CONCEPT NOTE

Nicaraguan *Atención a Crisis Pilots:*

Evaluating Impact and Complementarities of Parenting & CCT Pilots

1. Motivation

Despite the strong argument for investing in young children (Case and Paxson. 2006; Currie and Thomas 1999; Heckman and Masterov, 2007; Grantham-McGregor et al. 2007) and the many types of interventions and delivery mechanisms that have been developed (Currie, 2001; Schady, 2006; Young and Richardson, 2007), knowledge on Early Childhood Development programs' effectiveness in low-income settings remains thin.[1] Many factors determine children's cognitive development: family characteristics, socioeconomic background, maternal health, child health and nutrition, stimulation, household income, parental education and employment, parenting practices and family environment (Vegas and Santibanez, 2010). Interventions that aim to improve ECD outcomes each tackle a subset of these determinants. Some programs in developing countries contain interventions targeted to children along with interventions targeted parents. However, there is particularly limited evidence on the effectiveness of programs that aim to improve ECD outcomes by modifying parental practice in order to increase children's cognitive development. The impact of parenting intervention has not been evaluated in large-scale randomized-control trials in low-income settings (Engle et al., 2007). This is surprising given programs that aim to enhance parental practices potentially are more sustainable than center-based programs and could have a large scale-up potentials.

Together with the limited evidence on the effectiveness of parenting interventions, evidence on the degree of complementarities between parenting interventions and interventions that improve nutrition is even more scarce.[2] In particular, as far as we know, there is no evidence regarding the complementarities of parenting program and Conditional Cash Transfer programs (CCTs), which typically aim to improve nutrition, health and education outcomes and have become a popular social

[1] For developing countries, most evidence focuses on impacts of attendance at nursery programs and preschool programs (e.g. Attanasio and Vera-Hernández 2004; Behrman et al. 2004; Berlinski et al. 2006; 2007). There is also a large literature documenting the impacts of nutritional supplementation programs, including substantial evidence from randomized control trials (see Walker et al. 2007 for a review).

[2] The most cited results come from a relatively small-scale study on targeted food supplementation and home-based stimulation in Jamaica in the 80s (Grantham-McGregor, et al. 1991).

policy tool in developing countries over the past decade (Fiszbein and Schady, 2009). They have been implemented in more than 30 countries worldwide and are being planned or piloted in many more. Numerous studies have shown that in the short-term these programs have led to improvements in a host of outcomes including grades of schooling attained and nutritional status, and use of preventive health care. Yet, while these programs have explicit long-term goals, little is known, about their effects in the medium to long-term. In particular, there are open questions on whether these programs can lead to sustainable changes in households' human capital investments decisions, even after the conditionalities may fall away.

Indeed, to the best of our knowledge, the question on longer-term impacts of CCTs has only been investigated (to date) for the case of the conditional cash transfer program in Mexico, Progresa/Oportunidades. Strikingly, comparing outcomes for treatment and control groups in 2003 and 2007 shows small to no effects on cognitive ability, achievement, and labor market outcomes (Behrman, Parker and Todd, 2005; Fernald, Gertler and Neufeld, 2008). But Oportunidades is an on-going program, and the experimental control group was phased in 18 months after the treatment group (in 1999). As such the longer-term evaluations primarily pick up differences in the length of exposure and do not allow analyzing whether exposure to the program for a limited time period, can lead to sustainable changes in parental behavior. Nevertheless, given the lack of positive longer-term evidence, and given the goals and popularity of these programs as well as the extra cost associated with administering conditionalities, it is hence crucial to rigorously evaluate the longer effects of CCTs in cognition and achievement in other settings and using a different experimental design.

The impact evaluation of the Nicaraguan *Atención a Crisis* Parenting and CCT pilots aims at filling those knowledge gaps. In particular, the Nicaraguan *Atención a Crisis* pilots provide a unique opportunity to evaluate the relative impact and complementarities of innovative parenting and CCT programs in a low-income setting. While Nicaragua constitutes the 2nd poorest country in Latin America after Haiti, an unusually rich three-round panel dataset (including data on language acquisition, memory, social and motor skills) has been collected in the *Atención a Crisis* pilot region. Recent work by Macours, Schady and Vakis (2009) has documented large delays in ECD outcomes among children in this region.

