys in the late treatment group.[1] Researchers focused on the cohort of children who were born between November 2000 and October 2001, up

to one year after the start of the transfers in the early treatment group. Because all children were eligible for health transfers during the program, children in the early treatment group who were born after November 2000 benefitted from transfers during the first 1,000 days of life, while boys of the same age in the late treatment group did not benefit until later in their development. Random assignment of municipalities to early and late treatment groups means that any differences observed between the two groups of boys should be attributable to whether they received additional resources during the first 1,000 days of life or later.

Data are from pre-program census and household evaluation survey, RPS administrative data, and a long-term follow-up survey. The household surveys collected information on boys' height and weight and administered various cognitive tests.

Results and policy lessons

Impact on Cognitive Outcomes: Earlier exposure to RPS led to cognitive outcomes for boys in the early treatment group that were 0.15 standard deviations larger than their peers in the late treatment group. These results suggest that interventions that improve nutrition and/or health during the first 1,000 days of life can have a lasting positive impact on cognitive development for children, beyond programs which improve these conditions for children at other times in their life.

Impact on Physical Outcomes: Receiving RPS in utero and within the first two years of life did not, on average, lead to higher physical growth 10 years later. Boys in the early treatment group did not have significantly different physical characteristics than boys in the late treatment group. When researchers examined physical characteristics of the boys in both groups in 2003, when the early treatment group had received 3 full years of the cash transfer while the late treatment group had only received one, boys in early treatment households were about 0.4 standard deviations taller than their peers in the late treatment group. In 2004, after the late treatment group had received a second year of transfers, the height difference between the two groups had narrowed substantially and was no longer statistically significant. This suggests that boys in the late treatment group caught up to their peers who received the CCTs earlier in life.

Barham, Tania, Karen Macours, and John A. Maluccio. 2013. "Boys' Cognitive Skill Formation and Physical Growth: Long-Term Experimental Evidence on Critical Ages for Early Childhood Interventions." American Economic Review: Papers & Proceedings 103(3): 467-471.

1. The authors focus on boys because research has shown that boys are more vulnerable in early life than girls, particularly during the pre-natal period.