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The impact of daycare on maternal labour supply and child development in Mexico

March 2014

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Evaluation
Report 6

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The impact of daycare on maternal labour supply and child development in Mexico

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**3ie Impact Evaluation Report 6
March 2014**



**International Initiative
for Impact Evaluation**

Executive summary

Various countries around the world have implemented daycare programmes to support working mothers and improve the well-being of their children. However, a lack of evidence exists regarding the impact of such programmes in developing countries. The aim of this study was to evaluate the impact of one such programme in Mexico, the *Programa de estancias infantiles para apoyar a madres trabajadoras* (childcare programme to support working mothers – PEI). Specifically, the study was designed to evaluate its impact on labour market participation and use of time among female beneficiaries, and the well-being of their children.

The evaluation design followed a pipeline approach in which we compared a group of children on waiting lists for daycare (controls) with those attending daycare (beneficiaries). Our sample comprised 1,573 households (1,255 beneficiaries; 318 controls) from seven Mexican states. The evaluation showed that mothers who benefitted from the PEI increased their proportion of employment (18 per cent), short-term job tenure (15 per cent) and hours worked per month (24 hours). However, no significant impacts of the PEI were found on income, possibly because beneficiary respondents under-reported their income for fear of losing the benefits of the programme.

As for the use of time, beneficiary mothers spent on average 83 minutes less per day caring for children under five years of age, and other household members spent more time on childcare (72 minutes per day) to compensate for this change. No significant effects were found on the mental health of beneficiary mothers. The evaluation revealed heterogeneous effects within the sample. For instance, mothers who reported not having worked before entering the programme had a higher proportion of employment upon entering the programme (21 per cent), whereas mothers who had worked before PEI had a higher level of empowerment (6 per cent above the mean), indicating improvements in self-esteem and personal recognition.

Concerning child well-being, no significant effects were found for the full sample on child development and dietary diversity. Although the prevalence of disease (15 days before the survey) rose by 17 per cent for children in the programme, this effect decreased with age and level of exposure. Regarding heterogeneous effects on child development, children under 30 months of age with fewer than six months of exposure to the programme increased personal-social behaviour z-scores – standard deviation (sd) 0.36 – and children older than 30 months with more than six months of exposure demonstrated increased communication z-scores (0.30 sd). This latter effect was larger for children with mothers who worked before the programme (0.38 sd).

Our evaluation of quality of care at daycare settings (through videotaped observation) showed that working in small groups increased both personal-social behaviour and communication z-scores in 0.22 sd and 0.14 sd, respectively. The evidence suggests that girls, and children who live in better home environments, are more likely to have better z-scores. Unexpectedly, teacher characteristics did not contribute to improving the children's development scores.

Analysis of the costs of providing daycare services suggests that the average cost per child is equivalent to US\$83.5 per month and the income received through government subsidies and parents' fees is enough to cover the costs. That said, the estimated profit is low (US\$52 per month) and any variation in the costs of operation could put the sustainability of daycare settings at risk.

Finally, the results suggest that the programme's effectiveness could be improved with greater targeting of mothers who did not work before entering the programme and more intensive

promotion of child development in daycare settings. Regarding the financial viability of the programme, increasing either government subsidies or parents' fees should be explored.

Contents

Executive summary	ii
List of tables and figures	vi
Abbreviations and acronyms	viii
1. Intervention, evaluation questions and policy relevance	1
1.1 Intervention	1
1.2 Evaluation questions and literature review	2
2. Theory of change	7
3. Evaluation design	8
3.1 Methodology	8
4. Impact evaluation results	12
4.1 Sampling design and power calculations	12
4.2 Data collection	14
4.3 Descriptive statistics	15
4.4 Summary of findings	34
5. Quality of care at daycare centres	35
5.1 Methodology	36
5.2 Results	39
5.3 Summary of findings	43
6. Conclusions and recommendations	45
6.1 Conclusions	45
6.2 Policy implications and recommendations	47
Appendix A: Description of the types of support and main changes in PEI eligibility criteria	49
Appendix B: Child development scales and samples, by age group	51
Appendix C: Power calculations	52
Appendix D: Descriptive statistics, balance tests and propensity score matching results	54
Appendix E: Quality of care at daycare centres	66
a) Ethical considerations of videotaping teachers and assistants at daycare settings	66
b) Items included of ECCP and ECERS-R scales	66
c) Procedures of video recordings	67
d) Codes for assessing caregiver–child interactions	68
e) Qualitative ratings of child–caregiver interactions	70
f) Reliability of the coding	71
h) Correlation analysis	76
Appendix F: Cost analysis of daycare settings enrolled in PEI	79

a) Methodology	79
b) Data collection	80
c) Results	80
d) Variable costs	81
e) Salary and rent expenses per child	82
f) Summary of variable costs per child	84
g) Income sources per child	86
h) Fixed costs: initial investment	88
Appendix G: Dissemination activities.....	89
References	90

List of tables and figures

Table 1 Topics, research questions and evidence from the existing literature	3
Table 2 Pipeline strategy	10
Table 3 Minimum detectable effect for the pipeline strategy	13
Table 4 Sample of households for the pipeline analysis by state	14
Table 5 Final sample of daycare centres and households by state	15
Table 6 Main caregivers of beneficiary children and those on the waiting list	16
Table 7 Balance test: mothers' characteristics	18
Table 8 Balance test: household characteristics	19
Table 9 Impact of the programme on the labour market and participants' use of time	20
Table 10 Job tenure for the mother from 2008-2011	21
Table 11 Consistency of reported income, 2006-2011	23
Table 12 Impact of the programme on labour market and time use for mothers who worked before PEI	24
Table 13 Impact of the programme on labour market and time use for mothers who did not work before PEI	25
Table 14 Balance test: mental health of mothers	26
Table 15 Impact of the programme on the mental health of mothers	26
Table 16 Impact of the programme on the mental health of mothers regarding their work condition prior to the programme	27
Table 17 Balance test: characteristics of children	28
Table 18 Impact of the programme on the children's health, nutrition and development	29
Table 19 Impact of the programme on children's health, by age range	30
Table 20 Impact of the programme on child nutrition, by age range	30
Table 21 Impact of the programme on the communication scale of children, by age range	31
Table 22 Impact of the programme on the scale of children's personal-social behaviour, by age	31
Table 23 Impact of the programme on the health of children whose mother worked before PEI	32
Table 24 Impact of the programme on the nutrition of children whose mothers worked before PEI	32
Table 25 Impact of the programme on the communication scale of children whose mothers worked before PEI	33
Table 26 Impact of the programme on the health of children whose mothers did not work before the PEI	33
Table 27 Impact of the programme on the development of children whose mothers did not work before the PEI, by age group	34
Table 28 Distribution of videos for encoding	39
Table 29 Teacher's characteristics	40
Table 30 ASQ personal social and communication z-scores	42
Figure 1 Beneficiaries and daycare centres (January 2007 to May 2011)	2
Figure 2 Conceptual framework	7
Figure 3 Distribution of children's ages between groups	17
Figure 4 Distribution of mothers' monthly income between groups	21
Figure 5 Distribution of household monthly income between groups	22

Appendix tables

Table A 1 Support for working mothers and single fathers	49
Table A 2 Incentive to care and childcare services	50
Table A 3 Enrolment in the network of daycare centres	50
Table B 1 Skills evaluated by age range in the communication scale of ASQ	51
Table B 2 Skills evaluated by age range in the personal-social scale of ASQ	51
Table B 3 ASQ sample by ages	52
Table C 1 Estimated power calculations before fieldwork	53
Table C 2 Power calculations for children outcomes: by age and exposure time	53
Table D 1 Descriptive statistics	54
Table D 2 Balance tests	55
Table D 3 Balance tests for mothers who worked before entering the programme	56
Table D 4 Balance tests for mothers who did not work before entering the programme	57
Table D 5 OLS and PSM estimations	59
Table D 6 Common support	60
Table D 7 Balancing property	61
Table D 8 OLS and PSM estimations	62
Table D 9 Common support	63
Table D 10 Balancing property	64
Table D 11 Mother's income	65
Table E 1 Record of standardisation exercises (2011)	72
Table E 2 Description of coded behaviours (frequency)	73
Table E 3 Description of observed behaviours (duration in minutes)	73
Table E 4 Proportion of time for each behaviour with respect to the total coded time	74
Table E 5 Descriptive statistics of subjective variables	75
Table E 6 Correlation of teacher characteristics and coded behaviours	76
Table E 7 Correlation of subjective variables and ASQ z-scores	76
Table E 8 Descriptive statistics of daycare structural quality variables	77
Table E 9 Correlation of daycare structural quality and teacher characteristics	77
Table E 10 Total HOME score	78
Table E 11 Correlation of HOME score and ASQ z-scores	78
Table F 1 Characteristics of daycare providers and daycare settings	81
Table F 2 Average number of children enrolled by daycare, state and region	81
Table F 3 Average monthly expense in salaries per child in the daycare settings	82
Table F 4 Projected monthly rent costs	83
Table F 5 Average monthly expense in rent per child	83
Table F 6 Average monthly variable costs per child, state and region	84
Table F 7 Monthly amount received of subsidy and corresponsibility per child	87
Table F 8 Initial investment for infrastructure adaptation	88
Table F 9 Investment expense by state and region	88
Table G 1 Dissemination activities	89

Appendix figures

Figure F 1 Current expenditure per child, per month and region	85
Figure F 2 Distribution of variable costs per child	86

Abbreviations and acronyms

ADD	acute diarrhoeal disease
ARI	acute respiratory infections
ASQ	Ages and Stages Questionnaire
ATT	average treatment effect on the treated
CIS	<i>Cedula de información socioeconomica</i> (socioeconomic information document)
DIF	<i>Sistema Nacional para el Desarrollo Integral de la Familia</i> (national system for integral development of the family)
ECCP	<i>Escala de Calidad para Centros Preescolares</i> (quality scale for pre-school settings)
ECERS-R	The early childhood environment rating scale-revised
HC	<i>Programa de Hogares Comunitarios</i> (community homes programme, Guatemala)
HCB	<i>Programa Hogares Comunitarios de Bienestar Familiar</i> (community welfare homes programme, Colombia)
HOME	Home Observation for Measurement of the Environment
INSP	Instituto Nacional de Salud Pública (National Institute of Public Health)
MDE	minimum detectable effect
N	population
N/A	not available
NICHD	National Institute of Child Health and Human Development
OLS	ordinary least squares
ORCE	Observational Ratings of the Caregiving Environment
PEC	<i>Programa de Escuelas de Calidad</i> (quality schools programme)
PEI	<i>Programa de Estancias Infantiles para Apoyar a Madres Trabajadoras</i> (childcare programme to support working mothers)
PIDI	<i>Proyecto Integral de Desarrollo Infantil</i> (integrated child development project)
PSM	propensity score matching
sd	standard deviation
SEDESOL	Secretaría de Desarrollo Social (Ministry of social development)

1. Intervention, evaluation questions and policy relevance

Various countries around the world have implemented daycare programmes to provide support for working mothers and improve children's well-being. Daycare programmes offer alternative care options to a growing number of women who seek to balance childcare with work or education. In addition, programmes that promote adequate nutrition and early stimulation are shown to have a positive impact on children's health, nutrition and development. This two-fold justification for such daycare programmes accounts for their growing popularity and widespread implementation.

Nevertheless, the impact of daycare programmes, particularly in developing countries, is an under-researched area. The aim of the study was to respond to this research gap by carrying out a rigorous impact evaluation of the Mexican daycare programme *Programa de Estancias Infantiles para Apoyar a Madres Trabajadoras* (henceforth referred to as PEI, its Spanish acronym). This study evaluates the impact of this programme on the labour market participation and time allocation of beneficiary mothers, as well as the health, nutrition and development of their children. In this way, this evaluation report will assess the effectiveness of the programme, identify potential areas for improvement, and contribute to the accumulating evidence on the effectiveness of such programmes in developing countries.

1.1 Intervention

The PEI provides subsidised care and childcare services (of a value of up to US\$55 per child or US\$111 per child with disabilities)¹ to mothers and single fathers who are working, seeking employment or studying, thereby enabling them to enter or remain in the labour market or in education. In addition, the programme provides financial support to those willing to create and operate daycare centres in order to increase childcare availability for low-income families.²

Potential and target population

The PEI was established in January 2007, with a target population of low-income mothers³ aged 14 or older with at least one child aged between 1 and 3 years, 11 months (between 1 and 5 years, 11 months for children with disabilities). The programme specifically aims to target households in which a lack of access to childcare through public social security institutions or other means prevents productive household members from working, job-seeking or studying (ROP 2010).

By May 2011, the PEI had expanded to benefit 249,282 mothers⁴ and had received 265,415 children in 9,255 daycare centres across the country.⁵ This expansion is illustrated in Figure 1.

¹ The average exchange rate in 2010 was \$12.63 pesos = US\$1 (Central Bank of Mexico).

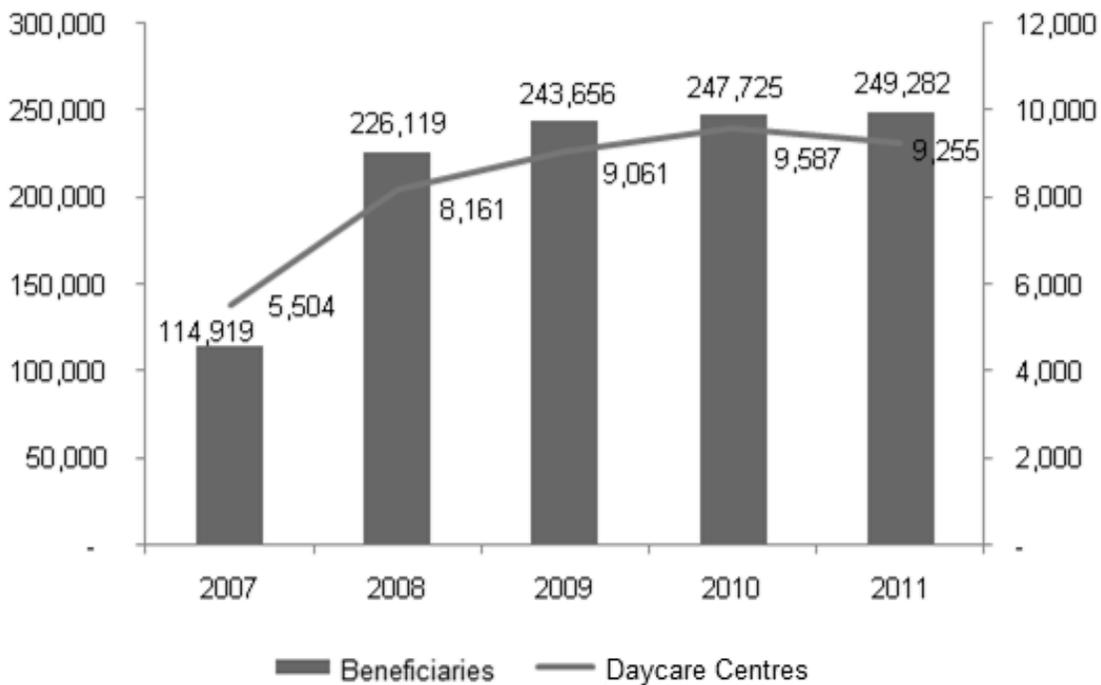
² See Appendix A for a detailed description of each type of support and main changes in eligibility criteria of the programme.

³ Low income is set at households with a monthly income of up to 1.5 minimum wages per capita (US\$202).

⁴ Only three per cent of parents registered in the programme reported themselves as single fathers; when we refer to *mothers* in the report, we include any single fathers or guardians registered in the programme.

⁵ In the first quarter of 2009, the National Survey of Occupation and Employment (ENOE in Spanish) showed an estimated target population of nearly 1.5 million women interested in working; this does not take into account the number of other families with a potential interest in the programme.

Figure 1 Beneficiaries and daycare centres (January 2007 to May 2011)



Source: Prepared by INSP, with data provided by PEI.

1.2 Evaluation questions and literature review

This report aims to present the findings of a rigorous impact evaluation of the PEI in the areas of maternal employment, income and use of time, as well as the health, nutrition and development of their children.

In carrying out the impact evaluation, we started with the hypotheses that the PEI has:

- A positive impact on labour market participation by beneficiaries, in terms of both the permanence of their employment and their incorporation into the labour market;
- A positive impact on beneficiaries' household income;
- An impact on decisions made around beneficiaries' use of time; and
- An impact on the health, nutrition and development of beneficiary children.

Table 1 sets out the associated research questions and evidence from the literature for each of the impact indicators.

Table 1 Topics, research questions and evidence from the existing literature

Topics of study	Research questions	Evidence	Results from the literature
Income	What is the programme's impact on household income?	Positive	In Brazil, an impact analysis of childcare services on female labour participation and final earnings found that the use of private childcare services increased household income from full time work by 11.9% (Deutsch 1998).
	What is the programme's impact on the mother's income?		In Mexico, the PEI increased the income of women with at least high school education (Calderón 2012). According to a qualitative evaluation of the PEI, the beneficiaries' perception indicated that household income increased due to the increase in the mother's income (INSP 2009).
Labour market participation	What is the programme's impact on the labour market participation of mothers involved in the programme?	Positive	In Colombia, the <i>Programa Hogares Comunitarios de Bienestar</i> (HCB) increased the probability of the mother being employed by 25% and the average hours worked by more than 36 hours per month (Attanasio and Vera-Hernández 2004). In Mexico, the PEI increased the probability of beneficiary women entering work to 5.17% above the national average (Calderón 2012).
	What is the programme's impact on the participation of beneficiary mothers in the formal and informal labour markets?	Mixed in the informal sector	In Mexico, the PEI reduced the probability of mothers working in the informal sector by 0.66% (Calderón 2012). The qualitative evaluation of the PEI found that beneficiary mothers reported an increase in their participation in the labour market, mainly in the informal sector (INSP 2009).
	What is the programme's impact on the permanency of the job by the beneficiary mothers?	Positive	In Mexico, for the group of mothers already working before entering the PEI, the probability of switching jobs decreased by 17.6% compared with the mean (Calderón 2012).
	What is the programme's impact on the labour participation of other household members who cared for children (e.g. grandparents or siblings over 12 years old)?	N/A (not available)	We did not find evidence in the literature about the impact of daycare programmes on labour market participation of household members other than the mother.
	What is the programme's impact on the number of jobs held by the mother?	N/A	We found no evidence on the number of jobs held.
Use of time (not working)	What is the programme's impact on the time spent on non-work activities by beneficiary mothers caring for children under 5 years old?	N/A	We found no evidence on the use of time spent on non-work activities.
	What is the programme's impact		We found no evidence on the use of time spent on non-work activities.

Topics of study	Research questions	Evidence	Results from the literature
Health	<p>on the time spent on non-work activities by other household members caring for children of under 5 years old?</p> <p>What is the programme's impact on the health status (morbidity in the past 2 weeks) of beneficiary children?</p>	Mixed	<p>According to a systematic literature review on the impact of daycare programmes on child health, nutrition and development in developing countries (Leroy <i>et al.</i> 2011), only one study was found that analysed health outcomes. The impact evaluation of the HCB, a community nursery programme in rural Colombia (Bernal <i>et al.</i> 2009) found that children who attended the programme had a 3.6% higher incidence of acute diarrhoeal disease (ADD) and 0.09% more acute respiratory infections (ARI). Differentiated by age, children aged 0–24 months who attended the programme for more than 16 months had a lower prevalence of ADD (6.9%) and ARI (3.4%).</p> <p>A study in Canada of the Quebec's Universal Daycare Plan (Baker <i>et al.</i> 2008) with regard to the health effects of daycare programmes found these effects to be negative, significant and relevant in magnitude. The chance of having excellent health was reduced by 5.3% for children who attended daycare centres and the probability of not having infections was also reduced.</p> <p>A study from the United States of the influence of attendance at daycare on the common cold (Ball <i>et al.</i> 2002) found that attendance at large daycare centres was associated with more common colds during preschool years, yet was found to protect against the common cold during the early school years. This protection waned by 13 years old. A separate study, also in the United States, of the risk of respiratory illness associated with daycare attendance, (Hurwitz <i>et al.</i> 1991) found that older siblings of children aged 6 weeks–17 months who attended daycare centres had an increased risk of respiratory illness through exposure to this, whereas older siblings of children aged 36–59 months were protected against respiratory illness. In addition, children with past exposure to daycare in each age group attending daycare demonstrated a decreased risk of respiratory illness.</p>
Nutrition	<p>What is the programme's impact on nutritional status (dietary diversity; height for age; weight for height; and prevalence of anaemia) of children in the programme?</p>	Mixed	<p>The qualitative analysis of the PEI indicates that beneficiary mothers see an improvement in their children's diet diversity (INSP 2009).</p> <p>According to Leroy <i>et al.</i>'s systematic literature review (2011), 4 studies were found that analysed nutritional outcomes; the results were mixed.</p> <p>1) The HCB evaluation (Attanasio and Vera-Hernández 2004) estimated a positive impact of 0.45 sd and 0.94 sd on height-for-age z-scores for rural and urban areas, respectively, for children under 6 years old. The same estimations were carried out by child height quintiles and the authors found larger effects for younger children, assuming a hypothetical scenario where children attended HCB during the first 72 months of age.</p>

Topics of study	Research questions	Evidence	Results from the literature
Child development	What is the programme's impact on the development of beneficiary children?	Mixed	<p>2) Bernal <i>et al.</i> (2009) evaluated the same HCB programme in Colombia and found different effects in nutrition: the prevalence of being underweight decreased for only two age groups and with different time of exposure. Also, they found an increase of six percentage points in stunting for children under 2 years old with 2–4 months of exposure to the programme.</p> <p>3) A study from Bolivia on the effectiveness of an early childhood development programme called <i>Proyecto Integral de Desarrollo Infantil</i> (PIDI) found a negative effect of 7–9 percentage points on weight-for-age for an exposure of less than 12 months for children in areas not served by the programme (Behrman <i>et al.</i> 2004). The authors argued that this effect was probably due to residual selection bias. In this evaluation, no impacts were found on child growth.</p> <p>4) An assessment of the impact of daycare on child dietary intake in a study of Guatemala's <i>Programa de Hogares Comunitarios</i> (HC) found that the diet of children attending the programme contained 12% more energy, 26% more protein, 22% more iron and 85% more vitamins (Ruel and Quisumbing 2006).</p> <p>The qualitative analysis of the PEI indicates that beneficiary mothers perceived improvements in their children's language and expression skills, colour recognition, nursery rhymes and sphincter control.</p> <p>According to Leroy <i>et al.</i>'s systematic literature review (2011), four studies were found to have a positive effect on child development outcomes:</p> <p>1) In Colombia, Bernal <i>et al.</i> (2009) found an improvement of 10%–34% on language and cognitive skills, depending on the exposure (2–15 months and more than 16 months, respectively). In vocabulary, they found positive impacts for children with an exposure over 16 months (2.4% for children aged 3–4 years and 5% for children over 4). This was also the case for verbal ability (4%), mathematical reasoning (5%) and general knowledge (3%) for children over 3 years old who had more than 16 months of exposure.</p> <p>2) In Bolivia, Behrman <i>et al.</i> (2004) found positive impacts on gross and fine motor, language and psycho-social skills, varying from 2%–6% only in children aged 37–58 months.</p> <p>3) In Argentina, Berlinski and Galiani (2005) found an increase of 4.69 and 4.76 percentage points in mathematics and Spanish test scores, respectively.</p> <p>4) In Uruguay, Berlinski <i>et al.</i> (2008) found that one year of preschool had a positive effect on school attendance from 4.3 percentage points to 27.4 percentage points at the ages of 7 and 15 years, respectively. Also, an increase in years of schooling was found, from –0.341</p>

Topics of study	Research questions	Evidence	Results from the literature
			<p>years to 0.788 years at the ages of 7 and 15 years, respectively.</p> <p>Additional evidence reviewed by Engle <i>et al.</i> (2011) found positive effects on child development:</p> <p>1) In Bangladesh, Aboud <i>et al.</i> (2008) found that preschool graduates scored higher in oral, reading and writing skills than non-attendees.</p> <p>2) In Kenya, Uganda and Zanzibar, Mwaura <i>et al.</i> (2008) found significant improvements in scores on British Ability Scales (0.50 and 0.79) and African Child Intelligence Test scores (0.86 and 0.95) for treatment children, when compared to children with no preschool.</p> <p>3) In Chile, Urzúa and Veramendi (2010) found significantly higher scores in motor skill subscales, using the TEPSI psychomotor development test,⁶ specifically on coordination (0.19 sd), language (0.18 sd) and overall score (0.17 sd). However, the following tests found no significant differences were found between children attending daycare settings and those not attending: Peabody Picture Vocabulary Test, child behaviour checklist and child behaviour questionnaire.</p> <p>Additional evidence from developed countries showed that in Canada showed an increase of 0.10 points in the score of hyperactivity and increased aggressiveness in children aged 2 and 3 years in the programme (Baker 2008).</p>

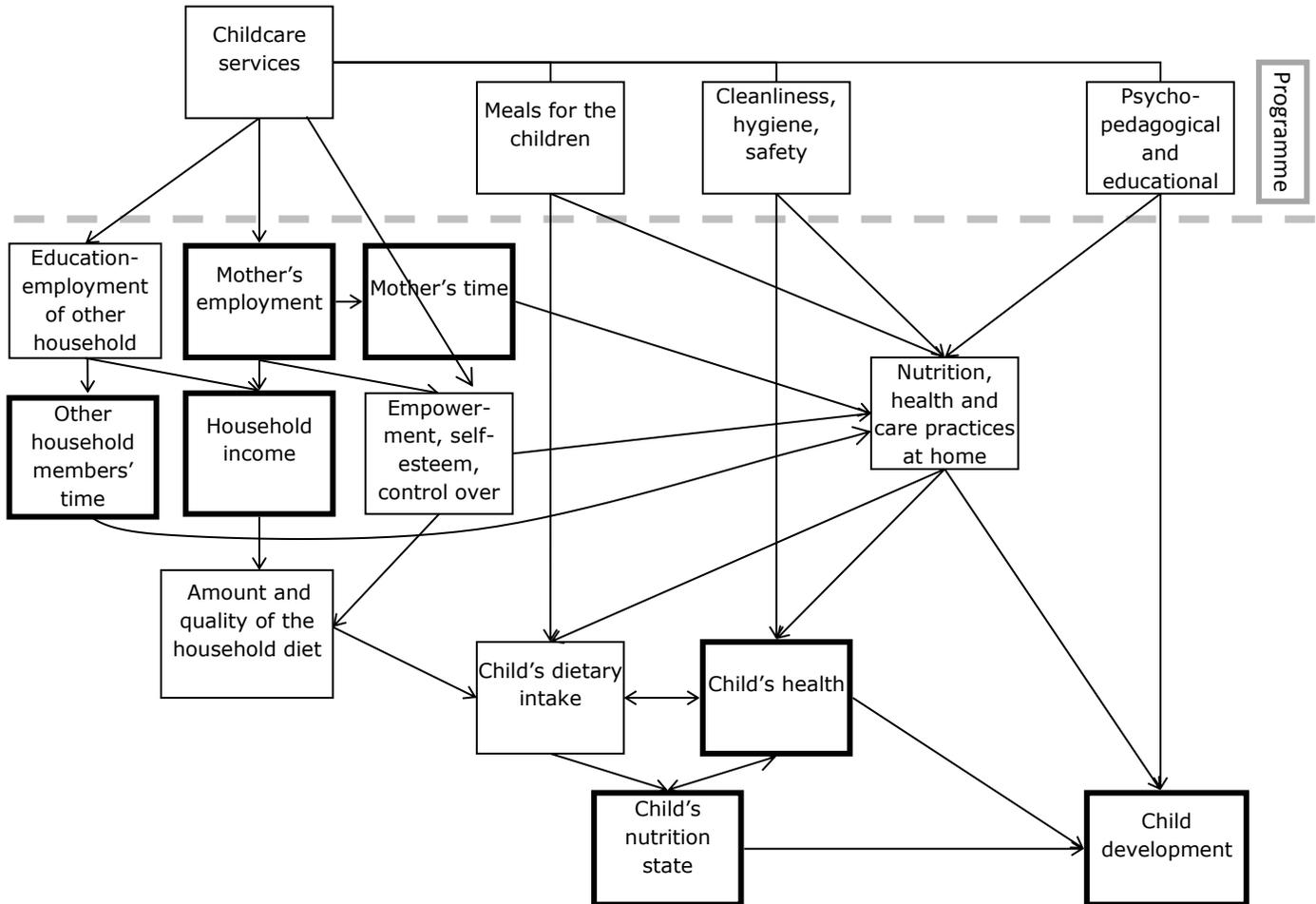
Source: Prepared by INSP

⁶ This test has three subscales, which measure: coordination, language and motor functions.

