Inequality of Opportunity in Asia and the Pacific

Birth Registration
The shaded areas of the map indicate ESCAP members and associate members.

The Economic and Social Commission for Asia and the Pacific (ESCAP) serves as the United Nations’ regional hub promoting cooperation among countries to achieve inclusive and sustainable development. The largest regional intergovernmental platform with 53 Member States and 9 associate members, ESCAP has emerged as a strong regional think-tank offering countries sound analytical products that shed insight into the evolving economic, social and environmental dynamics of the region. The Commission’s strategic focus is to deliver on the 2030 Agenda for Sustainable Development, which it does by reinforcing and deepening regional cooperation and integration to advance connectivity, financial cooperation and market integration. ESCAP’s research and analysis coupled with its policy advisory services, capacity building and technical assistance to governments aims to support countries’ sustainable and inclusive development ambitions.

Copyright © United Nations, 2024
All rights reserved
Printed in Thailand
ST/ESCAP/3123

Disclaimer

The views expressed in this publication are those of the authors and do not necessarily reflect the views and policies of the United Nations or other international agencies. The publication has been issued without formal editing. Reproduction and dissemination of material in this publication for educational or other non-commercial purposes are authorized without prior written permission from the copyright holder, provided that the source is fully acknowledged. For further information on this publication, please contact:

Social Development Division
Economic and Social Commission for Asia and the Pacific
United Nations Building
Rajadamnern Nok Avenue
Bangkok 10200, Thailand
Email: escap-sdd@un.org
Website: www.unescap.org
Inequality of Opportunity in Asia and the Pacific

Birth Registration
Acknowledgements

The paper was prepared under the leadership of Katinka Weinberger, Chief, Sustainable Socioeconomic Transformation Section, Social Development Division, and guidance of Selsah Pasali, Social Affairs Officer. Orlando Roman led the drafting of this paper. Research assistance and document support was provided by Weixun Hu, Zilu Zhou and Pornnipa Srivipapattana.

The paper benefitted from review and valuable inputs provided by Petra Nahmias and Tanja B. Sejersen from ESCAP Statistics Division.

The graphic design was done by Daniel Feary.
Table of contents

Acknowledgements .................................... 2
About the Inequality of Opportunity papers .......... 5
1. Introduction and scope ............................ 6
2. Identifying the circumstances associated with birth registration ............................ 10
3. Policies to bolster birth registration in Asia and the Pacific ............................ 20
Annex 1: Methodology for identifying gaps in access to barriers and opportunities .................................................. 22
References ............................................. 26
List of boxes

2.4 Where are the differences in birth registration highest? 15

List of figures

Figure 1 Classification and regression tree (CART) for birth registration completeness rate in Pakistan, where poorer (bottom 40) children with two or more siblings are furthest behind group, 2017 11

Figure 2 Classification and regression tree (CART) for birth registration completeness in Lao People’s Democratic Republic, where poorer (bottom 40) boys whose mother has lower education and with one or more siblings are the furthest behind groups, 2017 12

Figure 3 National differences in birth registration completeness rates in Asia and the Pacific, latest year 13

Figure 4 Birth registration completeness rates, and difference between the furthest behind and the furthest ahead groups in birth registration, latest year 14

Figure 5 Inequality in birth registration completeness rates (D-index), latest year 16

Figure 6 Inequality in birth registration completeness rates (D-index) and average birth registration completeness rates, latest year 16

Figure 7 Gaps in birth registration completeness, change over time 19

List of tables

Table 1 The shared circumstances of the furthest behind children under 5, latest year 18

Table A1 List of countries and survey years 22

Table A2 Selected Indicators and Factors 25
About the Inequality of Opportunity papers

The ESCAP *Inequality of Opportunity* papers place people in vulnerable situations at the heart of sustainable and inclusive development. They do so by identifying areas where inequality jeopardizes a person’s prospects, e.g.: education; women’s access to sexual and reproductive health care; children’s nutrition; decent work; basic water and sanitation; access to clean energy; financial inclusion; pandemic preparedness; and violence against women. Each of these opportunities is covered by specific commitments outlined in the 2030 Agenda for Sustainable Development and addressed in separate thematic reports covering 30 countries throughout Asia and the Pacific.

ESCAP first discussed inequality of opportunity in its 2015 report *Time for Equality*, establishing the distinction between inequality of outcome and inequality of opportunity. While the former depicts the consequences of unequally distributed income and wealth, the latter is concerned with access to key services necessary to realize one’s human rights and fundamental freedoms.

The *Inequality of Opportunity* papers apply a novel approach to analyzing household surveys with the aim of identifying the groups of individuals with the lowest access to the above-referenced opportunities. These groups are defined by common circumstances over which the individual has no direct control at the time of measurement of the key outcome, such as their wealth, place of residence and education level, amongst others, unlikely to change swiftly.

In addition to identifying the furthest behind, the *Inequality of Opportunity* papers also explore the gaps between groups in accessing these key opportunities, as well as the extent to which these have narrowed or widened over time. They also review overall inequality trends in these opportunities.

Ultimately, these findings are of direct use for generating discussion on transformations needed to reach the “furthest behind first” as pledged in the 2030 Agenda for Sustainable Development.

---

**Note:**

1. All policy papers follow the same methodology using the latest publicly available DHS and MICS data, except for decent work, where slight modifications are due to the use of a different dataset.
1. Introduction and scope

Birth registration is a crucial element of civil registration and vital statistics (CRVS) systems, playing a pivotal role in the global commitment to “leave no one behind”. This foundational act not only establishes a person’s identity through an official and permanent record of the existence of an individual and the recognition of that individual as a person before the law but also affirms their family relationships, promoting, protecting, and supporting their access to a wide array of social, political, and economic rights and services throughout their lives. The absence of birth registration can render individuals stateless and invisible to their governments, leading to exclusion from essential services, restricted societal participation, and increased vulnerability to violence, exploitation and abuse.

Defined as “the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events pertaining to the population, as provided through decree or regulation in accordance with the legal requirements in each country”, CRVS systems are essential for both individuals and societies. Birth registration ensures a legal identity, as enshrined in the Universal Declaration of Human Rights, protecting rights to property, inheritance, and legal protection, and facilitating access to education, healthcare, and social services. Legal identity is also crucial for taxation and domestic resource mobilization. For governments and policymakers, these systems enhance governance transparency and accountability, enabling more effective policymaking and service delivery. Birth registration is vital across a person’s lifespan. For children, it is an important step for their protection against child marriage and unlawful adoption but must be complemented by the enforcement of their right to be treated as a child in respective juridical system. It also supports their right for education. For the working-age individuals, it enables access to formal employment and social protection, essential services, and political rights and ownership of assets, such as land. For the elderly, it is crucial for verifying age and accessing pensions and benefits.

