Technical Appendix

The NextGen Aid Project

World Vision International & EY

11 April 2024

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Cover Image: Unrecognizable Muslim family standing on hilltop and admiring highland view, Ryotaro Tsukata

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Abbreviations

Table 1 - Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
BCR	Benefit to cost ratio
CM	Child Mortality
CRS	Creditor Reporting System
DAC	Development Assistance Committee
EYS	Expected Years of Schooling
FDI	Foreign Direct Investment
G8	Group of Eight
GAC	Global Action for Children
GDP	Gross Domestic Product
GNI	Gross National Income
GNIpc	Gross National Income per capita
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
MYS	Mean Years of Schooling
ODA	Official Development Assistance
OECD	The Organisation for Economic Co-operation and Development
RMNCH	Reproductive, Maternal, Newborn, and Child Health
ROI	Return on investment
SDG	Sustainable Development Goal
SDGI	Sustainable Development Goal Indicators
TFP	Total Factor Productivity
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations International Emergency Fund
VSL	Value of statistical life
VSLY	Value of statistical life year
WV	World Vision
WVI	World Vision International

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1.   Summary and definitions

1.1   Summary

This document provides details of the economic appraisal and is a technical appendix to the interactive dashboard. The content contained in this document may not capture the overarching narrative of the economic appraisal, hence both materials should be viewed in conjunction.

The objective of this economic appraisal is to estimate the return on investment (ROI) from child-related Official Development Assistance (ODA). The appraisal employs innovative methods combining traditional regression analysis and findings of growing body of research focusing on indirect benefits of interventions through (peer-) networks. The novel analysis quantifies the benefits arising as a result of ODA and express the ROI in dollar returns for every $1 invested in children. The findings of this appraisal seek to strengthen the case for donor governments to consider children in the design, delivery, and impact evaluation of their ODA.

The primary data source is the Organization for Economic Co-operation and Development (OECD) Creditor Reporting System (CRS), which captures all ODA provided by OECD Development Assistance Committee (DAC) member countries to developing nations. The analysis covers the most five years of data from 2017 to 2021 available during the analysis period, capturing time trends and account for year-to-year variations, and includes any changes in investment resulting from the global pandemic.

The economic appraisal considers holistic benefits across different benefit domains to estimate the ROI. Whilst the cohort of interest receiving ODA are children, the economic appraisal includes wider economic and social benefits, capturing children and the broader communities as beneficiaries. The benefits are projected over the 10-year period.

1.2   Definitions

Table 2 provides definitions used to describe the economic appraisal in this document.

Table 2 -Definitions

Benefit domain	The benefit domain refers to the overarching benefit parent category, that captures multiple benefits.
Benefit indicator	The benefit indicator is a statistical measure, that is recorded at time and country level. The indicator is a proxy indicator to estimate a variety of benefits falling under each benefit domain.
Children	'Children' refers to all persons under the age of 18 years old.
DAC	The OECD Development Assistance Committee (DAC) is an international committee consisting of 31 countries, many of which are the world's largest aid providers. It strives to promote development co-operation and implement policies in line with the 2030 Agenda for Sustainable Development. This agenda focuses on outcomes such as poverty eradication, improved living standards, and sustainable economic growth.
ODA	Official Development Assistance is government aid designed to promote the economic development and welfare of developing countries. Loans and credits for military purposes are excluded. This indicator is expressed in million USD constant prices, using 2020 as the base year.
ODA analysis sample	The ODA analysis sample captures aid activity that spans over 2017 to 2021 and considers flows by DAC members, multilateral donors, non-DAC members, and excludes aid provisioned by private donors. This sample will inform this economic appraisal.

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ODA classification algorithm	The ODA classification algorithm is a tool developed for this project, which is used to classify child-related ODA. The algorithm has been calibrated to estimate a probability for each ODA flow listed in the analysis data, aiming to identify which flows are likely child-related.
Child-related ODA	Child-related ODA represents the share of ODA that are directed towards the welfare of children. In this economic appraisal, such investments are assigned a probability threshold of 0.5 >= pr < 0.8 of benefitting children, and pr >= 0.8 of being child-specific, as defined by the classification algorithm. All investments with the assigned probability below 0.5 are considered as not children related.
Social Multipliers	Social multipliers refer to the additional (indirect) benefit received by individuals connected to those receiving an intervention.
Social Value	The social value measures the value the ODA create for the economy, local communities, and the broader society.

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2.   Summary of available research literature and studies

This section summarizes relevant research to support the methodology used in the economic appraisal.

2.1   Classification of the Official Development Assistance

Official Development Assistance (ODA) refers to government assistance that aims to foster the development and economic welfare of developing countries. The United Nations (UN) has long advocated for developed nations to commit 0.7 percent of their gross national income to ODA.[1]

This aid is delivered through financial support in the form of grants or concessional loans from the DAC member countries to developing countries to support project and programs. These projects or programs are intended to advance development in areas such as health, sanitation, education, infrastructure, and other. The tracking of ODA flows plays a crucial role in informing donors about where future flows should be directed and providing insights into the current resource flows available to developing countries.

The primary source for collecting ODA flows between DAC members and developing countries is the OECD CRS database. This data repository is managed and validated by the OECD, which collects unit record information from bilateral and multilateral providers. Providers use a standardized file format to input information about specific ODA flows, such as the purpose code and the recipient country, ensuring greater comparability with other ODA flows.[2]

The CRS database represents the value of ODA in 2020 constant USD prices. It comprises 51 variables that provide detailed information about each ODA flow, including the donor and recipient involved, the purpose and objective, and various other indicators. For further details, see **Appendix A**.

2.1.1   Classification methodologies

The ODA classification algorithm developed in this economic appraisal is informed by the evidence from previous classification methodologies aimed at identifying intended recipients of the aid. **Table 3** provides the list of these methodologies.

Table 3 - ODA Classification Algorithm Research Summary

Classification Algorithm Methodologies	
Report	**Key methodology**
World Vision International - Counting Pennies 3[3]	The methodology aims to identify ODA that are directed towards ending violence against children through a combination of selected purpose codes and key words. To ensure that the classification captures ODA directed towards the targeted cohort, the authors employ additional searching for keywords in five different languages (English, Dutch, German, Spanish and French).

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[1] OECD Data (n.d.). Net ODA. Retrieved on 19 June, 2023 from https://data.oecd.org/oda/net-oda.htm

[2] OECD (n.d.). Development finance standards. Retrieved on 19 June, 2023 from https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/#resources

[3] World Vision International (2021). Counting Pennies 3: Assessment of Official Development Assistance to end violence against children. Retrieved on 19 June, 2023 from Counting Pennies 3 | It Takes A World | World Vision International (wvi.org)

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Moving Minds - International aid levels for early childhood services in crisis contexts[4]	To identify ODA aimed to support the early childhood services in crisis context, the methodology employs a detailed keyword search methodology.
Muskoka - G8 Member Spending on Maternal, Newborn and Child Health[5]	The methodology relies on a selection of purpose codes and apportions the value of ODA based on an imputed percentage (i.e., weighting the value of the contribution). Multilateral donor contributions are apportioned based on agency (i.e., World Bank), and bilateral contributions are apportioned based on purpose codes (i.e., 12220 Basic Health Care). The imputed percentages were determined in consultation between the Group of Eight (G8) working group and multilateral agencies.
Their World – Just Beginning: Methodology[6]	This is an alternative to the methodology developed in 'G8 Member Spending on Maternal, Newborn and Child Health' and describes the rationale for determining imputed percentages. More specifically, this methodology targets children under the age of 5, in contrast to the Muskoka Methodology, which also included women of reproductive age. The methodology employed in these studies justifies the adjustment of the imputed percentages to accurately identify the age group of interest.
World Vision (WV) Canada - Measuring Canadian ODA investments in Children[7]	The WV Canada analysis aims to categorize projects and investments related to children as 'Child-focused' and 'Child-related'. 'Focused' pertains to investments that are wholly related to children, and 'related' refers to investments that are partly related to children. The classification was conducted using the Global Action for Children (GAC) Children's Issues Policy Maker[8], or by reviewing individual records.

Learnings

The previous methodologies described in **Table 3** primarily focus on using keyword terms and purpose codes to identify ODA within the CRS database that is directed towards the target cohort. For example, this approach was reflected in the Counting Pennies 3 report which used these techniques to identify ODA directed towards the demobilization of child soldiers. The keyword terms that were relevant to identify child-related ODA has been informed by the above-mentioned previous methodologies. Languages other than English were also considered in the classification, highlighting the presence of different languages within the CRS database.

The Muskoka methodology introduced the concept of weighting the value of ODA contributions. The report applied different imputed percentages to both bilateral and multilateral contributions that were determined through stakeholder consultation. This economic appraisal incorporated the concept of weighting the value of ODA by utilizing the predicted probability as weights to adjust the value of ODA contributions.

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[4] Moving Minds Alliance (Dec 2020). Analysis of international aid levels for early childhood services in crisis contexts. Retrieved on 19 June, 2023 from analysis-of-international-aid-levels-for-early-childhood-services-in-crisis-contexts.pdf (movingmindsalliance.org)

[5] G7 Research Group and University of Toronto (n.d.). Methodology for Calculating Baselines and Commitments: G8 Member Spending on Maternal, Newborn and Child Health, Retrieved on 19 June, 2023 from http://www.g8.utoronto.ca/summit/2010muskoka/methodology.html

[6] Their world (n.d.). Just Beginning: Methodology. Retrieved on 19 June, 2023 from https://theirworld.org/resources/just-beginning-methodology/

[7] Non-public report provided to EY by the World Vision International.

[8] The GAC Children's Issues Policy Maker guide provides a framework for categorising the level of aid targeting children, distinguishing between the principal objective, significant objective, and non-targeted objective.

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2.2   Benefits of Official Development Assistance

The extent to which government aid contributes towards sustainable economic and social well-being has been the subject of ongoing debate. The benefits from global interventions can be framed in two ways: either the benefit is attributed to a change in an indicator of interest, or the benefit is monetized to determine a monetary return from a change in the indicator.

2.2.1   Benefit attribution to indicators

Growing literature has sought to determine the benefits from foreign and government aid directed toward achieving higher economic growth and improved human development. In recent years, the focus of published studies has shifted towards identifying the most appropriate indicators capturing economic growth and human development.

Traditionally, sustainable economic and social well-being was estimated using measures of macroeconomic performance such as gross domestic product (GDP) or gross national income (GNI), consumption, investment and international trade. In the area of development economics, economists employed the GDP or GNI per capita levels to measure economic and social well-being and acknowledged that this may not capture all components of economic and social-wellbeing, giving rise to the use of the Human Development Index (HDI).[9] The HDI extends the traditional economic indicator to health and education domains, capturing a much broader measure of sustainable economic and social well-being.

Researchers debate that despite HDI acting as a broader measure than GDP or GNI, one of the weaknesses of using this indicator is lack of confidence that the indicator covers the multi-dimensional nature of human development. An accurate picture of prosperity requires the consideration of factors related to the quality of life, such as empowerment, feelings of security and other less commonly observed factors specific to the environments in developing countries such as inequality or favorable working conditions.

To overcome the challenges in measuring human development and enable more rigorous assessment of the effectiveness of global development programs, the UN Member States embraced the collection of broader human development indicators described as Sustainable Development Goal Indicators (SDGIs). This includes an extensive number of indicators aimed at addressing the complex nature of tracking the human development. Research evidence employing these indicators is still emerging, and there is limited measurement of how effective interventions are in generating monetary returns towards achieving the SDGs.

The following sections provide an overview of the research evidence employing various indicators to better understand the impact of the foreign or government aid.

The impact of aid on economic growth

Evidence of the impact of aid towards developing countries on their economic growth is mixed, with a number of studies suggesting positive, negative or statistically insignificant impact. **Table 4** summarizes a selection of the research focusing on the impact of aid on economic growth. The inconclusive findings may be influenced by the varying methodologies and the data available to inform about the country-specific characteristics. For instance, the political landscape with corruption, policy conditions and trade openness has been found to strongly contribute towards the effectiveness of aid in developing countries. This is hypothesized to be underpinned by the role of political institutions in host countries to distribute aid, and create the environment required to nurture economic growth.[10]

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[9] United Nations Development Programme (2022). Human Development Report 2021/22. New York. USA

[10] Deaton, A. (2013). 7. How to help those left behind, The Great Escape: Health, Wealth, and the Origins of Inequality, Princeton University Press.

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Table 4 - Research on the impact of aid on economic growth

Research on the impact of aid on economic growth	
Source	Findings
Burnside and Dollar (2000)[11]	The study estimates the effect of aid on economic growth, conditional on the policy conditions. The key findings concludes that aid has a small impact on overall GDP growth and the impact is observed to be larger in countries with good policy conditions. Good policy conditions were considered using variables for: 'trade openness', 'inflation' and 'budget surplus and expenditure relative to GDP'. This study highlighted the importance of ensuring developing countries have good local policy conditions to ensure the effectiveness of Aid in increasing economic development and wellbeing.
Groβ and Danzinger (2022)[12]	The study estimates the effect of different forms of aid on total factor productivity (TFP) for 51 recipient countries over 36 years. The evidence suggests that grant funding weakens productivity growth through TFP (-0.140), resulting in a decrease in productivity, while sector related aid increases productivity (0.045).
Choi (2015)[13]	The study investigates the relationship between ODA, economic growth and trade in South American countries using a Vector Error Correction Model. The analysis concluded that developing countries need to exceed a defined threshold of ODA before being able to capture benefits from changes in international trade and Foreign Direct Investment (FDI).
Drifferd and Jones (2013)[14]	The analysis employs a systems-based approach to estimate the impact of FDI, ODA and migrant remittances on economic growth in developing countries. A three-stage least squares estimation is conducted to account for the endogeneity between growth and sources of growth. Increased FDI and migrant remittances are found to have a positive impact on developing countries. Better institutional environments, protect foreign investment and maintain a high level of law and order, enabling enhanced further growth. After a threshold of bureaucratic quality, aid makes has a significant impact. The results are found to be similar when quantifying the FDI and migrant remittances on economic growth.
Dreher et.al (2016)[15]	The study aims to determine if the effect of aid on economic growth is reduced by a countries service in the United Nations Security Council. The evidence shows that short-term political favoritism reduces the effectiveness of aid.

The impact of aid on the Human Development Index

The Human Development Index is used to measure and compare the progress in key dimensions of human development across countries. It was created by the United Nations Development

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[11] Burnside, C. and D. Dollar (2000), *Aid, Policy and Growth,* The American Economic Review 90 (4): 847-868.

[12] Groβ, E., & Nowak-Lehmann Danzinger, F. (2022). What effect does development aid have on productivity in recipient countries? Review of Development Economics, 26, 1438–1465.