2. Theory of change

Figure 2 shows the mechanisms through which a childcare programme such as the PEI may have effects on labour market variables, time use and children's well-being. The figure is based on the conceptual framework presented by Leroy *et al* (2011) in a systematic review of literature on the impact of daycare programmes on child health, nutrition and development in developing countries (Leroy *et al.* 2011).

Figure 2 Conceptual framework



Source: Prepared by INSP based on Leroy *et al.*'s conceptual framework (2011) and complemented with the scheme of the 2009 Methodology Design and Survey (INSP 2009).

The authors put forward the argument that childcare provision through an established daycare programme could facilitate women's participation in the labour market. The consequent increase in household income brought about by the mother's employment would allow for the purchase of higher quality meals, thereby improving children's dietary intake. At the same time, mothers' use of childcare services could negatively affect the time they spend taking care of their children at home.

Regarding the programme components, the provision of children's meals by the daycare provider may directly affect their dietary intake and nutritional status. Daycare levels of hygiene, cleanliness

and safety might lead to changes in childhood health – for example, infectious diseases or accidents. The quality of the psycho-pedagogical and educational activities provided may directly affect child development. Social interaction may have a positive impact on child development as well, but may also lead to more exposure to communicable diseases through contact with other children.

Finally, the services provided at daycare centres might affect the level of care provided at home. For instance, the meals offered to children in daycare might lead parents to offer less (or lower quality) food to children at home. Alternatively, parents might learn from the services provided at daycare centres and improve the care environment and practices at home.⁷

3. Evaluation design

3.1 Methodology

The main questions that we are concerned with in this evaluation are concerning the impact of the PEI on: mothers' participation in the labour force; mothers' and primary caregivers' time use; overall household income; and child development. To answer these questions, it is necessary to examine the counterfactual question: what would have happened to these variables in the absence of the programme? Examining this question is essential in establishing whether a certain result observed is indeed an effect of the programme. This counterfactual estimate is not trivial, because we only observe what actually happened and not what 'would have happened'.

Comparing the same person before and after being enrolled in the programme to estimate its impact is problematic, because it is possible that there are other factors, unrelated to the programme but related to the outcome variable, which could change the results of the outcome variable. Equally, comparing mothers who received support with those who did not raises problems because: (a) the selection process for the programme itself means that only mothers meeting certain criteria are enrolled; and (b) within the eligible group, different factors lead some mothers to request support and others not.

Comparing mothers with and without support will generally produce biased estimates of the actual effect, given that it attributes the intrinsic differences between mothers (selection effect) to the programme. In order to carry out a rigorous evaluation that can establish its true causal effects, it is necessary to build a control group with observable and unobservable characteristics⁸ identical to those of the group receiving the support. This can be achieved by selecting the groups of mothers who receive support and those who do not, through a random process. The randomisation procedure ensures that the estimated effect is causal, because by construction it eliminates the selection effect.

In the Methodology Design and Survey conducted between 2007 and 2009, an experimental design was considered as the first choice for the impact evaluation of the PEI (INSP 2009). To achieve randomisation between groups, it was necessary to have an excess of demand for the programme services. Unfortunately, despite intensive dissemination of the programme in the locations selected for evaluation, the excess demand required to use the experimental design was not generated,⁹ so

⁷ A detailed description of the mechanisms through which childcare services have effects in different variables can be consulted in Leroy *et al.* (2011).

⁸ *Observable characteristics* refers to factors such as years of schooling, work experience, etc.; *unobservable characteristics* refers to unseen factors such as motivation to work, employment alternatives, etc.

⁹ We estimate that this was due mainly to the effect of economic crisis, which reduced employment opportunities for the potential beneficiaries and therefore the need for childcare services. Other possible explanations are: an epidemic outbreak of AH1N1, which made parents more cautious about sending their

this initial alternative design for the evaluation was discarded. The second-best alternative was a pipeline design.

The pipeline design is a good alternative method, as it has the following advantages: (a) it does not require researchers to wait until the treatment is given, but can be carried out using existing information from children already enrolled in the programme; (b) it exploits the natural process of programme enrolment; (c) it allows comparison of beneficiaries and non-beneficiaries of the same locality and who are interested in the same daycare centre, thus increasing the likelihood of having an appropriate comparison group; and (d) it allows for the use of matching techniques in the case of not having a perfectly balanced sample.

This design considers the natural process of enrolment of children in daycare settings, where beneficiary children make up the treatment group and those on the waiting list make up the comparison or control group. This strategy has the advantage that the control and treatment groups have already expressed interest in being in the same daycare centre, with the only difference between the groups being the fact that the treatment group showed this interest at an earlier stage. If this difference in the time of application is small, we believe that may be due to factors independent of the programme results. Under this scenario, the pipeline approach must meet the identification assumption, for which it must be proved that children already receiving the support are not different in observable variables to those on the waiting list. In this case, both groups can be considered to be comparable and likely to have the same potential outcomes.

In order to ensure a rigorous impact evaluation of the PEI, we demonstrated the reliability of this assumption through the following procedures. First, we analysed programme enrolment data at different points in time using historical information from the beneficiaries' socioeconomic information document (CIS, based on the initials in Spanish)¹⁰ and found that the characteristics of enrolled households were similar, regardless of entry time, indicating that it is possible to make a valid comparison between households registered on the programme and those on waiting lists.¹¹

Secondly, in order to obtain similar information for the control group and to verify that treatment and control households are similar in observable variables, it was necessary to design a waiting list format with variables common to the CIS, to ensure that the information collected in the two groups was homogeneous and could be used to test statistical balance. To do so, we provided comprehensive training for daycare providers on how to collect the required information, and then supervised a subsample of daycare settings to make sure that the relevant information was being collected correctly and was of good quality.

Once we had the comparative information collected in the CIS and the waiting list formats, the evaluation sample was selected by matching programme beneficiaries and children on waiting lists of the same ages in daycare settings that were full or at most had three available spaces.

children to daycare settings because of the risks of infection; and the ABC Nursery incident in Sonora, which also contributed to the decline in demand for childcare services. Overall, only 10 per cent of the 1,931 households that had originally showed interest in joining the programme did so.

¹⁰ This is an official government form, collected before entering the programme as part of the selection process to identify the eligible households.

¹¹ For a complete discussion of the similarities between those enrolled in the programme and those waiting list households, please consult section 2.5 of INSP (2011) available at: < <http://www.sedesol.gob.mx> >

Table 2 Pipeline strategy

	Treatment (in the programme)	Control (waiting list)
Impact evaluation survey	Have received the programme's benefits	Have not received the programme's benefits

Source: Prepared by INSP

As shown in Table 2, programme beneficiaries are considered the treatment group, and those found on the waiting list form the control group. These groups were naturally created when the daycare centres registered with the PEI.

Pipeline strategy

Once the pipeline identification assumption had been tested, the next step was to quantify the difference in the variables of interest for the group of beneficiaries with respect to the group of controls. According to the statistical notation introduced by Rubin (1974), we have that $Y_{i,1}$ is the outcome¹² of the mother (or child) i for having access to the support, and $Y_{i,0}$ is the outcome without the support. For the purposes of the impact evaluation, we were principally interested in estimating the Effect i :

$$Effect_i \equiv Y_{i,1} - Y_{i,0}$$

Thus, through ordinary least squares (OLS), we used the following regression model to estimate the impact of the programme with the pipeline strategy:

$$Y_i = \alpha + \beta With_i + \theta X_i + \delta_j + \varepsilon$$

where:

- Y_i is the outcome for mother or child i ;
- α is the constant;
- $With_i = 1$ if person i reports to be a PEI beneficiary;
- $With_i = 0$ if person i is on the waiting list of a PEI daycare centre;
- β measures the average effect of the programme on outcome Y ;
- X_i denotes control variables¹³;
- δ_j denotes fixed effects at daycare level; and
- ε is the error term.

In a pipeline design such as the one proposed for this evaluation, it is not possible to collect baseline survey data, because households in the treatment group are selected when they have already received the benefits of the programme. Therefore, in the survey for the evaluation, retrospective sections were included to be answered by programme beneficiaries and mothers on the waiting list.

Measuring child development

Communication skills and personal-social behaviour were evaluated with the Mexican context

¹² The outcomes may be: employment; income; main activity of the mother; hours worked; hours spent caring for children under five years old in the household; health and child development, etc.

¹³ The control variables we included were: (a) *mother's* age, years of schooling and whether she was working or looking for work in November 2006; (b) *household* size; households with at least one child under five years old not attending daycare; gender of household head; (c) *child's* age; weight-to-height ratio at birth; height-to-age ratio at birth; being or had been breastfed; mother's subjective assessment of child's intelligence and health compared with other children of the same age; number of objects child has age one to stimulate development.

adaptation of the Ages and Stages Questionnaire (ASQ) (Bricker and Squires 1999). The ASQ consists of scales completed by the child's parents, which are age-specific and detect developmental delays in children of less than 60 months of age.¹⁴ The scales are divided into six age groups and each group assigned a number of questions based on the activities that children can perform at different ages.¹⁵

ASQ scale of communication

The communication scale includes sections on the child's ability to understand language and communicate with words and gestures in the context of everyday life. In some questions, the child is asked to follow simple instructions given by their parents or to express needs or desires.

ASQ scale of personal-social behaviour

The scale of personal-social behaviour assesses the child's emerging skills to be independent and to engage with others. The sections cover: the child's self-care skills (eating, dressing); their sense of self (recognition in the mirror); and their facility to get along with others (sharing).¹⁶

For both scales, the possible answers are 'Yes', 'Sometimes', 'No' and 'Not yet'. We assigned a value to each of these and generated scores accordingly, taking into account the age range of the children in question.

Previous studies have shown the skills of communication and personal-social behaviour to be: a) influenced by the quality of childcare setting at an early age; b) important for school readiness; and c) relatively easy to measure based on the parental report (Currie and Thomas 2000; Yoshikawa *et al.* 2007). This measure was adapted by psychologists in child development at Mexico's National Institute of Perinatology for use in the Methodology Design and Survey (INSP 2009). During adaptation, all sections were evaluated and tested with a small sample of children.¹⁷

There was concern that the variability in the results gathered in our study would be too low to detect differences in development between age groups, given that the ASQ is an identification test that assesses a limited range of skills by group. To address this problem, we added sections designed for slightly older children.¹⁸

The evaluation of adapted ASQ shows that the results in the scales of communication and personal-social behaviour are associated with the child's height, mother's education, mother's mental health depression and environmental household factors in the directions expected. This suggests that the measure is sensitive enough to detect differences in development between groups.

¹⁴ For this analysis, we only used the questions corresponding to the age ranges of children benefiting from the PEI (12–48 months). See Appendix B for the observations used in each age group.

¹⁵ The instrument was designed to include one or two additional questions in each age group regarding something the child would not yet have the ability to perform. This serves to identify a possible reporting bias among the mothers.

¹⁶ See Appendix B for a detailed summary of the questions by age group that were used to measure communication and personal-social scales.

¹⁷ Some sections were modified to make them appropriate to the cultural context. For instance, in the games section, changes were made to include relevant games for Mexican families (e.g. peek-a-boo).

¹⁸ For instance, parents with children aged 24 months were also asked to complete the sections aimed at children of 26–27 months of age.

4. Impact evaluation results

4.1 Sampling design and power calculations

In a study's design stage, the minimum effect of the difference between study groups should be considered, along with the desired statistical power. According to this, one should calculate the required sample size. To estimate the minimum detectable effect (MDE) we used the following formula (Duflo *et al.* 2006):

$$MDE = (t_{(1-k)} + t_{(\alpha)}) * \sqrt{\frac{1}{P(1-P)}} \sqrt{\frac{\sigma^2}{N}}$$

where:

$t_{(1-k)}$ denotes statistical value with a significance level of 1 minus power k ;

t_{α} denotes statistical value with a significance level of 5 per cent;

P denotes the proportion of individuals in the treatment group;

σ^2 denotes variance; and

N denotes number of observations

Pipeline strategy: beneficiaries versus waiting list

Table 3 shows: the sample size (N); mean; standard deviation (sd); and MDE with a power of 80 per cent of the main variables of interest for sample of analysis.¹⁹ It shows that the mothers' average monthly income is \$3,036 pesos (US\$251),²⁰ with a standard deviation of \$1,804 pesos (US\$149). In the sample of 1,184 individuals, the MDE is about \$325 pesos per month (US\$27), representing a variation of 10 per cent with respect to the mean.

For the variable monthly household income, the minimal effect that can be detected is \$681 pesos (US\$56), which corresponds to a variation of 11 per cent. As for the main activity carried out by the mother, the MDE is 6 per cent for the mothers who have a job and 14 per cent for those seeking employment, accounting for a change of 7.5 per cent in the number of mothers who are employed and 63 per cent in those who are looking for a job. Given the large size of the MDE, it will be difficult to identify effects of the programme on job seeking.

¹⁹ The original power calculations are included in Appendix C. For these estimations, we used a sample of 1,241 households that were either eligible for, or interested in participating in, the PEI according to the survey collected in 2009.

²⁰ The average exchange rate reported by the Central Bank of Mexico during the survey collection was \$12.08 pesos = US\$1.

Table 3 Minimum detectable effect for the pipeline strategy

Variable (unit of measure)	N	Mean	sd	MDE (80 per cent)
Monthly wage of the mother (pesos)	1,184	3,036.22	1,804.45	\$324.77
Monthly wage of the household (pesos)	1,501	6,092.94	4,261.77	\$681.24
Mother has a job	1,570	79%	0.40	6%
Mother looks for a job and does not work	323	22%	0.42	14%
Monthly hours spent working by the mother (hours)	1,246	150.97	73.43	12.88
Mother has a written contract	968	34%	0.47	9%
Mother has access to social security	1,246	22%	0.42	7%
Use of time				
Hours of daily childcare while performing other activities (mother) (hours)	1,445	5.29	3.22	0.52
Hours of daily exclusive childcare (mother) (hours)	1,444	2.84	1.71	0.28
Hours of daily childcare while performing other activities (main caregiver in the household) (hours)	629	3.51	2.75	0.68
Hours of daily exclusive childcare provided (main caregiver in the household) (hours)	769	2.19	1.43	0.32
Child's diet diversity at home (number of food groups)	1,573	6.51	1.49	0.23
Prevalence of illness 15 days prior to the interview	1,573	48%	0.50	8%
Child's communication scale (z-score)	1,418	-0.01	0.99	0.16
Child's personal-social scale (z-score)	1,418	-0.04	1.01	0.17
Empowerment of the mother (score)	1,572	32.01	5.53	0.86
Perceived stress ²¹ (score)	1,572	15.60	5.02	0.78
Depression ²² (score)	1,570	11.88	7.71	1.21

Source: Prepared by INSP

The data collected show that, on average, mothers spend 150 hours per month at work and the minimal effect that can be detected is approximately 13 hours. In terms of the status (formal or informal) of the mother's job, the MDE of these two variables is 9 and 7 per cent, respectively. In terms of use of time, on average mothers spend 5.3 hours a day at home taking care of children under five years old while doing other activities, with an MDE of 0.52 hours (around 30 minutes). For time exclusively spent on childcare, the MDE is 0.28 hours (17 minutes).

Regarding child outcomes, it is possible to detect an effect of at least 8 per cent on the prevalence of disease; an sd of at least 0.17 and 0.16 on ASQ personal-social and communication z-scores, respectively. Moreover, according to the conceptual framework described above, the type of job held by the mother may also affect empowerment, self-esteem (depression) and stress. For empowerment and perceived stress, it is possible to detect an effect of at least 0.86 and 0.78 points in the respective scales, while for depression, the MDE is 1.2 points.

²¹ It is the most-used psychological instrument for measuring perceived stress (Cohen *et al.* 1983).

²² It is a self-report instrument to assess depression (Radloff 1977).

4.2 Data collection

During February and March 2011, data for the impact evaluation survey were collected in seven Mexican states: Chiapas, Hidalgo, Jalisco, State of Mexico, Puebla, Sonora and Tlaxcala.²³ Table 4 shows the pipeline sample of analysis. It included a total of 2,843 households, of which 45 per cent (1,273) were already PEI beneficiaries; the remaining 55 per cent (1,570) were on the waiting list.

Table 4 Sample of households for the pipeline analysis by state

State	Beneficiary households	Waiting list households	Total households
Chiapas	192	259	451
Hidalgo	167	159	326
Jalisco	124	117	241
Sate of Mexico	512	727	1239
Puebla	75	87	162
Sonora	138	152	290
Tlaxcala	65	69	134
Total	1,273	1,570	2,843

Source: Prepared by INSP

However, despite all fieldwork efforts, there are no data for 1,084 selected households (39 per cent);²⁴ primarily due to the poor quality of information provided in the waiting list formats.²⁵ Once the households were found, the survey response rate was positive in 89 per cent of households (918 beneficiary households and 655 control households) and in 100 per cent of the daycare centres (236).

²³ We selected this sample of states to capture cultural differences between the north, central and southern regions in the use of daycare settings and women's participation in the labour market. Although our sample is not representative at the national level, similar impact results can be found in the national analysis carried out by Calderón (2012). The Calderón study evaluated the same daycare programme (PEI) as we did. The main differences between the studies are data sources and evaluation design, with Calderón using representative data on a national level from: *Mexican National Survey of Employment* (2000–2004); *Mexican National Survey of Occupation and Employment* (2005–2010); *Mexican Population Census* (2005–2010); and administrative data provided by SEDESOL and IMSS, the Mexican social security institute. Unlike our pipeline approach, Calderón's evaluation design followed a difference-in-differences approach, adapting the synthetic control method to repeated cross-section data to ensure the control group had the same mix of skills and preferences as the eligible group. We believe that Calderón's study can be considered a rigorous impact evaluation.

²⁴ 815 households in the control sample and 269 in the treatment sample.

²⁵ We believe this attrition does not cause large bias; however, we cannot prove it and it remains a limitation of our study. Attrition was mainly due to errors in the addresses on waiting lists, and it is not obvious that these are correlated with potential outcomes. For *beneficiaries*, we used the CIS as baseline information to compare households found and not found. The groups are balanced on the available variables (number of persons living in the household; mother's income and main activity; if she was working, looking for work, studying or dedicated to housework). For *households on the waiting list*, we compared the data collected via waiting list forms for those households found and not found in the survey. Even though we found balance in some mother and household characteristics (years of schooling, if she was dedicated to housework and household income) we found significant differences in: gender of household head; if the mother was working; and if the mother was studying. However, it is more important to prove that surveyed beneficiaries and controls are balanced in a broad list of observable variables, which is what we have done in this report.

Table 5 shows that 337 households registered to be on the waiting list reported to be beneficiaries of PEI in the survey which led us to a final sample of 1,573 households: 1,255 beneficiaries and 318 on waiting lists.

Table 5 Final sample of daycare centres and households by state

State	Daycare centres	Beneficiary households	Waiting list households	Total households
Chiapas	39	250	47	297
Hidalgo	25	129	23	152
Jalisco	22	131	36	167
State of Mexico	102	475	136	611
Puebla	18	84	11	95
Sonora	21	128	50	178
Tlaxcala	9	58	15	73
Total	236	1,255	318	1,573

Source: Prepared by INSP.

4.3 Descriptive statistics²⁶

In this section, we describe the main characteristics of the households surveyed – both PEI beneficiaries and those on the waiting list. Most of the programme beneficiaries are women (96.6 per cent) who are, on average, 28 years old, with 11 years of schooling. Some 23 per cent of the beneficiaries are heads of households; 84 per cent work on average seven hours and 20 minutes per day, receiving a monthly salary of \$3,095 pesos (US\$256). In terms of job security, 34 per cent of beneficiaries have a written contract and 23 per cent have social security. Twenty eight per cent have access to daycare through a public institution and the average amount of time spent per day on exclusive care for children under five years old is two hours and 48 minutes.

As for the mental health of the mothers surveyed, it was found that mothers had, on average, 32 points out of a maximum of 39 on the empowerment scale (in which higher scores indicate higher self-esteem and personal recognition). On the perceived stress scale (in which higher scores indicate higher stress levels), the average score was 15.6 points out of a maximum 40, and on the depression scale, the average was 11.9 points out of 80. A score of 17 is the cut-off point for depression; therefore, we can observe that in our sample, on average, mothers are some way from indicating symptoms of depression.

The surveyed households comprise, on average, 4.2 persons with 1.3 children under five years old. They have 1.9 members working and a per capita monthly income of \$1,478 pesos (US\$122); 39 per cent own their homes, with 52 per cent reporting cement floors, 47 per cent tiled floors and 1 per cent dirt floors. The homes have an average of 2.7 rooms; 82 per cent have a refrigerator and 46 per cent a microwave. Only 30 per cent own a vehicle, while 85 per cent have at least one mobile phone.

As regards children's health, 30 per cent were born with wasting (low weight-to-age ratio) and 8 per cent with stunting (low height-to-age ratio); 89 per cent of children were given or are given breast milk, and 74 per cent had vaccination cards. The average age of children in the survey was 2.5 years; 47 per cent had been ill in the two weeks preceding the survey, with coughs being the

²⁶ Table D1 (Appendix D) lists the descriptive statistic variables.

most common ailment (80 per cent). In terms of dietary diversity, children consumed 6.5 of a possible nine food groups considered.²⁷

Concerning the choice of daycare provider, 55 per cent of sample beneficiaries considered that these were located close to home, with the average distance to daycare centre being 15 minutes away. Some 94 per cent considered that the treatment shown by teachers in daycare settings was good or excellent, while 91 per cent considered the food given at daycare centres to be good or excellent. The average length of time spent in daycare by the children represented in the sample was five months. In Table 6, we present the distribution of principal caregivers before children were enrolled onto the programme or registered on the waiting list. It can be seen that 58 per cent of children in the control group are cared for by their parents, 38 per cent by other persons (mainly maternal grandparents), and only 4 per cent were reported to be attending daycare centres.

Table 6 Main caregivers of beneficiary children and those on the waiting list

Principal caregiver of children	Total observations	%	Waiting list observations	%	Beneficiaries observations	%
Mother, father or guardian	708	45.0	184	57.9	524	41.8
Daycare	521	33.1	13	4.1	508	40.5
Other	344	21.9	121	38.1	223	17.8
Child's father	9	2.6	4	3.3	5	2.2
Paternal grandparents	46	13.4	14	11.6	32	14.3
Maternal grandparents	180	52.3	64	52.9	116	52.0
Child's siblings	15	4.4	4	3.3	11	4.9
Paternal uncle/aunt	13	3.8	6	5.0	7	3.1
Maternal uncle/aunt	48	14.0	19	15.7	29	13.0
Other relatives	11	3.2	4	3.3	7	3.1
Neighbours	10	2.9	3	2.5	7	3.1
Baby sitters	5	1.5	0	0.0	5	2.2
Friends	6	1.7	3	2.5	3	1.3
Other	1	0.3	0	0.0	1	0.4
Total	1,573	100.0	318	20.2	1,255	79.8

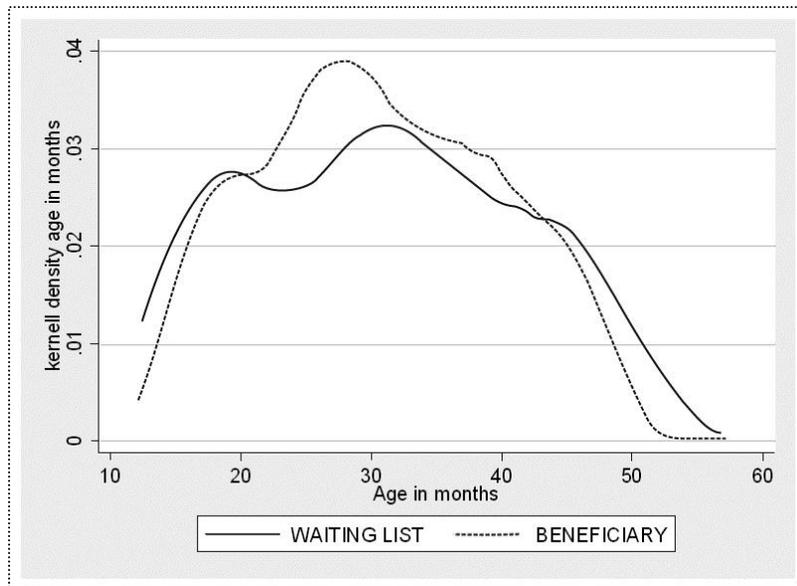
Source: Prepared by INSP

To confirm the validity of the pipeline strategy, it is necessary to verify the identification assumption of the pipeline approach with a balance test (mean difference) in the predetermined or baseline variables between the study groups. If the mean differences in these variables are not statistically significant, then we can be sure that the households on the waiting list in our control group are an appropriate comparison group; and, therefore, any differences we observe in the outcome variables can be attributed to the programme.

²⁷ The nine food groups were: cereals; roots and tubers; fruits and vegetables fortified with vitamin A; other fruits; other vegetables; legumes, vegetables and dried fruits; oils and fats; dairy; eggs; meat, poultry and fish.