Member States in Asia and the Pacific proclaimed the period of 2015-2024 as the Asian and Pacific CRVS Decade through the Ministerial Declaration to “Get everyone in the picture” in Asia and the Pacific following the first Ministerial Conference on CRVS in November 2014. Their aim was and still is to realize their shared vision of universal and responsive CRVS systems in the region that leave no one behind. They also endorsed the “Regional Action Framework on civil registration and vital statistics in Asia and the Pacific” and committed to its implementation through comprehensive, integrated and concerted efforts to achieve the shared vision which includes three goals and 15 targets. In 2018, member States adopted the ESCAP Resolution 74/8 entitled “Accelerating the implementation of the Regional Action Framework on Civil Registration and Vital Statistics in Asia and the Pacific”, which recognized the progress made since 2014 along with the importance of CRVS in advancing the 2030 Agenda for Sustainable Development but noted that stronger coordination, monitoring and knowledge-sharing was needed to achieve the goals of the CRVS Decade. In 2021, the second Ministerial Conference on CRVS convened in the context of the coronavirus disease (COVID-19) pandemic adopting the Ministerial Declaration on “Building a more Resilient Future with Inclusive Civil Registration and Vital Statistics” which emphasized the importance of strengthening CRVS to support resilience from disasters and ensure inclusive recovery from crises. The Declaration then called for identification and assessment of inequalities related to CRVS and removing all barriers to CRVS especially for people in vulnerable situations including women and children, internally displaced persons, domestic workers, foundlings and persons without documentation. In the following year, member States adopted the ESCAP Resolution 78/4 endorsing the Ministerial Declaration and requested ESCAP to continue to support countries in the region with the implementation of the regional action framework and convene the third Ministerial Conference in 2025.
However, in 2019, 64 million children under 5 years of age were unregistered in Asia and the Pacific.\footnote{In 2019, 64 million children under 5 years of age were unregistered in Asia and the Pacific.} Fifty million resided in South and South-West Asia, constituting 78 per cent of all unregistered children under 5 in the region.\footnote{Moreover, at least 16 countries reported that less than 90 per cent of their under-5 population was registered, with countries like Afghanistan and Pakistan registering less than half.} Such gaps exacerbate systemic inequalities—evidenced by birth registration completeness in the wealthiest quintile being double those in the poorest.\footnote{Despite efforts to strengthen CRVS systems over the past years, millions of children under 5 are projected to remain unregistered by 2030, underscoring the need for continued focus and action to leaving no one behind by improving birth registration and CRVS systems in general.} 18 countries in Asia and the Pacific require birth certification for vaccination and immunization, while over 34 countries require birth certificates for school enrollment and to obtain national identity card or passport.\footnote{Further, birth registration plays a significant role in reducing statelessness and ensuring visibility before the law, issues that disproportionately affect marginalized communities and exacerbate inequalities (SDG 10).} Furthermore, high-quality and up-to-date data on birth registration are essential for monitoring progress and achieving the SDGs by facilitating targeted interventions and the efficient allocation of resources (SDG 17).

\subsection*{1.1 Birth registration and the 2030 Agenda for Sustainable Development}

Birth registration helps ensure that every individual, regardless of their birthplace or circumstances, is acknowledged by their government. This is fostered through Sustainable Development Goal (SDG) 16, where Member States committed to “provide legal identity for all, including birth registration by 2030” (Target 16.9).

Focusing on birth registration is vital for realizing various rights and services, and is integral to achieving the 2030 Agenda for Sustainable Development. Birth registration is key for accessing social protection and financial services and establish ownership of assets (i.e., land or house) (SDG 1), thus contributing to poverty reduction efforts.\footnote{On the other hand, demand-side constraints arise from potential registrants and their families. These are often due to limited public awareness of birth registration’s importance, cultural stigma, absence of services in minority languages, direct or indirect costs associated with birth registration, or simply a lack of compelling reasons to register children under 5. In India, factors such as the mother’s lack of formal education, limited exposure to media, belonging to the poorest wealth quintiles, or identification with marginalized classes or as Muslims are linked to lower birth registration completeness rates.\footnote{In the Lao People’s Democratic Republic, birth registration among children under 5 is influenced by ethno-geographic factors, such as...} It also supports access to national identity cards, passports, free healthcare if available, and immunizations (SDG 3). For instance,}
location of residence and their mother’s minority identity. Some parents may also deliberately avoid registration for various reasons. For example, being unregistered can act as a shield against state scrutiny, or concealment if children are out of school and/or involved in illegal work.

In reality, demand-side and supply-side factors interact in unique ways in different contexts and constrain the completeness of birth registration. For example, in Indonesia, significant barriers such as the cost of registration, the distance to registration centers and lack of awareness hindered birth registration completeness of children under 5. Even though birth registration has become free in Indonesia, indirect costs still remain along with awareness problems particularly among households in vulnerable situations, leading to about 60 per cent of children not having their birth registered by their first birthday.

Still, many countries in Asia and the Pacific have made significant progress in improving birth registration and CRVS systems. The number of children under 5 years of age whose birth was never registered decreased by more than half from 2012 to 2019 which is partly thanks to the action taken by member States in achieving the three goals and 15 targets of the Regional Action Framework on CRVS. For example, the Fijian government introduced the “Parenthood Payment Assistance Payment Programme” in 2018. This initiative offered financial incentives to encourage parents to register births promptly. Preliminary results indicate that this policy led to an increase in birth registration among children born within one year after the introduction of this policy compared with children born within a year before. Similarly, Indonesia made a pioneering move in 2014 by launching an integrated mobile legal identity service. This approach harmonized the birth registration process across various CRVS institutions, leading to a more streamlined and efficient system. This approach had additional benefits, as it also provided consistent treatment for both Muslim and non-Muslim populations during registration. Countries have also been investing in increasing the resilience of their CRVS systems in the face of natural disasters (i.e., Vanuatu) or COVID-19 pandemic (i.e., Malaysia) and eliminating statelessness (i.e., Kyrgyzstan) in the face of political change. Overall, CRVS issues are increasingly being addressed in a coordinated and multisectoral manner in alignment with the commitments and principles of the Regional Action Framework on CRVS in Asia and the Pacific.

Still, many countries in Asia and the Pacific have made significant progress in improving birth registration and CRVS systems. This outcome is directly linked with SDG 16, indicator 16.9.1, which measures the “proportion of children under 5 years of age whose births have been registered with a civil authority, by age”. Whether a child’s birth is registered with the national authorities is based on a positive response from either their mother, primary caretaker, or the household head, to either of the questions in nationally representative household surveys:

1. “Does (name) have a birth certificate?”; and
2. “Has (name)’s birth been registered with the Civil Registration Authority?”

The exact questions vary depending on the used survey and country (see Annex 1). This methodology provides a straightforward means of measuring birth registration in the target populations. Respondents are asked to show proof of birth certificates, as well. However, it has
important limitations including self-reporting and survivor bias, among others.