Early-childhood development is currently high on the policy agenda in Nicaragua. In order to tackle the ECD delays documented in the *Atención a Crisis* pilot region, an innovative ECD "parenting

pilot" was developed by CIASES, a group of local specialists in early childhood and education, in collaboration with researchers from Johns Hopkins University (JHU) and the World Bank. The activity benefited from financial support from various Trust Funds and the BASIS research consortium. The development of the parenting pilot complements the innovative productive CCT pilots launched in 2005 with support from a World Bank loan (see below). In parallel, the Ministry of the Family has recently restarted a centrum-based ECD intervention (PAININ - Programa Amor). And there is a renewed interest in experimenting with different approaches and modalities for ECD interventions, as illustrated by a new urban program that is being set up. Lessons that can be learned from the proposed evaluation about the effectiveness of different modalities will hence come very timely for the policy dialogue. This will be greatly facilitated by the fact that PAININ partly covers the same communities than the *Atención a Crisis* CCT pilots and the complementary ECD pilot focused on parents. The sample of treatment communities for the parenting pilot is balanced between communities with and without PAININ. This will allow analyzing the complementarities and substitutabilities between the 2 approaches, a third innovative component of this proposal.

2. Interventions

The *Atención a Crisis* parenting pilot was launched in September 2009. The overall objective of the pilot is to achieve changes in parental practices that are sustainable beyond the duration of the project and will lead to improved investments in ECD. The pilot trains community educators to deliver 5 community workshops targeted to parents of children age 0 to 6. The workshops aim to (i) stimulate adoption of practices that benefit ECD, (ii) improve awareness about the importance of language and communication skill, (iii) increase awareness of the importance of playing and games for children's development, (iv) augment the active role of mothers and fathers in their children's plays, and (v) increase knowledge about adequate nutrition practices. Workshops are complemented by bi-weekly household visit of parents by community educators, a core component of the intervention. Stimulation material is also distributed to the parents. In order to test the optimal design of the ECD pilot, two modalities are being undertaken. In the first modality, educators are mainly female and primarily target children's mother. In the second modality, educators are mainly

male and target both the children's mother and father. To our knowledge, it is the first time an ECD intervention with a rigorous evaluation design targets fathers in low-income settings.

The 2 modalities are randomized orthogonally on the randomized design of *Atención a Crisis* CCT pilot, which was implemented by the Nicaraguan Ministry of the Family with support from the World Bank. The beneficiaries in the *Atención a Crisis* CCT pilot treatment communities randomly received one of three packages (see details in table 1): (i) a conditional cash transfer (CCT) conditional on children's primary school and health service attendance; (ii) the CCT plus a scholarship that allowed one of the household members to choose among a number of vocational training courses offered in the municipal headquarters. These beneficiaries also participated in labor market and business-skill training workshops organized in their own communities; and (iii) the CCT plus a productive investment grant, aimed at encouraging recipients to start a small non-agricultural activity with the goal of asset creation and income diversification. This grant was conditional on the household developing a business development plan.

While the *Atención a Crisis* CCT pilot was implemented between November 2005 and December 2006, the productive components led to sustainable behavioral and income changes (World Bank, forthcoming) which makes analyzing complementarities with the parenting pilots implemented in 2009 particularly interesting.

3. Primary Research Questions

The evaluation will tackle four primary research questions.

First, what is the impact of the ECD "parenting" pilot on ECD outcomes of children between 0 and 6 years old? And what is the impact on parental investment in stimulation, nutrition, and children's health care, which are generally considered the most important risk factors, and consequently likely mechanisms to affect ECD outcomes. The analysis will fill the existing knowledge gap on the effectiveness of ECD interventions that focus on improving children's stimulations by targeting parents in low-income settings.