In order to ensure comparability between groups, it was verified that the age distribution of children was similar. As shown in Figure 3, four of the children on the waiting list were outside of the range of ages of beneficiary children and were therefore excluded from the analysis.²⁸

Figure 3 Distribution of children's ages between groups



Source: Prepared by INSP

The following sections present the results of the balance tests and the estimated impacts, first for the full sample and then for subgroups of mothers who worked and did not work before entering the PEI.²⁹ First, we present the variables of labour market variables and the mother's use of time; then the mother's mental health; and finally results in health, nutrition and child development.

*Labour market and use of time: characteristics and balance tests*³⁰

Table 7 presents the descriptive statistics of the mothers registered on the programme. On

²⁸ The final test sample for the group of beneficiaries was 1,232, with a further 314 households on a waiting list. Children younger than 12 months or older than 57 months were not considered. For *Reglas de operación para el programa de estancias infantiles para apoyar a madres trabajadoras* (ROP), the age range of children who attend the daycare settings is 12–47 months. However, 39 children in the survey (2.5 per cent) were reported to be more than 47 months old and receiving benefits from the PEI. Therefore, they were included in the analysis.

²⁹ Appendix D shows the results of the balance tests in all the predetermined or baseline variables for the full sample and subsample results of mothers who worked and did not work before the entering the PEI.

³⁰ Each table of the balance tests shows the number of observations (N), the mean and sd for each group: beneficiaries and those on the waiting list. To test the identification assumption, in the case of continuous variables a t-test was estimated comparing the mean of the two populations; while for the categorical or dichotomous variables a chi-square test was estimated, which compares the distribution of the variables in different categories and between the two test groups. These results are shown in column 'p' and indicate whether differences between groups are statistically significant. The previous result corrects fixed effects at the daycare level by comparing each variable between groups of beneficiaries and non-beneficiaries and indicating if the difference is significant by adjusting the specific characteristics of each daycare centre. It is important to adjust at the daycare level, since the beneficiaries in different daycare settings are more heterogeneous than the beneficiaries of the same daycare.

average, mothers who receive the benefits of the PEI are one year older than those registered on the waiting list, at the one per cent statistical significance level. In terms of years of schooling, the differences between beneficiary mothers and those on the waiting list are also significant; with the latter having on average one year less of schooling. These differences are economically small, and we believe they will not mean large biases in the estimation of causal effects of the programme.

Using different propensity score matching (PSM) methods (nearest neighbour, kernel and radius), we estimated the average treatment effect on the treated (ATT) and compared these results with the OLS estimations presented in this evaluation. We used two different specifications for the PSM estimations, including: (a) only the unbalanced variables as the covariates for the PSM estimations (mother's age, mother's education, whether or not the head of the household is male and the logarithm of the mother's income in 2007); and (b) four additional variables (whether or not the mother was working or looking for a job in 2007 and 2006), which are lags of important dependent variables. Yet the results are robust to inclusion for various covariates.³¹

Regarding their main activity, mothers were asked if they were working or looking for work at different points in time. Table 7 shows the percentage of mothers who were working or looking for work in late 2006 and late 2007. Overall, no significant differences were observed between beneficiaries and those on the waiting list who reported working in 2006 (33 per cent versus 31 per cent) nor in 2007 (37 per cent versus 34 per cent). The findings were that 4.1 per cent of beneficiary mothers and 3.8 per cent of those on waiting lists reported looking for work in late 2006, but this difference was not statistically significant.

Finally, 3.6 percent and 3.8 per cent of the beneficiaries and mothers on the waiting list were looking for work in 2007. On average, beneficiary mothers earned \$150 pesos (US\$14) less in November 2006, but this difference is not significant.³² In November 2007, the beneficiary mothers received \$305 pesos (US\$28) less than the mothers on the waiting list, and this difference is significant.

Table 7 Balance test: mothers' characteristics

Variable (unit of measure)	Beneficiaries			Waiting list			p
	N	Mean	sd	N	Mean	sd	
Age of mother (years)	1,232	28.33	6.67	313	27.2	6.66	0.008***
Years of mother's schooling (years)	1,225	11.53	3.31	311	10.43	3.18	0.000***
Worked in Nov. 2007	1,226	37.11%	0.48	312	33.97%	0.47	0.143
Worked in Nov. 2006	1,229	32.95%	0.47	312	31.09%	0.46	0.937
Was looking for work in Nov. 2007	1,226	3.59%	0.19	312	3.85%	0.19	0.658
Was looking for work in Nov. 2006	1,229	4.15%	0.2	312	3.85%	0.19	0.523
Mother's income in Nov. 2007 (pesos)	443	2,669.06	1,648.9	105	2,974.48	1,985.57	0.011***
Mother's income in Nov. 2006 (pesos)	398	2,692.03	1,723.85	95	2,842.42	1,786.31	0.492
Had written contract in Nov. 2007	454	36.56%	0.48	106	37.74%	0.49	0.667
Had written contract in Nov. 2006	404	38.37%	0.49	97	38.14%	0.49	0.458

Note: * P < 0.10, ** P < 0.05, *** P < 0.01.

Source: Prepared by INSP

³¹ Appendix D includes a more detailed explanation of the PSM estimations.

³² The average exchange rate in 2006–2007 was \$10.93 pesos = US\$1 (Central Bank of Mexico).

It should be noted that the number of observations in both groups considers only those mothers who reported working in each period. Those who reported working in late 2006 and 2007 were asked if they had a written contract for their work: in late 2006, 38 per cent of beneficiary mothers and those on the waiting list had a written contract; there was only a slight change a year later, 36 per cent of beneficiaries versus 37 per cent of those on the waiting list.

Table 8 shows the balance tests for household variables. This includes the fact that 70 per cent of beneficiary households and 78 per cent of non-beneficiary households are male-headed. This difference is statistically significant.

Table 8 Balance test: household characteristics

Variable (unit of measure)	Beneficiaries			Waiting list			p
	N	Mean	sd	N	Mean	sd	
Head of household is male	1,223	69.99%	0.46	312	78.85%	0.41	0.017**
Own house	1,232	39.12%	0.49	313	39.94%	0.49	0.817
Household members	1,232	4.23	1.48	314	4.35	1.46	0.392
Children under five in the household	1,232	1.31	0.53	314	1.33	0.55	0.949

Note: * P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Of the beneficiaries, 39 per cent reported that they owned the house in which they lived,³³ compared to 40 per cent of those on the waiting list. This difference is not statistically significant, indicating that, in terms of housing, the two groups are in similar conditions. Regarding the number of people living in the household, there were no significant differences either, with an average of four household members for both groups. Similarly, there is no difference in the number of children under five years old living in both groups of households.

*Results: labour market and use of time*³⁴

In Table 9, we present the impact of the programme on labour and time use, using the pipeline analysis strategy that compares beneficiary households with those on the waiting list.

³³ We also considered the households that reported the house as their own, but were still paying for it.

³⁴ In all the estimated models, we included robust standard errors that control for potential problems of heteroskedasticity.

Table 9 Impact of the programme on the labour market and participants' use of time

Impact in:	Variable (unit of measure)	N	Mean	Impact	Standard error
Mother's labour participation	Working	1,172	84%	0.178***	(0.0416)
	Looking for work	1,173	3.9%	-0.0149	(0.0223)
	Studying	1,173	2.1%	0.00461	(0.0157)
	Hours worked per week	1,174	34.97	6.863***	(2.116)
Main caregiver's labour participation (where this is not the mother)	Working	212	52%	0.188	(0.181)
	Looking for work	212	6%	0.0548	(0.0752)
	Studying	212	9%	-0.129*	(0.0740)
	Hours worked per week	212	35.63	1.517	(8.663)
Income	Mother's income (logs)	889	8.03	0.276	(0.189)
	Household income (logs)	1,125	8.75	0.0590	(0.204)
Labour stability	Number of times she has changed work	1,074	0.25	-0.0486	(0.0788)
	Work experience (years)	705	1.90	0.308	(0.497)
	Written contract (%)	727	34.8%	0.0081	(0.0711)
	Social security (%)	927	23%	0.0093	(0.0519)
Use of time	Hours per day spent on childcare while performing other activities (mother)	1,174	4.97	-	(0.338)
	Hours per day spent on exclusive childcare (mother)	1,090	2.79	-0.306*	(0.175)
	Hours per day spent on childcare while performing other activities (main caregiver at the household)	212	3.72	0.163	(1.398)
	Hours per day spent on exclusive childcare (main household caregiver)	195	2.98	1.200*	(0.679)

Note:

All models controlled by: mother's age; mother's education; whether the mother worked or looked for work in 2006; whether the head of the household is male; number of people in the household; presence of children under five years old who do not attend any form of daycare; child's age; child's weight-to-height ratio and height-for-age ratio at birth; whether the child was breastfed; whether the mother considered the child healthier or more intelligent at the age of one compared with other children of the same age; number of objects designed to stimulate development owned by the child by the age of one. In addition, all models were controlled by daycare fixed effects.

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Table 9 shows that we found that the programme increases the proportion of beneficiary mothers who have a job by 18 per cent, and the number of hours worked by almost 6 hours per week, representing an average increase of 24 hours per month. There are no detectable changes for either group in the proportion of mothers looking for work or studying. This may imply that beneficiaries find a job quickly or that they have identified it previously.

In households where the primary caregiver is not the mother, the proportion of those studying is reduced by 13 per cent; this is consistent with the increase in hours they spend on childcare, as explained later. We found no significant effects on job stability measured by variables concerning: the number of times they change job; the mother's work experience; and whether they have a written contract in their current jobs.

Table 9 also shows that beneficiary mothers spend less time on childcare while doing other things. The effect is 1 hour and 23 minutes less per day, and 18 minutes less in terms of exclusive care. This is consistent with the increase of 6 hours of work per week. Where the primary caregiver is not the mother, the decrease in hours of care by the mother results in an increase of 1 hour and 12 minutes of exclusive care by the primary caregiver who lives in the home. This may be due to daycare schedules that do not necessarily cover the hours the mother is working.

We also developed a retrospective analysis using information on whether or not the mother had worked in November of previous years. As shown in Table 10, we found that the proportion of beneficiary mothers staying in the same job for the period 2010–2011³⁵ was positive and statistically significant (15 per cent). It can be seen that the effect size is similar, but not significant in the other periods analysed (2009–2011 and 2008–2011).

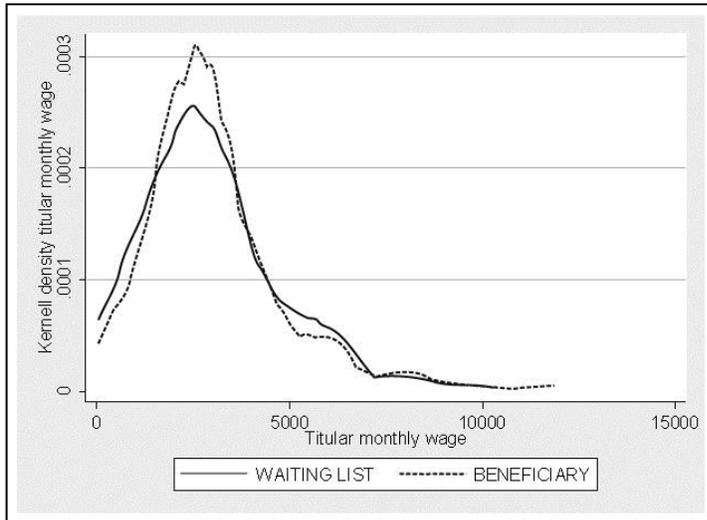
Table 10 Job tenure for the mother from 2008-2011

	Permanence 2010 to 2011	Permanence 2009 to 2011	Permanence 2008 to 2011
Beneficiary (%)	15.6**	15.1	15.8

Source: Prepared by INSP

Table 9 also shows that the programme has no statistically significant impact on income. Figure 4 shows the distribution of monthly wages of the household head in both groups. It is clear that the main differences in income between beneficiaries and those on the waiting list are concentrated between incomes of \$1,000 and \$3,000 pesos and between \$4,500 and \$7,000 pesos.

Figure 4 Distribution of mothers' monthly income between groups

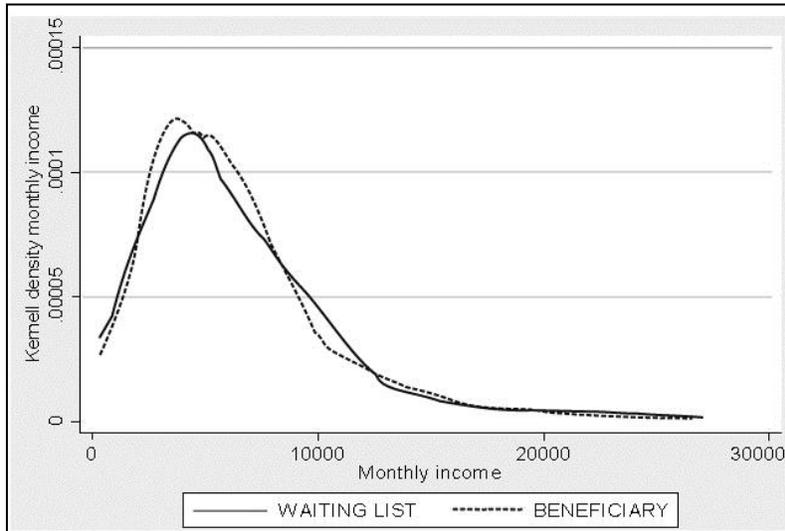


Source: Prepared by INSP

³⁵ This period includes November 2010 to February 2011. The other periods are from November 2009 to November 2011 and November 2008 to November 2011.

Figure 5 shows that there are more differences in income level when taking the household, rather than just the mother's, monthly income into account.

Figure 5 Distribution of household monthly income between groups



Source: Prepared by INSP

As mentioned, no income effects were found and we believe there are three possible explanations for these differences, which we explore below:

1. Beneficiary respondents under-reported their income for fear of losing the benefits of the programme (measurement error);
2. There is not enough power to measure impacts below 10 per cent (see Table 3 in Section 4.1); and
3. There is no balance at baseline.

Hypothesis 1: beneficiary respondents under-reported their income for fear of losing the benefits of the programme (measurement error). To explore this hypothesis, we carried out further analyses, being aware that there are greater incentives for the beneficiaries to under-report current rather than historical income, because their participation in the programme depends on the former.

As shown in Table 11, we found that the only statistically significant income gap between the two groups was in 2007, when the income reportedly received by beneficiaries was \$175 pesos (US\$16) lower than that received by non-beneficiaries. The reported income of beneficiaries was also lower in 2006 and 2011, by \$101 pesos (US\$9.3) and \$54 pesos (US\$4.5), respectively, though these decreases are not significant. For the period 2008–2010, beneficiaries reported higher income than mothers on the waiting list, but this was not statistically significant. With these results, it is not possible to conclude whether the beneficiary mothers under-reported their current income.

Table 11 Consistency of reported income, 2006–2011

	Current income	Income 2010	Income 2009	Income 2008	Income 2007	Income 2006
Beneficiary	-\$54.58 pesos (-US\$4.5)	\$66.86 pesos (US\$5.3)	\$15.32 pesos (US\$1.1)	\$0.173 pesos (US\$0.01)	\$175.4 pesos*** (-US\$16)	-\$101.1 pesos (-US\$9.3)

Note:

Does not include the top 99 percentile of income. Income variables included are not conditioned to work.

***P < 0.01

Source: Prepared by INSP

Hypothesis 3: there is no baseline balance. Given the statistical differences in some of the baseline characteristics between the control and treatment groups (age, years of schooling and income in 2007), we addressed this hypothesis by estimating the ATT on the mother's labour income with three PSM methodologies (nearest neighbour, kernel and radius), and using four different sets of control variables, which included the unbalanced characteristics and historical data on mothers' labour income. After the matching, the balancing property was fulfilled and the ATT on the mother's labour income was positive but not statistically significant. For more detail on descriptive statistics, see the tables in Appendix D.

Employment condition of the mother before entering the PEI

It is plausible to assume that the results and effectiveness of daycare settings differ for mothers more likely to have a job while applying to access the programme. The likely reason for this is that women who work already have someone to care for their children. For these women, the programme may help them find a better job or access better childcare; whereas for non-working mothers one of the main benefits, in addition to those enjoyed by working mothers, is having the time to find a job. For this reason, we differentiate the results for mothers by their work histories, approximated by the variable 'had a job in 2008' – in other words, 24 months prior to the survey being carried out. This cut-off point was chosen in line with the maximum exposure of 24 months to the PEI that we have recorded in the sample.³⁶

Tables D3 and D4 (Appendix D) show the balance tests for the subgroup of mothers who worked before entering the programme or signing up to the waiting list. For working mothers in 2008, we find equivalence between the beneficiary and waiting list groups in the areas of education, employment status and formality of employment in 2006 and 2007. However, we find some significant differences in the mothers' characteristics in terms of: age (beneficiary mothers were two years older); income in 2007 (beneficiary income was \$280 pesos less); and marital status (12 per cent more of beneficiaries were single). The characteristics of beneficiary and waiting list children, however, showed only a small difference in age (beneficiary children were one month older).

In the subsample of mothers who did not work in 2008, we found equivalence between both groups in employment status, income and job status in 2006 and 2007. Equivalence was also found in the child-level variables of interest. However, we found some significant differences in the

³⁶ This variable is correct for several reasons:

- (a) It is determined prior to programme participation by the beneficiaries surveyed;
- (b) It has persistence – the correlation between working in 2007 and 2008 is over 50 per cent; and
- (c) We tested if the variable worked in 2006 and 2007 and the results are similar.

In contrast, using the variable 'working a month before the application to the daycare' implies different calendar months for different people, which limits comparability.

mothers' characteristics in terms of: age (beneficiaries were 1 year older); education (beneficiaries had 1 year more of schooling); and marital status (9 per cent more beneficiary mothers were single). Furthermore, we found that beneficiary households were slightly smaller than households on the waiting list (comprising 4.29 and 4.33 members, respectively).

For both subsamples, we found some significant differences between the two groups, but in general we believe these differences are economically small. However, the impact estimation models for these subsamples include predetermined variables that control for these pre-existing differences to avoid potential bias in the results.

Results: mothers who worked before the PEI

In this subgroup, we found no significant effects on labour outcomes or time use for the primary caregiver (where this is not the mother). As shown in Table 12, the only effects found were in the mother's time use, through a reduction of 35 minutes in the daily number of hours spent by the mother on exclusive care.

Table 12 Impact of the programme on labour market and time use for mothers who worked before PEI

Impact on:	Variable (unit of measure)	N	Mean	Impact	Standard error
Mother's labour participation	Working	464	90.3%	0.0959	(0.0632)
	Looking for work	464	3.17%	0.0339	(0.0388)
	Studying	464	0.4%	0	(0)
	Hours worked per week	464	35.46	2.713	(3.694)
Main caregiver's labour participation (where this is not the mother)	Working	83	53%	-0.148	(0.607)
	Looking for work	83	7%	-0.334	(0.282)
	Studying	83	8%	0.0286	(0.213)
	Hours worked per week	83	34.39	12.99	(31.65)
Income	Mother's income (logs)	464	35.49	2.713	(3.694)
	Household income (logs)	390	7.63	0.0545	(0.333)
Labour stability	Times of work changed (number)	451	8.39	0.101	(0.366)
	Work experience (years)	453	0.21	0.0002	(0.126)
	Written contract	305	3.98%	0.126	(1.060)
	Social security	406	39.6%	0.077	(0.0963)
Use of time	Time per day spent on childcare while performing other activities (mother) (%)	406	29.61%	-0.819	(0.598)
	Hours per day spent on exclusive childcare (mother)	464	4.92	-0.585*	(0.314)
	Hours per day spent on childcare while performing other activities (main caregiver)	435	2.79	6.717	(3.881)
	Hours per day spent on exclusive childcare (main caregiver)	83	3.58	-0.355	(1.573)

Note:

For a list of model controls, see note under Table 9

* P < 0.10, ** P < 0.05, *** P < 0.01

Results: mothers who did not work before the PEI

Table 13 shows that, among mothers who did not work before the PEI, 21 per cent gained employment after entering the programme (November 2008), with the number of hours worked per week increasing on average by 7 hours and 28 minutes – an equivalent of almost 1 additional day of work per week. As for other primary caregivers, the PEI increased the proportion of their employment by 56 per cent.

Table 13 Impact of the programme on labour market and time use for mothers who did not work before PEI

Impact on:	Variable (unit of measure)	N	Mean	Impact	Standard error
Mother's labour participation	Working	707	79.78%	0.211***	(0.0646)
	Looking for work	708	4.47%	-0.0496	(0.0333)
	Studying	708	3.39%	0.0044	(0.0278)
	Hours worked per week	709	34.52	7.481**	(3.060)
Main caregiver's labour participation (where this is not the mother)	Working	128	51.00%	0.563*	(0.297)
	Looking for work	128	6.00%	0.188	(0.123)
	Studying	128	9.00%	-0.279	(0.172)
	Hours worked per week	128	36.90	23.27	(16.44)
Income	Mother's income (logs)	498	7.34	0.306	(0.287)
	Household income (logs)	673	8.33	-0.0296	(0.301)
Labour stability	Number of times changed jobs	620	0.28	-0.0684	(0.127)
	Work experience (years)	399	1.15	-0.125	(0.491)
	Written contract	409	31.49%	-0.0419	(0.120)
	Social security	520	18.37%	0.0201	(0.0781)
Use of time	Hours per day spent on childcare while performing other activities (mother)	709	5	-1.737***	(0.493)
	Hours per day spent on exclusive childcare (mother)	654	2.81	-0.255	(0.250)
	Hours per day spent on childcare while performing other activities (main caregiver)	128	3.78	-2.528	(2.822)
	Hours per day spent on exclusive childcare (main caregiver)	118	3	0.940	(1.889)

Note: For a list of model controls, see note under Table 9

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Regarding the impact of the PEI on the use of time, it is clear that there is a reduction of 1 hour, 44 minutes per day devoted to childcare while the mother performs other activities. In this subsample we found no changes in the number of hours of care from other primary caregivers living in the household.

These observations lead us to conclude that the mothers who did not work before entering the PEI show greater impact upon the labour market than the mothers who were already working when they entered the programme. To contextualise the effect of the PEI on employment and the impact documented in other similar programmes,³⁷ we compare this with results from two studies contained in our literature review in Section 1.2:

³⁷ Comparisons within the document are used as a framework to contextualise the scale of the results. However, we recognise the limitations of such comparisons because the studies have been performed in different contexts and typically use different evaluation methodologies.

- Argentina: a programme promoting the expansion of the supply of pre-primary schools led to a 12.4 per cent increase in the probability of the mother's employment (Berlinski and Galiani 2005); and
- Colombia: the probability of employment among mothers in the HCB programme increased by 25 per cent, and the number of hours worked by beneficiary mothers increased by 36 hours per month (Bernal *et al.* 2009).

This comparison shows that the magnitude of the PEI's impact on employment is within the range of what has been found through studies of other programmes in Latin America.

Mothers' mental health: characteristics and balance tests

As shown in Table 14, there are no significant differences between groups in the variables of the mothers' mental health. On average, both groups score 32 points on the empowering scale, 15 points on the perceived stress scale and 12 points on the depression scale. With no differences between the groups, we can be sure of no bias in estimating causal effects of the PEI.

Table 14 Balance test: mental health of mothers

Variables (unit of measure)	Beneficiaries			Waiting list			P
	N	Mean	sd	N	Mean	sd	
Empowerment scale for the mother (score)	1,231	32.06	5.52	314	31.83	5.6	0.333
Perceived stress scale (score)	1,231	15.54	4.9	314	15.82	5.51	0.865
Depression scale (score)	1,230	11.73	7.63	313	12.6	8.14	0.520

Note: * P < 0.10, ** P < 0.05, *** P < 0.01

Results: mothers' mental health

Table 15 shows that we found no significant effects on mental health indicators for mothers, as measured by psychological scales of empowerment, stress or depression. This reveals a slight contrast with expectations and may be due to the possibility that any resulting peace of mind from daycare provision is counter-balanced by the stress of more work. Furthermore, the reported effects are rather short-term. That no significant effects on the levels of maternal depression have been noted in this evaluation is important because studies of similar programmes in developed countries have reported that the depression score of mothers increased by 10.2 per cent compared with the average (Baker *et al.* 2008).

Table 15 Impact of the programme on the mental health of mothers

Impact on:	Variable (unit of measure)	N	Mean	Impact	Standard error
Mental health	Depression scale (score)	1,172	11.71	-0.165	(0.771)
	Stress scale (score)	1,174	15.58	0.0415	(0.517)
	Empowerment scale (score)	1,174	32.13	0.134	(0.565)

Note:

For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Mental health of mothers before entering the programme

The subsample of mothers who worked in 2008 revealed only positive effects on their empowerment. This effect is equivalent to a six per cent increase in the level of empowerment relative to the mean, which makes it economically significant. It indicates an improvement in self-esteem and personal recognition.

This is consistent with the results of the qualitative evaluation of the PEI (INSP 2009), which found that one of the reasons why working women enrolled their children in daycare is to retain their children's affection and control over their education. In cases where women delegate their children's care to the grandmother to enable them to work, the mother can lose control over her children's education and often fears the child will develop greater affection for the grandmother.

Subsidised daycare services can therefore have positive effects on women's empowerment, even if they were already working. This pathway of impact was not originally included in the theory of change presented in Figure 2 (Section 2); however, it was added after analysing these findings. In contrast, Table 16 shows that there are no effects on the subgroup of mothers who did not work before 2008.

Table 16 Impact of the programme on the mental health of mothers regarding their work condition prior to the programme

Impact on:	Variable (unit of measure)	Mother did not work in 2008				Mother worked in 2008			
		N	Mean	Impact	Standard error	N	Mean	Impact	Standard error
Mother's mental health	Depression scale (score)	707	12.08	-0.563	(1.107)	464	11.16	0.116	(1.402)
	Stress scale (score)	709	15.76	0.229	(0.724)	464	15.76	-0.723	(0.990)
	Empowerment scale (score)	709	31.91	-0.427	(0.785)	464	32.25	1.928*	(1.115)

Note:

For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Child development, health and nutrition: characteristics and balance tests

As mentioned before, children in both groups and within the same age range were considered for this analysis. Table 17 shows that the beneficiary children are approximately 0.33 months younger than children who are on the waiting list (30.61 versus 30.94 months); however, this difference is not statistically significant.

Table 17 Balance test: characteristics of children

Variable (unit of measure)	Beneficiaries			Waiting list			p
	N	Mean	sd	N	Mean	sd	
Age of child (months)	1232	30.61	9.16	314	30.94	10.53	0.847
At birth							
Weight-for-height ratio of child at birth (z-score)	959	-1.14	1.80	241	-1.10	1.67	0.201
Height-for-age ratio of child at birth (z-score)	1,052	0.63	1.72	268	0.68	1.72	0.608
Child with low weight	1,201	6%	0.25	304	7%	0.26	0.687
Child with low height	1,095	1%	0.1	276	0%	0.06	0.208
Child with wasting at birth	959	30%	0.46	241	27%	0.44	0.108
Child with stunting at birth	1,052	8%	0.27	268	6%	0.24	0.858
First year of life							
Considered their child healthier than other children, by 1 year of age	1,229	66%	0.47	314	68%	47%	0.890
Considered their child more intelligent than other children, by 1 year of age	1,227	77%	0.42	314	75%	43%	0.661
Retrospective variables							
Age at which child said other words besides mother and father (months)	644	12.69	2.75	158	12.59	2.61	0.315
Age at which child took first steps (months)	835	13.27	2.36	194	13.19	2.42	0.963
Child was or is breastfed	1,232	89%	0.32	314	88%	0.33	0.971

Note:

* P < 0.10, ** P < 0.05, *** P < 0.01

Children are considered underweight if they are less than 2.3 kilograms (WHO 2006)

Girls are considered underweight if they are under 44.8 centimetres; boys under 45.5 centimetres (WHO 2006)

Wasting refers to acute malnutrition; *stunting* refers to chronic malnutrition.