To ensure a consistent, temporal comparison across countries, the paper utilizes household data from the Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Survey (MICS) for 27 countries in Asia and the Pacific. The analysis records a child as having their birth registered if either their mother, primary caretaker or household head gives a positive response to any of these questions in the DHS or MICS surveys (see Table A2 in Appendix). The paper employs innovative techniques in examining differences in birth registration completeness among children under 5 years of age, focusing on their shared socioeconomic circumstances. When analyzing micro data from MICS, the selection of variables related to these circumstances is aligned with existing empirical research elaborated in Section 1.2, encompassing all potential determinants across survey modules. This includes data on children under 5 years of age, women aged 15-49, and household-level characteristics. For DHS countries, these variables are found in the household and household member modules.

The paper does not attempt to identify causal factors influencing birth registration completeness, as this would require more complex empirical methods than innovative disaggregation methodologies to address issues of endogeneity. Multivariate regression models with instrumental variables or impact evaluation methodologies for policy experiments are ideally suited for causal analysis. In addition, the paper does not explore determinants such as distance to registration centers, cost of birth registration, availability of information about birth registration, awareness of the registration process, and cultural norms impacting registration likelihood due to the lack of data. The results may also be influenced by measurement errors surrounding birth registration. Ultimately the aim of this paper is to apply an innovative methodological approach, the classification and regression tree approach (CART) and the dissimilarity index (D-Index) to explore the shared circumstances of the most disadvantaged groups of children under 5 in birth registration, the “furthest behind” groups, within and across countries and over time in Asia and the Pacific. The results may inspire further empirical research at national and subnational levels.
2. Identifying the circumstances associated with birth registration

The 2030 Agenda for Sustainable Development calls on Member States to provide legal identity for all, including birth registration. This sectionunpacks differences in birth registration completeness rates and aims to uncover the shared characteristics among children under 5 years of age most and least likely to have their birth registered with the national authorities. In doing so, the section aims to inform policy making and interventions strategies intended at improving birth registration completeness rates in Asia and the Pacific.

2.1 Which children under 5 years of age are less likely to have their birth registered?

This paper investigates disparities in birth registration completeness rates among children under 5 using the classification and regression tree (CART) methodology. Using DHS and MICS data from 27 countries between 2010-2022, an algorithm splits the sample into groups of children having their birth registered, based on the following circumstances: wealth of the household where the children under 5 currently reside (belonging to the top 60 or the bottom 40 of the household wealth distribution); place of residence (urban or rural); age group of the children in months (0-11 months, 12-23 months, 24-35 months, 36-47 months, and 48-59 months); educational attainment of the mother (lower education, secondary education, or higher education); number of children under 5 years of age in the household (none (<0.5), 1 or more (>0.5), 2 or more (>1.5), 3 or more (>2.5), fewer than 2 (<1.5), fewer than 3 (<2.5)); and sex of the child (male or female). In each iteration, the algorithm identifies children with the highest and lowest birth registration completeness rates with the national authorities. These groups of children under 5 are exclusive and exhaustive, ensuring that each child is classified into a unique category of the tree structure. To avoid a too small sub-sample size, the analysis ceases to make additional partitions if the resultant nodes would fail to contain either 9 per cent of the total sample population or an absolute value of 49 survey respondents (see Annex 1).

The selection of these circumstances aligns with the suggested disaggregation of SDG 16.9 and is guided by several criteria. First, the 2030 Agenda emphasizes the importance of data disaggregation by various demographic factors, including income, age, location, ethnicity, among others. In the case of SDG indicator 16.9.1, the agenda calls for disaggregation by age. Second, these factors are commonly included in the existing empirical literature on birth registration. In addition, an ESCAP study investigating birth registration determinants in Asia and the Pacific identified these factors as highly significant. Finally, these variables are chosen for their largely exogenous or predetermined nature in relation to the responses provided by the child’s mother, primary caretaker, or household head at the time of the survey.

To illustrate how different circumstances may interact to produce a disadvantage in birth registration completion, Pakistan and Lao People's Democratic Republic are selected as country case studies due to their large differences between the “furthest behind” and the “furthest ahead” children. The CART analysis first introduces Pakistan as an example. The binary regression tree for Pakistan shows that 42 per cent of children under 5 years of age have their birth registered with the national authorities (Figure 1).

Considering all circumstances included in the model, the CART algorithm finds that wealth of the household where the children under 5 currently reside contributes to the highest variation in

\[iv\] It is important to note that the results presented in Figure 1 are at national level which may be influenced by different birth registration processes across different provinces of Pakistan.
disaggregating the national average: 18 per cent of children living in households from the bottom 40 per cent of the wealth distribution have their birth registration completed, compared to 61 per cent of children living in households from the top 60 per cent of the wealth distribution. No other circumstance leads to such a stark differentiation within the national average. The second split within children in poorer (bottom 40) households identifies age of children with significant variation: children under 2 years of age are less likely to be registered compared to children aged 3 years or above (15 per cent vs. 21 per cent, respectively). There are no further splits in this group which could mean that the remaining set of circumstances including the place of residence, sex and educational attainment of mother do not explain sufficient variation.

Terminal node now represents over 20 per cent of children under 5 so technically it could be split if there was sufficient variation.\textsuperscript{v}

On the contrary, the second split within children in richer (top 60) households refers to the educational attainment of the mother: children whose mother has secondary or higher education are better-off when compared to children whose mother has lower education (72 per cent vs. 57 per cent, respectively). There are no further splits in this group.

The classification and regression tree shows that in Pakistan as of 2017, children living in poorer households who are less than or equal to 2 years old are the furthest behind group, i.e., they have the lowest likelihood of having their birth registered. In this group, which comprises

\textsuperscript{v} Such differences may or may not be statistically significant, as often tested in parametric models. The CART methodology is a nonparametric methodology driven by ANOVA with an objective to minimize the sum of squared errors at each step. See Annex 1 for more information about the methodology. For more information on Pakistan, see UNICEF’s summative evaluation of its “Digital Birth Registration Programme” in 2017-2021 period here.
24 per cent of children under 5 years of age in the country, only 15 per cent have their birth registered. In other words, 85 per cent are left behind. This stands in contrast to the furthest ahead group, richer (top 60) children whose mother has secondary or higher education, which comprises 12 per cent of children under 5 years of age in the country, and where 72 per cent have their birth registered. In other words, 28 per cent are left behind.