[13] Choi, C.H, (2015), The Impact of ODA FDI Trade on the South America's Economic Growth; comparative analysis of 4 countries. Int Commer Inf Rev 17(3):115–130

[14] Drifferd, N. and C. Jones (2013), Impact of FDI, ODA and Migrant Remittances on Economic Growth in Developing Countries: A Systems Approach. European Journal of Development Research 25(2): 173 – 196.

[15] Dreher, A., et.al (2016), Geopolitics, Aid, and Growth: The Impact of UN Security Council Membership on the Effectiveness of Aid. Policy Research Working Paper 7771. The World Bank, Washington, DC.

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Programme (UNDP) in 1990 as a way to provide a more comprehensive measure of human well-being beyond traditional economic indicators such as GDP. The HDI was developed in response to the limitations of relying solely on economic indicators to gauge the progress and well-being of a nation. The HDI aims to provide a more comprehensive measure of human development. It seeks to highlight the importance of not only economic growth but also health and education as fundamental components of human development and well-being.[16]

The literature aligns more consistently when evaluating the impact of aid on other than the economic growth measures such as GDP or GNI. **Table 5** outlines a selection of research evidence that aimed at estimating and attributing benefits arising from ODA on measures of human development.

Table 5 - Research on the impact of aid on the HDI

Research on the impact of aid on the HDI	
Source	Findings
Jung and Lee (2019)[17]	The purpose of this study is to evaluate the extent to which each type of aid contributes towards the improvement in personal welfare. The study evaluates ODA directed from Korea towards 15 African countries. Using a two-stage instrumental approach, the analysis finds the total ODA has a positively significant effect on all subcomponents of the HDI, including life expectancy, education, and economic growth in recipient countries. Upon the classification of ODA, the impact of ODA targeting education, health and public service was statistically significant, while ODA invested in water and sanitation was not.
Staciu and Barbulecu (2016)[18]	The authors evaluate the impact of FDI on the HDI in 41 African countries in 1960 – 2010. The evidence suggests a positive relationship between ODA and life expectancy, and a negative relationship between ODA and years of schooling or GNI. Polity scores and the economic freedom index are incorporated as control variables to account for the variation through the quality and the effectiveness of institutions.
Signoor and Vandernoot (2021)[19]	The study analyses the relationship between ODA and HDI using data for 163 ODA recipient countries between1990 – 2018. Using an ordinary least squares panel regression with random and fixed effects, the analysis shows that HDI is positively driven by internal country factors such as government expenditure in education, while external factors such as the level of ODA and FDI are not statistically significant.

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[16] United Nations Development Programme (2022). *Human Development Report 2021/22.* New York, USA.

[17] Lee, E., Jung, K and J. Sul, (2019), Searching for the Various Effects of Subprograms in Official Development Assistance on Human Development across 15 Asian Countries: Panel Regression and Fuzzy Set Approaches, Sustainability 11(4).

[18] Staciu, G. and R. Barbulecu, (2016), A study of the relationship between Foreign Aid and Human Development in Africa. InTech.

[19] Signor, J. & J. Vandernoot, (2021). Does Foreign Aid contribute to HDI improvement? Advances in Management & Applied Economics 1(2).

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Akinbode and Bolarinwa (2020)[20]	The study uses a generalized method of moments approach[21] to evaluate the impact of foreign aid and corruption on HDI in 47 Sub-Saharan African countries between 2000 – 2016. The analysis concludes that the effect of aid on HDI is not statistically significant. The corruption is shown to reduce HDI and the trade openness has a positive impact on the HDI.
Shirazi and Ali (2009)[22]	The study aims to determine the direction of causality between economic growth and government aid to Pakistan in 1975-2006. Using a vector error correction model,[23] the study evaluated the relationship between the level of ODA received and the country's development expressed by GDP or HDI. The evidence suggests that while the higher level of ODA may cause the GDP growth, the rising GDP may also attract lower levels of ODA. In economic literature, such phenomenon is defined as the endogeneity caused by reverse causality and is important to consider when evaluating the impact of ODA. The modelling techniques that do not account for potential endogeneity issue lead to biased and inconsistent estimators measuring the impact of ODA. By comparing two economic indicators, GDP and HDI, the study demonstrates that the issue of the reverse causality can be avoided by using the HDI indicator for economic growth and highlights the importance of the indicator when evaluating the impact of ODA.

Sustainable Development Goal Indicators

In 2015, the UN Member States unanimously embraced the 2030 Agenda for Sustainable Development, presenting a collective framework aimed at ensuring peace and prosperity for both humanity and the environment, not only in the present but also in the future. At the core of this agenda lie the 17 Sustainable Development Goals (SDGs), which serve as a pressing call to action for all nations, regardless of their level of development, to collaborate globally. These goals acknowledge the interconnected nature of poverty eradication, improved health and education, reduced inequality, and economic growth, all while addressing the challenges of climate change and striving to safeguard our oceans and forests.[24]

Sustainable Development Goals are defined by 169 SDG targets. Progress in the SDG targets are measured using 232 Sustainable Development Goal Indicators (SDGIs). The development of SDGIs is ongoing and the data is currently only available for 25 percent of the SDGIs.[25] While the SDGIs are the future benchmark for measuring human development progress, most research currently focused on the impact of aid on a selective short list of indicators at a time. The Research collating and attributing the benefits from aid across all of the SDGIs is currently sparse. The efforts to collate and classify data from the indicators continue to be a crucial goal in the international development landscape.

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[20] Akinbode, S. O. and T. M. Bolarinwa (2020), Effect of Foreign Aid on Human Development in Sub-Saharan Africa: A System GMM Approach, South-Eastern Europe Journal of Economics 18(1): 19-38.

[21] The generalised method of moments (GMM) is a statistical method that incorporates a variety of the assumptions about the moments of the random variables instead of assuming overarching assumptions describing the entire statistical distribution of the predicted variables. In practice, by combining economic data and information with the information in population moment conditions, the method allows to consider a higher number of moment conditions than the number of model parameters without interfering the statistical power of the model.

[22]Nasim, S., Mannap, T. A. A. Turkhan and Ali, M. (2009). Effectiveness of Foreign Aid and Human Development. *The Pakistan Development Review* 48(4): 853-862.

[23] The vector error correction model is a stochastic time series model, that is utilised when long-run stochastic trends are expected.

[24] United Nations Development Programme (n.d.). The Sustainable Development Goals in action. Department of Economic and Social Affairs, United Nations.

[25] Dunning, C. and J. Kalow (2016). *SDG Indicators: Serious Gaps Abound in Data Availability*. Published by the Center for Global Development. Retrieved on 19 June, 2023 from SDG Indicators: Serious Gaps Abound in Data Availability | Center For Global Development | Ideas to Action (cgdev.org)

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There are 232 sustainable development indicators, 152 of these indicators are Tier 1 where the indicator is conceptually clear and has an internationally established methodology. United Nations International Emergency Fund (UNICEF) identifies 35 indicators as child related.[26] There are 29 tier 1 and child-related indicators.

A selection of tier 1 and child related Sustainable Development Indicators and their impact on the community in described in **Table 6**. A description for the impact of the remaining tier 1 and child related SDGIs are included in **Appendix B**.

Table 6 - The SDG indicators and the impact on the community

Indicator #	SDG Indicator	Impact on the community	Benefit
2.2.2	Prevalence of malnutrition among children under 5 years of age	Malnutrition encompasses two key indicators: stunting and wasting, both of which can lead to premature death and reduced physical and cognitive potential.[27] Reducing the prevalence of malnutrition will positively impact health and education outcomes and deliver benefits to the broader society through improved living standards and increase gross national income.	• Improvements in health • Improvements in education • Improvements in living standards
3.1.2	Proportion of births attended by skilled health personnel	A skilled health professional, such as a midwife, nurse, obstetrician or pediatrician, provides the necessary medical support during birth and is crucial to ensure the safety of the mother and newborn. It is evident that increasing the proportion of births attended by such professional will increase the likelihood of survival, reduce the number of stillbirths and deliver benefits to the broader community.[28]	• Improvements in health
3.3.1	Number of new Human Immunodeficiency Virus (HIV) infections per 1,000 uninfected population, by sex, age and key populations	HIV is a virus that weakens the immune system, leading to Acquired Immune Deficiency Syndrome (AIDS). HIV destroys the body's ability to fight off infection and disease, which can ultimately lead to death. Without treatment, median survival from the time of infection is about 10.5 years for males and 11.5 years for females.'[29] Presence of HIV also impacts the productivity of children and teachers in the education system.[30]	• Improvements in health • Improvement in education
3.7.2	Adolescent birth rate (aged 10-14 years; aged 15-19 years) per 1,000 women in that age group	In low- and middle income countries, the death of infants born during adolescent pregnancies is 50 percent higher than newborns of mothers aged 20-29.[31] It is also more likely to decrease expected years of schooling and subsequently future income.[32]	• Improvements in health • Improvements in human rights • Improvements in education/work
5.2.1	Proportion of ever-partnered women and girls aged 15 years and older subjected to violence by current or former partner	Decreases in violence experienced by women and girls inflicted by their partner may lead to improvements in basic human rights.[33]	
5.3.1	Proportion of women aged 20–24 years who were married or in a	Delaying marriage or union until at least the age of 18 years allows girls to access education and develop their skills, potentially leading to higher income and improved	• Improvements in education

[26] UNICEF. (2022). *SDG global indicators related to children*, UNICEF. Retrieved on 19 June, 2023 from: https://data.unicef.org › SDG-Briefing-Notes-web

[27] The World Bank (n.d.). The World Bank in Social Protection. Retrieved on 19 June, 2023 from https://www.worldbank.org/en/topic/socialprotection

[28] Moucheraud, C., Worku, A., Molla, M et al. (2015). Consequences of maternal mortality on infant and child survival: a 25-year longitudinal analysis in Butajira Ethiopia (1987-2011). Reprod Health 12 (1), S4.

[29] United Nations, Sustainable Development Goals Handbook

[30] Ijumba, N. (n.d.). Impact of HIV/AIDS on education and Poverty. United Nations. Retrieved on 19 June, 2023 from https://www.un.org/en/chronicle/article/impact-hivaids-education-and-poverty

[31] WHO. (2018). Maternal mortality ratio (per 100 000 live births). Retrieved on 19 June, 2023 from https://www.who.int/data/gho/indicator-metadata-registry/imr-details/26

[32] World Bank. (2017). Educating girls, Ending child marriage. Retrieved on 19 June, 2023 from https://www.worldbank.org/en/news/immersive-story/2017/08/22/educating-girls-ending-child-marriage

[33] Fan, S. and A. Koski (2022), The health consequences of child marriage: a systematic review of the evidence. BMC Public Health 22 (309).

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	union before age 15 and before age 18	life opportunities. The research evidence also suggests that delaying marriage may also reduce the risk of psychical violence from an intimate partner.[34]	• Improvements in health
8.7.1[35]	Proportion and number of children aged 5-17 years engaged in child labor, by sex and age	Engaging and trapping children in labor compromises their future. Children occupied in child labor have reduced opportunity to engage with the education system which results in reduces subsequent earning potential.[36]	• Improvement in education/work
16.2.1[37]	Proportion of children aged 1-17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month	Psychological aggression is characterized by the act of raising one's voice, shouting, yelling, or using offensive language towards a child. Physical or corporal punishment involves actions that aim to inflict physical pain or discomfort without causing injuries. Employing violent disciplinary methods, whether physical or verbal, goes against children's rights and can have both immediate and long-term effects. Immediate consequences may include negative impacts on education outcomes, while long-term repercussions can affect income and subsequently living standards. This form of violence against children is prevalent and most widely accepted in society.[38]	• Improvement in education/work
16.2.3[39]	Proportion of young women and men aged 18-29 years who experienced sexual violence by age 18	Sexual abuse involving children can occur when one child engages in sexual activities with another child, particularly if the offender is considerably older or uses power, threats, or coercion. Such experiences of sexual violence during childhood hinder various aspects of development, including physical, psychological/emotional, and social well-being. In addition to the physical harm that may arise, extensive research has consistently shown that child sexual abuse is linked to numerous negative mental health consequences and unfavorable behavioral outcomes in adulthood. This abuse has the potential to impede expected years of education and subsequently limit future income-earning prospects.[40]	• Improvement in health • Improvement in education • Improvement in living standards
16.9.1	Proportion of children under 5 years of age whose births have been registered with a civil authority	Registering children at birth is the first step in securing their recognition before the law, safeguarding their rights, and ensuring any violation of their rights does not go unnoticed.[12] Higher rates of reporting allows authorities to track and monitor demographics allowing them to target resource allocation to children in need.	• Improvement in health and development • Improvements in living standards

2.2.2 Benefit monetization

The published and grey research evidence base has to date focused on evaluating the impact of foreign or government on various indicators such as GDP, HDI or SDGI discussed in **Section 2.2.1.** While these indicators continue to demonstrate the importance of measuring the effectiveness of the development programs and the impact on the human development in a specific country, they are challenging to aggregate and monetize at a global level.

Research monetizing the impact from changes in the SDGIs is limited. The lack of data available for both the SDGIs and the monetary benefits associated with changes in each indicator contributes towards the limited literature and inconsistent track of the SDGIs.[41]

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[34] Ibid.

[35] 8.7.1 has been classified as a Tier 2 indicators as at 31st March 2023, however has still been included in this analysis due to the importance of child protection in its alignment with World Vision priorities.

[36] International Labour Office (2003), *An Economic study of the costs and benefits of eliminating child labour*. ILO

[37] 16.2.1 and 16.2.3 have been classified as Tier 2 indicators as at 31st March 2023, however has still been included in this analysis due to the importance of child protection in its alignment with World Vision priorities.

[38] Violent Discipline. UNICEF. Retrieved on 14 July, 2023 from Violent Discipline

[39] Ibid.

[40] Violence against children. UNICEF. Retrieved on 14 July, 2023 from Violence against children

[41] The evidence suggests that the data is only available for 25% of SDGIs. Based on: Dunning, C. and J. Kalow (2016), *SDG Indicators: Serious Gaps Abound in Data Availability*. Center for Global Development. Retrieved on 19 June, 2023 from SDG Indicators: Serious Gaps Abound in Data Availability | Center For Global Development | Ideas to Action (cgdev.org).

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A small but growing literature focused on monetizing the impact of changes in these indicators for a sample of countries. The key approach taken by these studies aim to convert the changes in observed SDGIs to corresponding benefits in health or education domains, that can be further monetized using a value of statistical life or expected changes in future earnings This section summarizes a selection of papers to introduce the monetization approach applied in this literature.

Monetizing health-related benefits

Benefits from the improvements in health are often monetized by considering the value of statistical life (VSL). The VSL is an approximate value measuring how much the society is willing to pay to reduce the risk of dying, or the risk of injury, disease or disability. Used alongside the life expectancy the measure allows to place the value on the society's willingness to pay for an additional healthy year, expressed in the value of statistical life year (VSLY) .