Source: Prepared by INSP

The survey contains a section dedicated to the analysis of the state of health, nutrition and child development during the first year of the child's life. Table 17 presents the descriptive statistics of the main results. In terms of the perception of children's health, a higher percentage of those on the waiting list were considered to be healthier than other children of the same age (66 per cent versus 68 per cent). It was reported that 77 per cent of beneficiary children and 75 per cent of those on the waiting list were considered to be more intelligent than other children of the same age. These differences are not statistically significant between the two groups. Concerning nutrition, the majority of children in both groups were or had been breastfed (89 and 88 per cent).

We generated variables of underweight, stunting and wasting according to the World Health Organization's child growth standards (WHO 2006).³⁸ From the information gathered regarding the sex, weight and height of the children at birth, we found that 6 per cent of beneficiary children and 7 per cent of those on the waiting list had a low birth weight. The weight-for-height z-score at birth is -1.14 sd for the beneficiary children and -1.10 sd for children on the waiting list; the mean of the height-for-age z-score is 0.63 for beneficiary children and 0.68 sd for their counterparts on waiting lists. In addition, 8 per cent and 6 per cent respectively, were diagnosed with stunting at birth; 30 per cent of beneficiary children and 27 per cent of those on the waiting list were diagnosed with wasting at birth. None of these differences are significant.

³⁸ A child weighing less than 2.3 kilograms is considered a low birth weight; a girl measuring less than 44.8 centimetres or a boy measuring less than 45.5 centimetres is considered to be stunted. Children are diagnosed with wasting if their weight-to-height ratio is below -2 (sd from the international reference) and with stunting if their size-to-age ratio is below -2 (sd from the international reference).

In terms of child development, the age of the child when he or she uttered their first words (besides mother or father) was taken into consideration, along with their age when they took their first steps. To encourage consistency in reporting these results, plausible age ranges were considered,³⁹ which accounts for why some observations were excluded in both groups. Table 17 shows that there are no significant differences between beneficiary children and those on the waiting list in terms of their age when they said their first word (12.7 months versus 12.6 months) and took their first steps (13.3 months versus 13.2 months). Children in the comparison groups are similar because none of the variables of interest were found to be statistically different, showing that the two groups are comparable.

Results: overall health, nutrition and child development

Table 18 shows the average impact of the PEI on the children and an estimation of how these effects could change over time. The programme leads to an increase of 17.1 per cent in the prevalence of disease among the children. This result may be accounted for by their increased contact with a greater number of children at the daycare centre, whose immune systems are still developing. The results collated according to the age and times of exposure are presented in Table 19 and reflect this conclusion.

These findings are consistent with those found in the study for Colombia (Attanasio and Vera-Hernández 2004), and evidence from the United States shows that attendance at large daycare centres can be associated with an increased susceptibility to common colds during the pre-school years. However, attendance at large daycare centres was also found to protect children from the common cold in the early school years, presumably by means of acquired immunity (Ball *et al.* 2002). Elsewhere, a nationwide study in the United States found that increased duration of daycare exposure was associated with a decreased risk of respiratory illness (Hurwitz *et al.* 1991).

Table 18 also shows that we found no significant effects of the PEI on dietary diversity and child development. The fact that the diversity of children's diet at home does not change is positive, showing that the food provided at the daycare centre does not displace or compromise the diet provided at home.

It is worth mentioning that we found no detrimental effects on the children. This is of paramount importance, in light of certain research indicating that such effects do in fact take place (Baker *et al.* 2008).

Table 18 Impact of the programme on the children's health, nutrition and development

Impact on:	Variable (unit of measure)	N	Mean	Impact	Standard error
Child health	Prevalence of illness 15 days prior to the interview	1,174	49%	0.171***	(0.0509)
Child diet diversity	Food groups the child eats at home (number)	1,174	6.46	-0.148	(0.150)
Child development	Communication scale (z-score)	1,071	0.03	0.0716	(0.105)
	Personal-social behaviour scale (z-score)	1,071	0.03	0.0928	(0.107)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

³⁹ According to child development experts, children are likely to say their first word between 8 and 24 months old. In general, the most common timeframe is between 12 and 17 months old, but it is equally possible that the child utters their first words sooner or later. According to WHO standards, first steps usually occur between 8 and 18 months old (WHO 2006).

*Heterogeneous effects by age of the children*⁴⁰

The development of children proceeds at different rates and in different directions according to their age. Therefore, it is important to carry out separate studies according to each age range. There is evidence to suggest that the impact of childcare is particularly effective in the early years (Engle and Black 2007), so we would expect the effects to be more significant for children younger than 30 months old (corresponding to the mean age in our sample).

Table 19 shows that, when analysing the prevalence of disease in the 15 days prior to the interview, there was no effect among the children over 30 months old. However, when analysed by exposure dummies, we observed that those with more than 6 months of exposure to the programme showed a reduction of 17.4 per cent in the prevalence of illness in this age group. This is not so for children under 30 months, for whom the prevalence of disease increased by 30 per cent for all minors and by 14 per cent for those who had spent the least amount of time in the programme.

Table 19 Impact of the programme on children's health, by age range

Prevalence of illness 15 days prior to the interview					
Age range	Exposure time	N	Mean (%)	Impact	Standard error
Older than 30 months	Total (months)	595	44	0.0614	(0.0778)
	Exposure: 1–6 months	223	49	-0.0727	(0.0687)
	Exposure: more than 6 months	269	38	-0.174***	(0.0664)
Younger than 30 months	Total (months)	594	55	0.298***	(0.0869)
	Exposure: 1–6 months	311	59	0.140**	(0.0621)
	Exposure: more than 6 months	118	42	0.0299	(0.0787)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Table 20 shows that there are no effects on dietary diversity for any age group.

Table 20 Impact of the programme on child nutrition, by age range

Number of food groups the child eats at home					
Age range	Exposure time	N	Mean	Impact	Standard error
Older than 30 months	Total (months)	567	6.44	-0.0604	(0.238)
	Exposure: 1–6 months	223	6.52%	0.197	(0.212)
	Exposure: more than 6 months	269	6.34%	0.180	(0.205)
Younger than 30 months	Total (months)	567	6.49	0.0235	(0.234)
	Exposure: 1–6 months	311	6.61%	0.0952	(0.166)
	Exposure: more than 6 months	118	6.51%	-0.0526	(0.211)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

Source: Prepared by INSP

⁴⁰ Note that in this analysis we are carrying out stratification by age group, thus the statistical power to detect effects is reduced because the sample analysis of each subgroup is smaller than the total sample of children. The power calculations for these subgroups are presented in Appendix C.

Table 21 shows that the programme has a positive average impact of 0.301 sd on the communication scale for children older than 30 months with more than 6 months' exposure. The programmes on children's development obtained a magnitude in the range between small and medium.⁴¹ These results are consistent with the findings reported in a study for Colombia, where the intervention was based on feeding and stimulating underweight children aged 42–75 months who attended a daycare centre, which registered higher effects on children with longer exposure time (Engle and Black 207). Among the group of younger children, we found no significant effect on the communication scale.⁴²

Table 21 Impact of the programme on the communication scale of children, by age range

Communication scale (ASQ)					
Age range	Exposure time	N	Mean	Impact	Standard error
Older than 30 months	Total (months)	507	.04	0.178	(0.168)
	Exposure: 1–6 months	204	–0.11%	0.110	(0.142)
	Exposure: more than 6 months	243	0.21%	0.301*	(0.138)
Younger than 30 months	Total (months)	527	.03	0.0546	(0.173)
	Exposure: 1–6 months	286	–0.04%	–0.0643	(0.127)
	Exposure: more than 6 months	108	0.21%	0.0958	(0.157)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Finally, Table 22 shows that no effects on the scale of personal-social behaviour are attributed to the PEI.

Table 22 Impact of the programme on the scale of children's personal-social behaviour, by age

Personal-social behaviour scale (ASQ)					
Age range	Exposure time	N	Mean	Impact	Standard error
Older than 30 months	Total (months)	507	.01	0.0170	(0.170)
	Exposure: 1–6 months	204	–0.11%	0.0829	(0.144)
	Exposure: more than 6 months	243	0.21%	0.216	(0.140)
Younger than 30 months	Total (months)	527	.04	0.268	(0.179)
	Exposure: 1–6 months	286	–0.04%	0.166	(0.131)
	Exposure: more than 6 months	108	0.21%	0.0787	(0.163)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10, ** P < 0.05, *** P < 0.01

Source: Prepared by INSP

Results for subset of children whose mothers worked before the PEI

⁴¹ To interpret the size of the effect reported in terms of sd., the economic rule that classifies the size of effects in broad terms is: an effect of 0.2 sd is considered small; 0.5 medium; and 0.8 large (Cohen 1988).

⁴² After undertaking a more detailed analysis of the ASQ communication scale, we found that, when asked if the child in question (aged 31–42 months) knew any nursery rhymes or children's songs, the answer given by beneficiaries and those on the waiting list was significantly different. This is consistent with the impact noted in the communication z-scores (increase of 0.30 sd), and leads us to conclude that the effect is directly linked to this particular question, seeing as it is more likely that the beneficiary children would sing at daycare compared with those who do not attend.

Regarding the impact of the results mentioned above (Table 13), we found that the effects on labour and the use of time increased when the mother had not worked prior to the PEI. This may also be true for indicators measuring the impact upon children, due to the fact that the home care may differ depending on whether or not the mother works.

When we analysed the effects on children, taking all variables into account and considering only those households where the beneficiary mother worked before entering the programme, we found that the programme does indeed have an effect on the prevalence of disease, both in the full sample and when stratifying by age (see Table 23).

Table 23 Impact of the programme on the health of children whose mother worked before PEI

Prevalence of illness 15 days prior to interview				
Exposure time	N	Mean	Impact	Standard error
Total (months)	466	48.32%	0.265***	(0.0937)
Exposure: 1–6 months	226	54%	0.110	(0.0717)
Exposure: more than 6 months	104	41%	-0.0176	(0.0787)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10; ** P < 0.05; *** P < 0.01

Source: Prepared by INSP

Table 24 shows the positive effects on dietary diversity among the children who have been exposed to the programme for 6 months or less. These children's daily diet at home was diversified, because the number of food groups included in their diets increased from 6.5 to 7 out of 9 possible food groups.

Table 24 Impact of the programme on the nutrition of children whose mothers worked before PEI

Dietary diversity: number of food groups in the children's diet				
Exposure time	N	Mean	Impact	Standard error
Total (months)	605	6.47	-0.180	(0.281)
Exposure: 1–6 months	239	6.51%	0.476**	(0.211)
Exposure: more than 6 months	185	6.51%	0.271	(0.232)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10; ** P < 0.05; *** P < 0.01

Source: Prepared by INSP

Finally, Table 25 shows that of the subsample of children whose mothers worked prior to the PEI, those with more than six months' exposure to the programme showed positive effects on the communication scale of 0.33 sd.

Table 25 Impact of the programme on the communication scale of children whose mothers worked before PEI

Communication scale ASQ				
Exposure time	N	Mean	Impact	Standard error
Total (months)	425	0.01	-0.0706	(0.200)
Exposure 1-6 months	210	-0.07%	0.0867	(0.147)
Exposure more than 6 months	149	0.22%	0.328**	(0.160)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10; ** P < 0.05; *** P < 0.01

Source: Prepared by INSP

Results: health, nutrition and development among children whose mothers did not work before the PEI

Prevalence of disease among the children whose mothers did not work prior to the PEI was a significant 14.4 per cent.

Table 26 Impact of the programme on the health of children whose mothers did not work before the PEI

Prevalence of illness 15 days prior to interview				
Exposure time	N	Mean	Impact	Standard error
Total (months)	709	51%	0.144**	(0.0724)
Exposure: 1-6 months	327	56%	0.0579	(0.0562)
Exposure: more than 6 months	240	38%	-0.0931	(0.0614)

Note: For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10; ** P < 0.05; *** P < 0.01

Source: Prepared by INSP

From analysing this group, we found a positive effect in terms of personal-social behaviour, which seemed to be enhanced by greater exposure to the programme. For example, Table 27 shows how, among the sample of children with less than 6 months' exposure to the programme, we noted an increase in their z-score of 0.2 sd.; among those with more than 6 months' exposure, the score increased by 0.29 sd.

When differentiating by age, we found a greater effect on behaviour among the children under 30 months old. In this subgroup, with no differentiation by exposure, we found an effect of 0.59 sd in the scale of personal-social behaviour, and of 0.37 sd on the same scale for children who had 6 months or less exposure to the PEI.

The discovery of such positive effects on the personal-social behaviour of children is very significant because there is little information to provide evidence of the positive effects of daycare centres on these behaviours. For instance, a study with non-experimental data in Chile found no clear effects of daycare attendance on socio-emotional scores (Urzúa and Veramendi 2010). Our results on this scale are comparable, and even more positive, than those found in an observational study in Rio de Janeiro, where it was reported that children in high-quality daycare settings (the

top 20 per cent) had cognitive and social scores of 0.30 sd higher than children in lower-quality daycare settings (the bottom 20 per cent) (Barros 2010).

Table 27 Impact of the programme on the development of children whose mothers did not work before the PEI, by age group

Personal-social behaviour scale (ASQ)					
Age range	Exposure time	N	Mean	Impact	Standard error
Total	Total (months)	645	0.05	0.145	(0.149)
	Exposure: 1–6 months	297	-0.05%	0.203*	(0.115)
	Exposure: more than 6 months	216	0.19%	0.291**	(0.127)
Older than 30 months	Total (months)	312	0.08	-0.204	(0.247)
	Exposure: 1–6 months	127	-0.01%	0.154	(0.222)
	Exposure: more than 6 months	141	0.24%	0.269	(0.216)
Younger than 30 months	Total (months)	308	0.07	0.597**	(0.271)
	Exposure: 1–6 months	163	0.06%	0.367*	(0.203)
	Exposure: more than 6 months	63	0.08%	0.370	(0.251)

Note:

For a list of model controls, see note under Table 9. In addition, all models were controlled by daycare fixed effects.

* P < 0.10; ** P < 0.05; *** P < 0.01

Source: Prepared by INSP

In these last analyses, we carried out a double stratification (according to the mother's employment status in 2008 and the age of the child in question), but the statistical power to detect effects was lost because the sample of each group analysed ended up being 70 per cent lower than the full sample of children.

Nevertheless, the most substantial effects upon child development can be observed among the younger children whose mothers did not work before entering the programme.

4.4 Summary of findings

The impact evaluation presented in this study reveals that the programme is effective in promoting the participation of low-income women with young children in the labour market. However, the effect derived from the full sample is almost exclusively the result of findings for mothers who did not work before entering the programme. In addition, we found that, although the PEI contributes to the development of beneficiary children, the effects are only observed in certain subgroups of children and not in the entire sample.

In particular, the results show that the programme increases the number of hours that participating mothers worked, and their job tenure, at least in the short term. We also found that mothers spend less time caring for their children under five years old, a decrease that was compensated by an increase in the hours of care for the child's primary caregiver (in cases where this is not the mother) living at home. Through a subgroup analysis, we found that mothers who benefit most from the programme in terms of labour market variables are those who reported not having worked prior to entering the programme.

It is also worth noting that the programme's impact on the mother's participation in the labour market is particularly significant, because it occurs during a period of economic crisis and high unemployment rates. Taking this into consideration, the programme's impact may be even greater if analysed in a context of economic growth.

We did not find any effects of statistical significance regarding the mothers' mental health. Such a result was contrary to findings from developed countries, where evidence has suggested that mothers who take their children to daycare centres obtain higher depression scores compared with the average (Baker *et al.* 2008).

Similarly, no significant results were found with regards to child development or dietary diversity in the full sample. This is equally important, because other studies have found short-term adverse effects in these areas (Baker *et al.* 2008). However, positive effects were reported in some subgroups of children. For example, the programme was found to have improved the communication scale scores in the subgroup of children with more exposure to the PEI.

Another factor that was identified concerned the children whose mothers did not work before entering the programme; they benefited most in terms of developing personal-social behaviours, an outcome that increased with higher exposure. We found only positive effects on dietary diversity for the subgroup of children whose mothers had worked prior to entering the PEI, especially among those who had little exposure to the programme.

When analysing the prevalence of disease in the 15 days prior to conducting the survey, we identified a greater likelihood of disease in the full sample of children. However, when analysing the results by subgroups of age and time of exposure to the programme, the increase in the prevalence of disease occurred only in the group of younger children (under 30 months) and this effect diminished as the age and exposure of time to the programme increased, which is consistent with results from other studies in Colombia and the United States.

5. Quality of care at daycare centres

Evidence from the United States suggests that the quality of early childcare provision is related to developmental outcomes (Currie and Thomas 2000). Quality is generally characterised by structural aspects such as space, cleanliness, teacher's education, and class size; and observable processes, such as the responsiveness of the caregiver, child-adult interactions, opportunities for cognitive stimulation, and verbal engagement with children (NICHD 2002). Although both are necessary in order to ensure good provision for early childhood care, the processes that occur within the classroom are more significant in terms of developing the cognitive and language outcomes necessary to prepare the child for the learning environment at primary school (NICHD 2002).

Based on these findings, efforts have been made to improve the quality of provision for early childhood care in Mexico (Yoshikawa *et al.* 2007) and in other parts of the world (OECD 2010). However, there are very few impact evaluation studies that focus on developing countries by analysing the pathways through which daycare programmes exert their impact upon child outcomes. The impact evaluation of the PEI offers a unique opportunity to analyse these pathways while simultaneously analysing the two most important aspects of the quality of care at daycare centres and the impact upon child development outcomes.

For this evaluation, we selected a wide range of daycare quality factors that have been identified in existing literature for having had a significant impact upon child development. The measures we used included process and structural variables with theoretical and empirical underpinnings. For example, the process variables⁴³ reflect theories put forward by prominent child development theorists such as Bronfenbrenner (1979), Daniels (2005) and Rogoff (2003), who suggest that

⁴³ Focused on various types of teachers' interactions with young children.

young children's capacities are developed through their relationships and social engagements with adults and other children in their families and communities (Woodhead 2006).

According to these theorists, children are active, participatory agents in their own development and not merely passive recipients of what occurs around them. Programmes emphasising warm teacher–child relationships and child-centred learning activities that are supported by teachers are believed to more effectively promote child development. Structural variables, such as the organisation of the daycare centre, the amount of space provided in the classroom, the teacher–child ratio, teacher training, experience and income, help facilitate high-quality care and positive child outcomes (Bradley and Vandell 2007). We attempted to measure these process and structural aspects of the daycare centres through our assessments.

It should be noted that this has been the first time that quality has been measured in such a way in Mexico. With this in mind, some of the variables may not comply with the expected results to come out of the US daycare centres. Moreover, we have limited data to ensure our findings are representative of all daycare centres in the programme, and so the effects may not have been captured in their entirety. We also lacked baseline measures to control their influence on follow-up measures.

The following section is organised into two parts. First, we present the methodology and describe: the quality of care variables and other socio-demographic components of the daycare centres collected in the survey; the ethical considerations surrounding the study; and the proposed model of child development, measured through the child personal-social behaviour and communication scores. Second, we present the results and a summary of findings.

5.1 Methodology

Mother, child and household variables

Although it is clear that attendance at a high-quality early childhood care programme can benefit children's development, it is widely recognised that other factors relating to the child's background and home environment have an even greater impact on child outcomes. Among these are: the child's age and nutritional status; maternal education and mental health; the household's economic status; and the availability of home stimulation for language, cognitive and emotional development (Bradley and Corwyn 2005; Fernald *et al.* 2011; Grantham-McGregor *et al.* 2007; Walker *et al.* 2007, 2011).

The influence of the family environment on child development outcomes has been documented worldwide (Bradley *et al.* 1996; Bradley and Corwyn 2005). Elements of family environment that are particularly important for children's language and emotional development include parental sensitivity and stimulation for learning (Walker *et al.* 2007). Measuring the quality of the home environment helps to control the variability in child outcomes that may be wrongly attributed to the quality of the daycare centre.

The Home Observation for Measurement of the Environment (HOME) (Caldwell and Bradley 1984) measures the environment of a child's caregiver through structured interviews and observations in the child's home. The HOME includes sections that determine the sensitivity and interactions of the home caregivers towards the children, and the availability of materials and activities that encourage parental involvement in childcare. Higher scores on the HOME scale have been associated with better social and language outcomes in the United States (Bradley R. *et al.* 2001; Fuligni *et al.* 2004) and in other countries (Bradley and Corwyn 2005; Bradley *et al.* 1996).

The HOME scores predict developmental test performance even when socioeconomic factors and maternal education are taken into account, indicating that the quality of homecare behaviours

themselves affect child outcomes. To assess the home environment, we used a short version of the HOME (Bradley R. *et al.* 2001), items from an adapted inventory for low-income households (Ertem *et al.* 1997), and adult-child activities from UNICEF's multiple-indicator cluster surveys (UNICEF 2012).

Quality of processes

We measured the quality of processes within the daycare centres using codes adapted from the Observational Ratings of the Caregiving Environment (ORCE) scale, which evaluates the quality of child-caregiver interaction during a longitudinal study of how early childhood care is associated with child outcomes (NICHD 2010). The measure also served to forecast reading and maths outcomes for low-income children (Dearing *et al.* 2009).

Although the measure was designed to track and follow children, we have adapted it so that the caregivers are the subject of observation – in other words, observers encoded the caregivers' interactions with one or more children. Rather than make live observations of classrooms, which would require extensive training of multiple workers, we video-recorded two caregivers in each of 101 centres, selected at random.⁴⁴

*Codes for assessing caregiver-child interactions (objective variables)*⁴⁵

Video recordings were encoded as to how often the caregivers displayed the following interactions:⁴⁶

Behavioural codes: event codes with duration

- Responds to child's vocalisation
- Reads aloud to child
- Gives directions, explanations or instructions to child
- Expresses positive affection
- Speaks negatively to child
- Stimulates cognitive development
- Stimulates academic development
- Stimulates social development
- Playful exchange
- Watching; unoccupied; transition periods
- Activity with children only

Qualitative ratings of child-caregiver interactions (subjective variables)

In addition to the behavioural codes, we also assessed the overall quality of the caregivers' interactions with the children. We recorded caregivers' behaviours using the qualitative scales and then rated these after completing the behavioural coding of the video recordings. These can be considered subjective variables, as they are based on overall impressions from the entire session recorded.

Ratings for most of these scales were based on the quality and quantity of the behaviours. Thus, our evaluations took into account the quality of observed behaviours in relation to the proportion of time over which they were observed. Ratings of 1 and 4 were reserved for those observations which could be considered either problematic or exceptionally advantageous, depending on the specific scale.⁴⁷

Behavioural codes: event codes with duration

- Sensitivity or responsiveness to non-distress
- Intrusiveness
- Negative regard for the child
- Child-centredness of care

⁴⁴ A detailed description of the process undertaken by the camera crew can be found in Appendix E.

⁴⁵ Adaptation based on the *Study on early childhood care and development of young people* (NICHD 1991).

⁴⁶ The detailed description of each code can be found in Appendix E.

⁴⁷ A detailed description of the qualitative ratings can be found in Appendix E.

- Detachment or disengagement
- Stimulation of development
- Positive regard for the child
- Small groups
- Supervision

Given that the video recording activity is considered to involve a minimal risk to participants, we followed an explicit procedure according to the INSP Ethics Committee, which is explained in Appendix E.

Quality of daycare variables

The Early Childhood Environment Rating Scale-Revised (ECERS-R) is a popular tool for evaluating the quality of daycare centres in the US and abroad (Harms *et al.* 1998; Clifford and Rezska 2010).⁴⁸ The scale is completed through observation, and includes items assessing structural variables, such as availability of age-appropriate toys, established routine and smaller class size; and process variables, such as affection demonstrated towards the child, provision of opportunities to enhance learning through activities, and so on.⁴⁹ In addition, we gathered information on teacher characteristics that have been associated with higher-quality centres, such as education level, experience and salary (Burchinal *et al.* 2002; Phillips *et al.* 2000; Phillipsen *et al.* 1997; Weikart *et al.* 2003).

Reliability of the coding

The encoding of the videos was developed with the software *Noldus The Observer XT 2010*. This programme is a tool for collecting and presenting observational data. It allows visual analysis of data in one or more videos, in the form of horizontal bars that represent a continuous series of events observed, or by points to identify these events. Moreover, through reliability and standardisation analysis, it is possible to compare the different encoders record by record, allowing for the detection of a possible bias between observers, which is most important when reviewing the quality of the encodings.⁵⁰

During the training, different topics were addressed that were useful for the basic operation of the software – from the creation of a project for the coding and definition of codes to the analysis of reliability (standardisation) between encoders and the export of results to Excel. After the training, the encoders individually practised using the codes and the programme for one week. Once a week, they tested for an overall consistency to ensure that their results synchronised and codified within as close a margin as possible. The average proportion of agreements reached was 71 per cent.⁵¹

Empirical model: quality of care and child development

We have mentioned before that the ASQ scales evaluate children's communication and personal-

⁴⁸ The measure has been translated into Spanish and similar measures based on the ECERS-R have been carried out in Mexico (Martínez *et al.* 2004).

⁴⁹ For this analysis, the structural quality of the daycare centres was assessed through questionnaires and observations. The daycare provider was asked questions regarding the education and training of the employees, facility characteristics, and so on. In addition, observation items drawn from the ECCP and ECERS-R were also used. The description of each of the included items is detailed in Appendix E.

⁵⁰ Training on Noldus software was delivered between 28 March and 1 April in Cuernavaca by a child development expert from the University of Berkeley, who offered training sessions to two psychologists who were previously selected for their experience in coding observational study.

⁵¹ See Appendix E for the detailed proportion of agreements in the 13 days of standardisation.

social skills. In this section, we will present an empirical model considering the different variables that may have an effect on these skills.

Component 1: characteristics that are consistently related to child development outcomes⁵², such as: maternal education and depression; gender, age and height-for-age of the child; HOME score; and household's socioeconomic status.

Component 2: is formed by the quality of process variables (objective and subjective), such as teacher responsiveness, engagement in small groups and the frequency of cognitively stimulating activities.

Component 3: structural variables of the daycare setting, including size of classrooms and literacy areas and a group of teacher demographic characteristics (education level; monthly wage; years of experience working in childcare) and the teacher-to-student ratio.