Figure 2 presents the classification and regression tree for Lao People’s Democratic Republic. The binary regression tree again starts with the national birth registration completeness rate, at 58 per cent. Similar to the case of Pakistan, the CART algorithm finds that wealth of the household where the children under 5 currently reside contributes to the highest variation in disaggregating the national average: 40 per cent of children living in households from the bottom 40 per cent of the wealth distribution have their birth registered, compared to 74 per cent of children belonging to the top 60 per cent of the wealth distribution. The second split within children in poorer (bottom 40) households identifies the educational attainment of the mother as a key circumstance: children whose mother has lower education are worse-off when compared to children whose mother has secondary or higher education (38 per cent vs. 54 per cent, respectively). The third split within children in poorer (bottom 40) households whose mother has lower education identifies the number of children under 5 years of age in the household as a circumstance worth splitting. Those with 1 or more siblings under 5 are worse-off when compared to those with no siblings (35 per cent vs. 41 per cent). The final split within children in poorer (bottom 40) households whose mother has lower education and with one or more siblings under 5 is the sex of the child: boys are worse-off than girls (32 per cent vs. 37 per cent, respectively).

FIGURE 2
Classification and regression tree (CART) for birth registration completeness in Lao People’s Democratic Republic, where poorer (bottom 40) boys whose mother has lower education and with one or more siblings are the furthest behind groups, 2017

Source: ESCAP calculations based on latest MICS data from 2017. The LNOB trees shows birth registration completeness rate as captured by SDG 16.9.1, which measures the “proportion of children under five years of age whose births have been registered with a civil authority, by age”. For an animation of LNOB trees, please visit ESCAP LNOB Platform at https://lnob.unescap.org/methodology.

vi This national average does not include children whose births are recorded in family book. If they were to be categorized as birth registration completed, then this national average would increase to 73 per cent.
The lower branch of this tree is much more nuanced. It shows that in Lao People’s Democratic Republic as of 2017, boys in poorer (bottom 40) households with one or more siblings under 5 whose mother has lower education are the furthest behind group in birth registration completion. In this group, which comprises 11 per cent of children under 5 years of age in the country, only 32 per cent have their birth being registered, relative to the 58 per cent birth registration on average at the national level. In other words, 68 per cent of children in this group are left behind as opposed to 42 per cent being left behind at national level.

The same regression and classification tree analysis is produced for all 27 countries with available data. These trees are used as the basis for the various types of data analysis presented in this study. Using more recent and granular national data may produce more nuanced results and could improve the analysis further. The following section presents key findings from the most recent publicly available DHS and MICS surveys at the time of writing.

2.2 How large are the differences across countries in birth registration?

In the 27 countries included in this analysis, more than 80 per cent of children under 5 on average have their birth registered (Figure 3). The classification and regression tree analysis described above facilitates a comparison of differences in birth registration completeness rates both within and across countries. Figure 3 illustrates this: the blue line on each bar represents the children under 5 with the highest birth registration completeness rate, i.e., the furthest ahead group in each country. Conversely, the orange line represents the children under 5 with the lowest rate, i.e., the furthest behind group in each country. The actual composition of the furthest behind children

---

**FIGURE 3**

National differences in birth registration completeness rates in Asia and the Pacific, latest year

Source: ESCAP calculations based on latest DHS and MICS surveys from 2010-2022.
is discussed later in this section and shown in Table 1. The gray line across each bar shows the average birth registration completeness rate, by which countries are sorted.

In countries like Afghanistan, Lao People’s Democratic Republic, Pakistan, Papua New Guinea and Timor-Leste, less than 40 per cent of children in the furthest behind group have their birth registered implying that over 60 are left behind. Notably, in Pakistan and Papua New Guinea, this figure drops below 20 per cent leaving over 80 per cent behind.

The relationship between overall birth registration and gaps in birth registration between the furthest behind and the furthest ahead children is captured by using a polynomial equation (Figure 4). An inverted U-shaped pattern is expected: countries with very low or very high birth registration completeness rates tend to exhibit smaller gaps between groups of children with different circumstances. This pattern is observed across the region. However, Fiji, Indonesia, Kiribati, Lao People’s Democratic Republic, Myanmar, Pakistan, and Samoa have larger gaps than those predicted by their average birth registration completeness rates. In contrast, countries like Armenia, Kyrgyzstan, Maldives, Mongolia, Tajikistan, Thailand, Tonga, Turkmenistan, Uzbekistan, and Viet Nam exemplify how differences are close to zero when a high percentage of children are registered.

2.3 Measuring inequality in birth registration completeness within countries

The first step to measuring differences in completeness of birth registration is to identify all possible groups of children under 5 and their group-specific birth registration completeness rates. The dissimilarity index, or D-Index,
compares the birth registration completeness of each of these groups of children with the national average in each country (Box 1).

The D-Index is used to represent overall differences in birth registration completeness rates. Similar to the Gini coefficient, a value of zero implies that births of all children under 5 are registered with no one left behind. A value of one means that only a specific group of children under 5 have their birth registered, while all other groups of children have not.

**BOX 1 Calculating the Dissimilarity Index**

The dissimilarity index, or D-Index, measures how all different groups of children fare in terms of having their birth registered. To obtain the D-Index for each country, birth registration is calculated using the following equation:

\[
D = \frac{1}{2p} \sum_{i=1}^{n} \beta_i |p_i - \bar{p}|,
\]

where \(\beta_i\) is the weighted sampling proportion of group \(i\), (sum of \(\beta_i\) equals 1), \(\bar{p}\) is the average birth registration completeness rate in the country, and \(p_i\) is the birth registration completeness rate of population group \(i\), and takes values from zero to 1. There are “\(n\)” number of groups defined by using the interactions of circumstances selected for the analysis.

Six circumstances are used to determine the number and composition of the groups of children: wealth of the household where the children under 5 currently reside (2 groups); place of residence (2 groups); age group of the children in months (5 groups); educational attainment of the mother (3 groups); number of children under 5 years of age in the household (6 groups); and gender of the child (2 groups). This produces \(n=720\) groups (2×2×5×3×6×2), covering the entire sample population. In practice, the D-Index summarizes how much the birth registration completeness rates in these 720 groups are different from the national average.

**2.4 Where are the differences in birth registration highest?**

Inequality in birth registration is highest in countries with lower birth registration rates. For example, countries such as Afghanistan, Lao People’s Democratic Republic, Pakistan, Papua New Guinea, and Samoa have higher D-Indices, meaning that some groups of children with common characteristics are less likely to have their birth registered compared to the average child in the country. Countries including Armenia, Kyrgyzstan, Maldives, Mongolia, Tajikistan, Thailand, Turkmenistan and Uzbekistan have low D-Indices (Figure 5). In other words, the average birth registration completeness rate is not very different across different groups of children under 5. In the latter group of countries, birth registration is either complete or almost complete among children under 5 years of age.

“Similar to the Gini coefficient, a value of zero implies that births of all children under 5 are registered with no one left behind. A value of one means that only a specific group of children under 5 have their birth registered, while all other groups of children have not.”