Second, is there a difference in the impact on ECD outcomes between the intervention modality targeting mothers and the intervention modality targeting both parents? This question is important

and innovative for two reasons. First, given that fathers often take most of the resource allocation decisions in the household, while mothers spend more time with the children it is ex ante unclear whether targeting fathers could lead to larger changes in outcomes. Assessing the relative impact of these alternative modalities of the same intervention will hence provide key insights for the design of effective "parenting" programs. Second, to our knowledge there exists no evidence on the impact of improving fathers' practices on ECD outcomes in low-income settings.

Third, are there complementarities in terms of improved ECD outcomes of children between 0 and 6 years old between the ECD intervention and the behavioral and income changes generated by the CCT pilot? Nutrition, welfare levels and parental stimulations are all determinants of ECD, but their relative role has seldom been disentangled. In the *Atención a Crisis* region, the parenting pilots were randomized orthogonally to the CCT pilots. Since the latter generated lasting behavioral and welfare effects, the evaluation will be able to assess the complementarities between nutrition or welfare improvements and enhanced parental practices.

Finally, are there complementarities or substitutabilities between the ECD "parenting" pilot and the PAININ center-based intervention? This is an important question as there is substantial debate in Nicaragua and more broadly on the most effective way to deliver ECD interventions. Given that the targeting of the PAININ intervention was not part of a randomized design, this last question will be evaluated using quasi-experimental methods. In order to allow such an analysis, the *Atención a Crisis* ECD pilot sample is also balanced in terms of PAININ communities.

4. Outcome indicators

The evaluation will focus on 6 set of outcome indicators related to early childhood development:

i. Cognitive development of young children will be measured using the Denver (language) test for children between 0 and 83 months, as well as the TVIP (receptive language), Woodcock-Johnson (memory) tests, and digit span for children between 36 and 83 months.

ii. Socio-emotional development of young children will be measured for children between 0 and 83 months using the Denver (social) test; as well as behavioral problems index for children between 36 and 83 months.

iii. Physical health and growth of young children will be measuring using anthropometric (height and weight) data for all children.

iv. Fine and gross motor skills of young children will be measured using the Denver (fine and gross motor) test for children between 0 and 83 months and the McCarthy (leg motor) test for children between 36 and 83 months.

v. Parenting practices among parents of young children between 0 and 83 months will be measured for all children using a list of indicators regarding stimulation and parenting developed with the implementing agency; as well as survey-based information on nutritional and preventive health care practices, and information sharing and social learning regarding ECD.

5. Evaluation design and identification strategy

Randomization allows rigorous impact evaluation of various modalities and combinations of the parenting and CCT pilots. Table 2 summarizes the cross-over design implied by community randomization of the CCT and parenting pilots. The allocation of the CCT pilots was randomized in two stages. First, randomization was performed within groups of neighboring communities: 56 communities were assignment to the intervention, 50 to the control group. Second, eligible households within treatment communities were randomly allocated one of 3 benefit packages. Sample sizes were established after conducting careful power calculations. The randomization has been shown to result in balanced samples (see Macours, Schady and Vakis (2008), and references therein). In addition, extreme care was placed in tracking individual migrants, resulting in an annual attrition rate lower than 1% over 3 data rounds. This contributes to ensure that the experimental evaluation design for the CCT pilots remains valid and that causal program impact can be rigorously estimated.

A rigorous experimental evaluation design is also built-in the parenting pilots. The allocation of the parenting pilot was randomized at the community level. Out of the 106 communities, 44 communities were randomly chosen to participate in the parenting intervention and 62 to serve as control. Treatment communities were randomly assigned one of two intervention modalities (22 communities receiving each modality). The 2 modalities are randomized orthogonally on the randomized design of *Atención a Crisis* CCT pilot. Again, detailed power calculations were

undertaken to determine required sample sizes and extreme care will be placed in tracking migrant children.

Successful implementation of these randomization procedures provides a clear identification strategy to answer the three core policy questions above. All these questions can be tackled by taking single-difference in post-intervention outcomes between the relevant treatment and control groups.