It is important to note that for those daycare centres where we had more than one classroom encoded, we estimated an average of each of the variables in order to generate summary variables at the level of the daycare centre. The same process was followed for the teacher characteristics. Therefore, the process quality variables used in the model are a proxy of the overall quality of care at the daycare centres.

The proposed model for both ASQ scales is the following:

$$Y_i = \beta_1 L_i + \beta_2 P_j + \beta_3 Q_j + \beta_4 \alpha_k + \varepsilon$$

where:

- Y_i is ASQ communication or personal-social z-score for children i ;
- L_i is the component of mother, child and household variables related to development outcomes of children i ;
- P_j is the component of quality of processes variables in the daycare centre j ;
- Q_j is the component of quality variables in the daycare centre j ;
- α_k is the component of dummies for municipality k ; and
- ε is the error term.

5.2 Results

Sample of daycare centres with videos

The allocation of the videos encoded was completely random. For the daycare centres that had video recordings in two classrooms, one was assigned randomly to each encoder. For the rest of the daycare centres that had only one video, the videos were randomized so that each one encoded a similar number of videos. Finally the video assignment was as follows:

Table 28 Distribution of videos for encoding

Encoder	Room 1	Room 2	Total
1	65	29	94
2	36	58	94
Total	101	87	188

⁵² See LaFreniere *et al.* (2010); Wallentin (2009); Richman *et al.* (1992); Fernald *et al.* (2011); Black *et al.* (2000); Mashburn A. *et al.* (2008); Peisner-Feinberg and Burchinal (1997); Peisner-Feinberg E. *et al.* (2001).

Source: Prepared by INSP

The sample of analysis consists of 82 daycare centres with two classrooms video-recorded, and 19 daycare centres with only one classroom recorded. This constitutes our sample of 101 daycare centres and 183 classrooms (92 were analysed by Encoder 1 and 91 by Encoder 2).⁵³ The videos were recorded during the leisure and recreational activity times at the daycare centres, because it was more likely to observe teachers' stimulation of a child's development at this time.

Table 29 shows that, on average, teachers are 27-year-old women with 13 years of schooling; 64 per cent have received training in the past year; they have 3 years' experience in childcare and 1.4 years of experience in the daycare centre where they currently work; and they receive a salary of \$2,687 pesos (US\$222) per month.⁵⁴ In the daycare settings where videos were recorded, there are 7.5 children per teacher, on average.

Table 29 Teacher's characteristics

Description	Observations	Mean	sd
Age (years)	177	27.35	7.20
Female (%)	177	0.99	0.02
Years of schooling of the daycare centres' staff	177	13.06	2.44
Received training in the past 12 months (%)	177	0.64	0.48
Specialist childcare studies (%)	99	0.77	0.42
Years of experience in childcare (in any daycare centre)	172	3.28	3.91
Years working in current daycare centre	171	1.36	0.88
Monthly income (pesos)	175	2,687.26	2,250.04
Student-to-teacher ratio	183	7.57	1.07

Source: Prepared by INSP

Results: quality of care and child development

As we mentioned in Section 5.1, child development outcomes such as communication and personal-social skills can be evaluated through the ASQ scales. It has been widely noted in most studies (mainly emanating from the United States or Europe) that outcomes are associated with the following measures of quality (Yoshikawa *et al.* 2007).

In Section 5.1, we presented an empirical model that includes three components regarding the quality of care that could explain child development outcomes. Component 1 includes mother, child and household variables that have been highlighted in the literature as relevant to child development. Component 2 represents both the objective and subjective quality of process variables at daycare centres. Component 3 includes the daycare centre's structural variables and the teacher's socio-demographic variables. We measured the specific variables included in each component based on their relevance to quality and child outcomes. For both ASQ scales, we presented a regression that includes all the variables that, according to the evidence presented, are related to child development outcomes.

Table 30 presents the ASQ personal social and communication z-scores. Column 3 shows the results for the personal-social ASQ scale regression, where the variables in the model explain around 18 per cent of the variability in this scale.

⁵³ Five rooms could not be encoded because the videos were damaged.

⁵⁴The average rate change reported by the Central Bank of Mexico during the survey collection was \$12.08 pesos = US\$1.

For Component 1 (variables), we found that the co-efficient of child's gender variable indicates that being a girl increases the personal-social z-score by 0.48 sd; this result has also been found cross-culturally (LaFreniere *et al.* 2010).

We also found a positive and significant effect of the HOME score on this ASQ scale. The regression results show that an increase in 1 sd of the HOME scale increased the personal-social z-score by 0.07 sd This suggests that children living in better home environments are more likely to have better personal-social skills. This finding is consistent with literature, where higher scores on the HOME scale have been associated with better social and linguistic outcomes (Bradley R. *et al.* 2001; Fuligni *et al.* 2004; Leventhal *et al.* 2004; Bradley and Corwyn 2005; Bradley *et al.* 1996).

Maternal characteristics, age and height-for-age of children, and household income variables were not associated with the personal-social z-scores.

For Component 2 (process variables), results show that the presence of small group activities increased the personal social z-scores by about 0.22 sd Based on a large review of pre-schools around the world that found working in small groups benefited children's development (Montie *et al.* 2006), we can speculate that working in smaller groups may help children develop social skills by encouraging child-child interactions that can be easily supervised and supported by teachers. Thus, there is some evidence to support the idea that, in such centres, some types of teacher-child interactions do in fact contribute to children's social and personal development.

For Component 3 (structural aspects in the daycare), the results suggest that for an increase of 1 sd in the years of education received by the teacher, the personal-social z score is reduced by - 0.06 sd It is unclear why this may be, but we suspect this effect is due to three possibilities: 1) teachers with higher education are assigned to the most complicated children; 2) the teachers are more educated to compensate probable teaching weaknesses; or 3) the education received is not quite adequate to stimulate child development.

Column 4 shows the results of the ASQ communication z-score regression. It can be seen that the variables explain around the 14 per cent of the communication z-score variability. The results suggest that being a girl increases the ASQ communication z-score by 0.45 sd This early advantage among females relating to communication skills has been documented, but gender differences in language ability tend to disappear in later childhood (Wallentin 2009). Also, compared with the youngest, children older than 36 months have higher communication z-scores, in average 0.26 sd Consistent with the literature, an increase of 1 sd on the HOME scale (better quality of care at home), increases the communication z-score by about 0.04 sd.

For Component 2 the existence of small group activities that involved whole group participation increases the ASQ communication z-scores in 0.13 sd In C 3, we found a small reduction of 0.08 sd in the communication z-scores for each increase of 1 sd in the years of teachers' education.

Table 30 ASQ personal social and communication z-scores

Components	Description of variables	Personal-social z-score	Communication z-score
Component 1: mother, child and household variables	Mother's education (years)	0.0129 (0.0178)	0.0263 (0.0191)
	Mother's depression (score)	-0.00280 (0.00724)	-0.00896 (0.00776)
	Child's gender (1 = boys)	-0.488*** (0.115)	-0.452*** (0.123)
	The child is 36 months or older (= 1)	0.105 (0.130)	0.256* (0.139)
	Height-for-age (z-score)	-0.0680 (0.0592)	-0.00603 (0.0635)
	HOME score	0.0750*** (0.0176)	0.0375** (0.0188)
	Household monthly income (pesos)	-3.32e-07 (1.12e-05)	2.84e-06 (1.20e-05)
Component 2: quality of process variables	Frequency of cognitive development stimulation by the teacher (number)	-0.00236 (0.00160)	-0.00216 (0.00171)
	Small group activities (2 = there were small group activities and all the children took part ; 1 = there were small group activities and NOT all the children took part; 0 = there were no small group activities)	0.222*** (0.0567)	0.135** (0.0608)
	Sensitivity or responsiveness to non-distress (1 = not at all characteristic; 2 = minimally characteristic; 3 = moderately characteristic; 4 = highly characteristic)	0.0378 (0.0870)	-0.0729 (0.0932)
Component 3: daycare variables	The classroom has space where children and adults can move about easily for the activities to be properly effective (0 = inadequate, basic and 1 = good or excellent)	-0.0894 (0.146)	0.157 (0.156)
	Books and literacy areas ((=0 if inadequate; minimum, good, and =1 if excellent)	-0.144 (0.166)	-0.262 (0.178)
	Teacher's salary (pesos)	0.000141 (0.000114)	2.20e-05 (0.000122)
	Teacher's education (years)	-0.0654** (0.0313)	-0.0780** (0.0335)
	Teacher's experience of childcare (years)	0.0156 (0.0215)	0.0178 (0.0230)
	Student-to-teacher ratio (number)	-0.00568 (0.0591)	0.0486 (0.0634)
	Observations R-squared	320 0.177	320 0.136

Source: Prepared by INSP

5.3 Summary of findings

According to the programme's rules of operation, the national system for integrated family development (DIF, or *Sistema Nacional para el Desarrollo Integral de la Familia*) is responsible for carrying out supervision of the quality of care provided in childcare facilities and offers training to daycare providers on childcare issues.⁵⁵ The schedule of daily activities suggested by the DIF proposes the following plan for allocating time during the 8 hours of service:

- 1 hour and 30 minutes (19 per cent) welcoming and receiving the children;
- 40 minutes (8 per cent) for naps;
- 2 hours (25 per cent) for leisure or recreational activities; and
- 3 hours and 15 minutes (40 per cent) on children's personal hygiene (washing hands, changing nappies, and so on) and feeding.

From what we observed, of the 2 hours spent in leisure or recreational activities, teachers were encoded as stimulating the development of the children only 45 per cent of the time available – in other words, for approximately 54 minutes during the whole day. The rest of the time, teachers would leave the children to play by themselves, give instructions or explanations or leave the children waiting while they set up the next activity.

We showed that most of the process quality behaviours positively correlate with the caregiver's number of years in education. This suggests that the level of interaction among the children in the classrooms is improved by the presence of teachers who have a higher level of education. However, as the regression analyses suggest, the teacher characteristics did not contribute to the children's development scores.

Regarding the treatment of the children at the daycare centres, teachers showed an interest in getting involved with the children either physically or by encouraging them, offering suggestions when they performed activities. Most of the time, they provided adequate supervision.

The regression analyses show that the sex of the child is an important predictor to explain both ASQ scales. Specifically, girls are more likely to get higher ASQ communication and personal social z-scores. This is consistent with previous research (LaFreniere *et al.* 2010; Wallentin 2009). As expected, the home environment was related to ASQ scores (Bradley R. *et al.* 2001; Fuligni *et al.* 2004; Leventhal *et al.* 2004; Bradley and Corwyn 2005; Bradley *et al.* 1996). Children living in homes with higher HOME scores also had higher z-scores on the two ASQ scales. No statistical evidence was found for socioeconomic status as an important predictor of higher ASQ z-scores.

In addition, we found some evidence that process variables were related to better child outcomes. For both communication and personal-social behaviour, working in small groups may be a proxy for different kinds of interactions that were not captured by our coding – such as more child-

⁵⁵ Daycare providers should pass the evaluations and take the training, courses and workshops offered by SEDESOL and the DIF. Furthermore, an assistant should take part in the initial training for the programme and any additional training as determined by the DIF and SEDESOL to obtain the technical standard certification of competency.

oriented interactions and activities, fewer group response or repetition-type activities, more hands-on activities and more responsive teacher–child interactions.

The correlations between the teachers' characteristics and the structural quality variables suggest that a teacher's age, experience in childcare and time worked in the current daycare centre predicted better structural quality.

Despite the number of observations and the size of the effects, we consider that these results represent a good assessment of the quality of care in the daycare centres analysed. On the one hand, we found that the daycare centres met the programme's rules of operation by providing the minimum requirement of quality standards and provided a caring, safe and hygienic service where children were looked after while their mothers worked. On the other hand, this analysis allowed us to identify areas of opportunity to improve the programme in terms of the children's early stimulation.

Children's stimulation is not currently an explicit goal of the programme, but more advantage could be taken of the time spent in the daycare centre to enhance children's development. Early learning programmes are designed to improve children's survival, growth and development and should seek to manage the level of potential risk and minimise the negative effects of such risks (Engle and Black 2007). In particular, in the sample of daycare centres that were video recorded, we were able to identify a set of strengths concerning the teachers' positive treatment of the children, suitable for carrying out activities that stimulate the essential cognitive, social and linguistic development of the children during this stage. However, it was observed that the teachers did not take advantage of 100 per cent of the time devoted to stimulating the child's development, and activities often focused more on entertaining the children than on stimulating their development.

Similarly, we observed some structural barriers, such as reduced spaces, poor lighting and overcrowding, that limited the optimal development of activities. Among the areas for further improvement was the need for more training for teachers and teaching assistants at the daycare centres, with the aim of providing the necessary knowledge and tools to promote the proper development of the children attending the centres, capitalising on the time available.

On the whole, our findings echo those put forward by Martínez *et al.* (2004) whose quality assessment of 40 Mexican pre-schools found that the majority of centres were structurally adequate but lacking in terms of adequate teaching practices. Yoshikawa *et al.* (2007) noted that pre-schools participating in the quality schools programme (PEC, or *Programa de Escuelas de Calidad*) used the majority of funds they received in the first two years to improve the infrastructure of the schools rather than teaching practices. Historically, there may not have been sufficient emphasis on the training of pre-school and daycare workers.

For future studies, we need to conduct more careful observations and codings of interactions between children and teachers. This was difficult because of the large age range of the children in this analysis, and the fact that many of the quality measures are geared towards more structured pre-school settings rather than daycare centres.

Finally, it is important to continue to monitor the number of children per teacher (currently limited to eight children for every teacher). Smaller class sizes have also been attributed to improved child language and cognitive outcomes (Yoshikawa *et al.* 2007).

6. Conclusions and recommendations

6.1 Conclusions

Impact evaluation is an essential tool for measuring the effects that a programme has on its target population; it allows us to identify the extent to which a programme is achieving its objectives and pinpoint areas of opportunity for improving programme effectiveness. This is particularly relevant when it comes to programmes that operate with public funds, where it is important not only to be accountable for the use of resources but also show the effects obtained through the allocation of resources.

It is particularly important to measure the impact of the PEI, given the scarce evidence regarding the effectiveness of such programmes in developing countries. Although several countries have implemented childcare programmes to support working mothers and improve children's welfare, the impact of these programmes shows mixed effects. Positive impacts on labour force participation of mothers and some indicators of child development are often mixed with negative effects on some child-level variables, such as prevalence of illness.

This study assesses the impact of the PEI on programme beneficiaries' employment, income health status and nutrition, and on the development of their children. The methodology used for the evaluation consisted of a pipeline analysis in which we compared the children and households on the waiting list (controls) and those already attending the daycare (beneficiaries). We ensured the validity of this method by showing that the groups are statistically similar and thus comparable in observable characteristics. Therefore, the impacts found can be attributable to the programme.

We did not find a substitution effect of childcare, because less than 0.05 per cent of beneficiaries reported using childcare services before entering the programme or signing up for the waiting list. This implies that the PEI probably represents a new alternative for childcare for low-income families. This result is consistent with evidence from Canada, which suggests that an increase in participation and childcare use is reflected primarily in a reduced use of informal childcare services, provided by grandparents or other relatives, which is replaced by government-subsidised childcare (Baker *et al.* 2008).

The impact evaluation presented in this study reveals that the PEI is effective in promoting participation in the labour market of low-income women with young children; but the effect derived from the full sample is almost exclusively the result of mothers who did not work before entering the programme. We did not find income effects, probably because of one of the two reasons: measurement error, given that the measure is self-reported and beneficiaries had incentives to underreport; or not enough power to measure impacts below 10 per cent.

In particular, the results show that the programme increases the proportion of mothers who are employed, the number of hours they work and their job tenure, at least in the short term. We also

found that mothers spend less time caring for their youngest children (under five years of age), a decrease that was compensated by an increase in hours of care from the child's primary caregiver (someone other than the mother) who lives at home.

In addition, the PEI contributes to the development of beneficiary children, though the effects are only observed in some subgroups of children and not in the entire sample. For instance, we found that the programme improves the score of the scale of communication in children with more exposure to the PEI. Children whose mothers who did not work before entering the programme benefit the most in terms of developing personal-social behaviour, and this effect is greater with higher exposure. Furthermore, we only found positive effects on diet diversity for those children whose mothers worked prior to entering PEI, especially those who had little exposure to the programme.

As regards child health, we found that the increase in disease prevalence during the 15 days prior to the survey occurs only in the group of younger children (under 30 months old), an effect that decreases as age and exposure to the programme increases. These findings are consistent with results from other studies of similar programmes. The mixed effects on children's welfare suggest that there are opportunity areas that may allow for the impact of the programme to be maximised through a more intensive promotion of child development, as well as health promotion in daycare settings.

Regarding the quality of care at daycare settings, the results represent a good assessment of the daycare settings since they are offering a caring, safe, hygienic, quality service where children are cared for while the mother works or looks for a job. We also identified some opportunity areas to improve the programme in terms of instruction style (for example, with small groups) that could be offered to children.

Finally, we conducted a simple variable cost analysis (included in Appendix F) of running a daycare centre by state and country region, where we describe the main cost categories and estimate an average cost per child of \$1,009 pesos per month, equivalent to US\$83.5.⁵⁶ The main cost categories are: salaries (50 per cent of variable cost), meals (22 per cent) and rent (12 per cent). With respect to income, the daycare settings receive on average \$692 pesos of subsidy per child per month and around \$335 pesos from *corresponsibility* fees, which parents pay each month.⁵⁷ Therefore, daycare settings receive around \$1,027 pesos (equivalent to US\$85) per child per month, which is slightly above the average cost per child.

Our results suggest that profits for daycare settings are around \$630 pesos per month (equivalent to US\$52). Although this is low, one should consider that it already discounts the daycare provider's salary, which is around \$4,095 pesos (US\$339). It is clear, therefore, that if any improvements in quality of service are required, they should come with increased subsidies or

⁵⁶ The average rate change reported by the Central Bank of Mexico during the survey collection was \$12.08 pesos = US\$1.

⁵⁷ It is important to clarify that the subsidy granted per child was not designated to cover the full cost of daycare. In the operation rules of the programme, it is specified that the beneficiaries must make up the difference between the total daycare cost and the subsidy they are receiving. This difference is what we refer to as *corresponsibility*.

corresponsibility fees for it be financially viable. Our results are similar to a previous study of the PEI in 2009 with a national sample of daycare settings: the authors estimated an average monthly profit of \$5,074 pesos, equivalent to US\$391 dollars,⁵⁸ but this revenue did not include the salary of the daycare provider (Flacso and C230-Consultores 2009).

In terms of the cost to the government of providing affordable childcare services to the low-income population, we compared similar daycare programmes in Latin America and found that Mexico allocates the highest amount of resources per child for daycare services. According to the Mexican Ministry of Finance, in 2010 the government allocated \$2,615 million pesos to the PEI that would allow 9,100 daycare settings to provide services to about 272,122 children and their mothers; this means an annual cost per child of \$9,610 pesos, equivalent to approximately US\$66 per month per child (SHCP 2010). In Bolivia, the PIDI-estimated cost per child is US\$43 per month (Behrman *et al.* 2004), whereas in Colombia, the HCB programme has an estimated cost per child of US\$21 per month (Attanasio and Vera-Hernández 2004).

6.2 Policy implications and recommendations

The main short-term benefits found in this study are focused on the group of mothers who did not work before entering the PEI and their children. However, a follow-up survey of a representative sample of PEI beneficiaries in 2010 suggests that this group of mothers represents a minority among PEI beneficiaries. It is therefore recommended that information about the programme is more widely disseminated among this group in particular, and that these women are even given priority to join the programme.

The increase in disease prevalence in younger children has been found elsewhere, and is believed to be an artefact of contact with other children. To decrease the prevalence of disease, especially in younger children with less exposure, it is recommended that PEI stress the importance of regular and thorough hand washing, as well as daily cleaning of toys and objects that may transfer disease. Establishing mechanisms for collaboration with the Mexican Ministry of Health to implement vaccination and disease prevention campaigns aimed at this population are also recommended.

Although we found some positive effects with regards to child development, most of these were of moderate magnitude and only identified for certain subgroups. It is important to note that our study measures short-term impacts, because the average exposure to the programme was around six months. It could be the case that the moderate effects found in some subgroups of children with such a short exposure to the programme are an indication of potential larger effects in the longer term. Future evaluations of the programme should address this question.

Many characteristics of daycare settings that are theoretically and empirically linked to daycare quality were tested for their influence on child outcomes, but we found only one aspect, engagement in small group activities, that positively related to both communication and personal-social ASQ scores. Based on this finding, it is recommended that the PEI encourages more use of small-group activities in its curriculum. On average, the centres were rated as basic to good on the presence of language-promoting materials, but the evidence is not that these were used to benefit children's communication development.

Additionally, an analysis by socioeconomic status is recommended to explore the differential effects of the programme on this dimension, particularly among the most economically

⁵⁸ The average rate change reported by the Central Bank of Mexico during the survey collected for that study (November–December 2009) was \$12.98 pesos = US\$1.

disadvantaged. It also could be proved, through an experimental study, whether variation in the grant amount of the programme has heterogeneous effects on the population. This would help to identify the type of households that benefit more from the programme and would provide relevant information for programme targeting.

Finally, we identified low profitability in daycare settings enrolled in the PEI, which could put the sustainability of the programme at risk in the long run. Future studies should explore in more detail the most cost-effective solutions to this potential problem. From our perspective, one alternative that could be explored is to increase the amount of subsidy paid by the government or the amount paid by parents as corresponsibility fees, or a combination of the two. Another way to increase profitability, however, since the great majority of costs are semi-fixed, is to increase the number of children in daycare settings. This is feasible because a large percentage of daycare centres are operating below full capacity.⁵⁹ One should be careful, however, that the increase in the number of children does not reduce the quality of care.

Nevertheless, to increase take-up, an increase in subsidy may be needed. Our take-up analysis, carried out in 2009, showed that a weekly intensive promotion is not very effective at increasing take-up. One reason may be that the subsidy amount is not enough to induce take-up; hence, increasing the subsidy may be a solution to raise both take-up and profitability without affecting quality. However, another reason why daycare settings are not operating at full capacity is because of low demand due to cultural barriers (INSP 2011).

In a qualitative study of daycare settings conducted in Mexico in 2007, we found that in the south and central regions of the country there is a strong belief that a woman's role is to take care of children, and that they should therefore not be working; even among those who do work, there is a belief that other family members should take care of the children rather than sending them to daycare (INSP 2009). It is unlikely that changing the subsidy amount would induce take-up in this population; perhaps a longer promotion of the programme that emphasises changing cultural barriers might be more effective. In any case, to answer these questions we will need to know the price elasticity of take-up, which could be learned by conducting a randomized experiment.

⁵⁹ According to PEI administrative data, on average, daycare settings have 13 available spaces.

Appendix A: Description of the types of support and main changes in PEI eligibility criteria

In the first type of support for working mothers and single fathers, people who meet the eligibility criteria and requirements receive the services in any of the daycare settings affiliated to the network, whose cost will be covered partially or totally by the Federal Government and the beneficiary, to a maximum of \$700 pesos per month for no more than three children per household. The mother or father makes a monthly contribution under the concept of shared responsibility to cover the difference between the support given by the Federal Government and the fee set by the daycare provider. Since its creation, the main changes of eligibility criteria and amounts of support have changed.

Table A 1 Support for working mothers and single fathers

Year	Criteria	Amount (in pesos)
2007	Support for working parents, in households living in poverty, with income less than or equal to 6 times the monthly minimum wage, with at least one child aged 1 to 2 years, 11 months. Maximum of three children per household.	<ul style="list-style-type: none"> • Maximum \$700 per month
2008	The eligibility of children changes to households with at least one child aged 1 to 3 years, 11 months, or 1 to 5 years, 11 months in the case of disability.	<ul style="list-style-type: none"> • \$700 per month to households with a monthly income of up to 4 minimum wages • \$600 per month to households with a monthly income of 4.1 to 5 minimum wages • \$450 per month to households with a monthly income of 5.1 to 6 minimum wages
2009	Unchanged since 2008.	<ul style="list-style-type: none"> • \$700 per month to households with a monthly income of up to 4 minimum wages • \$450 per month to households with a monthly income of 4.1 to 6 minimum wages
2010	The eligibility criteria for households changes to households living in poverty with a monthly income of up to 1.5 minimum wages per capita.	<ul style="list-style-type: none"> • \$700 per month to households with monthly per capita income of up to 1.25 minimum wages • \$450 per month to households with monthly per capita income of 1.26 to 1.5 minimum wages
2011	The eligibility criteria of households changes to households that exceed the patrimonial poverty situation and have an income below or equal to 1.5 minimum wages per capita per month.	<ul style="list-style-type: none"> • Maximum \$700 per month per child from 1 to 3 years 11 months • Maximum \$1,400 per month for children with disabilities

Source: Prepared by INSP, based on the Programme of Operation Rules 2007–2011

In the second type of incentives to care and childcare services, individuals or groups who wish to establish and operate a newly created daycare for a minimum period of one calendar year, will, according to the membership criteria, receive a maximum support of \$61,000 pesos for the adaptation and equipment of facilities, and the development or acquisition of materials to work with children.

Table A 2 Incentive to care and childcare services

Year	Criteria	Maximum amount (in pesos)
2007	Individuals, groups of individuals or legal entities, including civil society organisations, willing and able to provide care services and childcare for the population living in poverty according to the rules of operation. Minimum of 5 children per daycare centre.	\$35,000; on a maximum of two occasions
2008	Must be affiliated with the network for a minimum period of one calendar year; minimum of 10 children per daycare; and minimum 2 m ² of floor space per child.	\$35,000; with a second maximum of \$20,000
2009	It is added that the main daycare provider ⁶⁰ must have at least junior high schooling or equivalent.	\$35,000
2010	No more than 60 children per daycare centre.	\$55,000
2011	Unchanged from 2010.	\$61,000

Source: Prepared by INSP, based on the Programme of Operation Rules 2007–2011

Finally, in the form of enrolment in the network of daycare centres, financial support is granted up to \$41,000 pesos to daycare providers for existing facilities or spaces in which the childcare service is offered. These funds allow them to make the minimum necessary adjustments to ensure the building and equipment fulfils requirements of the current rules of operation and serves the PEI's target population.

Table A 3 Enrolment in the network of daycare centres

Year	Criteria	Maximum amount (in pesos)
2007	Any nursery and daycare that meets the membership criteria can be incorporated into the network for a given period. Membership is open to any person or entity, including civil society organisations, that offers or may offer childcare to the target population of the programme.	\$1,000
2008	Must be operating a daycare centre affiliated to the network for a minimum period of one calendar year; minimum of 10 children per daycare centre; minimum and 2 m ² of floor space per child.	\$15,000
2009	It is added that the daycare provider must have at least junior high schooling or equivalent.	\$15,000
2010	No more than 60 children per daycare centre.	\$35,000
2011	Unchanged from 2010.	\$41,000

Source: Prepared by INSP, based on the Programme of Operation Rules 2007–2011

⁶⁰ A daycare provider is the person that owns the daycare or is in charge of its operation.