When comparing the D-index with the average birth registration completeness rate, inequalities in birth registration completeness tend to be higher where a lower share of children under five have their births registered (Figure 6, upper left quadrant). In contrast, countries with a higher share of children under 5 having their birth registered have less inequality (Figure 6, lower right quadrant).
2. IDENTIFYING THE CIRCUMSTANCES ASSOCIATED WITH BIRTH REGISTRATION

FIGURE 5
Inequality in birth registration completeness rates (D-Index), latest year

Source: ESCAP calculations based on latest DHS and MICS surveys from 2010-2022.

FIGURE 6
Inequality in birth registration completeness rates (D-Index) and average birth registration completeness rates, latest year

Source: ESCAP calculations based on latest DHS and MICS surveys from 2010-2022.
2.5 The characteristics of children with the lowest birth registration completeness

This section narrows the focus on the furthest behind children, i.e., those children with the lowest birth registration completeness rate in each country, and identifies the common circumstances that they share. Although these circumstances might not be the same across the 27 countries analyzed, several commonalities are found. Table 1 lists the circumstances of children under 5 with the lowest likelihood of having their birth registration completed (columns 2-7), as well as the size of the population they represent (column 8).

“Age of child, measured in months in MICS and years in DHS, consistently matter in identifying children left furthest behind in 19 countries. In the majority of cases, children under one year of age are left behind. Household wealth comes next with children living in poorer households located at the bottom 40 per cent of the wealth distribution are also less likely to have their birth registration completed. Sex of child also matters but there is no consistent gender bias against girls or boys. Maternal education comes next with children whose mothers have lower education at a disadvantage. Place of residence appears as a key circumstance identifying furthest behind children only in Armenia and Papua New Guinea with children living in rural areas at a disadvantage. Moreover, many of these furthest behind children represent a high share of the total population of children under 5 in their respective countries. For example, in Bangladesh, Pakistan, Papua New Guinea, Samoa and Timor-Leste, the furthest behind children represent at least 20 per cent of the total population of children under 5 in the country.”

2.6 Are the differences in birth registration declining over time?

This section reviews the birth registration completeness rates where two different surveys are available at different points in time. Specifically, it explores: i) if the average birth registration completion has increased over time, indicating an improvement in birth registration completeness in the country; and ii) whether the gap between the furthest behind children, i.e., those with the lowest birth registration rate, and the average birth registration has narrowed over time, indicating an improvement for the furthest behind groups when compared to the national average (Figure 7).

“Improvement in birth registration completion for the furthest behind children has been recorded in Nepal, Philippines Turkmenistan and Viet Nam, indicating that, on average, birth registration completion has improved for those most marginalized children. In all countries, the gap between the furthest behind children and the average birth registration completeness rate has also decreased, indicating efforts to leave no one behind. The case of Nepal is particularly interesting since birth registration completeness rate at national level decreased from 75 per cent in 2019 to 72 per cent in 2022 which may be related to the source of data as MICS was collected in 2019 and DHS was collected in 2022.”

On the other hand, there is a notable increase in the gap between furthest behind and average children in Afghanistan from 2010 to 2022. While the birth registration completeness rate on average increased from 37 per cent to 48 per cent, there was virtually no change among furthest...
## TABLE 1
The shared circumstances of the furthest behind children under 5, latest year

<table>
<thead>
<tr>
<th>COUNTRIES</th>
<th>WEALTH</th>
<th>RESIDENCE</th>
<th>EDUCATION LEVEL OF THE MOTHER</th>
<th>CHILD’S AGE GROUP (IN MONTHS)</th>
<th>CHILD’S AGE GROUP (IN YEARS)</th>
<th>NUMBER OF CHILDREN UNDER 5 YEARS OF AGE</th>
<th>GENDER</th>
<th>SIZE OF THE FURTHEST BEHIND GROUP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>B40</td>
<td></td>
<td></td>
<td>24 months and above</td>
<td>4 years old</td>
<td>3 or more children under 5</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Armenia</td>
<td></td>
<td></td>
<td>Lower or secondary education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Bangladesh</td>
<td></td>
<td></td>
<td>0-11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Cambodia</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>Less than 1 year old</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Fiji</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>0-11</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Indonesia</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>Less than 2 years old</td>
<td>Female</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Kiribati</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>0-11</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0-11</td>
<td>Female</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>B40</td>
<td></td>
<td>Lower education</td>
<td></td>
<td>2 or more children under 5</td>
<td>Male</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Less than 1 year old</td>
<td>Male</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Mongolia</td>
<td></td>
<td>Rural</td>
<td></td>
<td></td>
<td>0-11</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Myanmar</td>
<td>B40</td>
<td></td>
<td>Lower education</td>
<td></td>
<td>2 or more children under 5</td>
<td>Female</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Less than 1 year old</td>
<td></td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Pakistan</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>Less than 3 years old</td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>B40</td>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>Philippines</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>Less than 2 years old</td>
<td>2 or more children under 5</td>
<td>Female</td>
<td>9</td>
</tr>
<tr>
<td>Samoa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0-11</td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>Less than 1 year old</td>
<td></td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>B40</td>
<td></td>
<td></td>
<td></td>
<td>Less than 1 year old</td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Tonga</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0-11</td>
<td></td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>B40</td>
<td></td>
<td>Secondary or higher education</td>
<td>0-11, 24-35</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Viet Nam</td>
<td></td>
<td></td>
<td>Lower education</td>
<td>12-23, 24-35</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>9</td>
<td>4</td>
<td>6</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: ESCAP calculations based on latest DHS and MICS surveys from 2010-2022. Bhutan, Kazakhstan, Thailand, Turkmenistan, and Uzbekistan are not shown, as the national average rate and furthest behind rate are 99 per cent or above.

Note: B40 refers to households belonging to the bottom 40 of the wealth distribution, while T60 refers to those at the top 60 of the wealth distribution.
behind children. In Lao People’s Democratic Republic, the gap between average children and furthest behind children remained wide over the years. While birth registration completeness rate seems to have decreased over time, this is also due to the fact a distinction was made between family book and birth registration certificate in Lao People’s Democratic Republic. In 2017, children whose birth registration was recorded only in the family book are not categorized as their birth registration completed. Even when they are included there is a slight decrease in birth registration completeness rate in Lao People’s Democratic Republic from 74.8 per cent in 2011-2012 to 73 per cent in 2017.

It is important to note this progress is not always fully comparable because the time lag between two surveys spans from different years across countries. Furthermore, the composition of the furthest behind children may vary between the two surveys, and many other factors could be masking these results. The findings should therefore be viewed with caution.