Figure 1 presents the overview of the approach taken to monetize health-related benefits using the VSL and **Table 7** presents a selection of papers that employed this approach.

Figure 1 - Monetization of Nutritional Programs (Horton, et.al, (2009) [42]

Table 7 - Monetization of health-related benefits

Monetization of health-related benefits	
Source	**Findings**
Horton, et.al, (2009), [43]	The study monetizes the benefit from nutritional programs by converting the benefit from increased coverage of Vitamin A into a reduction in child mortality. The monetization is based on the number of deaths averted (at birth or otherwise) and the value of disability adjusted life years. The study concludes that such program may contribute with an average 9.67 unweighted Benefit to cost ratio (BCR).[44]
Winkleman and Adams, (2017)[45]	The study estimates the impact of ODA on child mortality between 2000 – 2015. The results indicate that every dollar increase in ODA per capita is associated with 0.035 decrease in child deaths per 1000 live births.
Wodon, et.al (2021)[46]	The study analyzed various interventions aimed at reducing violence in schools. To monetize the impact of such interventions, the analysis relied on years of schooling, GDP, and other economic indicators. The findings suggest that, as a result of lost future earnings, the total costs of failure to prevent violence at schools may be around US$11 trillion. Promising interventions have high benefits to costs ratios, and early childhood interventions are most effective.

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[42] Horton, S. et.al, (2009). Second Copenhagen Consensus: Micronutrient supplements for child survival. Best Practice Paper, Copenhagen Consensus Centre 2009, EY Analysis.

[43] Horton, S. et.al, (2009). Second Copenhagen Consensus: Micronutrient supplements for child survival. Best Practice Paper, Copenhagen Consensus Centre 2009.

[44] The BCR varies depending on the coverage and region.

[45] Winkelman, T. F. and G. B. Adams (2017). An empirical assessment of the relationship between Official Development Aid and child mortality, 2000-2015. Int J Public Health 62 (2):231-240.

[46] Wodon, Q. et.al (2021). *Ending Violence in schools: An investment case, Safe to learn, End Violence Against Children*, World Bank, Washington, DC.

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Acemoglu and Johnson (2006)[47]	The authors analyze the impact of life expectancy/mortality on economic performed expressed as GDP. Life expectancy instrumented using a mortality indicator has a significant impact on increasing population numbers, however the effect on total GDP is small. The study concludes that increasing life expectancy may not lead to increase income per capita.

Monetizing education-related benefits

The traditional and well-established practice for monetizing benefits from improvements in the education-related benefits employs the measure of years of schooling. By assessing the corresponding impact on future wages, the approach allows expression of the return to the individuals and the broader society from increased earnings and the future contributions to the economy.

The approach to monetizing the benefits from education-related outcomes builds on the economic theory focusing on early childhood development introduced by the Prof James J. Heckman. The Heckman Equation builds on the human capital growth model to quantify the monetary payoffs arising from different child related outcomes and their benefits. The theory adds to the better understanding of diminishing returns of education that are described by the Heckman Curve.

The Heckman Curve presented in **Figure 2**, demonstrates that the highest rate of economic returns arises from early investments in children that support targeted early intervention programs. Investing early and building skill upon skill provides greater future opportunities to children, improves productivity, and reduce social spending. The rate of return on investment in quality early education for disadvantaged children is 7-10 percent per annum through better outcomes in education, health, sociability, economic productivity and reduced crime. Most recent evidence suggests that comprehensive, high-quality, birth-to-five early childhood programs for disadvantaged children, yielded a 13 percent ROI per child, per annum, through better outcomes in education, economics, social and health.

Figure 2 - Heckman Curve: Economic impact of investing in childhood learning[48]
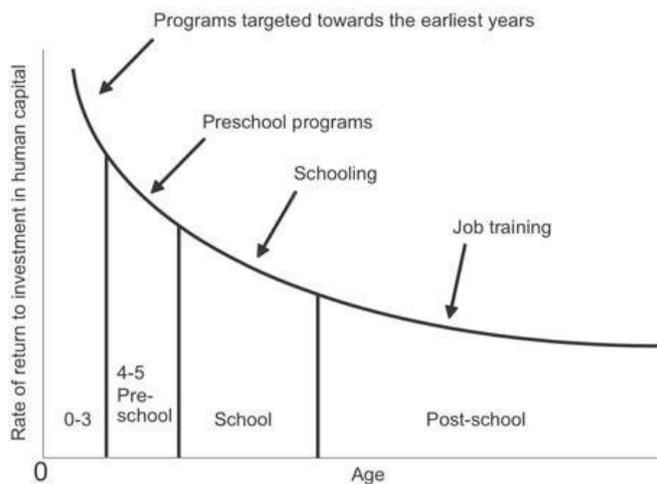
Source: Rea, D. and Burton, T. (2020), NEW EVIDENCE ON THE HECKMAN CURVE. Journal of Economic Surveys, 34: 241-262.

The substantive evidence contributed by J. J. Heckman and his co-authors, gives rise to a better understanding the channels through which the benefits from education may be realized,

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[47] Acemoglu, D. and S. Johnson, (2007). Disease and Development: The Effect of Life Expectancy on Economic Growth. Journal of Political Economy 115(6).

[48] Heckman, J. (2008). Early childhood education and care. The case for investing in disadvantaged young children. CESifo DICE Report 6(2).

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particularly in the context of developing countries. It is evident that benefits related to the reduction in violence, particularly against children at school age, and child labor are realized through improved access to education.[49] Using the assessed impact on violence in school or child labor, the monetization approach converts the benefits into monetary terms using anticipated increase in years of schooling. **Figure 3** and **Figure 4** present the overarching approach and Table 8 describes a selection of papers employing this approach to monetize the impact of government aid.

Figure 3 - Monetization of child protection programs (Wodon, et.al (2021) [50]

Figure 4 - Monetization of child labor ILO (2003) [51]

Table 8 - Monetization of education benefits

Monetization of education benefits	
Source	**Findings**
International Labour Office (2003)[52]	The study evaluates interventions conducted by International Labour Office aimed at ending child labor. Using a cost-benefit analysis approach, the authors employ years of schooling and disability-adjusted life years to measure benefits from education and health domains. On the global level, it is expected that the total net economic benefits amount to $4,346.1b between 2000 to 2020.[53]
Psacharopoulos, Patrinos, (2018)[54]	The authors conduct a meta-study encompassing the findings on global returns to investment in education. The study concludes that on average, an individual's future income increases by an 9.5 percent for every additional expected year of schooling. Considering the additional benefits to the society, the overall, social value is shown to increase to 19 percent.

[49] Ellery, F., Kassam, N. and C. Bazan (2010). Prevention pays: the economic benefits of ending violence in schools. Woking: Plan.

[50] Wodon, Q. et.al (2021). *Ending Violence in schools: An investment case, Safe to learn, End Violence Against Children*, World Bank, Washington, DC. EY Analysis.

[51] International Labour Office (2003), *An Economic study of the costs and benefits of eliminating child labour*. ILO. EY Analysis.

[52] International Labour Office (2003), *An Economic study of the costs and benefits of eliminating child labour*. ILO

[53] Disability Adjusted Life years are a re-presented of quality of life as QALY = 1 - DALY.

[54] Psacharopoulos, G. H.A. Patrinos (2018). *Returns to Investment in Education: A Decennial Review of the Global Literature,* Education Economics 26(5):1-14.

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3. Detailed overview of methodology

3.1 Approach to monetize benefits from ODA

The key objective of the economic appraisal is to estimate the return on child-related ODA from the perspective of the donor. To ensure that economic findings are robust the following two data sources are required: first, costs/investments associated with the delivery of the program/project or aid targeting the development and welfare of children; and second benefits that can be attributed to the child-related aid and represent the 'return to investment' (ROI). The data used to inform the economic appraisal is described in **Appendix A**.

The ROI methodology relies on an economic framework, that identifies five key stages and of the analysis. First, child-related ODA flows are identified using the ODA classification algorithm based on the information about the aid activity available at the OECD CRS database (see **Section 3.3**). Second, a regression analysis is performed to attribute benefits and estimate the impact from ODA on identified benefits (See **Section 3.4**). Third, the estimated impact is monetized using publicly available and proxy value data from peer-reviewed research evidence. (See **Section 3.6**) Fourth, additional benefits from empowering children and communities are attributed using a social multiplier approach. Lastly, benefits from the two attributed approaches are aggregated. This ROI methodology is presented in **Figure 5**.

Figure 5 - Benefit Monetization Approach

1.ODA classification algorithm	2. Statistical Benefit Attribution	3. Benefit Monetisation	4. Social Multipliers Attribution	5. Aggregating Benefits
1. Estimate ($) ODA that is child specific/related.	2. Regression analysis to identify the impact of child-related ODA on different benefit domains.	3. Monetise the impact from each benefit domain and combine the total benefit.	4. Consider the additional impact from empowering children and communities with social multipliers	5. Collate and present benefits from Statistical and Social Multiplier benefit attribution.

Source: EY Analysis

3.2 Relevant data and information

3.2.1 Determination of costs

The key objective of the economic appraisal is to estimate the return on child-related ODA. To ensure that economic findings are robust the following two data sources are required: first, costs/investments associated with the delivery of the program/project or aid targeting the development and welfare of children; and second benefits that can be attributed to the aid targeting children and represent the 'return to investment'. The data used to inform the economic appraisal is described in **Table 9**.

Table 9 – The information in the OECD CRS database utilized in the data-driven approach

OECD CRS database variables	
Variable	**Description**
Donor	Identifies the type of donor such as DAC members, non-DAC donors, private donors and multilateral donors.
Recipient id and recipient name	Describes the recipient code and name associated with the recipient country
Channel of delivery	Refers to the agency or institution responsible for delivering ODA
Income group	Refers to the classification of countries based on their income level, i.e., Low- and middle-income countries
Region	Describes the region name associated with the recipient country

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Sector	Refers to the specific area or field in which ODA activity is carried out. Sectors are categorized according to the purpose or objective of the activity, such as health, education, agriculture, infrastructure, or environment. The data used in the identification of the training sample only.
Purpose code	Purpose codes serve as an indicator of the primary intended outcome or purpose of ODA. For example, purpose code 11220 ('Primary Education') indicates that the investment targets the improvement of primary education for children. The data used in the identification of the training sample only.
SDG focus	SDG codes ('Sustainable Development Goals') are a set of 17 global goals aimed at ending poverty, protecting the planet, and promoting peace, prosperity, and well-being for all people. The SDG codes in the OECD CRS database are used to track and report on ODA activities that are relevant to the SDGs. SDG indicators were not available in the before 2018.[55] The algorithm the identification of the key SDG focus category only.
Project title / Short description / Long description	Describes individual projects or programs that were financed through ODA activity. All variables are manual user text inputs and may contain different type of information selected by the user. The algorithm utilizes the text inputs by identifying relevant information mentioned within the text, i.e., keywords related to beneficiary of interest (i.e., child, boy, and girl).
Reproductive, Maternal, Newborn, and Child Health (RMNCH) indicator	The RMNCH indicator identifies the projects and programs that are related to the reproductive, maternal, newborn, and child health, with values ranging from 0-4. A value of 0 indicates no funding, while values of 1, 2, 3, and 4 indicate increasing levels of funding, with a value of 4 indicating that the program has an explicit primary objective related to RMNCH.
Gender equality indicator	The gender equality indicator takes the values "o" for not targeted, "1" for significant, and "2" for principal.

Note: All variables indicated with * are considered as predictors in the ODA classification algorithm. To ensure the prediction accuracy, variables have been transformed to dummy variables (where required). Project title/short-/long-description title are employed to create dummy indicators for keywords.

3.2.2 Redistribution of 'Regional' and 'Bilateral and Unspecified' ODA

Within the OECD CRS dataset, there exist ODA flows that do not indicate the recipient country accurately. The ODA CRS dataset contains two different instances of non-country specific investments within the 'recipient' column; these are recipients marked as regional, i.e., (North of Sahara, regional), and as bilateral and unspecified. It is recognized that these flows may represent a significant contribution towards children, as such a redistribution approach to allocate and divide ODA value is employed in this economic appraisal. The process of redistribution in this analysis revolves around using investment value proportions to ensure equal redistribution based on the available data. The sections below introduce the detailed approach taken to redistribute regional and bilateral, unspecified investments in this economic appraisal.

Regional

A regional investment i targeting a country c in a given year t are redistributed by following four steps:

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[55] It is important to note that the inputting of SDG codes into the OECD CRS database by providers is voluntary and not consistently used, thus highlighting a potential limitation of this variable. The limitation has been included in Section 5.

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1) Determining the total amount of regional investment in a given year for each region. For example, the sum of the total regional ODA value directed towards North of Sahara which is represented in the data as 'North of Sahara, regional'. See **Equation (1)**.

$$Total\ regional\ investment\ by\ region = \sum_{i,t} Region, regional_{i,t}$$

<div align="right">(1)</div>

2) Calculating the individual ODA shares for recipient countries belonging to the region of interest. This is calculated by taking the value of investment i at year t for a country c that belongs to the region of interest. This figure is then divided by the sum value of all investments in that Region in year t. The result provides an interregional share for each ODA.

$$Regional\ Share = \left(\frac{value_{i,t,c}}{\sum Region_{i,t}} \right)$$

<div align="right">(2)</div>

3) Multiply the total regional investment component in **Equation (1)** by the regional share **Equation (2)**

This results in **Equation (3)**, representing the amount to be redistributed ('Add') to investment i in year t for country c.

$$Add_{c,t} = \sum Region, regional_{i,t} \cdot \left(\frac{value_{i,c,t}}{\sum Region_{i,t}} \right)$$

<div align="right">(3)</div>

4) Combine the 'Add' component with the original value of investment i in year t for country c. This results in the updated value for that investment see **Equation (4)**.

$$Value.Update_{c,t} = Add_{c,t} + value_{c,t}$$

<div align="right">(4)</div>

Bilateral and unspecified

Bilateral and unspecified ODA are not directed to any specific country or region. Based on their descriptions, it's understood that these investments may be directed towards donor target countries but are not further specified. Although these investments represent a share of ODA targeting children, they won't be considered for impact analysis described in **Section 3.4** to avoid any measurement errors.

The total value of bilateral and unspecified child-related ODA from 2017 to 2021 is around $6.0 billion (US$ 2020 Constant Prices), accounting for around 0.6 percent of the total ODA. The portion represents a small share of the total ODA and its exclusion is unlikely to significantly impact the overall results.

3.2.3 Determination of outcomes and benefits

The section outlines the detailed methodology on classifying child-related ODA and introduce the approach taken to benefit attribution and monetization in this economic appraisal.