Appendix B: Child development scales and samples, by age group

Table B 1 Skills evaluated by age range in the communication scale of ASQ

Age group	Type of skill evaluated
12–18 months	Without receiving instructions, is capable of playing games, following simple commands, saying words to refer to something. Can identify or recognise objects, imitate simple words heard, say more than eight words (besides mother and father).
19–24 months	If asked, can identify some drawings; is able to follow simple instructions; identifies parts of the body; can say more than 15 words; correctly uses words like 'mine', 'yours', and so on. Builds sentences of four words or more; is able to say what happens when shown a picture.
25–30 months	Besides the above, is able to answer to first and last name and follow more elaborate instructions such as 'put the toy on the table'.
31–36 months	Besides the above, is able to answer if asked about the functionality of an object (e.g. a knife); knows children's songs, knows what to answer to questions such as: What do you do if you're hungry? Are you thirsty? etc.; is able to name three objects in a common category (fruits, animals, etc.)
37–42 months	Besides the above, correctly uses words to indicate plural, uses complete sentences with the correct tenses (e.g. I am in the house); uses words that indicate the past tense.
43–48 months	Besides the above, knows the antonym of some words; can say at least two things to describe something (e.g. it is small, it is blue etc.).

Source: Prepared by INSP. Based on the ASQ instrument.

Table B 2 Skills evaluated by age range in the personal-social scale of ASQ

Age group	Type of skill evaluated
12–18 months	If asked, can offer an object or put it in someone's hand; helps getting dressed or undressed (e.g. pushes own arm to put on a sweater, lifts own foot to put on shoes, etc.). Throws a ball to have it thrown back; cuddles toy animals; feeds themselves with a spoon; tries to attract attention by pulling the hand or clothing of an adult; if they look in the mirror offers objects to their own reflection; goes to an adult to ask for something; imitates activities they observe adults doing; can drink from a cup without spilling the contents; plays with dolls to suggest eating, sleeping, etc.
19–24 months	Besides the above, they can: eat with a fork; recognise themselves in the mirror; share their toys with other children; pull their trousers up once their feet are in; knows if they are a boy or girl.
25–30 months	Besides the above, they can put on a jacket or a sweater; or wash their face and dry it alone.
31–36 months	Besides the above, they can serve food from one container to another using a utensil.
37–42 months	Besides the above, they can brush their teeth without help; say the names of their classmates or neighbours without help.
43–48 months	Besides the above, they can say at least four of the following: name; surname; age; sex; where they live; or the names of siblings. They can also use the toilet, wiping themselves and washing their hands alone; dress and undress without help from an adult.

Source: Prepared by INSP. Based on the ASQ instrument.

Table B 3 ASQ sample by ages

Age group	Total	Beneficiaries	Waiting list
12–18 months	201	151	50
19–24 months	256	212	44
25–30 months	357	301	56
31–36 months	302	241	61
37–42 months	244	200	44
43–48 months	167	130	37
Total	1,527	1,235	288

Source: Prepared by INSP. Based on the ASQ instrument.

Appendix C: Power calculations

Table C 1 Estimated power calculations before fieldwork

Variables	Mean	sd	Intraclass correlation coefficient	Sample size	MDE	
					Response rate 90%	Response rate 80%
Household income(pesos)	5541	4708	0.11	5000	\$ 496.64	\$ 479.29
Mother has a job (%)	46.9	49.9	0.05		4.80%	4.59%
Mother looks for a job and does not work (%)	39.4	48.9	0.06		4.82%	4.62%
Child development (z-scores)*	0.08	1.02	0.05		0.098 sd	0.093 sd
Height (centimetres)	89.8	5.6	0.05	2500	0.721 cm	0.685 cm
Height-for-age (z-scores)	-0.9	1.03	0.01		0.129 sd	0.122 sd
Haemoglobin (g/dL)	12.5	1.4	0.1		0.186 sd	0.178 sd
Anaemia (%)	26.8	44.4	0.04		0.056 sd	0.053 sd

Note: Children below 11 grams of haemoglobin per deciliter (g/dL) are diagnosed with anaemia. For these estimations, we used a sample of 1,241 households eligible and interested in participating in the programme from the survey collected in 2009. Source: Prepared by INSP

Table C 2 Power calculations for children outcomes: by age and exposure time
Prevalence of illness 15 days prior to the interview (%)

Age range	Exposure time	N	Mean	MDE (80%)
Older than 30 months	Total (months)	755	42%	26.8%
	Exposure: 1-6 months (%)	255	46%	54.4%
	Exposure: more than 6 months (%)	317	37%	53.3%
Younger than 30 months	Total (months)	738	53%	22.7%
	Exposure: 1-6 months (%)	338	57%	47.4%
	Exposure: more than 6 months (%)	123	42%	149.2%
Food groups the child eats at home (number)				
Age range	Exposure time	N	Mean	MDE (80%)
Older than 30 months	Total (months)	755	6.53	0.054
	Exposure: 1-6 months (%)	255	6.55	0.121
	Exposure: more than 6 months (%)	317	6.42	0.099
Younger than 30 months	Total (months)	738	6.52	0.052
	Exposure: 1-6 months (%)	338	6.59	0.117
	Exposure: more than 6 months (%)	123	6.53	0.296
ASQ-communication z-score (sd)				
Age range	Exposure time	N	Mean	MDE (80%)
Older than 30 months	Total (months)	672	0.01	0.25
	Exposure: 1-6 months (%)	232	-0.14	0.53
	Exposure: more than 6 months (%)	278	0.19	0.48
Younger than 30 months	Total (months)	681	-0.01	0.25
	Exposure: 1-6 months (%)	312	-0.04	0.55
	Exposure: more than 6 months (%)	112	0.21	1.4
ASQ-personal-social z-score (sd)				
Age range	Exposure time	N	Mean	MDE (80%)
Older than 30 months	Total (months)	672	0.01	0.25
	Exposure: 1-6 months (%)	232	-0.14	0.53
	Exposure: more than 6 months (%)	278	0.19	0.48
Younger than 30 months	Total (months)	681	-0.02	0.25
	Exposure: 1-6 months (%)	312	0.02	0.55
	Exposure: more than 6 months (%)	112	0.07	1.4

Source: Prepared by INSP

Appendix D: Descriptive statistics, balance tests and propensity score matching results

Table D 1 Descriptive statistics

Characteristics	Survey 2011
Mothers' characteristics	
Women	96.6%
Schooling: high school	52.14%
Schooling: junior high school	36.2%
Head of family	23%
Single	30%
Age (years)	28.37
Household characteristics	
Household members (number)	4.23
Household members working (number)	1.9
Children under five years old (number)	1.3
Per capita household income (pesos)	1,478.56
Owns the house	39.12%
Household has cement floor	52%
Household has tiled floor	46.9%
Household has dirt floor basement	1.06%
Rooms in the household (number)	2.78
Owns a refrigerator	82.6%
Owns a microwave	47.7%
Owns a vehicle	30.2%
Owns a mobile phone	85.4%
Head of household	
Male	71.8%
Average age (years)	35 years
Schooling: junior high school	78%
Schooling: high school	44%
Children's characteristics	
Was sick in the past 15 days	49%
Child had diarrhoea	21%
Child had a respiratory illness	80%
Low weight for age	30%
Low height for age	8%
Is or was being breastfed	89%
Has vaccination card	74%
Child's age (years)	2.5
Diet diversity (food groups consumed)	6.46

Source: Prepared by INSP

Table D 2 Balance tests

	Beneficiaries			Waiting list			P value	
	N	Mean	sd	N	Mean	sd	simple	adjusted
Mothers' characteristics								
Age of mother (years)	1,232	28.33	6.67	313	27.2	6.66	0.008**	0.008**
Years of mother's schooling (years)	1,225	11.53	3.31	311	10.43	3.18	0.000**	0.000**
Worked in November 2007	1,226	37.11%	0.48	312	33.97%	0.47	0.530	0.304
Worked in November 2006	1,229	32.95%	0.47	312	31.09%	0.46	0.304	0.530
Was looking for work in November 2007	1,226	3.59%	0.19	312	3.85%	0.19	0.829	0.829
Was looking for work in November 2006	1,229	4.15%	0.2	312	3.85%	0.19	0.809	0.809
Mother's income in November 2007 (pesos)	443	2669.06	1648.9	105	2974.48	1985.57	0.102	0.102
Mother's income in November 2006 (pesos)	398	2692.03	1,723.85	95	2842.42	1786.31	0.448	0.448
Had a written contract in November 2007	454	36.56%	0.48	106	37.74%	0.49	0.822	0.822
Had a written contract in November 2006	404	38.37%	0.49	97	38.14%	0.49	0.968	0.968
Household characteristics								
Head of household is male	1,223	69.99%	0.46	312	78.85%	0.41	0.002**	0.017**
Own house	1,232	39.1%	0.49	313	39.9%	0.49	0.793	0.817
Number of people in the household	1,232	4.23	1.48	314	4.35	1.46	0.193	0.392
Number of children under 5 years old in the household	1,232	1.31	0.53	314	1.33	0.55	0.486	0.949
Children's characteristics								
Age of child (months)	1,232	30.61	9.16	314	30.94	10.53	0.587	0.847
Weight-for-height of child of interest at birth (z-score)	959	-1.14	1.80	241	-1.10	1.67	0.754	0.201
Height-for-age of child of interest at birth (z-score)	1,052	0.63	1.72	268	0.68	1.72	0.698	0.608
Child with low weight (=1 if <2.3 kilograms)	1,201	6%	0.25	304	7%	0.26	0.604	0.687
Child with low height	1,095	1%	0.1	276	0%	0.06	0.359	0.208
Child with wasting diagnosis at birth	959	30%	0.46	241	27%	0.44	0.237	0.108
Child with stunting diagnosis at birth	1,052	8%	0.27	268	6%	0.24	0.342	0.858
Consider own child healthier than other children, age 1	1,229	66%	0.47	314	68%	0.47	0.609	0.890
Consider own child smarter than other children, age 1	1,227	77%	0.42	314	75%	0.43	0.673	0.661
Months at which child said words besides mother and father	644	12.69	2.75	158	12.59	2.61	0.691	0.315
Months at which child took first steps	835	13.27	2.36	194	13.19	2.42	0.666	0.963
Was or is being breastfed	1,232	89%	0.32	314	88%	0.33	0.630	0.971
Note: To avoid outliers, we do not consider the upper percentile 1 of the income. *Significance level of 5% ** Significance level of 1%								
<i>Wasting</i> refers to acute malnutrition; <i>stunting</i> refers to chronic malnutrition.								

Table D 3 Balance tests for mothers who worked before entering the programme

Mothers' characteristics	Beneficiaries			Waiting List			P value	
	N	Mean	sd	N	Mean	sd	simple	Adjusted
Age of mother (years)	495	30.04	6.85	110	28.69	6.66	0.06	0.046*
Years of mother's schooling (years)	493	11.76	3.44	108	10.29	3.28	0.00	0.252
Worked in November 2007	491	74%	0.44	110	74%	0.44	0.949	0.702
Worked in November 2006	494	60%	0.49	110	60%	0.49	0.95	0.310
Was looking for work in November 2007	491	0.02	0.14	110	0.01	0.1	0.425	0.382
Was looking for work in November 2006	494	0.03	0.18	110	0.01	0.1	0.158	0.118
Mother's income in November 2007 (pesos)	354	2,601.35	1,611.82	80	2,879.63	1,948.31	0.181	0.061
Mother's income in November 2006 (pesos)	291	2,644.27	1,687.8	64	2,589.84	1,758.28	0.817	0.799
Had a written contract in November 2007	362	0.36	0.48	81	0.37	0.49	0.923	0.622
Had a written contract in November 2006	298	0.38	0.49	66	0.36	0.48	0.813	0.278
Household characteristics								
Head of household is male	493	0.68	0.47	110	0.77	0.42	0.06	0.146
Own house	495	0.39	0.49	109	0.39	0.49	0.929	0.516
Number of people in the household	495	4.15	1.4	110	4.41	1.44	0.082	0.409
Number of children under 5 years old in the household	495	1.32	0.54	110	1.45	0.64	0.038*	0.058*
Children's characteristics								
Age of child	495	30.57	9.58	110	29.69	10.81	0.396	0.018**
Weight-for-height of child of interest at birth (z-score)	385	-1.03	1.82	87	-1.01	1.87	0.903	0.436
Height-for-age of child of interest at birth (z-score)	422	0.51	1.69	93	0.65	1.73	0.464	0.911
Child with low weight (=1 if <2.3 kilograms)	481	7%	0.25	105	7%	0.25	0.943	0.267
Child with low height	437	1%	0.1	95	0%	0	0.349	0.440
Child with wasting diagnosis at birth	385	29%	0.45	87	28%	0.45	0.854	0.647
Child with stunting diagnosis at birth	422	9%	0.29	93	6%	0.25	0.388	0.577
Consider own child healthier than other children, age 1	494	65%	0.48	110	66%	0.47	0.722	0.811
Consider own child smarter than other children, age 1	493	77%	0.42	110	75%	0.44	0.57	0.960
Months at which child said words other than mother and father	256	12.58	2.7	57	12.21	2.56	0.344	0.462
Months at which child took first steps	343	13.17	2.19	65	13.18	2.34	0.966	0.466
Was or is being breastfed	495	88%	0.33	110	85%	0.35	0.527	0.712

Note: To avoid outliers, we do not consider the upper percentile 1 of the income; *Significance level of 5% ** Significance level of 1%
Wasting refers to acute malnutrition; *stunting* refers to chronic malnutrition.

Table D 4 Balance tests for mothers who did not work before entering the programme

Mothers' characteristics	Beneficiaries			Waiting list			P value	
	N	Mean	sd	N	Mean	sd	simple	adjusted
Age of mother (years)	735	27.17	6.29	202	26.39	6.55	0.121	0.087*
Years of mother's schooling (years)	730	11.38	3.23	202	10.51	3.14	0.001	0.011**
Worked in November 2007	734	13%	0.33	202	12%	0.33	0.952	0.410
Worked in November 2006	734	14%	0.35	202	15%	0.36	0.747	0.698
Was looking for work in November 2007	734	5%	0.21	202	5%	0.23	0.632	0.974
Was looking for work in November 2006	734	5%	0.21	202	5%	0.23	0.632	0.829
Mother's income in November 2007 (pesos)	89	2,938.36	1,772.85	25	3278	2,112.65	0.419	0.399
Mother's income in November 2006 (pesos)	106	2,825.89	1,828.29	31	3,363.87	1,757.52	0.148	0.486
Had a written contract in November 2007	92	37%	0.49	25	40%	0.5	0.781	0.292
Had a written contract in November 2006	106	40%	0.49	31	42%	0.5	0.817	0.138
Household characteristics								
Head of household is male	728	0.71	0.45	201	0.8	0.4	0.021	0.158
Own house	735	0.39	0.49	203	0.4	0.49	0.825	0.593
Number of people in the household	735	4.29	1.53	203	4.33	1.47	0.721	0.058*
Number of children under 5 years old	735	1.3	0.53	203	1.27	0.48	0.554	0.220
Children's characteristics								
Age of child	735	30.62	8.87	203	31.64	10.35	0.161	0.404
Weight-for-height of child of interest at birth (z-score)	573	-1.21	1.78	153	-1.14	1.54	0.625	0.529
Height-for-age of child of interest at birth (z-score)	629	0.71	1.75	174	0.69	1.72	0.877	0.567
Child with low weight (=1 if <2.3 kilograms)	718	6%	0.24	198	8%	0.27	0.463	0.728
Child with low height	657	1%	0.1	180	1%	0.07	0.641	0.395
Child with wasting diagnosis at birth	573	32%	0.47	153	25%	0.44	0.134	0.329
Child with stunting diagnosis at birth	629	7%	0.26	174	6%	0.24	0.652	0.935
Consider own child healthier than other children, age 1	733	67%	0.47	203	68%	0.47	0.789	0.145
Consider own child smarter than other children, age 1	732	76%	0.43	203	76%	0.43	0.97	0.889
Months at which child said words other than mother and father	388	12.76	2.79	101	12.81	2.62	0.874	0.153
Months at which they took their first steps	490	13.32	2.47	128	13.14	2.42	0.451	0.712
Was or is being breastfed	735	89%	0.31	203	89%	0.32	0.857	0.473

Note: To avoid outliers, we do not consider the upper percentile 1 of the income; *Significance level of 5% ** Significance level of 1%
Wasting refers to acute malnutrition; *stunting* refers to chronic malnutrition.

a) Propensity score matching estimations

The PSM estimations were carried out using the STATA command '*psmatch2*'. Using different matching methods (nearest neighbour, kernel and radius), we estimated the ATT and compared these results with the OLS estimations presented in this evaluation.

We used two different specifications for the propensity score. The first included:

- The unbalanced variables as the covariates for the PSM estimations:
 - Mother's age;
 - Mother's education;
 - Whether or not the head of the household is male; and
 - The logarithm of the mother's income in 2007.
- The outcomes that were statistically significant in our OLS regressions:
 - If the mother has a job;
 - Weekly hours spent working by the mother;
 - Time of daily mother's childcare while performing other activities;
 - Time of daily mother's exclusive childcare;
 - Prevalence of child illness;
 - Time of daily main caregiver exclusive childcare; and
 - Whether the main caregiver studies (=1).

The second specification includes four additional variables – whether the mother was working or looking for a job in 2007 and 2006, which are lags of important dependent variables.

It is worth mentioning that the outcome variables related to the main caregiver (other than the mother), 'Time of daily exclusive childcare' and 'Main caregiver studies', are missing for a significant part of the sample, and thus the sample in which these two impacts are estimated is different from the whole sample (for both OLS and PSM methods).

Table D5 shows that in general the OLS and PSM are strikingly similar in terms of magnitude and significance, except for the main caregiver outcome variables (which is a much smaller sample).

b) First specification: using the more parsimonious p-score specification

Table D 5 OLS and PSM estimations

Variables	OLS estimations ¹			psmatch2: nearest neighbour				psmatch2 : kernel				psmatch2 : radius			
	Obs	Mean	Impact	Ctrl	Treat	ATT	t	Ctrl	Treat	ATT	t	Ctrl	Treat	ATT	t
Mother has a job (%)	1,172	0.84	0.178***	279	1096	0.18***	3.93	279	1,096	0.21***	6.35	279	1,096	0.20***	5.57
Hours mother works per week	1,174	34.97	6.863***	279	1096	8.22***	3.95	279	1,096	7.65***	4.94	279	1,096	8.04***	4.93
Hours mother spends per day on childcare while performing other activities	1,174	4.97	-1.388***	279	1096	-1.40***	-4.75	279	1,096	-1.51***	-6.65	279	1,096	-1.49***	-6.21
Hours per day mother spends on exclusive childcare	1,090	2.79	-0.306*	279	1096	-0.18	-1.04	279	1,096	-0.25*	-1.89	279	1,096	-0.26*	-1.88
Prevalence of illness 15 days prior to the interview (%)	1,174	0.49	0.171***	279	1096	0.06	1.26	279	1,096	0.14***	4.02	279	1,096	0.16***	4.33
Hours per day main caregiver spends on exclusive childcare	195	2.98	1.200*	39	179	-0.24	-0.49	39	179	-0.17	-0.46	39	177	-0.20	-0.52
The main caregiver studies (%)	212	0.09	-0.129*	39	179	0.09***	4.32	39	179	0.09***	4.32	39	177	0.10***	4.32

Note: The difference in the number of observations between OLS and PSM estimations is attributed to the number of covariates included in the regressions. For instance, the OLS controls for: mother's age; mother's education; whether the mother worked or looked for work in 2006; whether head of the household is male; number of people in the household; presence of children under 5 who do not attend any form of daycare; the child's age; child's weight-to-height ratio at birth, height-to-age ratio at birth; whether the child was breastfed; whether the mother considered the child healthier or more intelligent at the age of 1 compared with other children of the same age; number of objects designed to stimulate development owned by the child by the age of 1. The PSM only included the unbalanced variables: mother's age; mother's education; whether head of the household is male; and the logarithm of the mother's income in 2007.

*Significance level of 10%; **Significance level of 5%; *** Significance level of 1%

Source: Prepared by INSP

Common support

As explained before, sample size is smaller for the main caregiver's outcome variables. So, in Table D6 we report common support regions for these samples separately.

Table D 6 Common support

psmatch2: nearest neighbour, kernel and radius matching

Treatment assignment	Off support	On support	Total
Mother and child variables			
Untreated	0	279	279
Treated	11	1,096	1,107
Total	11	1,375	1,386
Main caregiver variables			
Untreated	0	39	39
Treated	15	179	194
Total	15	218	233

For the mother and children variables, the PSM estimates include a total of 1,386 observations (279 controls and 1,107 treatments) and only 11 observations fall outside the common support. For the variables of the main caregiver in the household, 15 observations out of 233 fall outside the common support of the PSM estimates.

Balancing property

In order to ensure that the balancing property is fulfilled, after performing the matching, we estimated the t-tests for equality of means in the two samples (before and after matching) for the variables used as covariates that were unbalanced, through the command *pstest*. Table D7 shows that, for each variable, the unmatched or matched rows represent the difference of means before and after the matching, respectively.⁶¹

⁶¹ The balancing property was also tested for the variables of the main caregiver. The results are consistent, and the balancing property is fulfilled at the 5 per cent of significance for the unbalanced variables.

Table D 7 Balancing property

Variables	pstest: nearest neighbour					pstest: kernel					pstest: radius				
		Mean		t-test			Mean		t-test			Mean		t-test	
Mother's age (years)		Control	Treatment	t	p> t		Control	Treatment	t	p> t		Control	Treatment	t	p> t
	Unmatched	28.32	27.15	2.65	0.01	Unmatched	28.32	27.15	2.65	0.01	Unmatched	28.32	27.15	2.65	0.01
	Matched	28.32	28.73	-1.32	0.19	Matched	28.32	28.26	0.20	0.84	Matched	28.32	28.42	-0.32	0.75
Mother's education (years)		Control	Treatment	t	p> t		Control	Treatment	t	p> t		Control	Treatment	t	p> t
	Unmatched	11.51	10.39	5.07	0.00	Unmatched	11.51	10.39	5.07	0.00	Unmatched	11.51	10.39	5.07	0.00
	Matched	11.56	11.54	0.17	0.86	Matched	11.56	11.37	1.42	0.16	Matched	11.56	11.46	0.74	0.46
Head of household is male (%)		Control	Treatment	t	p> t		Control	Treatment	t	p> t		Control	Treatment	t	p> t
	Unmatched	0.70	0.79	-3.04	0.00	Unmatched	0.70	0.79	-3.04	0.00	Unmatched	0.70	0.79	-3.04	0.00
	Matched	0.70	0.71	-0.61	0.54	Matched	0.70	0.72	-0.78	0.43	Matched	0.70	0.69	0.73	0.47
Income in 2007 (log)		Control	Treatment	t	p> t		Control	Treatment	t	p> t		Control	Treatment	t	p> t
	Unmatched	2.91	2.59	1.27	0.21	Unmatched	2.91	2.59	1.27	0.21	Unmatched	2.91	2.59	1.27	0.21
	Matched	2.91	3.07	-0.94	0.35	Matched	2.91	2.88	0.21	0.83	Matched	2.91	2.94	-0.17	0.87

For instance, the existing difference between controls and treatments for the unbalanced variables before the matching was statistically significant at 1 per cent. After the matching, the t-test suggests there are not statistically differences between groups.

c) Second specification: using the p-score specification with more covariates

After the exercise of including the unbalanced variables as covariates, we added more covariates of the mother's retrospective information for 2006 and 2007. Yet, the results are robust to inclusion for various covariates:

Table D 8 OLS and PSM estimations

VARIABLES	OLS estimations			psmatch2: nearest neighbour				psmatch2 : kernel				psmatch2 : radius			
	Obs	Mean	Impact	Ctrl	Treat	ATT	t	Ctrl	Treat	ATT	t	Ctrl	Treat	ATT	t
Mother has a job (%)	1,172	0.84	0.178***	279	1,095	0.20***	4.20	279	1,095	0.21***	6.26	279	1,086	0.21***	5.83
Hours mother works per week	1,174	34.97	6.863***	279	1,095	7.76***	3.62	279	1,095	7.63***	4.93	279	1,086	7.98***	4.97
Hours mother spends on childcare while performing other activities	1,174	4.97	-1.388***	279	1,095	-1.34***	-4.29	279	1,095	-1.51***	-6.64	279	1,086	-1.57***	-6.67
Time of daily exclusive childcare (mother) (hrs)	1,090	2.79	-0.306*	279	1,095	-0.34*	-1.82	279	1,095	-0.26**	-1.98	279	1,086	-0.27**	-2.02
Prevalence of illness 15 days prior to the interview (%)	1,174	0.49	0.171***	279	1,095	0.05	1.01	279	1,095	0.14***	4.06	279	1,086	0.16***	4.42
Time of daily exclusive childcare (main caregiver) (hrs)	195	2.98	1.200*	39	167	-0.59	-1.21	39	167	-0.28	-0.73	39	154	-0.40	-0.95
The main caregiver studies (%)	212	0.09	-0.129*	39	167	0.08***	3.90	39	167	0.08***	3.90	39	154	0.08***	3.76

Note: The difference in the number of observations between OLS and PSM estimations is attributed to the number of covariates included in the regressions. For instance, the OLS controls for: mother's age; mother's education; whether the mother worked or looked for work in 2006; whether head of the household is male; number of people in the household; presence of children under 5 years old who do not attend any form of daycare; the child's age; child's weight-to-height ratio at birth, height-to-age ratio at birth; whether the child was breastfed; whether the mother considered the child healthier or more intelligent at the age of 1 compared with other children of the same age; number of objects designed to stimulate development owned by the child by the age of 1. The PSM only included the unbalanced variables: mother's age; mother's education; whether head of the household is male; the logarithm of the mother's income in 2007, whether the mother was working or looking for a job in 2007 and 2006.

*Significance level of 10%; **Significance level of 5%; *** Significance level of 1%

Source: Prepared by INSP

Common support

In contrast to the previous PSM, Table D9 shows that the number of observations for control and treatment groups in the radius matching methodology differs to nearest neighbour and kernel. For the latter, only 11 and 26 observations fall outside the common support for the mother and main caregiver variables, respectively. The radius matching methodology excludes more observations, 20 and 39, for each group of variables.

Table D 9 Common support

psmatch2: nearest neighbour and kernel				psmatch2: radius matching			
Treatment assignment	Off support	On support	Total	Treatment assignment	Off support	On support	Total
Mother and child variables				Mother and child variables			
Untreated	0	279	279	Untreated	0	279	279
Treated	11	1,095	1,106	Treated	20	1,086	1,106
Total	11	1,374	1,385	Total	20	1,365	1,385
Main caregiver variables				Main caregiver variables			
Untreated	0	39	39	Untreated	0	39	39
Treated	26	167	193	Treated	39	54	193
Total	26	206	232	Total	39	193	232

Balancing property

Table D9 presents the t-test for equality of means for all the unbalanced variables. Like the previous results, after including four more covariates, the results suggest that both control and treatment groups are balanced in those predetermined characteristics after matching.⁶²

⁶² The balancing property was also tested for the variables of the main caregiver. The results are consistent and the balancing property is fulfilled.