Finally, the last policy question relates to complementarities between the ECD "parenting" pilot and the PAININ program. Such complementarities cannot be assessed with a randomized design. However, the *Atención a Crisis* ECD pilot sample was stratified based on the presence of PAININ in the study communities, such that the sample is balanced in terms of PAININ. Identification of the additional impact of the center-based PAININ intervention will rely on quasi-experimental (matched differences-in-differences) methods. The availability of pre-program outcome indicators will allow limiting bias in the matching estimators (Imbens, 2004). Importantly, the availability of 2 data rounds prior to the baseline ECD pilot data will also allow testing the identification assumptions behind the differences-in-differences approach.

6. Power Calculations

Detailed power calculations were undertaken to establish an adequate sample size for the impact evaluation of each pilot. The power calculations of the CCT pilots are documented in Macours and Vakis (2005). Moreover, results in Macours, Schady and Vakis (2008) have demonstrated that there was enough power not only to detect average impacts, but also heterogeneity of impacts by age group.

For the evaluation of the parenting pilot, baseline, round 1 and round 2 data collected to evaluate the CCT pilot were used to undertake power calculations. The intra-cluster correlation for ECD outcomes was computed from the 2nd follow-up survey. The upper bound (0.05) was used for power calculations. The correlation between baseline and follow-up value was estimated by taking the correlation in TVIP score between 2005 and 2006 (0.45). In order to detect increases of 0.2 standard deviations with a power of 0.8, 22 clusters (with 649 observations) are required for each treatment

arm and 66 clusters (with 1855 observations) in the control group. Such samples are also sufficient to detect increases in 0.2 standard deviations using difference-in-differences with a power of 0.9.

The actual samples contain 44 communities in the treatment group for a total of 1447 households with children between 0 and 83 months in treatment communities (741 households assigned to modality 1 of the intervention, 706 households assigned to modality 2) and 1770 households in control communities. Households have on average about 1.3 children between 0 and 83 months (resulting in 987 children in modality 1, and 957 children in modality 2, and 2301 children in the control), and all households with children in the age group were sampled.[3] Sampling was done at the household level, following the original sample of CCT pilots. The resulting sample size for children in each of the groups allows for possible high correlations among ECD outcomes of children of the same households, as well possible lack of power due to imperfect take-up and/or attrition.

7. Evaluation Team

The evaluation team consists of Karen Macours (Professor, Johns Hopkins University), Renos Vakis (Senior Economist, LCSPP, project TTL), Patrick Premand (Economist, HDNCE/SIEF, co-TTL for the impact evaluation), and Norbert Schady (Inter-American Development Bank).

- Karen Macours has been leading analytical work on the *Atención a Crisis* pilots since 2005. She teaches applied econometrics, impact evaluation, and economic development at JHU, including classes on ECD concepts and measurement, topics on which she has a strong publication record.
- Patrick Premand is a member of the core SIEF team, working on a range of rigorous impact evaluations in the SP and Education sectors. He has worked on the *Atención a Crisis* pilots since 2007.
- Norbert Schady is Sector Economic Adviser for Social Sectors at the Inter American Development Bank. He has co-authored the recent World Bank Policy Research Report on

[3] In the ECD pilot treatment communities, all households will children in the relevant age group were intent-to-treat households. For the evaluation, all these households are sampled. The alternative of having fewer children per community, but more communities, was considered, but had to be ruled out due to financial and logistical constraints for the pilot implementation (with 44 communities the maximum number of communities in which the treatment could be offered).

Conditional Cash Transfers, and has been involved in the evaluation of the *Atención a Crisis* pilots on ECD outcomes since 2005.

- Renos Vakis has been leading technical assistance and policy dialogue on the *Atención a Crisis* pilots since their inception. He has extensive experience designing, implementing and writing about impact evaluations.

The team works in close coordination with Nicaraguan Education and ECD experts at the CIASES research institute (in particular Vanessa Castro and Josefina Vijil). In addition, the team works with a very experienced survey firm (CIERUNIC) that has been extensively trained in collecting ECD test data and has a strong track record in delivering high-quality data with remarkably low attrition.

8. Timeline

Table 3 contains a timeline of impact evaluation activities. Since the launch of the CCT pilot in 2005, 3 high-quality surveys (all containing instruments to measure ECD outcomes) have been collected. The 3rd data round (collected in 2008-9) will serve as baseline for the evaluation of the ECD pilot. The pilot itself started in September 2009.

