Linguistic Childcare Index for Argentina

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Introduction

Early Childhood Development

Importance of early stimulation for human flourishing.

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Positive socio-economical returns of early stimulation:

- Health
- Formal education
- Social conscience
- Income, employment and productivity

Introduction

Family income and quality of parenting practices are not causally related (Heckman, 2008).

> Economically Disadvantaged + High-quality parenting practices

> Economically Advantaged + Low-quality parenting practices

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¿How do we target children exposed to low-quality parenting practices?

Multidimensional childcare index based on fuzzy sets theory

Theoretical framework

Childcare and early childhood development

Optimal intervention time

Domain	Intervention	In utero	0-60 months	7-24 months	24-60 months
Physical	Maternal health and nutrition	✓	✓		
	Exclusive breastfeeding		✓		
	Adequate nourishing			✓	✓
	Vaccines and regular health check ups		✓	✓	✓
Cognitive	Early stimulation		✓	✓	✓
Language	Early stimulation		✓	✓	✓
Socioemotional	Emotional development		✓	✓	
	Peer-interaction				✓

Naudeau et al. (2011)

Theoretical framework

Childcare Index (2-4 years old children)

Components	Measure
Health	Number of health check-ups being healthy MMR vaccine
Commensality	Accompaniment and interaction during meals Distraction: television viewing at mealtime
Nutrition	High biological protein (proportion) Energy (candy, soda) (proportion) Iron supplements Vitamin supplements
Anthropometry	Z Score BMI
Education	Daycare center assistance

Source: Own elaboration.

Theoretical framework

Childcare Quality Index

Phase I. Importance of each measure
Most important measure for each dimension $=1$
Other measures are compared$= r_j$, $j= 1, ..., n$ $\max \{r_1, \cdots, r_n\} = 1$
$\min \{r_1, \cdots, r_n\} > 0$

$$w_j = r_j / \sum_{j=1}^{n} r_j, \, j = 1, \cdots, n; \, w_j \in [0, 1], \sum_{j=1}^{n} w_j = 1.$$

Equally important $w_1 = w_2 = \cdots = w_n = 1/n$.

Theoretical framework

Phase II. Degree of each Component

$$g_i = LWA_{c_i}\left(s_{\alpha_1},\ s_{\alpha_2},\ \ldots, s_{\alpha_n}\right) = s_{\underline{\alpha}_i}, i = 1, \ldots, m.\underline{\alpha}_i = \sum_{j=1}^{n} w_j \alpha_j$$

$s_{\underline{\alpha}_i} \rightarrow$ virtual label

Theoretical framework

Phase III. Importance of each Component
Most important component of the index is selected=1

Other components are compared= $i = 1, \cdots, m,$ $\max \{u_1, \cdots, u_n\} = 1$
$\min \{u_1, \cdots, u_n\} > 0.$ $v_i = u_i / \sum_{i=1}^{m} v_i,$ $i = 1, \cdots, m;$ $v_i \in [0, 1],$
$\sum_{i=1}^{m} v_i = 1.$

Experts were consulted to determine the weights used in this phase:

$$\textit{Health} : v_1 = 0.25$$

$$\textit{Commensality} : \quad v_2 = 0.2$$

$$\textit{Nutrition} : \quad v_3 = 0.25$$

$$\textit{Anthropometry} : \quad v_4 = 0.1$$

$$\textit{Education} : \quad v_5 = 0.2$$

Theoretical framework

Phase IV. Childcare quality index

$$Ch_k = LWA_{c_k}\left(s_{\alpha_1},\ s_{\alpha_2}, \ldots, s_{\alpha_m}\right) = s_{\underline{\alpha}_k}, k = 1, ..., t.$$

$$\widehat{\alpha}_k = \sum_{i=1}^{m} v_i \alpha_i, v_i(i = 1, ..., m)$$

$s_{\underline{\alpha}_k} \in \underline{S} \rightarrow$ Linguistic label that indicates the Index valuation.

