

README for the Reproducibility Package for

Ensuring an Equal Start for all Pakistani Children: What Will It Cost?

This paper analyzes data from the Pakistan Bureau of Statistics (2017 Census)¹ and the provincial Education Management Information Systems² on the population size, enrolment rates, and achievement rates (dropout and repetition rates) in Early childhood Education (ECE). Data on existing infrastructure, human resources, ECE and education financing, and unit rates for key inputs such as teachers and basic ECE supplies were collected from each provincial government. Education financing inputs were categorized under three heads: salary, non-salary (such as payment of electricity bills), and development (such as construction of classrooms). Policy options and targets for ECE were then defined based on best practices and in line with national and provincial policies and implied service standards. Enrolment was projected for 2023-2035 using the population projections contained in the most recent published census files.³ Infrastructure and human resource requirements were based on prevailing policies and service standards in each province.

All analysis is executed in Excel. Excel files with calculations are divided by net enrolment rate goal (62 and 100 percent) and province. All calculations start from cells in the 'inputs' sheet of each file containing the variables and datasets listed in the next section. The file "Tables.xlsx" compiles the results of each Excel file into the tables presented in the paper and lists the files and cells each result comes from.

Data Statement

The paper's outputs, derived from five separate simulation models developed for Islamabad Capital Territory (ICT), Balochistan, Khyber Pakhtunkhwa, Punjab, and Sindh, are presented in 10 tables and one figure. These models are based on the following datasets and their sources.

Dataset	Source	Availability	Variable	Reference
Population data from the Pakistan Bureau of Statistics (2017)	Pakistan Bureau of Statistics (2017)	Public. Data was compiled from: https://www.pbs.gov.pk/content/final-results-census-2017	Population	B22:C27 on 'inputs' sheets
			Population growth rate	B9:B10 on 'inputs' sheets
Private ECE enrolment	Pakistan Education Statistics report 2020-21	Public. Data was compiled from: https://pie.gov.pk/Sitelma/ge/Publication/PES%202020-21.pdf	Private ECE enrolment	E47, E50 on 'inputs' sheets
Education data provided	Relevant provincial EMIS	Private. Provided to authors by relevant	Public ECE enrolment	D47, D50 on 'inputs' sheets

¹ <https://www.pbs.gov.pk/content/final-results-census-2017>

² <http://www.emis.gob.pk/>; <https://semis.rsu-sindh.gov.pk/>; <https://open.punjab.gov.pk/schools/>; https://ese.kp.gov.pk/page/education_management_information_system_emis; <http://hrmis.fde.gov.pk/>;

³ The rates used for each province are available online at <https://www.pbs.gov.pk/content/final-results-census-2017-0>, Table 1. These are 2.4 for Pakistan overall, 2.13 percent for Punjab, 2.89 percent for KP, 2.41 for Sindh, and 3.37 for Balochistan. While newer population growth rates are available from the 2023 census, age-wise population estimates are not yet published. Hence these newer growth rates were not used.

by provincial Education Management Information Systems (EMIS)		provincial education department; 2022	Dropout rates in ECE (same rate as public replicated for private and 'others' category)	Row 34 and 37 on 'inputs' sheets
			Repetition rates in ECE (same rate as public replicated for private and 'others' category)	Row 34 and 37 on 'inputs' sheets
			Number of ECE teachers	C62, C65 on 'inputs' sheets
			Number of ECE caregivers	M62, M65 on 'inputs' sheets
			Number of trained ECE teachers	H62, H65 on 'inputs' sheets
			Number of ECE classrooms	C76, C79 on 'inputs' sheets
			Number of ECE kits	M76, M79 on 'inputs' sheets
			Number of reading corners	R76, R79 on 'inputs' sheets
Primary Education budget data from the Institute of Social and Policy Sciences (I-SAPS)	I-SAPS	Public. Data was compiled from: http://i-saps.org/upload/report_publications/docs/1697711647.pdf	ECE salary budget (estimated by authors using primary education budget data)	G122: K122 on 'inputs' sheets
			ECE non-salary budget (estimated by authors using primary education budget data)	G123: K123 on 'inputs' sheets
			ECE development budget (estimated by authors using primary education budget data)	G124: K124 on 'inputs' sheets
			Education budget	G126: K126 on 'inputs' sheets
Education unit costs from the provincial education departments	Relevant provincial education departments	Private. Provided to authors by relevant provincial education department; 2022	Unit costs by item	C102:C114 on 'inputs' sheets

Description of exhibits

In the following table, the outputs of each table and figure are explained.

Table/Figure	Description
Table 1	It shows the baseline data used by the model. It has been collected from the above sources and presented to give a snapshot of the baseline figures.
Figure 1	It shows the share of education budgets allocated for ECE in ICT, four provinces, and combined for Pakistan. ECE budgets are estimated using primary education budgets, while overall education budgets are available. The proportion of ECE budget and education budget is presented in this figure.
Table 2	It shows the projections for ECE budgets for ICT, four provinces, and combined for Pakistan using the trends from the last five years. This is the business-as-usual scenario where the previous trends are used to project future allocations.
Table 3	This table presents the ECE budget projections for medium coverage (62 percent enrollment) using a core package. A core package

	assumes using the existing ECE facilities to the maximum such that there are no additional investments into infrastructure and curtailing supporting interventions like school meals, which are added as part of the other packages considered in this paper.
Table 4	This table presents the ECE budget projections for full coverage (100 percent enrollment) using the core package explained above.
Table 5	This table presents the ECE budget projections for medium coverage using an augmented package. An augmented package assumes an augmented service delivery package and includes additional strategies to ensure quality ECE delivery, like capacity building of ECE human resources and providing school meals to children.
Table 6	This table presents the ECE budget projections for full coverage using an augmented package as explained above.
Table 7	This table presents the ECE budget projections for medium coverage using an alternate delivery mechanism. An alternate delivery package introduces cost-effective service delivery mechanisms that can also deliver quality ECE. For example, providing education vouchers to parents for enrolling their children in private schools and community construction as the alternate modalities.
Table 8	This table presents the ECE budget projections for full coverage using an alternate delivery mechanism as explained above.
Table 9a	This table provides a summary of all the four scenarios used in the paper. The figures are presented in billions of PKR.
Table 9b	This table provides a summary of all the four scenarios used in the paper. The figures are presented as percentage of GDP. Percent of GDP computed using GDP at current market prices of 84,068.76 billion in 2023 from the State Bank of Pakistan (SBP) and an average annual growth rate of 2.5% as per SBP.