Table D 10 Balancing property

Variables	pstest: nearest neighbour					pstest: kernel					pstest: radius				
		Mean		t-test			Mean		t-test			Mean		t-test	
	Control	Treatment	t	p> t		Control	Treatment	t	p> t		Control	Treatment	t	p> t	
Mother's age (years)	Unmatched	28.31	27.15	2.64	0.01	Unmatched	28.31	27.15	2.64	0.01	Unmatched	28.31	27.15	2.64	0.01
	Matched	28.31	27.99	1.02	0.31	Matched	28.31	28.29	0.05	0.96	Matched	28.29	28.37	-0.28	0.78
Mother's education (years)	Unmatched	11.52	10.39	5.08	0.00	Unmatched	11.52	10.39	5.08	0.00	Unmatched	11.52	10.39	5.08	0.00
	Matched	11.55	11.43	0.89	0.37	Matched	11.55	11.35	1.44	0.15	Matched	11.52	11.41	0.77	0.44
Head of household is male (%)	Unmatched	0.70	0.79	-3.04	0.00	Unmatched	0.70	0.79	-3.04	0.00	Unmatched	0.70	0.79	-3.04	0.00
	Matched	0.70	0.66	1.88	0.06	Matched	0.70	0.72	-0.87	0.38	Matched	0.71	0.69	0.82	0.41
Income in 2007 (log)	Unmatched	2.91	2.59	1.25	0.21	Unmatched	2.91	2.59	1.25	0.21	Unmatched	2.91	2.59	1.25	0.21
	Matched	2.92	2.70	1.33	0.18	Matched	2.92	2.86	0.31	0.76	Matched	2.90	2.80	0.62	0.54
Mother had a job 2007 (%)	Unmatched	0.38	0.34	1.24	0.22	Unmatched	0.38	0.34	1.24	0.22	Unmatched	0.38	0.34	1.24	0.22
	Matched	0.38	0.36	1.15	0.25	Matched	0.38	0.37	0.34	0.73	Matched	0.38	0.37	0.59	0.56
Mother was looking for a job 2007 (%)	Unmatched	0.03	0.03	0.18	0.86	Unmatched	0.03	0.03	0.18	0.86	Unmatched	0.03	0.03	0.18	0.86
	Matched	0.03	0.02	2.25	0.03	Matched	0.03	0.03	-0.11	0.91	Matched	0.03	0.03	0.05	0.96
Mother had a job 2006 (%)	Unmatched	0.34	0.29	1.52	0.13	Unmatched	0.34	0.29	1.52	0.13	Unmatched	0.34	0.29	1.52	0.13
	Matched	0.34	0.33	0.54	0.59	Matched	0.34	0.34	0.23	0.82	Matched	0.34	0.35	-0.44	0.66
Mother was looking for a job 2006 (%)	Unmatched	0.04	0.03	0.32	0.75	Unmatched	0.04	0.03	0.32	0.75	Unmatched	0.04	0.03	0.32	0.75
	Matched	0.04	0.01	3.15	0.00	Matched	0.04	0.03	0.47	0.64	Matched	0.04	0.03	0.81	0.42

d) Mother's income: PSM estimations

We believe that one of the reasons we did not find effects on mother's income is because there is no balance in some variables at baseline (mother's age, mother's education, and mother's income in 2007) and the effects cannot be captured. For these reasons, we estimated the average treatment effect (on the treated) on the mother's salary with three different PSM methodologies (nearest neighbour, kernel and radius) and using four different sets of control variables. Table D10 shows that, after matching, the balancing property is fulfilled and the results were positive but, in most of the estimations, not statistically significant:

Table D 11 Mother's income

Control variables	psmatch2: nearest neighbour				psmatch2 : kernel				psmatch2 : radius			
	Ctrl	Treat	ATT	t	Ctrl	Treat	ATT	t	Ctrl	Treat	ATT	t
Mother's age (years); mother's education (years); household head is male (%); mother's income in 2010 and 2009 (pesos)	297	1,147	290.23	1.16	297	1,147	312.2	1.56	297	1,143	230.6	1.12
Mother's age (years); mother's education (years); household head is male (%); mother's income in 2010; 2009 and 2008 (pesos)	295	1,145	484.04	2.23	295	1,145	309.64	1.54	295	1,139	215.97	1.04
Mother's age (years); mother's education (years); household head is male (%); mother's income in 2010; 2009, 2008 and 2007 (pesos)	294	1,140	386.83	1.46	294	1,140	300.34	1.48	294	1,140	199.36	0.94
Mother's age (years); mother's education (years); household head is male (%); mother's income in 2010; 2009, 2008, 2007 and 2006 (pesos)	294	1,139	298.35	1.14	294	1,139	300.61	1.48	294	1,139	193.93	0.92

Appendix E: Quality of care at daycare centres

a) Ethical considerations of videotaping teachers and assistants at daycare settings

On the subject of direct observation through videotape, this can be considered to involve minimal risk to participants. According to the guidelines of the INSP Ethics Committee, the consent process was informed in writing:

1. We requested permission from the daycare provider for videotaping two teachers or assistants performing childcare activities for a period of one hour each.
2. We made the teachers or assistants aware of: the purpose of the videotape; the voluntary nature of their participation; and the complete confidentiality of the videos. We also requested permission to use the videos in future trainings as examples of positive interactions between the teacher and children (never to show negative interactions).
3. We emphasised that the videos would not be used for purposes other than those mentioned. The letter had to be signed by the teacher or assistant (as applicable) and two witnesses. Participants also were left with a copy of the consent form, which contained data from project managers and the Ethics Commission for questions related to the rights of participants. In the event that any teacher or assistant refused to be videotaped, we selected another teacher or assistant in the daycare centre. If the daycare provider refused to have any of their teachers or assistants participate in the study, then another provider was selected.

We considered that it was only necessary to have the informed consent of the teachers or assistants because they, in particular, and the environment in which the class was given, were the subject of study and not the children. In the encoding of videos, no individual child was identified and no child in the videotape was followed specifically. The observation points were given at the level of the teacher or assistant; each was assigned a code number and was not identified by name in the video.

The videos were coded during the months of April–June by two psychologists trained for this activity. As for data management and safety issues, there is a backup of the videos, which is kept locked by the project manager and will be used only in case of damage to any of the original videos. The videos will be retained for a period of five years; after this period, only material will be kept that may be useful for training and the rest will be destroyed.

b) Items included of ECCP and ECERS-R scales

From the ECCP (*Escala de Calidad para Centros Preescolares*) quality scale for preschool centres, we included the following four observational items, which were rated on a scale from 1–5 (1=inadequate, 2=developing, 3=basic, 4=good, 5=excellent):

- The classroom is safe, clean, looked after; it has natural light and ventilation and has an overall aesthetic appearance in the overall settlement;
- The classroom has space where children and adults can move easily to carry out activities;
- The classroom has furniture and teaching materials appropriate for the age of the pupils; and
- The classroom has sufficient, and a good mix of, materials for the children that are organised, well presented, accessible and age-appropriate.

From the ECERS-R scale we included the following two observational items, which were rated in a scale from 1 to 7 (1=inadequate, 3=basic, 5=good, 7=excellent):

- Book and literacy areas; and
- Print in the environment.

Besides these scales, we included the following two yes or no questions regarding open spaces and the availability of the following at daycare settings to promote gross motor skills:

- Yard, garden or any open space where children can go out and play; and
- Games or objects for climbing or riding, such as swings, slides, cars, etc.

c) Procedures of video recordings

Conducting observations directly or through videotapes of teachers in their groups can generate some reactivity; in other words, participants change their behaviour when being observed or videotaped. On the one hand, it has been documented that most people who are observed for a period of time, for example, 60 minutes, tend to forget or get used to being observed after the first few minutes. On the other hand, when there is reactivity, people often show their best behaviour, which might be very revealing and relevant to the study.

To minimise reactivity and behaviour that disrupts normal activity, we spent some time in the classroom with a video camera set up, but not recording. During this time, the person in charge of the video interviewed the daycare provider or simply observed the classroom (sitting on the floor, unnoticed, without talking or interacting with children or caregivers). After a period of time, for example, 10 minutes, it was likely that the children and the teacher would have forgotten that the interviewer in charge of the video was present. This was when we would activate the camera.

The field team visited the provider a day before recording, to leave letters of consent for teachers and parents to agree that they or their children (for parents) would participate in the study. During this first visit, the person recording the video would carry out a sensitising activity with a toy camera, simulating the recording. The next day, once the teachers, assistants and parents had given their consent, the teacher and children had already familiarised themselves with the recorder, so observation could be more neutral. In this procedure, we relied on guidance and recommendations developed in a study by the NICHD to make direct observations of children using the ORCE (NICHD 2010).

The interviewer was asked to say to the teachers and assistants who would be participating in the recording:

As you know, I'll be watching your class this morning. I want to observe a typical morning in the classroom. To ensure the observations are accurate, it is important that everyone act as naturally as possible and just do what you would be doing as if I wasn't here. I know this is easier said than done, but you should try to do what you normally do. The purpose of these observations is only to find out how the children spend their time here. I will follow your activities with the children, and could, therefore, have to enter and exit the room. I'll try not to interrupt. I ask you to ignore me and I hope the children will, too.

Video recorders' advice:

- Try to keep your conversation with adults and interaction with children to a minimum.
- Ask the teacher if there is a place where you can sit or stand with the camera, but that is out of the way as much as possible and has a good view of the class (and all activities).

Preferably wait 5–10 minutes before beginning the observation. This will allow time to resume the normal classroom routine, so that the teacher and the children become accustomed to your presence. During recording, you should be as neutral as possible; this does not mean rejecting a child, but do not be too encouraging.

d) Codes for assessing caregiver–child interactions

Behavioural codes: event codes with duration

Responds to child's vocalisation: Caregiver or adult listens to child or children's words and/or vocalisations and then responds vocally. This can be in response to a question asked by child, or responding to a child's answer to a question or repetition that the teacher has asked for. This does not include non-verbal responses (nodding head, performing activity in response to what child says) by the caregiver in response to the child's words or vocalisations.

Reads aloud to child: Caregiver or adult reads from book, magazine, paper or any other written material to the child or children. This can be reading single sentences or a complete story, but it is definitely reading and is not just pointing at pictures in a book. The child may or may not be listening and learning; the point is only that the caregiver is reading.

Gives directions, explanations and instructions to child: Caregiver or adult explains what they are going to do next, either an activity (music time) or event (potty time, lunch time); instructs children in an activity (for example, 'put the glue on the paper'; 'paint here'; 'remember to match the picture I am holding in my hand') or gives directions on how to do something that is part of an activity (for example, 'sit and wait your turn'; 'put the fruit in the basket'; 'climb the ladder with one foot and then the other'; 'use this (instrument) to look in the patient's ear'). There is no elaboration that provides further exploration or teaching.

Expresses positive affect: Caregiver expresses positive affect (verbally) toward children. This includes making general statements about the children's or group's appearances or behaviours, but these statements are not specific to a particular activity. The interaction does not have to be one-to-one; it may involve more than one child or more than one adult.

Speaks negatively to child: Caregiver or adult says something negative to a child (for example, using a word that may make the child feel shame or guilt, using negative words or intonation). This category goes beyond a simple 'no' (restricts activity); it must be a criticism or a derogatory (insulting) statement.

Stimulates cognitive development: Caregiver or adult stimulates a child's or children's non-academic cognitive development: teaches or sings songs; encourages a skill; gives child instruction of some sort with some elaboration; tries to give the child a new idea or experience. The stimulation must be directed towards the children and must be clearly aimed at improving their knowledge or understanding of something. This should be coded even if the activity is not necessarily appropriate or effective.

Stimulates academic development: (Do not code for children under three years of age). Caregiver teaches, encourages academic skill. This includes activities that teach about letters, numbers, counting, maths, geometric shapes, words, nature, sorting and categorising objects, learning sizes or amounts. The stimulation must be directed towards the children and must be clearly aimed at improving their knowledge or understanding of something. This should be coded even if the activity is not necessarily appropriate or effective.

Stimulates social development or interaction: Caregiver or adult stimulates the children's social or moral development. In general, these teachings help children get along in the world and learn about how to interact with other people, as is expected in society. She provides the opportunity for children to interact socially with other children. She encourages children to share, cooperate, and take turns with her or with each other. She forbids children to hit other children, take their toys away, etc. She teaches social skills and rules. She explains reasons for rules or expected behaviour.

Playful exchange: Child or children and caregiver are engaged in a playful interaction that has not already been coded as higher level stimulation (academic, social or cognitive). This is not just any old interaction: it is joyful and both child or children and caregiver are clearly enjoying the activity. It does not include any teaching or stimulation. Some examples: they laugh or giggle together; they play a game or sing a song together (that does not promote cognitive, social or academic stimulation).

Watching, unoccupied or transition: Children are awake, but not engaged in any observable activity; they may be waiting for the next activity to start (before eating, before going out to play, etc.); or they may be watching other people (adults or children) but not interacting with them. The other caregiver and other adults are ignoring the children; they may be across the room or close up, but they are clearly not interacting with the children. The children are not doing anything else at the same time (using or exploring a toy, interacting with anyone, being held). Also includes: TV is on and the child is looking at it.

Activity with child or children only: Children in the classroom are playing with or close to other children. The caregiver may or may not be supervising the children but she is not participating. The children may be playing in parallel, interactively or cooperatively.

Behavioural codes: point codes

Responds to negative affect: Caregiver or adult responds to a child's or children's negative affect: for example, fussing, fretting, crying or screaming. It must be clearly negative and audible, not just a frown or whimper. It may be prolonged. It should demand a response. The response may be verbal or non-verbal (for example, picking up and comforting child).

Positive physical contact: Caregiver and children have positive physical contact. The caregiver holds or touches the child or children, warmly and comfortingly, affectionately or playfully.

Facilitates child's behaviour: Caregiver or adult helps, assists, redirects or entertains child or children in some way. Caregiver may be responding to the child's need, bid, or signal (vocal or gestural) for help, or initiating the action on her own.

Restricts child's activities: Caregiver restricts child or children's activities, either verbally or physically. Verbally, caregiver prohibits the child's action, whether the action is appropriate or not. Physically, caregiver restricts child's actions with a physical barrier to block the child's movement, taking away a toy the child is playing with, or removing the child from an activity they are enjoying. Also includes: restricting the child's mobility or activity by putting or keeping them in a physical container.

Physical care: Caregiver is providing physical care to child or children. These activities are the ones necessary to take care of the child's physical needs. Examples: dressing, changing nappies, washing, going to bathroom, feeding, burping, bouncing to relieve wind, rocking child to sleep, putting on a sweater.

Activity (stimulation or language) includes less than half of the children at one time: Code this when activities are not all-inclusive at one time. That is, they require half or more of children to sit or wait for their turn, and during this waiting time the children do not have anything to do (for example, they could be sitting against a wall waiting for their turn on the ball or on the slide, etc.)

e) Qualitative ratings of child–caregiver interactions

Sensitivity or responsiveness to non-distress: This scale focuses on how the caregiver observes and responds to the child's social gestures, expressions and signals. The key defining characteristic of sensitive interaction is that it is child-centred. The sensitive caregiver is attuned to the child and manifests awareness of the child's needs, moods, interests and capabilities, and allows this awareness to guide his or her interaction (Fish 1990).

Markers of sensitivity include: (a) acknowledging the child's affect; (b) contingent vocalisations or verbal responsiveness by the caregiver; (c) facilitating the manipulation of an object or child's movement; (d) appropriate attention focusing; (e) evidence of good timing paced to the child's interest and arousal level; (f) slowing the pace when the child appears over-stimulated or tired (for example, demonstrating gaze aversion, fussiness); (g) picking up on the child's interest in toys or games; (h) shared positive affect; (i) encouraging the child's efforts; (j) providing an appropriate level of stimulation when needed; (k) sitting on the floor or in a low seat, at the child's level, to interact; (l) removing them from crib within a few minutes after awakening, and putting to bed when obviously tired; (m) timely discipline that matches the nature of the violation under consideration, and the child's ability to understand and benefit from whatever reprimand is offered.

Intrusiveness: Prototypically, intrusive caregivers impose their agenda on the child despite signals that a different activity, level or pace of interaction is needed (Fish 1990). High arousal, vigorous physical interaction, or a rapid pace are not, by themselves, indicative of intrusive overstimulation – if the child responds positively with sustained interest and is not engaging in defensive behaviours. It is when the child averts their gaze, turns away or expresses negative affect and the caregiver continues or escalates their activity that intrusive behaviour is evident. Intrusiveness is also apparent when the caregiver does not allow the child a turn or an opportunity to respond at their own pace.

Detachment or disengagement: The detached caregiver appears emotionally uninvolved or disengaged, and unaware of the child's needs for appropriate interaction to facilitate involvement with objects or people (Arnett 1989; Fish 1990).

Stimulation of development: This scale measures the degree to which the caregiver tries to foster the child's cognitive and mental development. A stimulating caregiver may take advantage of even routine activities (snacks, playground, walks, clean-up) to stimulate development, and will consistently engage in a variety of explicit activities with the intent of facilitating learning. The caregiver will make deliberate attempts to encourage the child's development, achievement and learning.

Positive regard for the child: This scale rates the caregiver's positive feelings towards the child, expressed during interaction with them. Positive feelings are shown by: (a) speaking in a warm tone of voice; (b) hugging or other expressions of physical affection; (c) an expressive face; (d) smiling; (e) laughing with the child; (f) enthusiasm about the child; (g) praising the child; and (h) general enjoyment of the child. Positive regard is evident when the caregiver listens, watches attentively, looks into the child's face when talking to them, has affectionate physical contact, and is playful.

Negative regard for the child: This scale rates the caregiver's negative regard for the child. Both frequency and intensity of negative affect toward the child are considered. Some markers of negative regard include: (a) disapproval; (b) tense body; (c) negative voice when correcting; (d) abruptness; (e) tense facial muscles and strained expression; (f) harshness; (g) threatening the child or punishing without explanation; and (h) roughness in wiping the child's face, changing nappies, or burping.

Child-centredness of care: This is an overall rating of how available and engaged the caregiver is while caring for the children in her classroom. The codes are:

1= Care is inadequate or barely adequate; what matters is the convenience of the staff. Caregiver is not devoting her full attention to making the lives of the children better.

2= Care is adult-centred: infants may receive adequate care or be responded to promptly, but this is largely in the service of adult goals. Care is never hostile, rejecting or inappropriate; neither is it marked by any special gentleness, respect, appreciation, interest in particular children, etc.

3= Care is somewhat or sometimes child-centred.

4= Care is consistently child-centred: when caregiver engages with the children, it is with the goal of maintaining or improving their comfort, contentment, interest, etc., rather than to make the adult's experience more interesting. There is marked gentleness in handling, marked pride and affection in tone of voice, marked concern with children's well-being and clear, concerted efforts to provide children with nurturing, stimulating experiences.

Small groups:

1= Activity is planned and organised in small groups and the caregiver attends equally to all.

2= Activity is planned or not planned in small groups; the caregiver does not give equal attention to all groups.

3= There is no activity in small groups.

Supervision:

1= Inadequate; children are at risk because the caregiver is not looking out for the children.

2= Poor supervision of children by the caregiver.

3= Children are rarely left unattended by the caregiver.

4= Adequate; the caregiver is always aware of the children, watching them, preventing accidents, and so on.

f) Reliability of the coding

Table E1 shows the results for 13 days when standardisation exercises were carried out by the encoders. For instance, on 25 April, codified Group 1 of a daycare setting and obtained 66 per cent of agreements, or behaviours coded in the same proportion, with a margin of 20 seconds. This means that, after comparing the observations of the encoder, record by record, the programme identified that for 66 per cent of cases, the codes matched within ± 20 seconds.

Table E 1 Record of standardisation exercises (2011)

Date	Group	Proportion of agreements
25 April	1	0.66
25 April	1	0.79
25 April	1	0.75
26 April	1	0.59
26 April	1	0.51
27 April	2	0.69
27 April	1	0.79
28 April	1	0.79
3 May	1	0.82
3 May	1	0.82
10 May	2	0.66
10 May	1	0.72
12 May	1	0.76
12 May	1	0.73
17 May	2	0.7
19 May	1	0.61
19 May	1	0.79
24 May	1	0.52
24 May	1	0.73
26 May	2	0.59
26 May	2	0.64
7 June	2	0.85
7 June	1	0.78
9 June	1	0.69
9 June	1	0.77
Average		0.71

Source: Prepared by INSP

g) Descriptive statistics: quality of care

Table E 2 Description of coded behaviours (frequency)

Description	Observations	Mean	sd	Min	Max
'Expresses positive affect'	183	2.43	3.97	0	33
'Nothing is being codified'	183	2.87	2.53	1	12
'Responds to child's vocalisation'	183	81.28	50.24	0	270
'Reads aloud to child'	183	0.25	1.33	0	10
'Speaks positively to child or children'	183	24.77	19.24	0	93
'Stimulates cognitive development'	183	102.39	49.97	6	264
'Stimulates social development or interaction'	183	9.36	7.59	0	43
'Speaks negatively to child'	183	0.08	0.89	0	12
'Activity with child or children only'	183	36.99	31.63	0	217
'Watching, unoccupied or transition'	183	14.20	14.12	0	85
'Gives directions, explanations or instructions to child'	183	86.74	45.00	6	236
'Playful exchange'	183	6.71	13.98	0	120
'Stimulates academic development'	183	2.08	12.09	0	115
'Responds to negative affect'	183	1.31	2.12	0	15
'Positive physical contact'	183	1.68	2.39	0	16
'Activity includes fewer than half of children at one time'	183	1.34	1.44	0	6
'Facilitates child's behaviour'	183	9.14	8.15	0	38
'Restricts child's activities'	183	81.97	55.09	5	374
'Physical care'	183	4.20	3.93	0	19

Table E 3 Description of observed behaviours (duration in minutes)

Description	Observations	Mean	sd	Min	Max
'Expresses positive affect'	183	0.12	0.32	0.00	3.65
'Nothing is being codified'	183	11.89	26.29	0.00	105.47
'Responds to child's vocalisation'	183	1.77	1.49	0.00	11.23
'Reads aloud to child'	183	0.05	0.31	0.00	2.97
'Speaks positively to child or children'	183	0.70	1.39	0.00	18.28
'Stimulates cognitive development'	183	18.85	8.50	0.83	54.25
'Stimulates social development or interaction'	183	0.70	1.02	0.00	10.82
'Speaks negatively to child'	151	0.01	0.07	0.00	0.85
'Activity with child or children only'	183	7.09	7.12	0.00	47.67
'Watching, unoccupied, or transition'	183	2.57	3.63	0.00	28.12
'Gives directions, explanations or instructions to child'	183	10.03	5.43	0.77	42.28
'Playful exchange'	183	1.66	3.26	0.00	19.53
'Stimulates academic development'	183	0.27	1.61	0.00	17.22

Table E 4 Proportion of time for each behaviour with respect to the total coded time

Description	Observations	Mean (%)	sd	Min	Max
Duration of Expresses positive affect/Total duration of coding	183	0	0.01	0.00	0.08
Duration of Nothing is being codified/Total duration of coding	183	29	0.63	0.00	2.01
Duration of Responds to child's vocalisation/Total duration of coding	183	4	0.03	0.00	0.25
Duration of Reads aloud to child/Total duration of coding	183	0	0.01	0.00	0.07
Duration of Speaks positively to children/Total duration of coding	183	2	0.03	0.00	0.40
Duration of Cognitive development/Total duration of coding	183	45	0.18	0.02	1.20
Duration of Social development/interaction/Total duration of coding	183	2	0.03	0.00	0.36
Duration of Speaks negatively to child/ Total duration of coding	151	0	0.00	0.00	0.02
Duration of Activity with children only/Total duration of coding	183	17	0.16	0.00	1.03
Duration of Watching/unoccupied/transition/Total duration of coding	183	6	0.08	0.00	0.62
Duration of Gives directions or instructions to child/Total duration of coding	183	24	0.12	0.05	0.94
Duration of Playful exchange/Total duration of coding	183	4	0.09	0.00	0.64
Duration of Stimulates academic development/Total duration of coding	183	1	0.04	0.00	0.38

Table E 5 Descriptive statistics of subjective variables

Variable	Description	Observations	Mean	sd
Child-centredness of care: how available and involved is the caregiver to provide care for the children	1 = uncharacteristic attention; 2 = minimally characteristic attention; 3 = moderately characteristic attention; 4 = very characteristic attention	183	3.22	0.74
Detachment: caregiver is not involved or aware of the children's needs for proper interaction		183	1.05	0.27
Stimulation of development: caregiver seeks to promote the children's development		183	2.80	0.90
Intrusiveness: caregiver imposes their agenda on children, even though there are signs of the need for a change in activity level or pace of interaction	1 = uncharacteristic 2 = minimally characteristic 3 = moderately characteristic 4 = very characteristic	183	1.95	0.88
Negative regard for the child: this considered both the frequency and intensity of negative affect toward children		183	1.10	0.36
Positive regard for the child: positive feelings of the caregiver to children, expressed during interaction with them		183	2.84	0.69
Sensitivity: the caregiver observes and responds to the children's social gestures, expressions and signs		183	2.93	0.73
Small groups	1 = planned and attended all children; 2 = planned or not planned and attended all children; 3 = no small groups	183	2.57	0.61
Two or more caregivers in the classroom (%)	0 = no additional caregiver; 1= other caregiver	183	0.52	0.50
Supervision	1= inadequate; 2=little supervision; 3= rarely left unattended; 4= adequate	183	2.95	0.66
Children's age group	1= aged 1-2 years); 2= aged 3-4	183	1.43	0.50
Number of children in the coded room	Actual number of children	182	8.71	3.29

Source: Prepared by INSP

h) Correlation analysis

Table E 6 Correlation of teacher characteristics and coded behaviours

Teacher characteristics	Teacher's age	Monthly wage	Received training the last 12 months (=1)	Has specialised studies in childcare (=1)	Years of education	Years of experience of childcare	Years at current daycare provider
Coded behaviours							
Responds to child's vocalisation	-0.1121	-0.0031	-0.0369	0.0784	0.3356	-0.0897	-0.0498
Speaks positively to children	0.1256	0.0939	0.0362	0.0290	0.4011	0.1204	0.1857
Stimulates cognitive development	-0.0235	-0.0037	-0.0932	0.1050	0.3408	0.0179	0.0110
Stimulates social development	0.0360	0.0014	-0.0138	-0.0509	0.1609	-0.1043	-0.0940
Activity with children only	-0.0213	-0.1454	-0.0560	-0.2471	0.0090	-0.0593	0.0177
Watching, unoccupied or transition	0.1055	0.0598	-0.0183	-0.1889	0.1410	0.1760	0.0358
Gives directions/instructions	-0.0437	-0.0856	-0.2336	-0.0746	0.2256	-0.0732	-0.1264
Playful exchange	-0.0320	-0.0193	0.0993	-0.2298	-0.0114	-0.1155	0.2166