**FIGURE 7**
Gaps in birth registration completeness, change over time

Source: ESCAP calculations based on latest DHS and MICS surveys from 2010-2022.
Note: pp=percentage points

- **Average rate**
- **Rate furthest behind group**
- **Gap is increasing**
- **Gap is decreasing**
3. Policies to bolster birth registration in Asia and the Pacific

Increasing birth registration completeness in Asia and the Pacific is a vital step towards achieving inclusive social development and upholding basic human rights. Birth registration is more than just a formality; it is the first legal acknowledgment of a child’s existence and is foundational to safeguarding their rights throughout life. A registered birth serves as the primary legal document to establish one’s identity, nationality, age, and family relations. This is crucial for protecting children from abuse, exploitation, and trafficking, and for ensuring their access to essential services throughout their life. The transformational pledge of Agenda 2030 on leaving no one behind cannot be achieved when births of millions of children are not registered. Since children living in vulnerable situations are overrepresented among the furthest behind, their invisibility contributes to rising inequalities over generations.

Concerted efforts by governments are required to leverage the rich potential of birth registration data for nuanced, evidence-based policymaking. By disaggregating birth registration completeness rates in Asia and the Pacific through an innovative methodology, this Paper shows that many countries have universal or near-universal birth registration for children under 5 years of age. However, countries with substantial gaps such as Afghanistan, Bangladesh, Lao People’s Democratic Republic, Pakistan, and Papua New Guinea should accelerate efforts to ensure that all births are registered while other countries should strive for closing remaining small gaps in birth registration completeness. While there are numerous circumstances that are associated with birth registration, findings indicate that children under one year of age living in poorer (bottom 40) and larger households (with two or more children under 5 years of age) are the most common furthest behind children. Getting everyone in the picture and leaving no one behind implies that accelerated policy action is needed in a context-specific manner targeting furthest behind children.

The following are key considerations to assist policymakers in their commitment to “provide legal identity for all, including birth registration by 2030” (SDG Target 16.9):

1. Strengthen coordination of CRVS systems and health services: effective birth registration requires a seamless integration with the broader CRVS systems and other basic social services, especially health sector. This approach ensures that every birth is recorded not just at health facilities but also within community settings. Following the development of data sharing protocols among government agencies involved in civil registration process, non-ad hoc and impactful coordination and collaboration between these agencies must be promoted. Personal identification numbers (PIN) are highly needed in countries recording lower birth registration completion to allow linkages across databases. For instance, Thailand uses an electronic civil registration system directly feeding birth and death data into the population register. When Thailand introduced the universal health coverage policy in 2001, the existence of unique identification number and computerized civil registration database helped rapidly enroll beneficiaries in health insurance plans covering 75 per cent of population within a year.

2. Leverage digital innovations and information and communication technologies (ICT) to enhance accessibility: the use of ICT in civil registration processes can significantly increase both the accessibility and accuracy of birth registration. Effective implementation of digital technologies and solutions ensures that vital events are recorded promptly and accurately, even in remote and underserved communities. From notification to registration, validation and verification, digital tools are strengthening CRVS systems overall. In South-East Asia, Malaysia, Singapore and Thailand are leading the way in digitization and digitalization of CRVS systems. In Bangladesh, a pilot project leveraging a digital notification
system showcased the transformative impact of ICT in improving birth and death registration. This system, which included a mobile app and a call center, enabled various community sources, including health workers and local authorities, to report vital events effectively. Another example is Singapore's LifeSG app, which has transformed the way its citizens access government services, consolidating more than 70 services into a single digital portal. One of its notable achievements is the reduction of childbirth registration time, shrinking it from an hour to just 15 minutes, with the added convenience of instant digital birth certificate downloads and the possibility to apply for child benefits, with seven out of every ten births in Singapore are now registered using this app. Similarly, countries in Asia and the Pacific like Kazakhstan and Türkiye increasingly rely on e-government platforms to store and easily distribute birth registration certificates on demand.

3 Implement demand-side policies with effective advocacy: Demand-side policies, supported by robust advocacy and education campaigns, are crucial in raising awareness about the importance of birth registration. Culturally tailored campaigns can play a pivotal role in changing perceptions and increasing the demand for registration services. Strengthening local and community-level participation in birth registration processes is also vital, especially to address accessibility challenges faced by people in vulnerable situations in the form of language and physical barriers to registration, among others. The success of programs in countries like Indonesia, where community-based initiatives have been instrumental in reaching out to marginalized groups, demonstrates the effectiveness of this approach. Advocacy and awareness raising campaigns should be delivered through most effective means of communication in languages that are accessible to especially those who are poor and living in rural and remote areas. The importance of birth registration must be particularly communicated to teenage and unmarried mothers who can suffer from stigma at local level.

4 Offer incentives and outreach programs: Incentive-based programs, coupled with outreach efforts, can significantly improve birth registration completion, particularly in underserved areas. Economic incentives, even in modest amounts that provide stipends for travel costs or in-kind transfers such as essential supplies for newborns, can help nudge parents to take requisite action. Such incentives should be provided on a regular basis in a predictable manner and be complemented by outreach programs. For example, in the Philippines, the government’s Philippine Identification System (PhilSys) Birth Registration Assistance Project (PBRAP) effectively increased birth registration completion, especially among marginalized communities, and Muslim Filipinos, among others. The Project helped births in these communities to be registered in the Local Civil Registry Offices which will be followed by enrollment in PhilSys. Targeting marginalized communities, the project, launched in 2022, has processed over 900,000 birth records and issued over 10,000 Certificates of Live Birth. The initiative's success is attributed to its combined use of incentives and extensive outreach, backed by strong local government support. In an effort to reach remote locations, frequent mobile registration services should be considered. Where possible, governments should also consider leveraging existing initiatives that target women and children and provide incentives for complete birth registration.

5 Undertake assessment of inequalities in birth registration completion: In the second half of the Decade, collecting and analyzing data from the perspective of inequalities in birth registration completion is crucial. This will help countries take requisite actions to leave no one behind. ESCAP continues to provide technical assistance in undertaking such assessments. While survey data has increasingly become available, inequality assessments should be applied to integrated data whereby census data and administrative data are linked so that a holistic account of the latest status of birth registration completion is the starting point for further analysis. In addition to collecting quantitative data, it is also important to undertake qualitative studies to understand the sociocultural context of civil registration.
Annex 1: Methodology for identifying gaps in access to barriers and opportunities

Inequality of Opportunity

To measure inequality of opportunity, the ESCAP policy papers on Inequality of Opportunity identify a set of opportunities and measure the gaps among different population groups in access to these opportunities. To do so, a set of circumstances is selected from available variables in the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS) datasets to define the groups. The circumstances are a set of conditions over which the individuals or households have no control at the time of data collection.

Those circumstances are used in the classification and regression tree (CART) analysis to identify the groups that are most disadvantaged in each country; in this case, the children under 5 years of age less likely to have their birth registered. The composition of those groups varies from country to country, as does the size of the sample population represented.

This approach differs from the use of “Inequality of Opportunity” in other recent literature, which instead uses regression analysis to explain the share of inequality of outcome (income inequality or consumption inequality) that can be attributed to circumstances over which individuals have no control, such as race and sex.