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3.3 ODA classification algorithm for identifying child-related ODA

3.3.1 Overview

The OECD CRS database records a broad range of information about the program of project funded through ODA, however, lacks the information about the key purposes and beneficiaries of these investments. A few indicators such as RMNHC and gender equality indicators have been recently introduced to support the funders to track and monitor investments related to these areas. The information on any other areas, that may be of interest to the funder, is hidden within the text description of the project or program and is subject to limitations on data inputs. The purpose of the ODA classification algorithm is to develop an indicator that evaluates if and what level of ODA is related to children using an ex post facto design.[56]

The development of the ODA classification algorithm is informed by research evidence and various methodologies that have been developed to identify intended recipients and outcomes for ODA within the OECD CRS database (for further detail on previous methodologies, see the research review available at **Section 2.1.1**. Previously employed methodologies provide the foundation for the ODA classification algorithm and informs about the relevant information for identifying ODA beneficiaries. There are a few key limitations of previous methodologies:

- Strong dependence on the researcher/analyst defined assumptions on identifying the beneficiaries of the aid and the level of aid contributions.

- Limited use of the available information in the CRS database that may not necessarily fully describe the intent and beneficiary of the aid.

- Requirement for manual filtering and review of descriptions in text, increasing the possibility of human error when determining whether an investment is aimed at the cohort of interest.

The ODA classification algorithm developed within the current analysis aims to address limitations mentioned above by offering a data-driven solution. For the purposes of this economic appraisal, the ODA classification algorithm has been calibrated to identify child-related ODA flows, by estimating a probability for each project or program listed in the ODA analysis data of being related to the development and welfare of children. Such an approach offers the following advantages:

- **Data-driven solution**, utilizing all relevant information in the ODA CRS dataset and find patterns that may not be noticed by a human. Beyond relying on descriptions and purpose codes, the approach also incorporates additional information, such as country demographic profiles, to improve the identification of relevant investments. This additional information includes variables such as the donor and recipient countries, the region, the channel used, and whether the flow was multilateral or bilateral. This enables the algorithm to capture child-investment dynamics between countries, i.e., investments targeting children may be more prevalent in certain countries due to factors such as higher numbers of children or lower income levels compared to other countries.

- **Refined solution**, providing numerous possibilities for conducting sensitivity analyses to ensure the accuracy of the results. Each ODA in the dataset is assigned a predicted probability of targeting children. By adjusting the probability threshold settings, the data can be segmented into investments that are less likely to target children and those that are more likely. For instance, a threshold can be set so that ODA with a predicted probability greater than or equal to 'x' are classified as child-related investments, while those with probabilities below 'x' are excluded. This threshold can be validated by generating random

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[56] Ex post facto design, in the context of this appraisal, pertains to utilising pre-existing traits (independent variables) to predict the probability of an investment targeting children (dependent variable).

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samples at different probability intervals (i.e., slices of the data), ensuring that the defined thresholds effectively identify child-related investments on average.

- **Efficient solution**, building upon the Muskoka methodology by introducing a data-driven approach to identify child-related ODA. The algorithm provides a probability measure indicating the likelihood of an investment targeting children, allowing for the weighting of investments. For example, investments in basic health that benefit multiple cohorts can be appropriately weighted based on their probability. This means that the value of an investment, such as $100, can be adjusted to $55 if it has a probability weighting of 0.55. This feature penalizes investments considered as child investments that exceed the lower bound threshold. Unlike the Muskoka report, which applies adjustments on a grouped basis, such as assigning the same weight to all multilateral investments by a specific agency or reweighting investments by purpose code uniformly, our approach leverages empirical evidence and data within the OECD CRS dataset. This reliance on data, rather than on liaison information from working groups and multilateral organizations as per previous studies, enhances the accuracy and objectivity of the ODA classification method.

3.3.2 The outcome of the algorithm

The ODA classification algorithm distinguishes the following investment types that categorizes the ODA analysis data into three parts as shown in **Figure 6**.

Figure 6 – The ODA classification algorithm distinguishes between the 'Child-specific', 'Child-benefitting', and 'Not Child-related' investment types
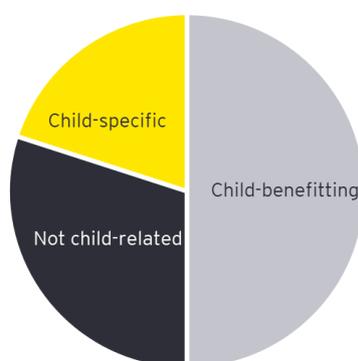
Source: EY Analysis

- **Child-specific category** includes all ODA that funded projects or programs that are wholly focused or directly related to the development and welfare of children, for example, investment in primary school teachers.

- **Child-benefitting category** includes all ODA that funded projects or programs that are partially focused or indirectly related to the development and welfare of children. This may include ODA that potentially deliver benefits to the entire population, including children, in addressing the basic human needs such as food, water, air and shelter.

- **Not child-related category** includes all ODA that funded projects or programs that are unlikely to directly or indirectly support the development and welfare of children (i.e., investments in trade facilitation or mining activities)

3.3.3 The methodology of the ODA classification algorithm

The methodology of the ODA classification algorithm relies on three steps:

Step 1. Partitioning the ODA analysis data and identifying the algorithm training data

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Step 2. Estimating the classification algorithm using a subsample of the data '*algorithm training data*'

Step 3. Predicting the likelihood of the investment being child-related on the full ODA analysis data and identifying probability thresholds

Each step of the methodology is further described below.

Step 1: Partitioning the ODA analysis data and identifying the algorithm training data

The ODA classification algorithm requires an assigned classification outcome and classification descriptors or predictors that describe the classification outcome. Whilst the OECD CRS database contains a broad range of the information about ODA and its overarching purposes, it does not record the classification outcome, which in this economic appraisal, is an identifier of the investment being child-specific, child-benefitting or not child related. To train the classification algorithm, the classification outcome is assigned by forming an algorithm training sample. The robustness of the ODA classification, that is the predicted likelihood of the investment being related children, largely depends on the accurate selection of the algorithm training sample.

Figure 7 - ODA Classification Algorithm
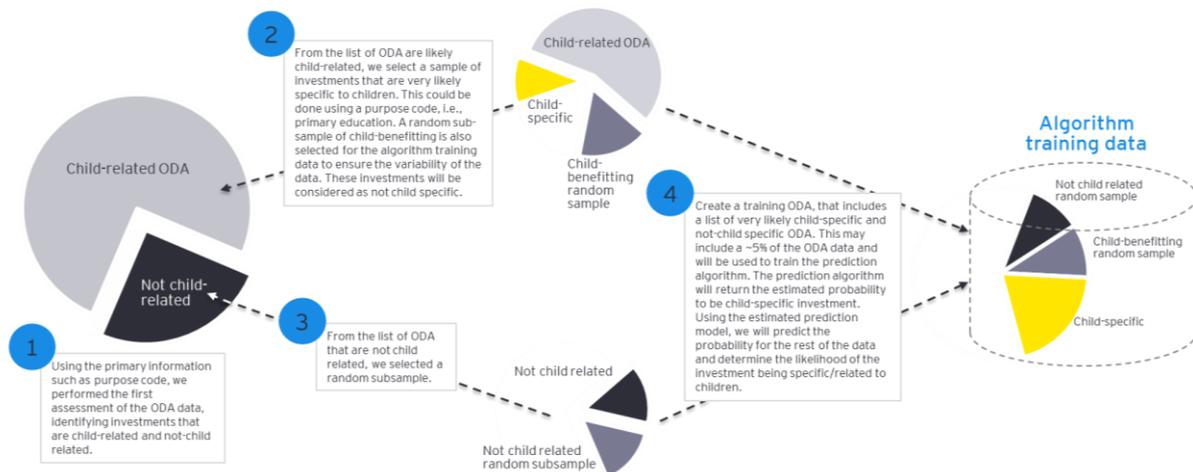
Source: EY Analysis

The algorithm training sample is a subsample of the ODA analysis data that is used to inform the ODA classification algorithm. This includes a small share of different types of ODA (See Section 3.3.2), where it is reasonable to assume if the beneficiaries of the investment are children or not. Using a list of ODA purpose codes,[57] the ODA analysis data has been partitioned into three broad categories: child-specific, child-benefitting, and not child-related. The purpose codes selected for the initial identification of the child-specific category include a short list of codes, which provide high certainty the project or the program benefit children in the community, i.e., the investment is related to the child's health or primary education. To ensure the variability of the training sample, the selected purpose codes for the initial assessment reflect not only the education domain (where the certainty to be related to children up to age of 18 is the highest, i.e., investment in primary education), but also include other domains such as health and child safety. The investments that may benefit children but also other members of the community, for example, the development of healthcare systems, improved access to basic sanitation, increase child protection and safety, reduced child labor, are captured using the selected codes for child-related category. Lastly, all

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[57] For a full list of purpose codes used in the selection for the initial identification of child-specific, child-benefitting, and not child-related categories, see **Table 14**.

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other investments that are unlikely to benefit children directly or indirectly are determined using purpose codes focusing on financial markets, government policies or the welfare of adults.

After the initial assessment of investment, a share of investments from each category is randomly selected to be included in the algorithm training sample. This serves as an initial assessment of each ODA that is only informed by the ODA overarching purpose and considers the relevant purpose codes where it is reasonable to assume if the investment is related to children. The algorithm training sample, which include about 5 percent of the ODA analysis sample, will be used to develop a classification algorithm and inform about the likelihood of the investment targeting children. The detailed method on selecting the algorithm training sample is presented in **Figure 7** and the list of selected purpose codes is available in **Appendix A**.

Table 10 - Sample of purpose codes and associated category

Purpose code categorization		
Child-specific	Child-benefittinf	Not child-related
11220 - Primary education	12220 - Basic health care	11230 - Basic life skills for adults
11231 - Basic life skills for youth	14031 - Basic drinking water supply	11420 - Higher education
11240 - Early childhood education	14032 - Basic sanitation	15142 - Macroeconomic policy
11250 - School feeding	15160 - Human rights	15151 - Elections
15261 - Child soldiers (prevention and demobilization)	52010 - Food assistance	33120 - Trade facilitation

*Note: This list is not exhaustive of all purpose codes used in this analysis. Please refer to Table 14 in **Appendix A**.*

Step 2: Estimating the classification algorithm using a subsample of the data 'algorithm training data'

The purpose of the ODA classification algorithm is to estimate the likelihood of the ODA being related to childre for all investments listed in the ODA analysis sample. The algorithm is trained using a subsample of investments (See Step 1 on identifying the algorithm training sample) and employs a broad range of information about the project and programs funded through ODA (Refer to the list of relevant variables in Section 3.2.1).

The likelihood of the investment being related to children is estimated using a logistic regression, that predicts a binary outcome variable with two values: "1" – the investment is related to children, either child-specific or child-benefitting investment and "0" – the investment is not child related. The logistic regression estimates the likelihood based on a set of ODA descriptors, such as the identifiers for SDG goals, identifier for the investment being a delivered through multilateral donor, the channel of delivery and the information of the recipient country, i.e., income group, region. The logistic regression controls for a broad list of binary identifiers utilizing the information captured in the ODA description and a few selected interactions between these identifiers (See the full list of keyword identifiers in Appendix A). The ODA classification algorithm for an ODA $i \in I$ received by a recipient country $c \in C$ in year $t \in T$ can be described as follows:

$$Prob \left(\ 'Investment \ being \ related \ to \ children' = 1 \right)_{it} = \ \alpha + X'_{ct}\beta + Z'_{it}\delta + K'_{it}\theta + \varepsilon$$

(5)

where X'_{ct} is a vector of recipient country specific characteristic, Z'_{it} is a vector of ODA-specific characteristics[58] and K'_{it} is a vector of relevant keyword identifiers and interactions (See **Appendix A**). To enhance the classification algorithm to capture ODA flows targeted at individuals under the age of 18, the regression incorporates interaction terms between key words such as teenager, adolescent, youth, and young, and interacts them with the word's child and adult. This approach allows the regression to capture the combined effects of these variables to more accurately

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[58] The list of all prediction characteristics including recipient country-specific and ODA-specific characteristics is detailed in Table 13.

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determine whether the investment is related to children. The parameters of the logistic regression are estimated using the maximum likelihood estimation.[59]

Step 3: Predicting the likelihood that the investment is related to children on the full ODA analysis data and identifying probability thresholds

Using the estimated parameters of the ODA classification algorithm, the likelihood of ODA being related to children is predicted for the entire ODA analysis data. After inspecting the distribution of the predicted probability distribution and its overlap with the initial assessment (See Step 1), a few potential probability cut-off thresholds have been to identify investments that are child-specific, child-benefitting or not-child related. The initial selection of different probability thresholds has been further refined during a co-design workshop in the collaborative approach with the World Vision International (WVI) project team.[60] Based on the feedback obtained from the WVI project team, the following probability cut-off rules have been adopted: investments are considered to be child-specific if the predicted probability is greater than or equal to 0.8; child-benefitting – if between 0.5 and 0.8; and all other regarded as not-child related investments. The probability cut-off thresholds are detailed in **Table 11** and shown in **Figure 8** that presents the distribution of the predicted probability on the ODA analysis sample.

Table 11 - Defined predicted probability thresholds for categorization of child-related ODA

Probability thresholds		
Child-specific	**Child-benefitting**	**Not child-related**
pr >= 0.8	0.5 >= pr < 0.8	pr <0.5

Figure 8 - Predicted probability distribution of full ODA analysis sample
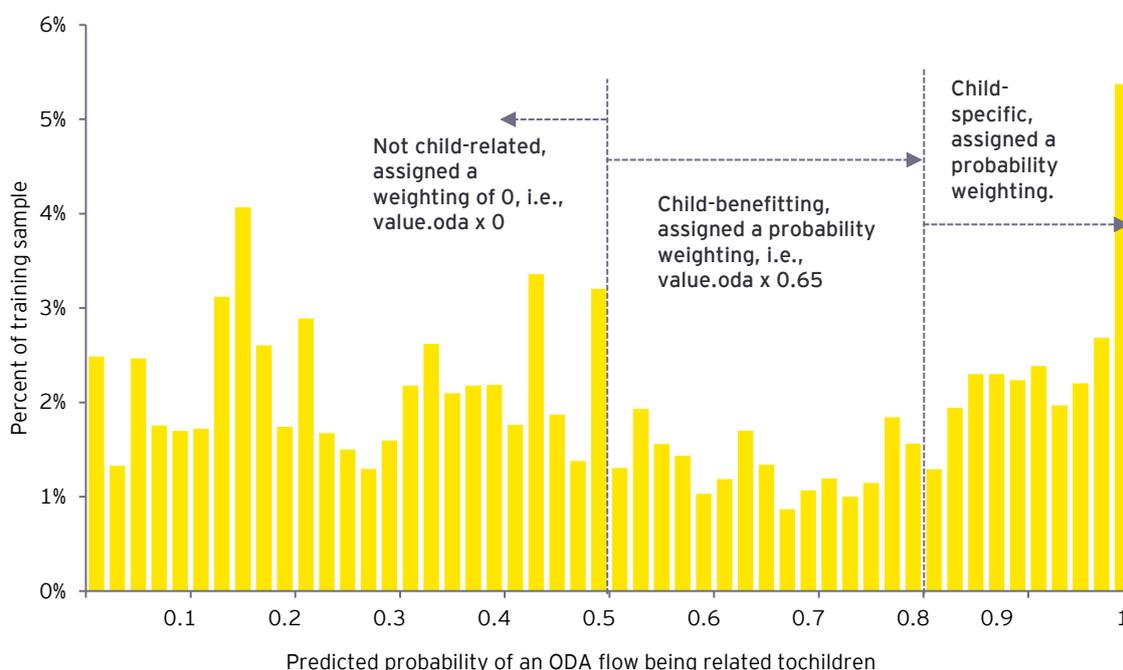
Source: OECD CRS, EY Analysis

The probability predicted using the ODA classification algorithm is considered as a weight, defining the level of the investment that impacts the development and welfare of children. For example, for the investment with the probability of 0.8, 80 percent of the investment value is attributed towards

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[59] Detailed results of the ODA classification algorithm are included in Table 22 in the Appendix E.