The team will use SIEF funding to cover costs associated with a 4th survey (a first follow-up round for the evaluation ECD intervention and 3rd follow-up for the evaluation of the impact of the CCT pilot on ECD outcomes). Data collection is planned for July 2011-March 2012. Upon entry in each sample community, the survey firm will start by updating existing community censuses. Comprehensive test data will be collected to measure ECD outcomes for children aged between 0 and 6 in the last data round as well as children born since then[4]. In addition, complementary household (caregiver) surveys will be collected[5]. These surveys will not constitute full-scale LSMS surveys (as in earlier rounds), but rather will focus on measuring parents and caregivers' practices and behaviors. Impact evaluation results from the 4th data round will be delivered by June 2011.

[4] We expect to collect test data for approximately 5500 children, 4245 children aged 0 to 6 in the 3rd data round and an expected 1250 new children born since then.
[5] We expect to collect data for approximately 4250 households (obtained by maintaining the average of 1.3 children per household).

Beyond the 2011 data collection round, the team plans to collect an additional 5th data round (timing tbc). Separate sources of funding will be considered for this activity. The 5th data round will constitute the 2nd follow-up survey for the impact evaluation of the parenting pilot and a 4th follow-up survey for the impact evaluation of the CCT pilots. The 5th data round will comprise a full-scale household survey (of LSMS types, as in rounds 1, 2 and 3); measure parents and caregivers' practices and behavior; measures of ECD outcomes for children aged 0 to 6, as well as measures of ECD and education outcomes for children aged 7 and above.

Table 1: *Atención a Crisis* CCT pilot design and annual benefits by component

Transfer	Amount	Comments	# beneficiary households
Traditional CCT			All 3000
Food transfer	$145/household per year	Partial transfer every 2 months over 1 year	
Education transfer	$90/household per year	Partial transfer every 2 months over 1 year	
School "backpack" (supplies)	$25/child per year	1 time transfer at the beginning of the school year	
School "supply-side" transfer	$1.3/child	Every 2 months over 1 year	
Health transfer	$90/household per year	Paid to health provider	
Occupational training (Traditional CCT above plus)			1000
Opportunity cost transfer	Up to $90/household per year	$15 per month for the duration of the course, up to 6 months. Paid every 2 months	
Course costs	Up to $140/household per year	Paid directly to course provider upon selection of course	
Matching Grant transfer (Traditional CCT above plus)			1000
Matching Grant transfer	$200/household	1 time transfer upon successful completion of a business development plan	

Table 2:

***Atención a Crisis* CCT and Parenting pilots: Impact Evaluation Design**

	***Atención a Crisis* CCT pilots**			
		Treatment Community (3 benefit packages, randomized within communities)	Control Community	Total
***Atención a Crisis* ECD "parenting" pilot**	Treatment Community (2 modalities, randomized at community level)	24 Group A	20 Group B	44
	Control Community	32 Group C	30 Group D	62
	Total	56	50	106

Note: The CCT pilot has 3 different benefit packages. Assignment of the 3 packages was randomized between eligible households within treated communities. The parenting intervention has 2 modalities. Assignment of modalities was randomized between communities. 11 communities of Group A receive modality 1 and 13 modality 2. 11 communities of Group B receive modality 1 and 9 modality 2.

Table 3

Impact Evaluation Timeline

Concept Note	Base-Line Data	Follow-up Data Round 1	Follow-up Data Round 2	Follw-up Data Round 3	Anticipated Completion Date
May 2005	***April-May 2005***	***August-September 2006***	***August 2008 - May 2009***	***June 2011-March 2012***	***September 2012***
	Baseline for evaluation of CCT pilots	First follow-up for evaluation of CCT pilots	Baseline for evaluation of ECD pilot, 2nd follow-up for evaluation of CCT pilots, with tracking	First follow-up for evaluation of ECD pilot, 3rd follow-up for evaluation of CCT pilots	(Impact Evaluation Report)

References

Attanasio, O., and M. Vera-Hernández. 2004. "Medium- and Long-Run Effects of Nutrition and Child Care: Evaluation of a Community Nursery Program in Rural Colombia." Working Paper EWP04/06, Institute for Fiscal Studies, University College, London.