Given that the DHS and MICS datasets do not include information on income or consumption (both classified as outcomes), these thematic policy papers do not include such regressions. However, future analysis might use the wealth index of the DHS and MICS as a proxy “outcome” and regress it on the set of circumstances used in this analysis.

The Data Sources

DHS and MICS are publicly available for 30 countries in Asia and the Pacific as shown in Table A1. The DHS and MICS datasets are selected because of the: a) comparability across countries; b) accessibility of the data; and c) extensive questions on health, demographic and basic socioeconomic data referencing both the household (e.g., water and sanitation, financial inclusion, electricity and clean fuels, ownership of mobile phones) and individuals (e.g., level of education, nutrition status). Data on birth registration completeness was available in 27 countries.

The Countries

Based on available surveys, 27 countries are included in this Inequality of Opportunity policy paper on birth registration. Table A1 provides the full list of 27 countries and their latest survey years.

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>LATEST YEAR</th>
<th>LATEST SURVEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>2022</td>
<td>MICS</td>
</tr>
<tr>
<td>Armenia</td>
<td>2016</td>
<td>DHS</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>2019</td>
<td>MICS</td>
</tr>
<tr>
<td>Bhutan</td>
<td>2010</td>
<td>MICS</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2022</td>
<td>DHS</td>
</tr>
<tr>
<td>Fiji</td>
<td>2021</td>
<td>MICS</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2017</td>
<td>DHS</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>2015</td>
<td>DHS</td>
</tr>
<tr>
<td>Kiribati</td>
<td>2019</td>
<td>MICS</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>2018</td>
<td>MICS</td>
</tr>
<tr>
<td>Lao People's Democratic Republic</td>
<td>2017</td>
<td>MICS</td>
</tr>
<tr>
<td>Maldives</td>
<td>2017</td>
<td>DHS</td>
</tr>
<tr>
<td>Mongolia</td>
<td>2018</td>
<td>MICS</td>
</tr>
<tr>
<td>Myanmar</td>
<td>2016</td>
<td>DHS</td>
</tr>
<tr>
<td>Nepal</td>
<td>2022</td>
<td>DHS</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2017</td>
<td>DHS</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>2018</td>
<td>DHS</td>
</tr>
<tr>
<td>Philippines</td>
<td>2022</td>
<td>DHS</td>
</tr>
<tr>
<td>Samoa</td>
<td>2019</td>
<td>MICS</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>2017</td>
<td>DHS</td>
</tr>
<tr>
<td>Thailand</td>
<td>2015</td>
<td>MICS</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>2016</td>
<td>DHS</td>
</tr>
<tr>
<td>Tonga</td>
<td>2019</td>
<td>MICS</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>2019</td>
<td>MICS</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>2019</td>
<td>MICS</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>2022</td>
<td>MICS</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>2021</td>
<td>MICS</td>
</tr>
</tbody>
</table>
The Indicators and Circumstances

This paper investigates disparities in birth registration for children under 5 years of age based on their common, shared demographic and socioeconomic characteristics. The circumstances used in the analysis are: wealth of the household where the children under 5 currently reside (belonging to the top 60 or the bottom 40 of the household wealth distribution); place of residence (urban or rural); age group of the children in months (0-11 months, 12-23 months, 24-35 months, 36-47 months, and 48-59 months); educational attainment of the mother (lower education, secondary education, or higher education); number of children under 5 years of age in the household (none (<0.5), 1 or more (>0.5), 2 or more (>1.5), 3 or more (>2.5), fewer than 2 (<1.5), fewer than 3 (<2.5)); and gender of the child (male or female).

In each iteration, the algorithm identifies children with the highest and lowest likelihood of having their birth registered with the national authorities.

The Classification and Regression Tree (CART)

Knowing that inequality of opportunity is broadly associated with specific circumstances opens the door to deeper exploration of the data, to see exactly which groups of children are the most marginalized and which groups of children have benefited most from development. Identifying these groups could help policymakers better focus policy and programmes to tackle inequality of opportunity.

The primary goal of using classification and regression tree (CART) analysis is to identify the groups of children with the lowest and highest access to opportunities, in this case, those with the lowest and highest birth registration rates.

“Birth registration” is the response variable, while the factors that characterize these groups are the explanatory variables, also referred to as “circumstances.”

A tree is an analytical structure that represents groups of children of the sample population that have significantly different response values, or different birth registration rates.

To identify the groups of children with the greatest difference in their birth registration, a regression tree is constructed for each country using R, an open-source statistical software. The root node of the tree refers to the entire population sample. The tree method algorithm starts by searching for the first split (or “partition”) of the tree. It does so by looking at each circumstance and separating the sample in two groups, so that it best satisfies a certain “splitting criterion.” This splitting criterion can be defined in a few ways, while the one used here is the Analysis of Variance, or “ANOVA.” The formula that represents the core of the algorithm is the following:

Where is the sum of squares for the parent node, and SSL and SSR are the sums of squares for the left and right child nodes, respectively.

The CART algorithm applies this ANOVA test to each possible split, or partition, of the sample population given by the circumstances. After comparing all of the available partitions, the algorithm is able to identify the single partition that would decrease variance the most for the combined sum of squares of the child nodes compared to the parent node. This is how CART uses ANOVA to identify the best possible split for each node down the tree.

In the example of birth registration, SST would describe the variance in the sum of squares for the share of children under 5 having their birth being registered. The possible partitions of this sample, resulting in SSL and SSR, would include the wealth of the household where the children under 5 currently reside (belonging to the top 60 or the bottom 40 of the household wealth distribution); place of residence (urban or rural); age group...
of the children in months (0-11 months, 12-23 months, 24-35 months, 36-47 months, and 48-59 months); educational attainment of the mother (lower education, secondary education, or higher education); number of children under 5 years of age in the household (none (<0.5), 1 or more (>0.5), 2 or more (>1.5), 3 or more (>2.5), fewer than 2 (<1.5), fewer than 3 (<2.5)); and gender of the child (male or female). Within the parameters of CART, all partitions are binary; among circumstances with multiple split thresholds, such as age group of the children, each possible combination of age grouping is considered (for example 0-11 and 12-23 months could be a single cohort assigned to one of the nodes, with 24-35, 36-47, and 48-59 months assigned to the other). This means the resultant nodes associated with SSL and SSR are mutually exclusive and complementary, and every child belongs to one and only one of the nodes for each partition of the tree generation.

The actual algorithm that generates the nodes for each partition works step-by-step, starting from the entire sample (where “T” given by SST is the root node). Each time the sample is partitioned, new nodes are generated, and the ANOVA is calculated and compared to the ANOVA before the new partition. This stepwise process of building nodes and branches of a tree is also known as “recursive partitioning.” Each partition (and hence the new pair of nodes) is kept when the decrease of variance exceeds a preset threshold also known as a “complexity parameter.” When the best available partition fails to satisfy the complexity parameter, or a set of other preset conditions can’t be satisfied, the algorithm ceases to make additional partitions. The nodes that could not be further partitioned are henceforth referred to as “terminal nodes.”