Theoretical framework

Childcare Evaluation: family assessment for a child in the sample

| Component	Measure	Response	Measure Valuation	Component Valuation	Linguistic Label
Health	MMR vaccine	Yes	2	2	Very High
	Nr of health check-ups	2	2		
Commensality	Accompaniment and interaction	Yes, No	1	-0.5	Low
	Television viewing	Always	-2		
Nutrition	% High biological protein	65.92%	1	0	Mean
	% Energy (candy, soda)	10.83%	-1		
	Iron supplements	Until 10 months old	2		
	Vitamin supplements	Never took	-2		
Anthropometry	Z Score BMI-for-age	0.29	2	2	Very High
Education	Daycare center assistance	Does not attend (2y old)	1	1	High

Source: ENNyS 2005.

$$C_1 = s_2 \ , \ \ C_2 = s_{-1} \ , \ \ C_3 = s_0 \ , \ \ C_4 = s_2 \ , \ \ C_5 = s_1$$

$$\underline{\alpha}_1 = 0.25 \times (2) \oplus 0.2 \times (-1) \oplus 0.25 \times (0) \oplus 0.1 \times (2) \oplus 0.2 \times (1) = 0.7$$
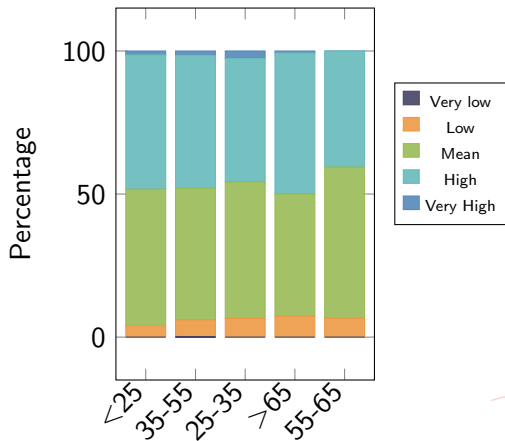
$$C_{630200605} = s_{0.7}$$

$$Ch_{630200605} : \quad \textbf{ChildCare Quality} \rightarrow \textbf{\textit{s}}_1 \rightarrow \textbf{High}$$

Sample child-care valuations
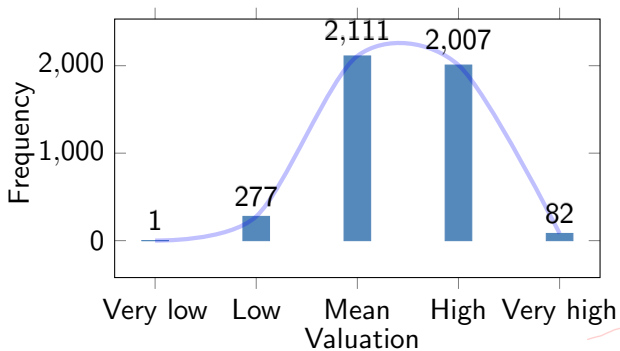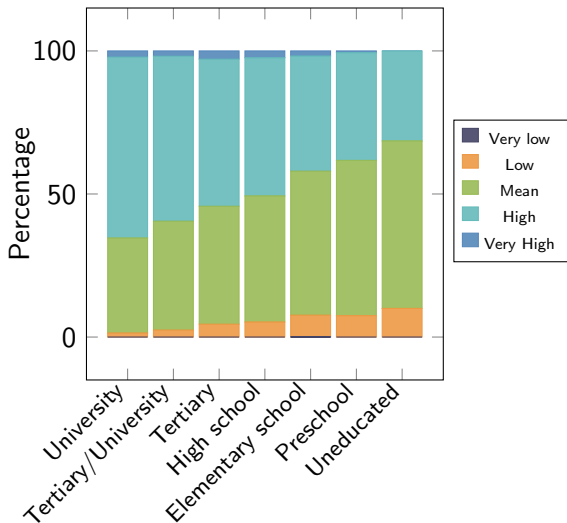
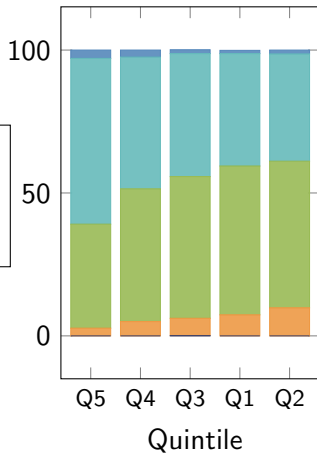Childcare quality by caregiver age

Results

Childcare level by caregiver education

Childcare level by PC family income

Conclusion

Childcare quality index
Interesting results:

- Right-skewed distribution: we are better than expected
- Care-giver education and income are important mediators of childcare quality.
- Lowest income quintile is not the one that performs the worst

Thank you

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