[60] Refer to appendix C for a list of attendees and key agenda items.

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children. To avoid any measurement errors, a value of 0 is assigned for all other investments with a predicted probability less than 0.5 and classified as not child related.[61]

Sensitivity analysis

To ensure the appropriate identification of child-related ODA, the selected probability thresholds were reviewed and refined in collaboration with the WVI project team. Samples were randomly selected from the full dataset at probability intervals of 0.1, ranging from 0.3 to 1.0, and were then reviewed with the WVI project team to ensure that the thresholds captured appropriate investments and were reasonable based on their past experiences with the OECD CRS dataset and similar investment cohorts. To assess the accuracy of the classification results, text-descriptor variables such as short and long descriptions, as well as project titles, were evaluated to determine if the assigned probabilities were appropriate for the investment. Alongside text-descriptor variables, other factors such as purpose codes and indicators like RMNCH were taken into account to gauge the rationality of the probability assignment.

3.4 Benefits from child-related ODA: Benefit Logic Map

Benefits in child-related progress towards the sustainable development goals can be broadly categorized into four benefit categories based on the targeted sector health, education and living standards. The indicator mapping approach has been taken to identify the SDG targets considered under each category to evaluate how the benefit domain contributes to the achievement of SDGs.

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[61] To determine the weighted value of each investment, the value in dollars ($) was multiplied by the predicted probability that the investment is related to children.

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Figure 9 presents the Benefit Logic Map, outlining where benefit categories may contribute towards the progress of selected examples of Sustainable Development Goals (in grey) and their targets (in white).

Benefit categories are measured by benefit domain(s) (in black). Benefits were estimated using two approaches. First, the analysis employs a statistical regression analysis to evaluate the health, education and living standard benefit domains. Whilst these benefit domains may not capture all indirect benefits of positive changes in SDGs, they capture the majority of the quantifiable components of progress in child-related human development.[62] To explore indirect benefits that may not be captured, a social multiplier[63] approach is employed to quantify additional broader benefits accrued through empowering children and communities. The following sections detail each benefit domain.

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[62] Ghislandi, S., Sanderson W. C. and S. Scherbov (2019). A simple measure of Human Development. Popul Dev Rev 45(1); SDG Action (2018). The Human Development Index – a better indicator for success? Retrieved on 19 June 20923 from https://sdg-action.org/the-human-development-index-a-better-indicator-for-success/

[63] Social multipliers refer to the additional (indirect) benefit received by individuals connected to those receiving an intervention.

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Figure 9 - Benefit Logic Map[64]

Health ♥

SDG	SDG Target
2 ZERO HUNGER	2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons
3 GOOD HEALTH AND WELL-BEING	3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
3 GOOD HEALTH AND WELL-BEING	3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
3 GOOD HEALTH AND WELL-BEING	3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

Child Mortality rate, under 5:	Child Stunting rate, under 5:

Education 🎓

SDG	SDG Target
4 QUALITY EDUCATION	4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
4 QUALITY EDUCATION	4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all
5 GENDER EQUALITY	5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation
5 GENDER EQUALITY	5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation

Mean Years of Schooling	Expected Years of Schooling

Living Standards 👛

SDG	SDG Target
1 NO POVERTY	1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day
1 NO POVERTY	1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
6 CLEAN WATER AND SANITATION	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
10 REDUCED INEQUALITIES	10.a: Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements

Gross National Income $

Empowering Children & Communities 👪

SDG	SDG Target
5 GENDER EQUALITY	5.2: Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation
5 GENDER EQUALITY	5.3: Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation
8 DECENT WORK AND ECONOMIC GROWTH	8.7: Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	16.2: End abuse, exploitation, trafficking and all forms of violence against and torture of children

Social Multipliers

Source: UNDP, EY Analysis

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[64] Source: United Nations Development Programme (n.d.). The Sustainable Development Goals in action. Department of Economic and Social Affairs, United Nations. EY Analysis.

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3.5 Statistical approach to benefit attribution

3.5.1 Benefit domains

Benefit domains considered in this economic appraisal capture a variety of benefits categorized under four benefit domains: health, education, living standards and empowering children and communities. A statistical approach is employed to estimate the first three domains (health, education and living standards), while social multipliers are used to estimate additional benefits arising from empowering children and communities through social multipliers.

Health, education and living standards are measured using a proxy value indicator, broadly capturing the human wellbeing and development. This section details these benefit domains and relevant benefits captured.

Health Domain

The health domain captures benefits from ODA that impacts children health and wellbeing, particularly in early stages of their life. The first years of life are critical for the physical, emotional and intellectual development of children. Brain development occurs faster than any other time in their life. Children develop physical, mental, and emotional foundations for their entire life ahead.[65] A number of child-related SDGIs measure early childhood health, which include:

- **SDGI 2.2.1:** Prevalence of stunting among children aged less than 5
- **SDGI 2.2.2:** Prevalence of malnutrition among children under 5 years of age
- **SDGI 3.1.1:** Maternal mortality ratio
- **SDGI 3.1.2:** Proportion of births attended by skilled health personnel
- **SDGI 3.2.2:** Neonatal mortality rate
- **SDGI 3.3.1:** Number of new Human Immunodeficiency Virus (HIV) infections per 1,000 uninfected population, by sex, age and key populations
- **SDGI 3.3.3:** Malaria population incidence.

Mortality and morbidity among young children are key output indicators for child health and well-being, and, more broadly, for social and economic development. These indicators are commonly employed in public health research to measure the quality of healthcare system. Progress in improving mortality can be representative of the healthcare systems ability to intervene with more emergent health conditions (i.e., diarrhea, malaria and perinatal conditions), while progress in morbidity can be representative of less emergent health conditions (i.e., nutrition and sanitation). Mortality can be measured using the indicator **child mortality rate, under 5 (CM)** which is defined as a share of children who die before reaching the age of five. The United Nations SDG Sustainable Development Goal 3.2 is to reduce the child mortality rate to at least as low as 2.5 percent in all countries by 2030.[66] The indicator for the prevalence of **stunting among children (CS)** under the age 5 years of age[67] can be representative of morbidity across the healthcare system. The UN aims to reduce end all forms of malnutrition by 2030, represented by stunting.

The benefit attribution approach (described in **Section 2.2.1**) describes the estimated impact of child-related ODA on child mortality and stunting indicators. When monetized using the VSL (in

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[65] UNICEF (2023). *Early Childhood Development and Health*. UNICEF.

[66] United Nations *(2023). E-Handbook on the Sustainable Development Goal Indicators,* UN. Retrieved on 19 June, 2023 from https://sdghelpdesk.unescap.org/e-library/e-handbook-sustainable-development-goals-indicators

[67] UNICEF and World Bank define stunting as the Percentage of children aged 0–59 months who are below minus two standard deviations from median height-for-age of the WHO Child Growth Standards. *Joint child malnutrition estimates*: World Health Organisation. Accessed at: Joint child malnutrition estimates

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Section 2.2.2) broader benefits listed in the SDGIs above will also be captured, such as the maternal mortality ratio and the prevalence of malnutrition among children under 5 years of age.

Figure 10 presents the trend in CM across 7 regions.

Figure 10 - Trends in child mortality (under 5) rates[68]
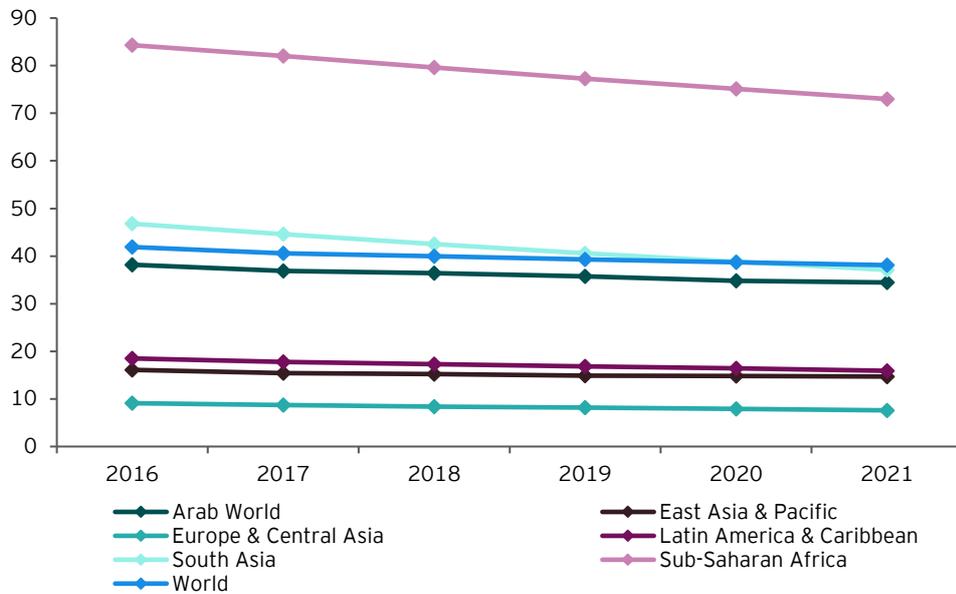
Source: HDI, EY Analysis

Figure 11 presents the trend in CS across 7 regions.[69]
Figure 11: Trends in child stunting (under five) rates
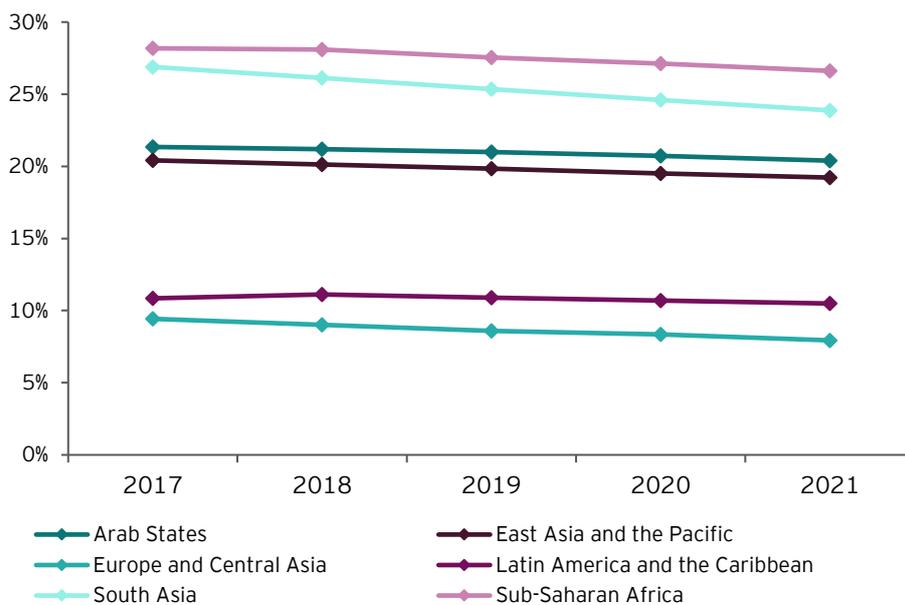
Source: UNICEF, EY Analysis

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[68] United Nations, (2023), Human Development Index;

[69] UNICEF, World Bank, Accessed from: Joint child malnutrition estimates;

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Education Domain

The United Nations Convention on the Rights of the Child acknowledges education as a fundamental entitlement for every child. Despite UN efforts, the education continues to be largely not accessible to many children in developing countries.[70] Education plays a crucial role in combating poverty and hunger, offering individuals the opportunity to improve their lives through enhanced communication abilities, critical thinking skills, and the fulfillment of basic employment requirements and has been one of the most integral drivers and outcomes of global development.[71]

A number of child-related SDGIs capture education-related outcomes, which include:

- **SDGI 4.1.1:** Proportion of young children meeting minimum proficiency level in reading and mathematics
- **SDGI 4.1.2:** Schooling completion rates
- **SDGI 4.2.2:** Participation rate in organized learning (one year before the official primary entry age)
- **SDGI 4.a.1:** Proportion of schools offering basic services.

A primary objective from education programs and projects funded by ODA is to increase time spent at school. Utilizing a combination of expected years of schooling with mean years of schooling can capture average time spent in education by past and current children.[72]

The indicator **expected years of schooling (EYS)** measures the number of years of schooling that a child of school entrance age can expect to receive if the current age-specific enrolment rates persist throughout the child's life by country.

The indicator **mean years of schooling (MYS)** measures the average number of years of total schooling adults aged 25 years and older have received.

Trends in EYS and MYS across 7 regions are presented in **Figure 12**.

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[70] Rueckert, P. (2019). 10 Barriers to Education that children living in poverty face. Global Citizen. Retrieved on 19 June, 2023 from 10 Barriers to Education That Children Living in Poverty Face (globalcitizen.org)

[71] World Vision Canada (2021). Why is education important and how does it affect one's future? Retrieved on 19 June, 2023 from Why is Education Important? | Purpose of Education | World Vision Canada

[72] Damon, A. et.al. (2016). Education in developing countries – what policies and programs affect learning and time in school? Education and Research: Review.