Behrman, J., Y. Cheng, and P. Todd. 2004. "Evaluating Preschool Programs When Length of Exposure to the Program Varies: A Nonparametric Approach." *Review of Economics and Statistics* 86(1): 108-32.

Behrman, J.; Parker, S. and P. Todd, 2005. "Long-Term Impacts of Oportunidades Conditional Cash Transfer Program on Rural Youth in Mexico." Ibero-American Institute for Economic Research Working Paper.

Berlinski, S., S. Galiani, and P. Gertler. 2006. "The Effect of Pre-Primary Education on Primary School Performance." Working Paper W06/04, Institute for Fiscal Studies, University College, London.

Berlinski, S., S. Galiani, and M. Manacorda. 2007. "Giving Children a Better Start in Life: Preschool Attendance and School-Age Profiles." Forthcoming, *Journal of Public Economics*.

Case, A., and C. Paxson. 2006. "Stature and Status: Height, Ability, and Labor Market Outcomes." NBER Working Paper No.12466. Cambridge, MA.

Currie, J. 2001. "Early Childhood Education Programs." *Journal of Economic Perspectives* 15(2): 213-38.
Currie, J., and D. Thomas. 1999. "Early Test Scores, Socioeconomic Status and Future Outcomes." NBER Working Paper No. 6943. Cambridge, MA.

Engle, P.; Black, M.; Behrman, J.; Cabral de Mello, M.; Gertler, P.; Kapiriri, L; Martorell, R.; Young, M. and the International Child Development Steering Group. "Strategies to avoid the loss of developmental potential in more than 200 million children in the developing world." *The Lancet,* Vol. 269.

Fernald, L; Gertler, P. and L. Neufeld, 2008. "Role of cash in conditional cash transfer programmes for child health, growth, and development: an analysis of Mexico's *Oportunidades*" *The Lancet*, Vol. 371

Fiszbein. A. and N. Schady, 2009. *Conditional Cash Transfers, Reducing Present and Future Poverty*. The World Bank, Washington DC.

Grantham-McGregor, S. M., Y. B. Cheung, S. Cueto, P. Glewwe, L. Richter, B. Strupp, and the International Child Development Steering Group. 2007. "Developmental Potential in the First 5 Years for Children in Developing Countries." *Lancet* 369: 60-70.

Grantham-McGregor, S.M., C.A. Powell, S.P. Walker and J.H. Himes, 1991. "Nutritional Supplementation, Psychosocial Stimulation, and Mental Development of Stunted Children: The Jamaican Study." *Lancet* 338: 1-5.

Heckman, J. J. and D. V. Masterov, 2007. "The Productivity Argument for Investing in Young Children", NBER Working Paper 13016.

Imbens, Guido, 2004. "Semiparametric Estimation of Average Treatment Effects under Exogeneity: A review", *Review of Economics and Statistics,* 86(1): 4-29.

Macours, K., and R. Vakis, 2005. "Weather risk and poverty in Nicaragua: Expanding risk management options for the poor. Pilot program objectives and impact evaluation design, mimeo, Johns Hopkins University and World Bank.

Macours, K; N. Schady and R. Vakis, 2008. "Cash Transfers, Behavioral Changes, and Cognitive Development in Early Childhood. Evidence from a Randomized Experiment" World Bank Working Paper Series 4759.

Schady, N., 2006. " Childhood Development in Latin America and the Caribbean." World Bank Policy Research Working Paper 3869.

Vegas, E. and L. Santibanez, 2010. *The Promise of Early Childhood Development in Latin America.* The World Bank, Washington DC.

Young, M. E. and L. M. Richardson, 2007. *Early Child Development, From Measurement to Action,* The World Bank, Washington DC.

World Bank, forthcoming. "Asset Creating, Productive Safety Nets and Poverty Reduction: Learning from the Crisis Program in Nicaragua's Drought Region" The World Bank, Washington DC.