Table E 7 Correlation of subjective variables and ASQ z-scores

ASQ z-scores	ASQ-communication (z-score)	ASQ-personal social (z-score)
Subjective variables		
Sensitivity/responsiveness to non-distress	-0.0706	-0.0279
Stimulation of development	-0.0500	-0.0114
Positive regard for the child	-0.0414	-0.0615
Child-centredness of care	-0.0542	-0.0514
Supervision	-0.0057	-0.0090
Intrusiveness (more points, less intrusive)	-0.0528	-0.0969
Detachment/disengagement	-0.0039	-0.0411
Negative regard for the child	-0.0424	-0.0222
Small group activities	0.0453	0.0847
Two or more caregivers in the classroom (%)	0.0854	0.0744
Child age: 0 = older children >2yrs ; 1 = younger children <=2yrs	-0.0136	-0.0422
Number of children in the classroom	0.0949	0.0328

Table E 8 Descriptive statistics of daycare structural quality variables

Structural items	Obs	Mean	sd	Min	Max
The classroom is safe, clean, looked after; it has natural light and ventilation and has an aesthetic design (ECCP)	565	3.79	0.92	1	5
The classroom has space where children and adults can move easily for the development of activities (ECCP)	565	3.99	0.84	2	5
The classroom has furniture and teaching materials appropriate for the age (ECCP)	565	3.70	1.07	1	5
The classroom has sufficient, and a good mix of age-appropriate materials for children that are organised, well presented and accessible (ECCP)	565	3.62	0.97	2	5
Books and literacy areas (ECERS-R)	565	4.52	1.54	1	7
Print in the environment (ECERS-R)	565	4.72	1.44	1	7
The daycare provider has a yard, garden or any open space where children can go out and play (=1)	565	0.83	0.37	0	1
The daycare provider has games or objects for climbing or riding such as swings, slides, cars, etc. (=1)	565	0.78	0.41	0	1
Total of all structural items	565	25.95	5.72	13	36

Table E 9 Correlation of daycare structural quality and teacher characteristics

Teacher characteristics	Teacher's age	Monthly wage	Received training the last 12 months	Specialised studies on childcare (=1)	Years of education	Years of experience of childcare	Years in current daycare
Structural items							
ECCP combined variable	0.2184	-0.0284	0.0184	-0.0094	0.0379	0.1678	0.0524
ECERS-R combined variable	0.207	-0.0552	-0.101	-0.0014	-0.002	0.2873	0.1595
The daycare provider has a yard, garden or any open space where children can go out and play (=1)	-0.2386	0.0209	0.0505	0.1101	0.1699	-0.1599	-0.0973
The daycare provider has games or objects for climbing or riding such as swings, slides, cars, etc. (=1)	-0.2349	0.0385	0.0917	0.1848	-0.003	-0.0608	-0.122
Total of all structural items	0.1885	-0.0382	-0.0282	0.015	0.0311	0.2166	0.0904

Table E 10 Total HOME score

Total HOME score	Obs.	Mean	Std. Dev.	Min	Max
For all children	565	27.67	4.01	12	38
For children <=36 months	190	27.80	4.06	12	37
For children >36 months	375	27.61	3.99	14	38

Table E 11 Correlation of HOME score and ASQ z-scores

ASQ z-scores HOME score	ASQ- communication z-score	ASQ- personal social z-score
For all children	0.17	0.20
For children <=36 months	0.20	0.22
For children >36 months	0.15	0.18

Appendix F: Cost analysis of daycare settings enrolled in PEI

The objective of this analysis is twofold: to explore whether the subsidy granted per child by the Mexican government is enough to guarantee the provision of childcare with minimum quality standards, and to explore whether this scheme of childcare provision, through privately owned daycare settings, is sustainable in the future as a business model.

a) Methodology

To analyse the variable costs of daycare settings, we considered monthly expenditure on: (a) building maintenance, equipment and materials; (b) services (electricity, water, gas, telephone and mobile phone); (c) meals for children and staff; (d) stationery (including advertising materials and paperwork related to PEI procedures); (e) staff training (including transportation costs); (f) toys and educational materials (such as books, videos, CDs, etc.); (g) hygiene and cleansing; (h) safety (first aid kit, fire extinguishers and health insurances); (i) taxes; (j) rent; and (k) staff salaries.

To deal with missing and outlier observations, we used the following procedure: all missing or outlier (below and above the first and 99th percentile respectively) observations were replaced by the average cost of the item in the state where the daycare provider was located. Only for the following items we replaced the uppermost percentile: building maintenance; training; educational materials; safety; and taxes. We did not replace the lowermost percentile for these items, because these are low-frequency costs and it is reasonable to believe that the expenditure per month could be a small amount or even zero.

We identified that 37 per cent of daycare settings did not report paying a monthly rent for the property. We therefore used the monthly expense in rent reported by all daycare settings, and through an OLS regression for panel data, we projected the monthly expense in rent, taking into account some variables. The estimated model is the following:

$$Y_i = \alpha_i + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_5 X_{5i} + \varepsilon_i$$

Where:

- Y_i is the monthly rent for the daycare provider i ;
- X_{1i} is a variable equals to one if the provider had a higher education level (high school to postgraduate), or zero if otherwise;
- X_{2i} represents the monthly expenditure on services by the provider i ;
- X_{3i} is a variable that takes the value of one if the provider was funded by an external source besides SEDESOL, and zero otherwise;
- X_{4i} represents the total capacity of children who can be enrolled at the provider (capacity); and
- X_{5i} represents the number of children currently enrolled at the provider.

The average income that daycare settings received per month was calculated considering both the subsidy received by the programme and the corresponsibility fee paid by parents. Since the subsidies and corresponsibility fees could vary across children, we included a section in the survey where we asked daycare providers to report the different amounts of subsidies and corresponsibility fees and the number of children who received each one. Therefore, we calculated the estimation of the average subsidy and corresponsibility fee per child per daycare provider by multiplying the subsidy (or corresponsibility) by the number of children who received (or paid for) it, and dividing this by the total number of children at the provider. We then added the average subsidy and the average corresponsibility per child to estimate total income per child per daycare provider.

As for the fixed costs analysis, we present the descriptive statistics and the distribution of the initial investment costs incurred by daycare providers in order to meet the PEI requirements. For the estimation of fixed costs, we only considered the reported investment costs directly incurred by daycare providers, which was additional to the subsidy that the programme offered for this purpose.

b) Data collection

The costing section of the daycare survey was collected by INSP between February and March 2011 in seven states from three regions of the country: north (Sonora), central (Hidalgo, Jalisco, State of Mexico, Puebla and Tlaxcala) and south (Chiapas). The survey was conducted in 704 daycare settings, with the daycare provider reporting information on the following topics: characteristics of the staff (age, sex, education, main functions in the daycare centre, monthly salary, experience in childcare, etc.); structural quality of the facility (infrastructure, equipment, material, space, lighting, etc.); cost of operation; diversity of the diet provided to the children; schedules of activities and number of children per teacher.

c) Results

Characteristics of the daycare settings

In Table F1, we present the main characteristics of the daycare providers in the 704 daycare settings in the sample.

Table F 1 Characteristics of daycare providers and daycare settings

Daycare provider characteristics	Observation	Mean	sd
Sex (=1 women)	704	96.0%	0.1
Age (years)	703	38.5	8.9
Schooling (years)	704	15.0	2.3
Monthly salary (pesos)	704	4095.5	2903.9
Children enrolled in daycare (number)	704	35.1	13.5
Proportion of children supported by the PEI (%)	704	97.7%	12.9
Daycare staff (number)	704	6.5	2.4
Average number of children per teacher in classrooms	704	7.5	1.4
Daycare has parental meetings (%)	704	68.9%	46.3%
Average corresponsibility paid in daycare settings (pesos)	704	335.48	189.1
Average amount of subsidies received in daycare settings per child (pesos)	704	691.9	152.7

Source: Prepared by INSP

Most daycare providers are women (96 per cent), are 38 years old, and have an average of 15 years of schooling and a monthly salary of \$4,096 pesos.⁶³ The daycare settings have an average of 35 children enrolled, of whom 98 per cent receive support from the programme. The mean number of children per teacher is 7.5, and 70 per cent of daycare settings organise meetings with parents. The average amount of the corresponsibility fee that parents pay is \$335 pesos, and the average subsidy received is \$692 pesos per child per month. Therefore, the total income that daycare settings receive per child per month is \$1,027 pesos.

d) Variable costs

Table F2 shows the number of daycare settings and the average number of children enrolled, by state and geographic region.

Table F 2 Average number of children enrolled by daycare, state and region

State/region	Daycare settings (number)	Children (mean)	sd	Min	Max
Chiapas	57	37.75	14.20	20	84
Hidalgo	55	32.05	12.13	12	60
Jalisco	145	34.98	13.29	10	60
State of Mexico	249	37.50	14.33	2	90
Puebla	109	32.03	12.30	12	60
Sonora	46	29.80	10.77	10	50
Tlaxcala	43	36.21	11.69	16	60
North region	46	29.80	10.77	10	50
Central region	601	35.31	13.50	2	90
South region	57	37.75	14.20	20	84
Total	704	35.15	13.47	2	90

Source: Prepared by INSP

⁶³ Not all daycare providers reported their monthly salary or reported a salary equal to zero; to complete the missing information, we imputed the average monthly salary of daycare providers in the state where the daycare is located (78 daycare providers reported zero salary and 52 have missing value in this variable).

Chiapas has the largest average number of children per daycare, with nearly 38 children; Sonora has the least, with almost 30. The State of Mexico has 35 per cent of all daycare settings in the sample, while Tlaxcala has only 6 per cent. It is important to note that the State of Mexico is the most populated state in the country, with more than 14 per cent of the country's total population (INEGI 2010).

e) Salary and rent expenses per child

Table F3 reports the average monthly salary paid to staff per child, by state and geographic region. This expenditure is the most important component of the variable costs in terms of magnitude.

Table F 3 Average monthly expense in salaries per child in the daycare settings

State	Daycare settings	Expense in salaries per child (pesos)
Chiapas	57	402.51
Hidalgo	55	467.98
Jalisco	145	517.90
State of Mexico	249	486.54
Puebla	109	430.38
Sonora	46	492.05
Tlaxcala	43	474.04
North region	46	492.05
Central region	601	481.33
South region	57	402.51
Total	704	475.65

Source: Prepared by INSP

On average, the monthly expense on staff salaries is around \$477 pesos per child; the highest expense is in the north, followed by the central region, and then the southern region, which is almost 20 per cent cheaper than the other two regions.

Only 63 per cent of daycare providers reported paying a monthly rent for property use. The remaining daycare settings did not report this expenditure because they were either the owners, someone let them use the property with no payment or they misreported their expenditures in this item. Whatever the case, we face the need to impute a monthly rent for those that had zero or missing values in this variable.

As we mentioned in part a), we projected the monthly expense in rent, taking into account some variables. Table F4 shows that almost all the variables described have a significant (and positive) relation with the monthly rent, with the exception of postgraduate studies and in cases where the daycare centre was funded by external sources. Once we got the projected values, we replaced the non-reported costs with this estimation of the monthly rent. Given that we used fixed effects, the variation across municipalities is also considered.

Table F 4 Projected monthly rent costs

Variables	Monthly Rent
The daycare provider has postgraduate studies (=1)	361.8 (456.6)
Monthly expenditure on services at the daycare centre (pesos)	0.337*** (0.121)
Daycare centre was funded by an external source (=1)	387.8 (355.1)
Children that can be attended to at the daycare centre (number)	37.88*** (10.12)
Children enrolled at the daycare centre (number)	64.61*** (13.35)
Constant	-487.7 (453.0)
Observations	447
R-squared	0.343
Standard errors in parentheses	

Note: *** p < 0.01; ** p < 0.05; * p < 0.1

Table F5 shows that, on average, the rent cost is \$126 pesos per child per month. In contrast to other costs, the central region has the largest cost per child in this item, which could be explained by the high population density of this region.

Table F 5 Average monthly expense in rent per child

State	daycare settings	Expense in rent per child (pesos)
Chiapas	57	105.65
Hidalgo	55	126.28
Jalisco	145	127.50
State of Mexico	249	132.33
Puebla	109	131.07
Sonora	46	115.48
Tlaxcala	43	112.67
North region	46	115.48
Central region	601	128.98
South region	57	105.65
Total	704	126.21

Source: Prepared by INSP

f) Summary of variable costs per child

Table F6 describes all variable costs per child enrolled in the daycare settings divided by category, state and region. In addition to rent and staff costs, it also includes the costs of: building maintenance; services (water, electricity, telephone); materials; stationery; training expenses (transportation, materials); educational materials; cleansing; safety; and taxes.

Table F 6 Average monthly variable costs per child, state and region

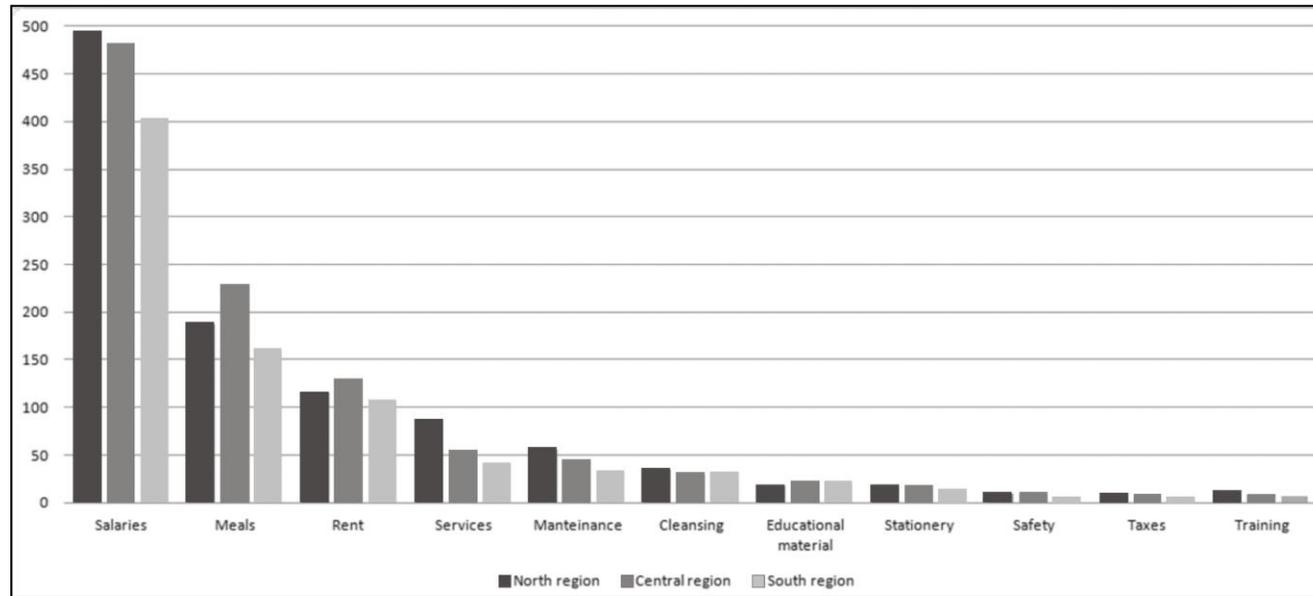
	Number of daycare settings (N)	Building maintenance per child^a (pesos)	Services per child^b (pesos)	Meals per child^b (pesos)	Stationery per child^b (pesos)	Staff training per child^a (pesos)	Educational materials per child^a (pesos)	Cleaning per child^b (pesos)	Safety per child^a (pesos)	Taxes per child^a (pesos)	Staff salary per child^b (pesos)	Rent per child (pesos)	Total per child (pesos)
Chiapas	57	33.69	41.20	160.94	13.91	6.35	20.96	31.48	4.76	5.04	402.51	105.65	826.48
Hidalgo	55	53.58	57.40	228.47	17.31	7.86	17.59	27.06	5.88	8.56	467.98	126.28	1,017.98
Jalisco	145	44.35	47.37	197.83	19.40	5.07	17.69	30.56	10.93	6.19	517.90	127.50	1,024.80
State of Mexico	249	43.18	57.29	248.63	16.25	8.13	21.43	29.92	5.44	5.98	486.54	132.33	1,055.13
Puebla	109	47.03	55.02	226.24	16.99	7.64	23.76	32.30	9.19	14.05	430.38	131.07	993.68
Sonora	46	55.87	85.92	187.20	19.19	8.51	17.00	34.09	9.33	7.97	492.05	115.48	1,032.60
Tlaxcala	43	33.62	45.32	194.84	14.19	4.81	18.22	24.00	6.86	6.19	474.04	112.67	934.75
North region	46	55.87	85.92	187.20	19.19	11.87	17.00	34.09	9.33	7.97	492.05	115.48	1,032.60
Central region	601	44.43	53.64	226.62	17.09	7.04	20.37	29.82	7.58	7.75	481.33	128.98	1,024.66
South region	57	33.69	41.20	160.94	13.91	6.35	20.96	31.48	5.01	5.04	402.51	105.65	826.48
Total	704	44.31	54.74	218.73	16.97	7.08	20.20	30.23	7.47	7.54	475.65	126.21	1,009.13

Note: ^a To avoid outliers, we excluded the highest percentile and replaced it with the average cost of the concept per state; ^b To avoid outliers, we excluded the lowest and the highest 0.1 percentile and replaced them with the average cost of the concept per state.

Source: Prepared by INSP

The average cost per child is estimated at \$1,009 pesos per month. About 50% corresponds to salaries; 22% to meals; 12% to rent; 5% to services; 4% to property maintenance; 3% to cleansing; 2% to educational material; 2% to stationery; 1% to safety; 1% to taxes; and 1% to training. Regarding the variability across regions, we find that the total cost in the north and central regions differs by only \$8 pesos, which is practically the same; whereas operating a daycare centre in the south is around 20% cheaper.

Figure F 1 Current expenditure per child, per month and region

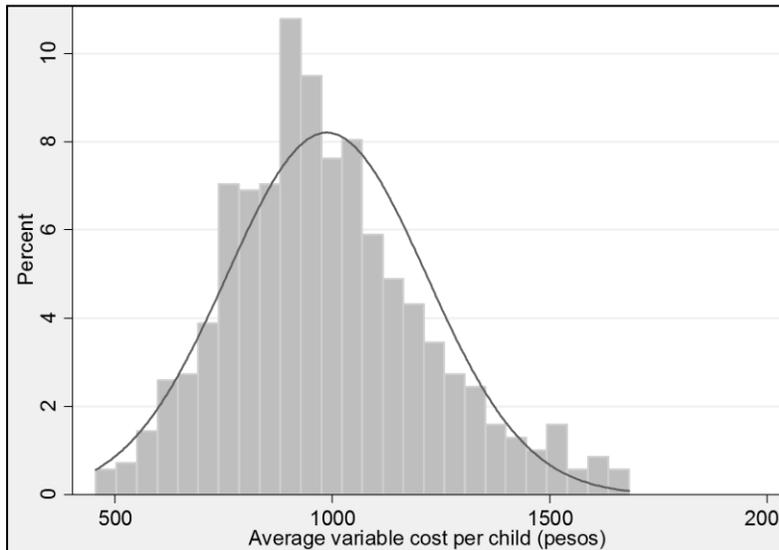


Source: Prepared by INSP

Figure F1 represents the different categories of expenditure and the average expenditure by region. Average monthly costs in the northern region are slightly higher than the other two regions for most expenditure categories.

Figure F2 shows that variable costs are normally distributed with a mean value of \$1,009 pesos.⁶⁴

Figure F 2 Distribution of variable costs per child



Source: Prepared by INSP

g) Income sources per child

We estimated the monthly average income that daycare settings received, from the subsidy granted by the PEI and the corresponsibility fee paid by parents. Table F7 shows that, on average, our sample of daycare settings received a monthly subsidy of \$692 pesos per child. The highest average subsidies were received in Chiapas and Jalisco (\$706 pesos), followed by Tlaxcala (\$695), Puebla (\$694), State of Mexico (\$684), Sonora (\$681) and Hidalgo (\$677).

On average, the corresponsibility fee directly paid by the parents was \$335 pesos per month per child. Chiapas was the state with the lowest amount per child (\$204) and Jalisco with the highest (\$399). The last column of Table F7 shows the average total income received by daycare settings. The highest average amount per child per month was received in Jalisco (\$1,105), followed by Sonora (\$1,057), Mexico state (\$1,038), Hidalgo (\$1,036), Puebla (\$973), Tlaxcala (\$952) and Chiapas (\$910).

⁶⁴ To avoid outliers, we excluded the highest percentile.

Table F 7 Monthly amount received of subsidy and corresponsibility per child

State/region	Daycare settings	Average subsidy granted per child (pesos)	Average corresponsibility per child (pesos)	Average amount received in the daycare settings per child (pesos)
Chiapas	57	706.69	203.67	910.37
Hidalgo	55	677.88	358.01	1,035.90
Jalisco	145	706.74	398.85	1,105.59
State of Mexico	249	683.74	354.30	1,038.04
Puebla	109	693.82	279.67	973.49
Sonora	46	681.54	375.85	1,057.39
Tlaxcala	43	694.61	257.12	951.73
North region	46	681.54	375.85	1,057.39
Central region	601	691.36	344.90	1,036.26
South region	57	706.69	203.67	910.37
Total	704	691.96	335.49	1,027.45

Consistent with the variable costs, the highest amount received in a daycare setting was in the north (\$1,057 pesos), followed by the central (\$1,036 pesos) and south (\$910 pesos) geographic regions.

The average monthly variable cost per child obtained in this analysis, is above the average subsidy granted per child (\$692 pesos). However, the daycare settings charge an average corresponsibility fee of \$335 pesos per month per child. Therefore, the average total monthly income received per child is \$1,027 pesos, which is slightly above the total average variable costs per child (\$1,009 pesos). This means that the average utility of daycare settings per child per month is \$18 pesos, considering that daycare settings have an average of 35 children enrolled; this means that the total utility per month is around \$630 pesos.

It is important to note that a previous cost analysis of the PEI was carried out in 2009, and the estimated variable costs were larger than the income received by daycare settings (\$1,644 pesos versus \$926 pesos) (INSP 2009). The methodology used was the same for the variable costs, but for the estimation of the fixed costs, we only considered the reported investment costs directly incurred by daycare providers, which was additional to the subsidy that the programme offered for this purpose.

In terms of the sample, the study from 2009 included a national representative sample of daycare settings, whereas the present study only includes daycare settings from seven states. Although the results are quite different in terms of the magnitude of the variable costs, we found a similar pattern in the distribution of costs across items and the highest average monthly cost was also found in the northern region.

Nevertheless, for the impact evaluation survey in 2011, we conducted a pilot survey of the questionnaire in several daycare settings to improve the instrument. We found that many daycare providers do not have organised administrative records; most questions about costs were answered after a few minutes of helping them to remember the expenditures and to add up the costs. Being aware of this, we reinforced fieldwork training with strategies to help daycare providers remember and add up their costs, in order to get the most accurate information possible. As far as we know, this type of training was not carried out for the 2009 survey.

h) Fixed costs: initial investment

The second part of the cost analysis is the estimation of the fixed costs of daycare settings supported by the programme. As stated in the methodology, the only fixed cost included in the analysis is the initial investment on infrastructure adjustment directly incurred by daycare providers, in order to meet the programme requirements.

Table F8 shows that 81 per cent of daycare providers reported an average initial investment of \$29,370 pesos, besides the subsidy received by the programme for infrastructure adaptations – see Section g) for more details on these subsidies.

Table F 8 Initial investment for infrastructure adaptation

Daycare provider report	Daycare settings	Percentage/amount (pesos)
The subsidy was not enough to ensure daycare was adequate	572	81.25 per cent
If the subsidy was not enough, how much did you have to invest to ensure daycare was adequate?	546	\$29,369.01

Source: Prepared by INSP

Table F9 shows the total investment per child reported by the daycare providers, presented by state and region.

Table F 9 Investment expense by state and region

State	Daycare settings	Investment costs (pesos)	Investment costs per child (pesos)
Chiapas	47	21,895.74	621.45
Hidalgo	42	41,976.19	1,508.61
Jalisco	100	28,931.1	808.78
State of Mexico	196	30,253.63	1,012.46
Puebla	87	28,787.36	1,022.42
Sonora	36	29,972.22	1,025.08
Tlaxcala	38	22,027.89	658.56
North region	36	29,972.22	1,025.08
Central region	463	30,080.74	986.30
South region	47	21,895.74	621.45
Total	546	29,369.01	957.45

Source: Prepared by INSP

Daycare providers in Hidalgo reported the highest initial investment (\$41,980), followed by the State of Mexico (\$30,250), Sonora (\$29,970), Jalisco (\$28,930), Puebla (\$28,790), Tlaxcala (\$22,000) and Chiapas (\$21,895). However, the average cost of investment per child follows the same pattern that was seen in the variable costs, where the north region has the highest costs, followed by the central and south regions.

i) Summary of findings

In this section, we estimated the variable and fixed costs of daycare centres enrolled in the programme. We found that the resources received from the government and parents are enough to cover the variable costs of providing childcare services with the minimum standards of quality established by the programme. However, the profit that results from

subtracting the variable costs from the income received is \$18 pesos per child per month on average, which implies that it will take around four years of operation to recover the initial investment incurred by the daycare provider (assuming that 35 children will be enrolled during that period).

Given that the average profit is very low, any variation in the costs of operation could affect the sustainability of daycare settings as microenterprises. Furthermore, if the programme wants to raise the standards of quality, it should be accompanied by an increase on either the subsidy or the corresponsibility fee to guarantee the financial viability of daycare settings.

Appendix G: Dissemination activities

Table G1 summarises the dissemination activities carried out during 2011 and the first semester of 2012.

Table G 1 Dissemination activities

Month	Description
2011	
January	The evaluation team presented the objectives, evaluation design and fieldwork strategy of the impact evaluation to programme officials at SEDESOL in Mexico City.
April	The evaluation team presented and got feedback on the impact evaluation preliminary results from SEDESOL and the programme in Mexico City.
May	The evaluation team presented and got feedback on the impact evaluation preliminary results from the Steering Committee of the National Council of Social Policy Evaluation (CONEVAL, from its initials in Spanish) in Mexico City.
August	The evaluation team presented the impact evaluation final results to programme officials at SEDESOL facilities in Mexico City.
December	SEDESOL published the impact evaluation final results on its website: < http://www.2006-2012.sedesol.gob.mx/work/models/SEDESOL/Resource/2342/1/images/Evaluacion_impacto_PEI/Inf_Final_PEI.pdf >
December	SEDESOL sent the impact evaluation final report to the Federal Congress and to CONEVAL.
2012	
May	The evaluation team presented the impact evaluation results to researchers from the Centre for Evaluation Research and Surveys at the INSP in Cuernavaca, Morelos.

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