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Figure 12 – Trends in EYS and MYS[73]
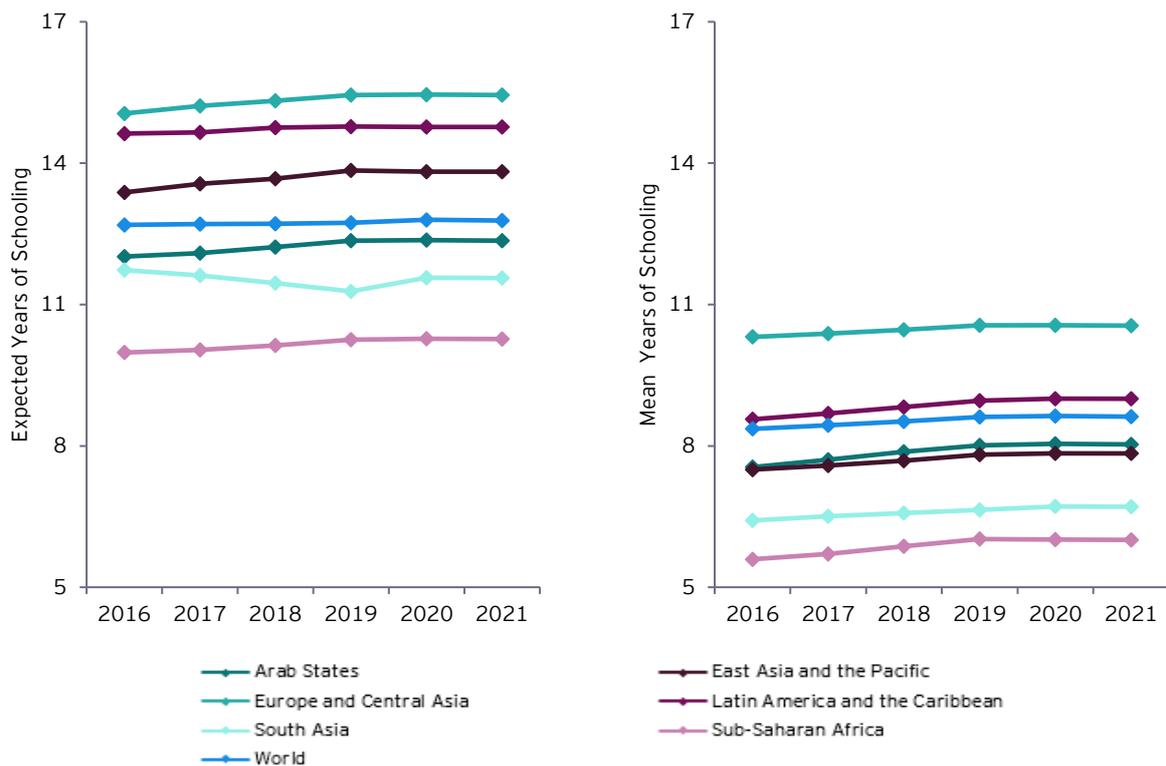
Source: UN, EY Analysis

Whilst additional years in schooling increases the potential for students to reap the benefits from education through improved employment opportunities, the benefits from increased education translates into other benefits related to health, child protection and safety.[74] [75]

Living Standards Domain

Evidence drawn from the past 50 years of development research and policy indicates that economic growth is the most effective way to enable communities to move out of poverty and deliver on their wider objectives for a better life.[76] Studies that examine the experiences of various developing nations consistently demonstrate compelling evidence that rapid and long-lasting economic growth is the most crucial factor in diminishing poverty. These cross-country analyses commonly suggest that a 10 percent rise in a country's average income will result in a poverty rate reduction of approximately 20 to 30 percent.[77]

A number of child-related SDGIs cover the dimensions of living standards, which include:

- **SDGI 1.1.1:** Population living below the international poverty line

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[73] United Nations, (2023), Human Development Index

[74] Hahn, R. A. and B. I. Truman (2015). Education Improved Public Health and Promotes Health Equity. International Journal of Health Services 45 (4): 657-678.

[75] Gottschalk, F. and T. Burns (eds.) (2020). Chapter 11 Education and child safety in: Education in the Digital Age: Healthy and Happy Children. Educational Research and Innovation, OECD Publishing, Paris. https://doi.org/10.1787.1209166a-en

[76] Rodrik, D. (2008). One Economics, Many Recipes: Globalization, Institutions and Economic Growth. Princeton, NJ: Princeton University Press.

[77] Richard, A. H. (2002). Economic Growth, Inequality and Poverty: Findings from a New Data Set, Policy Research Working Paper 2972, World Bank; Ravallion, M. and S. Chen (1997). What Can New Survey Data Tell Us about Recent Changes in Distribution and Poverty?' World Bank Economic Review 11(2): 357-382.

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- **SDGI 1.2.1:** Population living below the national poverty line

GNI is considered a holistic measure of economic growth. It measures the total domestic and foreign value added claimed by residents. GNI calculates the economy's total income, regardless of whether the income is earned by nationals within the country's borders or derived from investments in foreign business.[78]

The indicator **Gross National Income per capita (GNIpc)** is the GDP adjusted for price changes over time (inflation) and price differences between countries, it is measured in constant international $. **Figure 13** presents the trends in GNI indicators across 7 regions.

Figure 13 – Trends in GNIpc (USD $)[79]
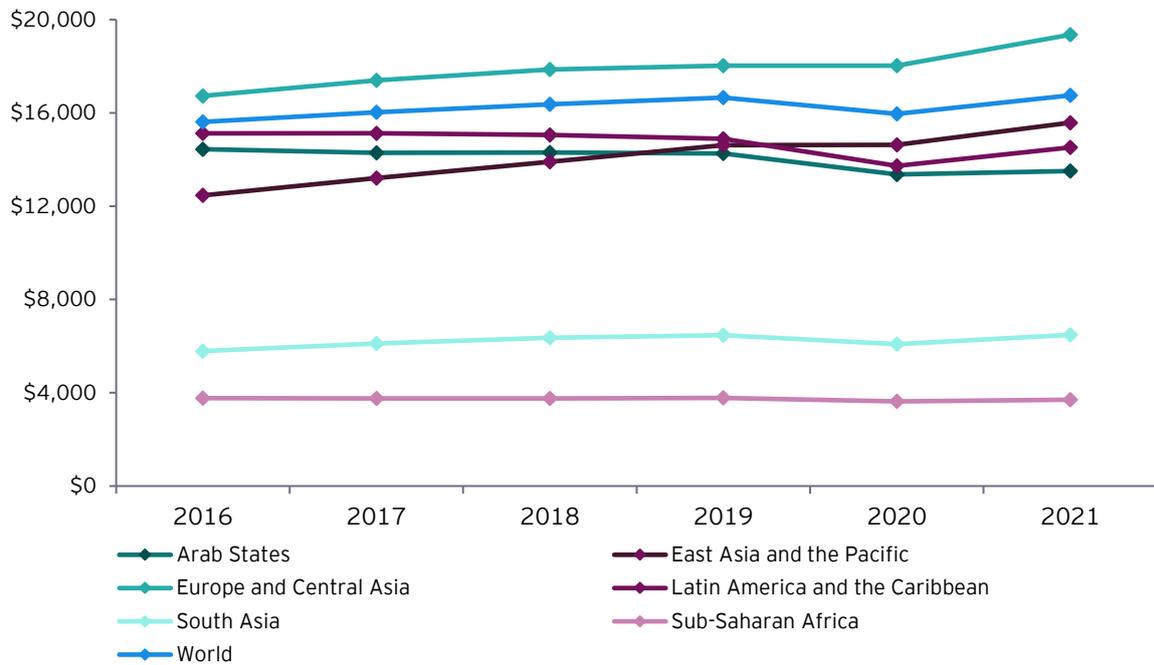
Source: UN, EY Analysis

3.5.2 Statistical approach to Benefit Attribution

The purpose of the benefit attribution analysis is to measure the impact of child-related ODA on each benefit indicator specified in **Section 3.5.1**, that can be then monetized as explained in **Section 3.6**.

To estimate the impact of ODA, the analysis employs a two-stage instrumental variable regression. Modelling the impact of ODA on any country performance metric faces an econometric challenge of endogeneity causing biased estimators. For instance, any type of foreign aid or ODA may be targeted towards countries with the lowest performance on the human development or, in this analysis, countries with the highest child mortality, lowest education and/or living standards. Thus, there might be a negative correlation between the levels of ODA and indicators detailed in **Section 28** expressed by benefit indicators

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[78] Maverick, J. B. (2022). Measuring Economic Conditions: GNI or GDP? Investopedia.

[79] United Nations, (2023), Human Development Index.

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Various approaches exist to tackle the endogeneity issue, one of which is employing an instrumental variable to produce valuable evidence.[80] In line with the research literature, population size has been used as an instrument to explain variations in ODA levels across countries.[81] [82] The evidence suggests that while population size does not impact country's growth and performance, it has a strong relationship with ODA per capita as the higher the population is, the lower ODA per capita is allocated.

The first and second stages of the instrumental variable regression estimates the impact of child-related ODA per capita in country c in a year t is specified in **Equation (6)** and **Equation (7)** respectively.

$$I_{c,t} = \alpha + \beta \, \widehat{ODA_{c,t-1}} + \boldsymbol{C}'\gamma_{c,t} + \sigma_c + \theta_t + \epsilon_{c,t}$$

(6)

With the corresponding first stage:

$$ODA_{c,t} = \varphi + \mu POP_{c,t} + \boldsymbol{C}'\gamma_{c,t}^0 + \sigma_c^0 + \theta_t^0 + \varepsilon_{c,t}$$

(7)

Where $\widehat{ODA_{c,t-1}}$ in **Equation (6)** is the predicted child-related ODA per capita from the first stage estimation. Here β is the estimate of interest and indicated the estimated change in a benefit indicator I with a one-off 1 percent increase in child-related ODA.[83] The statistical model includes a vector $\boldsymbol{C}'$ of additional country and investment-specific characteristics[84] and year θ_t and country σ_c fixed effects to isolate other factors that would otherwise be captured in the estimated impact.

The regressions specified in **Equation (6)** and **Equation (7)** are estimated to measure the change in each benefit domain indicator I, that are further explained in **Section 3.5.1**. The following parameters demonstrate the effect of a one-off 1 dollar increase in child-related ODA per capita:

- $\hat{\beta}^{CM}$ - change in Child Mortality (CM)
- $\hat{\beta}^{CS}$ - change in Child Stunting (CS)
- $\hat{\beta}^{EYS}$ – change in Expected Years of Schooling (EYS)
- $\hat{\beta}^{MYS}$ - change in Mean Years of Schooling (MYS)

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[80] Brückner, M. (2013). On the simultaneity problem in the aid and growth debate. Journal of Applied Econometrics 28(1): 126-150.

[81] Roodman, D. (2007). The Anarchy of Numbers: Aid, Development, and Cross Country Empirics. The World Bank Economic Review 21(2).

[82] Clemens, M. et.al. (2011). Counting Chickens when they Hatch: Timing and the Effects of Aid on Growth. The Economic Journal 122(561): 590-617.

[83] A one-off 1 percent increase in child-related ODA assumes the attributed benefits are from additional investment in a single year. If the increase in investment was ongoing, associated benefits would be larger.

[84] The descriptive statistics of all characteristics considered in the analysis are included **in Appendix A, Table 17.**

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- $\hat{\beta}^{GNI}$ – change in Gross National Income (GNI)

To enable benefit monetization described in **Section 3.6,** all parameters have been rescaled to represent the change in each benefit indicator with $1 increase in child-related ODA per capita using country population rates.

3.6 Benefit monetization

3.6.1 Monetizing health domain indicators

The social value generated from the change in child mortality rate per live birth is determined by monetizing the parameter $\hat{\beta}^{CM}$ as specified in **Equation (8):**

$$Social\ Value\ from\ the\ change\ in\ child\ mortality\ = SV^{CM} = \frac{\hat{\beta}^{CM}}{1,000} \times \overline{LB}\ \times VSL$$

(8)

With the following proxy value indicators[85] for:

- $\overline{LB}$ is a median number of live births, that is informed by the ODA analysis sample

- VSL is the Value of Statistical Life, that represents how much society is willing to pay to reduce the risk of death and reflects the global VSL estimate.

Since the benefit health domain is expressed in child mortality under the age 5 per 1,000 live births, the parameter $\hat{\beta}^{CM}$ is divided by 1,000 to reflect the change per one live birth.

The social value generated from a change in child stunting is determined by monetizing the parameter

$$Social\ Value\ from\ the\ change\ in\ child\ stunting = SV^{CS} =\ \hat{\beta}^{CS} \times \overline{\overline{POP^I}} \times \overline{\overline{POP}}\ \times \frac{VSL}{\overline{LE}} \times QALY^S$$

(9)

With the following proxy value indicators[86] for:

- $\overline{\overline{POP}}$ is the average population, based on the ODA analysis sample.

- $\overline{\overline{POP^I}}$ is the average proportion of children under the age of 5. The social value from changes in the rate of stunting can be attributed to children currently under the age of 5.

- VSL is the Value of Statistical Life, that represents how much society is willing to pay to reduce the risk of death and reflects the global VSL estimate.

- $\overline{LE}$ is the median Life Expectancy for the analysis sample of countries. It estimates the average age an individual is expected to live at birth.

- $QALY^S$ is the Quality Adjusted Life Year equivalent weight for stunting. It estimates how the quality of life for a person experiencing stunting compares to an average person.

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[85] The list of all assumptions supporting the benefit monetisation is provided in Table 21.
[86] The list of all assumptions supporting the benefit monetisation is provided in Table 21.

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Collective benefits from the health domain will be expressed as an average benefit from a reduction in child mortality and stunting, as specified in **Equation (10).**[87]

$$Social\ Value\ from\ the\ health\ domain\ = SV^H = \frac{(SV^{CM}) + (SV^{CS})}{2}$$

(10)

3.6.2 Monetizing education domain indicators

The social value from the changes in education domain is represented by the change in two indicators: expected years of schooling (EYS) and mean years of schooling (MYS) and can be determined as specified in **Equation (11)** and **(12)**:

$$Change\ in\ Social\ Value\ from\ the\ change\ in\ EYS\ = SV^{EYS} = \hat{\beta}^{EYS} \times \overline{\overline{POP}}^C \times \overline{\overline{POP}} \times \bar{w} \times SVS$$

(11)

$$Change\ in\ Social\ Value\ from\ the\ change\ in\ MYS\ = SV^{MYS} = \hat{\beta}^{MYS} \times \overline{\overline{POP}}^W \times \overline{\overline{POP}} \times \bar{w} \times SVS$$

(12)

With the following proxy value indicators[88] for:

- $\overline{\overline{POP}}$ is the average population, based on the ODA analysis sample.

- $\overline{\overline{POP}}^C$ is the average proportion of school aged children. The social value from the change in EYS is attributed to the proportion of school aged population as the number of their years of schooling is still to be determined.

- $\overline{\overline{POP}}^W$ is the average proportion of working population. The social value from the change in MYS is attributed to the share of population that has already completed their years of schooling.

- SVS is the social value of schooling to the individual and the broader society, expressed in percent increase in annual wage with one year increase in schooling.

- $\bar{w}$ is the median annual wages, expressed in $US.