In addition to finding groups of children that have significant differences in their birth registration rates, the CART algorithm, as applied to identify the furthest behind, requires that each group should have enough group members. To avoid a too small sub-sample size, the analysis ceases to make additional partitions if the resultant nodes would fail to contain either 9 per cent of the total sample population or an absolute value of 49 survey respondents. The analysis is also limited to 6 levels of nodes (encompassing 5 partitions), as additional partitions past that point have diminishing returns for the purpose of identifying population groups experiencing inequality of opportunity.

**Choice of Circumstances**

Out of the many variables available in the DHS and MICS surveys, several determinant factors are considered to help identify the most excluded groups of children under 5. The selection of variables is consistent across all surveys to maintain comparability across countries. These circumstances (determinant factors) define the composition of the groups of children. However, circumstances should not be interpreted as “causes” of inequality. The association found does not imply causality. Furthermore, there are many other factors that these models cannot consider, given the limitations of the datasets.

Ideally, it would have been preferred to include only circumstances over which the children have little control, such as the dominant religion in the respondent’s household, ethnicity, existence of a disability, or education of the father. The majority of the DHS and MICS surveys did not include these questions.

**Gaps and Limitations**

The available datasets limit the scope of this analysis somewhat. First, several relevant circumstances cannot be captured. Furthermore, and consistent with similar studies on inequalities among groups, this analysis does not consider inequality within groups. Even within homogenous groups, additional unobserved circumstances may affect outcomes. This analysis only calculates observable averages for each group, and thus draws conclusions on gaps and inequality based on these observations.

Finally, recent literature also links inequality of outcome with inequality of opportunity, by calculating the share of income inequality (inequality of outcome) that can be explained by the circumstances of each group. This analysis in this series of policy papers does not follow the same approach because the datasets do not include an income proxy besides the wealth index.
The wealth index and the bottom 40 – top 60 wealth split

Wealth, as used in this policy paper, is a composite index reflecting a household’s cumulative living standard that is developed by the DHS and MICS researchers and combines a range of household circumstances including: a) ownership of household assets, such as TVs, radios and bicycles; b) materials used for housing; and c) type of water and sanitation facilities.

The wealth index is calculated using the Principal Component Analysis and thus allows a relative ranking of households based on their assets. The wealth index is not comparable across countries, however, as it consists of different assets in each country. Cross-country comparison of household access based on “wealth” should be understood with this caveat.

In this series of policy papers, the wealth index is employed as a circumstance to distinguish between different types of households. Although technically not a circumstance over which the respondent has no control, wealth is still a proxy for many hidden conditions that may limit access to a certain opportunity, especially considering the lack of other determinant factors to explore.

In this paper, children can belong to one of two possible groups based on the wealth index: the bottom 40 per cent (sometimes labelled as “poorer”) and the top 60 per cent (or “richer”). Several other possible cuts of the wealth index were considered, including by quintile, top 40 – bottom 40, and top 10 – bottom 40. None of these were selected however, because generally they produce more homogenous groups thus overshadowing other circumstances (e.g., education levels, rural – urban distinctions). The top 40 – bottom 40 approach (and its variation of top 10 – bottom 40) are also rejected because they eliminate 20 to 50 per cent of the sample population from the analysis, with a risk of missing some “middle class” groups with common characteristics (e.g., secondary education).

Narrowing the sample population to only half (top 10 – bottom 40) also runs the risk of not allowing for making statistically significant inferences. Moreover, neither the top node, or root of the tree, nor the size of the groups of the rest of the nodes would be representative of the population.

Finally, the wealth index in the DHS and MICS produces a distribution of households by wealth without any monetary values assigned to the distribution. Therefore, the comparisons of top 1 – top 10 – top 40 per cent do not have the same explanatory value as they would if the wealth index had taken continuous monetary values.

### TABLE A2
Selected Indicators and Factors

<table>
<thead>
<tr>
<th>OPPORTUNITY STUDIED</th>
<th>COMPONENT</th>
<th>INDICATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth registration</td>
<td>Birth registration</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CIRCUMSTANCES USED TO DETERMINE THE FURTHEST BEHIND GROUPS</th>
<th>VARIABLE 1</th>
<th>VARIABLE 2</th>
<th>VARIABLE 3</th>
<th>VARIABLE 4</th>
<th>VARIABLE 5</th>
<th>VARIABLE 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth</td>
<td></td>
<td></td>
<td></td>
<td>Educational attainment of the mother</td>
<td>Number of children under 5 years of age</td>
<td>Gender</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SDG REFERENCE</th>
<th>RELATED SDG INDICATOR</th>
<th>SURVEY QUESTION (DHS/MICS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator 16.9.1: “proportion of children under 5 years of age whose births have been registered with a civil authority, by age”</td>
<td>1) “Does (name) have a birth certificate?”; and 2) “Has (name)’s birth been registered with the Civil Registration Authority?”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SURVEY REFERENCE</th>
<th>SURVEY RECODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR, IR</td>
<td></td>
</tr>
</tbody>
</table>

ix For more information, see Demographic and Health Surveys (DHS). Available at: http://www.dhsprogram.com/programming/wealth%20index/DHS_Wealth_Index_Files.pdf
References

REFERENCES


37 United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) (2023). Civil Registration in South-East Asia: Legislation, Digitization and Inequality. ESCAP, Bangkok.


40 Philippines Statistics Authority (2022). “Updates on the Implementation of PhilSys Birth Registration Assistance Project.” Available at: https://psa.gov.ph/content/updates-implementation-philsys-birth-registration-assistance-project

Inequality of Opportunity in Asia and the Pacific: Birth Registration

Reducing inequality in all its forms is at the heart of the 2030 Agenda for Sustainable Development. It is emphasized in the stand-alone Goal 10 “Reduce inequality within and among countries” and in other Goals that call for universality and for “leaving no one behind”. Reducing inequality advances human rights and social justice and is fundamental for all three dimensions of sustainable development.

The ESCAP Inequality of Opportunity papers identify areas of basic opportunities where inequality jeopardizes a person’s life prospects, namely: education; women’s access to healthcare; children’s nutrition; decent employment; basic water and sanitation; access to clean energy; financial inclusion, pandemic preparedness, and intimate partner violence against women. Each of these opportunities are covered by specific commitments outlined in the 2030 Agenda for Sustainable Development and addressed in a separate thematic paper covering up to 30 countries throughout Asia and the Pacific.

This report extends the Inequality of Opportunity series to explore inequality in birth registration and identifies the shared circumstances of the most disadvantaged groups of children under 5 in birth registration in Asia and the Pacific.

Visit our webpage at:

www.unescap.org/our-work/social-development

https://lnob.unescap.org/