The key difference between these two benefit indicators is in the timing at which the benefit is realized and thus the relevant subset of the population to which the benefit is attributed. The total benefits from education domain expressed in change in mean/expected year of schooling are measured as the weighted average based on the share of the population affected:

$$Social\ Value\ from\ the\ education\ domain\ = SV^E = \frac{(SV^{MYS} \times \overline{\overline{POP}}^W) + (SV^{EYS} \times \overline{\overline{POP}}^C)}{\overline{\overline{POP}}^W + \overline{\overline{POP}}^C}$$

(13)

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[87] An arithmetic average with equal weighting for Child Mortality and Child Stunting is consistent with the approach employed by World Bank' for the Human Capital Index. World Bank Group. (2021), The Human Capital Index 2020 Update, World Bank Group. DOI: 10.1596/978-1-4648-1552-2

[88] The list of all assumptions supporting the benefit monetisation is provided in Table 21.

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3.6.3 Monetizing living standards domain indicator

The benefit indicator for living standards is expressed in monetary values and reflect the gross national income per capita. The social value from the change in living standards is measured by scaling the estimated impact by the country's population: [89]

$$Social\ Value\ from\ the\ living\ standards\ domain = SV^{GNI} = \hat{\beta}^{GNI} \times \overline{\overline{POP}}$$

(14)

3.6.4 Comparing benefit attribution of global interventions

Figure 14 compares this monetization approach with other approaches described in **Section 2.2.2.**

Figure 14 - Comparison of monetization approach[90]
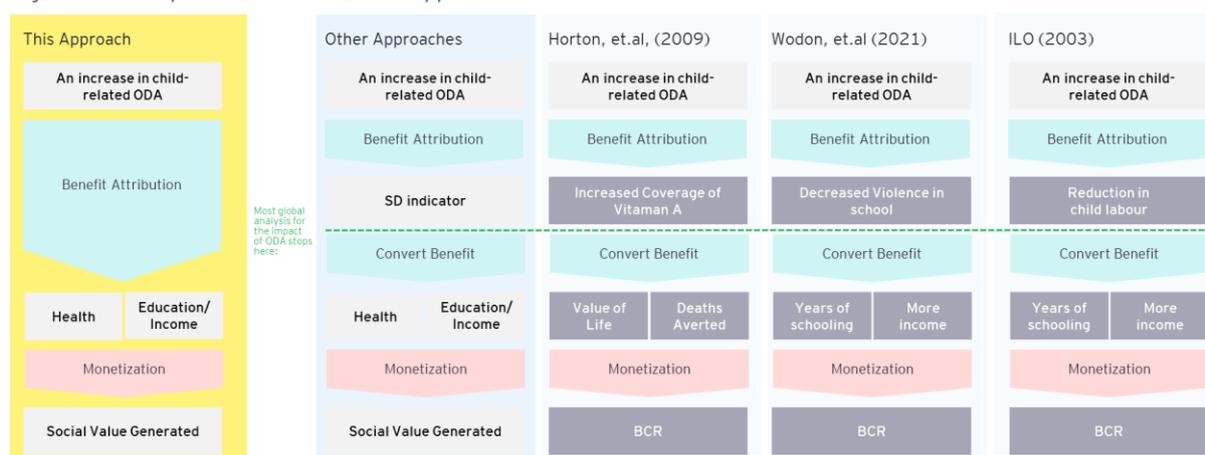
Source: Horton (2009), Wodon (2021), ILO (2003), EY Analysis

This approach attributes the increase in child-related ODA directly to health and education outcomes, while other approaches first attribute the benefit of ODA towards a single SDGI. This approach attributes the benefits directly from ODA to the health and education domains, such that benefits from these sub-categories have been captured in this project. Whilst the final outcome from both approaches is similar, this approach has the following advantages:

- Reduces the likelihood of overlapping benefits; overlapping benefit attribution can result in an overstated ROI. It is difficult to compare how changes across several indicators contribute towards the total monetary value without double counting.

- Cross sectional country-level data is available for the indicators being attributed and monetized in this analysis which enables a holistic evaluation for the global return of child-related ODA. Most country-level data is missing for the Sustainable Development Indicators and their monetization; this prevents the ability to use these indicators to conduct a holistic global analysis. Most analysis on the SDGIs are conducted for one country or a small selection of countries.

- Data scarcity to estimate over 240 SDGs – considering the broader impact ensures a more holistic evaluation of ROI.

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[89] The list of all assumptions supporting the benefit monetisation is provided in Table 21.

[90] Horton, S. et.al, (2009). Second Copenhagen Consensus: Micronutrient supplements for child survival. Best Practice Paper, Copenhagen Consensus Centre 2009; Wodon, Q. et.al (2021). *Ending Violence in schools: An investment case, Safe to learn, End Violence Against Children*, World Bank, Washington, DC.; International Labour Office (2003), *An Economic study of the costs and benefits of eliminating child labour*. ILO.

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3.7 Attributing benefits of social multipliers from empowering children and communities

In recent decades there has been growing sector discussion on the ideological position of ODA and its perceived paternalistic underpinnings.[91] A paternalistic system can present aid-receivers as powerless and/or ignorant of their problems, opportunities for action and their ability to provide feedback on the impact of aid to improve their well-being.[92] The elevation of community voice and leadership in programming to enable sustainable and community driven change by placing local communities at the center of the decision making process can support aid efforts to be more accountable and effective.[93] Reconsidering the role of local communities and better incorporating their leadership in decision making may help enable more effective developmental assistance[94] and as such has been integrated into the current modelling approach. This section considers a collection of additional benefits from empowering children and communities that may not have been fully captured by the analysis above. Attributing a direct financial benefit to wider economic and social benefits is challenging, yet important as it often significantly contributes to the impact of the targeted government aid, such as child-related ODA.

Most existing economic analysis only considers benefits to those directly impacted by an intervention. A growing body of academic literature also considers the indirect benefits of interventions by investigating network or social multiplier effects from such interventions. Social multipliers refer to the additional (indirect) benefit received by individuals connected to those receiving an intervention. Evidence quantifying the impact of global interventions on social multipliers in developing countries is limited.[95] This analysis relies on proxy values from selected peer-reviewed literature to estimate the proportion of additional benefits that can be attributed by empowering children and communities in a recipient country as a result of an intervention.

Figure 15 illustrates the selection of interventions considered in this analysis. Benefits from social multipliers are qualitatively described, and where available, proxy values from social multipliers are used to quantitatively monetize the indirect effects from child-related ODA.

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[91] Musella, A. M. and L. A. Corseri (2021). The Paternalistic Assumptions in the Narrative of International Aid: A Historical Overview 12(4): 9-19.

[92] Lotter, H. (2007). The moral challenge of poverty's impact on individuals. Bulletin for Christian Scholarship 72(2): 261-282.

[93] Winters, M. (2010). Accountability, Participation and Foreign Aid Effectiveness. International Studies Review 12(2): 218-243.

[94] Musella, A. M. and L. A. Corseri (2021). The Paternalistic Assumptions in the Narrative of International Aid: A Historical Overview 12(4): 9-19.

[95] Evidence quantifying benefits from social multipliers requires social network data. Social Network data refers to data understanding friendships and links between individuals across society Network data is scarce, (particularly in developing countries).

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Figure 15 - Benefits from empowering children and communities

Quantitative social multipliers

CHILD PROTECTION & LABOUR
Community support create social accountability externalising (family) problems and reduce child labour and crime

GENDER EQUALITY
Female friends encourage education, work and help reduce underage marriage and childbirth

BROADER HEALTH BENEFITS
Information networks promote peer vaccination and medication adoption

Qualitative social multipliers

ENHANCING EDUCATION & INCOME
Friendship networks increase the impact of education on future earning potential

MENTAL HEALTH
Community involvement provides a sense of belonging and social connectedness.

Source: EY Analysis

3.7.1 Enhancing Education and Income

The economic appraisal employs indicators that capture the direct impact of child-related ODA on increasing years of education and their expected income for children as described in **Section 2.2.1**. Social multipliers have the potential to further amplify the education benefits through the following channels:

- **Friendship Networks:** It is anticipated that benefits related to education and future employment may be further elevated through empowering children and the broader community by fostering learning through peer-based friendship networks. When studying alongside peers, individuals are likely to achieve better outcomes from education, which is likely to translate towards higher income of individuals living in ODA recipient countries. The Social Multiplier associated with friendship networks improving the quality of education are specified as $\emptyset^{FN}$ in **Equation (15).**

- **Social Norms:** Changing the social norms that incorporate addressing structural and institutional arrangements in addition to local beliefs systems around child protection and gender equality is likely to decrease the prevalence of child labor (especially among females) further increasing, access to and years of schooling and the subsequent earning potential. Benefits associated with changing the social norms are specified as $\emptyset^{CP}, \emptyset^{GE}$ in **Equation (15).**

Collectively social multipliers from improving education outcomes are specified in **Equation (15):**

$$Social\ Multipliers\ enhancing\ education\ outcomes\ = \emptyset^E = \ \emptyset^{CP} + C^F(\emptyset^{GE}) + \emptyset^{FN}$$

(15)

With the following indicators:[96]

- $\emptyset^E$ is the total social multiplier for education.

- $\emptyset^{CP}$ is the social multiplier associated with shifting the norms around child protection.

- C^F is the proportion of children that are females in the sample population.[97]

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[96] The list of all assumptions supporting the benefit monetisation is provided in Table 21.

[97] Shifting the social norm around gender inequality is assumed to only be attributable to the female portion of the sample.

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- $\emptyset^{GE}$ is the social multiplier associated with shifting the norms around gender equality.

- $\emptyset^{FN}$ is social multiplier associated with friendship networks improving quality of education.

Each of these social multipliers are further described in the following sections.

3.7.1.1 Child protection

Across the world, children experience acts of violence, exploitation and abuse, frequently in places where they should feel safest, such as their homes, schools, and the internet. Children's experiences of violence can encompass physical, sexual and emotional acts, alongside neglect.[98]

Children in humanitarian situations face elevated risk of harm. During wars, natural disasters or other emergencies, many families and children are displaced and impacted by trauma. Alongside risks of violence within their homes and communities, children may be separated from their families during humanitarian situations and experience abuse and exploitation, including though child trafficking and child labor.

Evidence suggests that girls and women are especially at risk of experiencing violence. This includes more frequent experiences of sexual violence, alongside cultural practices which can lead to girls being forced into child marriages and/or being subject to female genital mutilation. These practices are recognized internationally as violations of human rights, however, are documented to occur commonly in some settings.[99]

The sustainable development goals track the improvement in child protection through a collection of SDGIs including:

- **SDGI 5.2.1:** Proportion of ever-partnered women and girls aged 15 years and older subjected to violence by current or former partner

- **SDGI 5.3.1:** Proportion of women aged 20–24 years who were married or in a union before age 15 and before age 18

- **SDGI 5.3.2:** Proportion of girls and women aged 15–49 years who have undergone female genital mutilation

- **SDGI 16.1.1:** Intentional homicide rates

- **SDGI 16.2.1:** Proportion of children aged 1-17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month

- **SDGI 16.9.1:** Proportion of children under 5 years of age whose births have been registered with a civil authority

Benefits attributable to the society by improving changes in child protection include improvement in human rights, improved health and wellbeing and increased education and income potential.

Section 2.2.2 has highlighted previous approaches used by the literature to monetizing some of the benefits from increasing child protection through reducing violence at schools[100] and decreasing child labor.[101] Benefits have been attributed by considering increased years of schooling and subsequently increased earning potential (Refer to **Section 3.5.1**). In addition, the economic appraisal considers the benefits from severe cases where child abuse and neglect results in the premature death of the child (Refer to **Section 3.6.1).**

It is anticipated that there are further benefits associated with improving child protection outcomes which can be captured by considering the social multipliers associated with empowering the community against child endangerment. This is supported by evidence from Lima, et.al (2010),

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[98] UNICEF (n.d.). *Child Protection*. Retrieved on 19 June, 2023 from https://www.unicef.org/child-protection
[99] Ibid.
[100] Wodon, Q., et.al (2021). *Ending Violence in schools: An investment case, Safe to learn, End Violence Against Children*, World Bank, Washington, DC.
[101] International Labour Office (2003), An Economic study of the costs and benefits of eliminating child labour. ILO

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indicating that community support helps individuals externalize some of the experiences associated with family violence,[102] alongside the WVI's work highlighting the social accountability to reduce child labor.[103]

Child Protection benefit monetization

$$Social\ Multipliers\ from\ enhancing\ child\ protection\ norms = \emptyset^{CP} = \eta^{ODA \to CP} \times \eta^{CP \to CL} \times \eta^{CL \to E}$$

<div align="right">(16)</div>

With the following proxy indicators:

- $\eta^{ODA \to CP}$ is an assumption for the impact of ODA on improving social norms around child protection.

- $\eta^{CP \to CL}$ is a proxy for the impact of changing the social norm around child protection on child labor.

- $\eta^{CL \to E}$ is a proxy for the share of children that are likely to commence education after averting child labor.

ODA targeting improvements in community support networks may enable changing social norms around child protection (specified as $\eta^{ODA \to CP}$). Shifting the social norm around child protection is anticipated to decrease the proportion of children experiencing child labor (specified as $\eta^{CP \to CL}$). A share of additional children that have averted child labour are likely to access education (specified as $\eta^{CL \to E}$). Collectively this leads to a social multiplier from enhancing child protection norms as ($\emptyset^{CP}$) which contribute towards additional children accessing education and further enhancing education benefits.

3.7.1.2 Gender equality

Ensuring gender equality is a basic human right, considered fundamental to establishing a peaceful, prosperous, and sustainable global society.[104] While gender inequality is observed globally, its effect is amplified in developing countries.[105]

In schools, girls often face unequal support compared to boys when it comes to pursuing their desired studies. There are a range of underpinning drivers of this disparity. Girls' needs for safety, hygiene, and sanitation may be overlooked, preventing them from attending classes regularly. Additionally, discriminatory teaching methods and educational resources contribute to gender gaps in learning and skills development. UNICEF suggests that *'Worldwide, nearly 1 in 4 girls between the ages of 15 and 19 are neither employed nor in education or training – compared to 1 in 10 boys.[106]*

Gender norms and discrimination increase the chances of unwanted pregnancies, HIV and AIDS, and malnutrition among girls. This risk is amplified in emergency situations alongside in areas where menstruation and sexual health is considered taboo. Harmful gender norms are recognized to persist in many settings, and are deeply ingrained in laws and policies that do not adequately protect girls' rights. In numerous settings, legislation openly infringes upon girls rights, such as those that restrict women from inheriting property.

Gender equality is one of the UN's 17 Sustainable Development Goals. The progress against gender equality is measured by the following SDGIs:

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[102] Lima, J. et.al (2010), Effects of cumulative risk on behavioural and psychological wellbeing in the first grade: Moderation by neighbourhood context. Soc Sci Med 71(8): 1447-1454.

[103] World Vision International (2023), Child Labour: What you need to know. Retrieved on 19 June 2023 from https://www.wvi.org/stories/child-protection/child-labour-what-you-need-know.

[104] United Nations, (2022), The Sustainable Development Goals Report 2022, UN.   Retrieved on 19 June 2023 from https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf

[105] Jayachandran, S. (2015). The Roots of Gender inequality in Developing Countries. Annual Review of Economics 7:63–88

[106] UNICEF (n.d.). Gender Equality. Retrieved on 19 June 2023 from https://www.unicef.org/gender-equality/

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- **SDGI 5.1**: End all forms of discrimination against all women and girls everywhere

- **SDGI 5.2:** Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation

- **SDGI 5.3:** Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation

- **SDGI 5.4:** Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate

- **SDGI 5.5:** Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision making in political, economic and public life

- **SDGI 5.6:** Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences

ODA aims to contribute towards changes in these SDGI's, by targeting marginalized communities such as women, ethnic minorities, and people with disability. This can help address the structural inequalities they face and promote greater social and economic inclusion. ODA has also been used to fund programs that promote female education by providing scholarships and supporting women in accessing higher education. To ensure safety of females accessing education programs have targeted gender-based violence, offered support to survivors, and promoted legal and policy frameworks. [107],[108]

The benefit attribution analysis described in **Section 3.5.2** implicitly considers the disproportionate effect from ODA interventions between genders, by including control variables for population sex ration, female deaths, mean age at childbearing.[109] For example, as female individuals currently experience lower expected years of schooling than males, and subsequently earn lower income as a result, the impact of ODA is likely to have a proportionately larger effect on females compared to males. Hence, the monetized benefit associated with ODA targeted to females is expected to be higher when compared to that relating to males.

Whilst the analysis quantifies benefits on average, ODA is anticipated to have additional benefits that can be achieved through empowering children and communities to shift the social norm towards gender equality. The research literature highlights that female friends encourage education[110], work[111] and help reduce underage marriage and childbirth which are barriers to educational participation for girls and young women.

Gender Equality benefit monetization

$$Social\ Multipliers\ from\ enhancing\ gender\ equality\ norms = \emptyset^{GE} = \eta^{ODA \to GE} \times \eta^{GE \to CL} \times \eta^{CL \to E}$$

$$(17)$$

[107] Di Francesco, B. and I. McDonnell, (2018), *Leave No One Behind: How are Development Assistance Committee members answering the pledge of the 2030 Agenda for Sustainable Development?*, OECD Development Co-operation Working Papers, No. 47, OECD Publishing, Paris, Available at: https://doi.org/10.1787/eadd2f8d-en.

[108] OECD, (2019). Gender Equality and Women's Empowerment: Policy Coherence for Sustainable Development 2019. Retrieved on 19 June, 2023 from https://www.oecd.org/gov/gender-mainstreaming/policy-coherence-for-sustainable-development-and-gender-equality.pdf

[109] A list of all control variables included in the analysis can be found in **Table 17.**

[110] Hahn, Y. et al. (2019). Friendship and female education. The Economic Journal 130(627).

[111] Olivetti, C., Patacchini, E. and Y. Zenou (2018). Mothers, Peers and Gender-Role Identity. Journal of European Economic Association. 18(1): 266-301.

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With the following proxy indicators:

- $\eta^{ODA \to GE}$ is a proxy for the impact of ODA on improving social norms around gender equality.

- $\eta^{GE \to CL}$ is a proxy for the impact of changing the social norm around gender equality on child labor.

- $\eta^{CL \to E}$ is a proxy for the share of children that are likely to commence education after averting child labor.

ODA targeting improvements in community support networks can help shift the social norm around gender inequality child protection (specified as $\eta^{ODA \to GE}$). Shifting the social norm around gender equality is anticipated to decrease the proportion of children experiencing child labor (specified as $\eta^{GE \to CL}$). A share of the additional children that have averted child labor are likely to access education (specified as $\eta^{CL \to E}$). Collectively this leads to a social multiplier from enhancing gender equality norms as ($\emptyset^{GE}$) which contribute towards additional children accessing education and further enhancing education benefits. This is specified in **Equation (17)** as the social multiplier $\emptyset^{GE}$.

3.7.1.3 Friendship Networks

Friendship networks have also been found to increase the quality of education and further amplifying the impact of education on future earning potential[112] by empowering children and the broader community by fostering learning through peer-based friendship networks. When studying alongside peers, individuals are likely to achieve better outcomes from education.[113]

This can be quantified by further enhancing the social value in the education domain. $\emptyset^{FN}$ is social multiplier in **Equation (15)** which specifies how social multipliers from friendship networks enhance education outcomes in the model.

3.7.2 Broader health benefits

The health benefit domain described in **Section 2.2.1** considers mortality and stunting of children under the age of 5 as key indicators for capturing the majority of the health-related benefits. Whilst project and programs funded by child-related ODA will largely support the improved access and provision of health care including medications and medical supplies, there may be additional benefits that affect children at older ages and positively impact the broader community. Such benefits are measured by the following SDGIs:

- **SDGI 3.3.1:** Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations.

- **SDGI 3.8.1:** Coverage of essential health services.

- **SDGI 3.d.1:** International Health Regulations (IHR) capacity and health emergency preparedness.

- **SDGI 6.1.1:** Proportion of population using safely managed drinking water services.

The additional benefits from health-related projects and programs, that may not be captured by health or education domains include the significant role of knowledge and information exchange promoting the peer vaccination and medicine adoption.

For example, ODA towards the increased provision of vaccinations will directly contribute an increased the number of immunizations. Benefit from this effect will be captured by the mortality and stunting indicators in the health domain. While certain individuals might initially opt out of

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[112] List, J. et.al (2023). Neighborhood Spillover Effects of Early Childhood Interventions. CEPR Discussion Paper No.18134.
[113] Ibid.

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receiving vaccinations, despite improved accessibility, they may be swayed to receive vaccinations after witnessing the positive outcomes experienced by their vaccinated friends and family members. This observation is likely to serve as motivation and encouragement for these individuals to opt to receive HIV vaccinations as well, and receive subsequent benefits.[114] Similar effects have also been observed for deworming medication,[115] or water purification tablets.[116]

Broader health benefit monetization

These benefits can be captured using social multiplier effects. This can be quantified by further amplifying the social value from the health domain. **Equation (18)**, specifies the variable used as a proxy value indicator for the social multiplier represented broader health:

$$Social\ Multiplier\ for\ broader\ health = \emptyset^{BH}$$

(18)

3.7.3 Communities improving mental health

The health benefit domain described in **Section 2.2.1** considers mortality and stunting of children under the age of 5 mortality as the key indicators for capturing the majority of the health-related benefits.

Experiences of mental health challenges are present across diverse regions and cultures globally. Among them, depression and anxiety are the most widespread, affecting approximately one out of every ten individuals. In severe cases, conditions like depression, bipolar disorder, or schizophrenia can lead to suicide. In 2016, the estimated global number of suicide deaths reached almost 800,000.

Communities can play a crucial role in improving mental health by implementing various strategies and initiatives, such as:

- **Access to mental health services:** Raising awareness about mental health, reducing stigma, and promoting understanding of mental health challenges can lead to greater acceptance and support within the community.[117]

- **Community Support Groups:** Establishing support groups within the community can provide a safe space for individuals to share their experiences and seek support from peers who understand their challenges.[118]

- **Empowering Peers and engaging Local Leaders:** Training individuals with lived experiences of mental health challenges to become peer supporters or counsellors can create a more empathetic and understanding support network. Engaging local leaders and policymakers can help prioritize mental health challenges and secure resources for mental health programs within the community.[119]

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[114] Edge R., et.al. (2019). Observational study to assess the effects of social networks on the seasonal influenza vaccine uptake by early career doctors.

[115] BMJ Open 9(8); Miguel, E. and M. Kremer (2004). Worms: Identifying the impacts on education and health in the presence of treatment externalities. Econometrica 72(1):159-217.

[116] Dupas, P. (2014). Short-run subsidies and long-run adoption of health products. Econometrica 82(1):197-228.

[117] Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., … & WHO's Mental Health Gap Action Programme (mhGAP) Intervention Guide. (2018). The Lancet, 392(10161), 1553-1588.

[118] National Alliance on Mental Illness (NAMI). (n.d.). Support and education. Retrieved from https://www.nami.org/Support-Education

[119] Baker-Miller Pinkham, S. (2019). Peer support in mental health: How it works and why it matters. American Psychiatric Association Publishing.

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Data related to mental health conditions in developing countries is very sparse. The sustainable development goal indicators only measure for the most severe cases of mental health which lead to suicide:

- **SDGI 3.4.2:** Suicide Mortality Rate

Mental Health monetization

Due to the scarcity of data available for mental health outcomes in developing countries, monetizing the benefit of ODA targeting mental health using proxy values for social multipliers is limited.

3.8 Aggregating Benefits

3.8.1 Weighting the total social value generated

The UNDP relies on an arithmetic average across all benefit indicators describing each benefit domain to estimate the overall level of human development for each country.[120] Following this approach the total social value from the child-related ODA is determined as follows:[121]

$$Social\ Value\ = SV^{TOT} = \mu[\ SV^H, SV^E, SV^{GNI}]$$

(19)

Furthermore, the total social value can be calculated by including social multipliers for each benefit indicator as follows:

$$Total\ Social\ Value\ (incl.\ social\ multipliers)\ = TSV^{TOT} = \mu[\ SV^H(1+\emptyset^{BH}), SV^E(1+\emptyset^E), SV^{GNI}]$$

(20)

3.8.2 Benefit distribution over time

The social value from each benefit domain is projected for a period of 10 years and based on a social discount rate to account for varying distribution of benefits over time.

Social Discount rates represent the opportunity cost of resources over time. The social discount rate encapsulates the time value of money, in that expected value of benefits in the present (Year 1) are valued more than the expected value of benefits in the future (Year 2 – Year 10). In addition, the social discount rate also account for the diminishing impact of child-related ODA by also attributing an additional decreasing share of benefits in each analysis year.

Figure 16 – Social Discount Rate[122]

Year 1 100%	Year 2 89%	Year 3 80%	Year 4 71%	Year 5 64%	Year 6 57%	Year 7 51%	Year 8 45%	Year 9 40%	Year 10 36%

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[120] United Nations Development Programme (2005). Human Development Report, United Nations, Washington, DC.

[121] μ represents a function which performs an arithmetic mean on the set of values.

[122] There is no consensus on benefit drop-offs for global development; a pessimistic assumption is generally applies additional discounting to assume the impact of investments may not be lasting. Haacker, M. Hallet, T. B. and R. Atun (2020). On discount rates for economic evaluations in global health. Health Policy and Planning 35(1): 107–114.

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4.   Results of the economic appraisal

4.1   Results of the ODA classification

Using the ODA classification algorithm described in **Section 3.3**, all ODA have been classified to child-specific, child-benefitting and non-child related investments.

Figure 17 presents the total value[123] of child-related ODA between 2017 and 2021, with the blue-colored bar representing child-specific ODA and teal-colored bar representing child-benefitting ODA. The black line represents child-related ODA as a percentage of total ODA per year.

Based on ODA classification results the total value of ODA most likely related to children is $118.5b, representing approximately 12 percent of the total value of ODA over this period of $1.03b. Of the amount targeting children over this period, $48.4b (around 5 percent of total ODA) is child-specific ODA and $70.1b (around 7 percent of total ODA) is child-benefitting ODA. It is important to note that all ODA with a predicted probability of less than 0.5 are assigned a zero weight. As a result, they are not considered in the calculation of the total ODA targeting children.

Detailed values of each classified ODA category are outlined in Table 12.

Figure 17 – Total Global child-related ODA over the period of 2017 and 2021 accounts for around $118.5 billion (USD 2020 constant prices) and around 12 percent of total ODA.
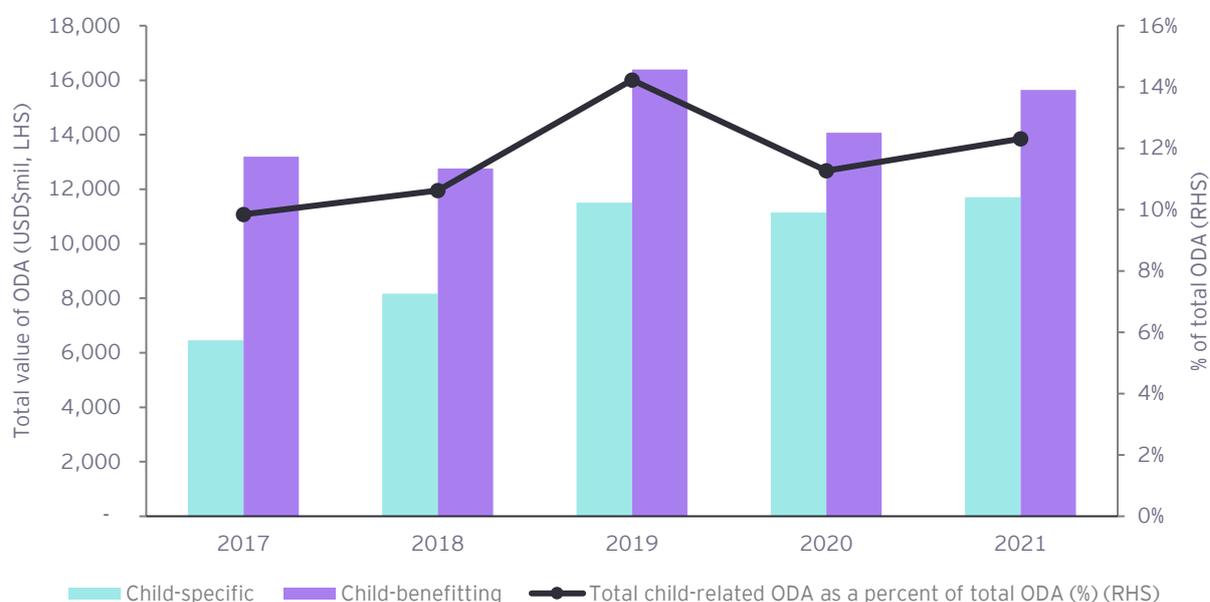
Source: OECD Stat, EY Analysis

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[123] The values expressed in 2020 US constant prices ($m).

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Child-related ODA, US $m, constant prices (2020)					
Year	Child-specific	Child-benefitting	Total child-related ODA	Total ODA	Total child-related as % of total ODA
2017	6,460	13,190	19,651	199,491	9.85%
2018	8,165	12,761	20,926	196,827	10.63%
2019	11,512	16,397	27,910	195,968	14.24%
2020	11,139	14,073	25,213	223,528	11.28%
2021	11,706	15,646	27,351	222,172	12.31%
Total	48,982	72,067	121,051	1,037,986	11.7%*

Represents the average of value over the period of 2017 to 2021.

4.2 The findings of benefit attribution results

The benefits from the child-related ODA have been attributed using the two-stage regression analysis described in **Section 3.5.2**. The analysis employed ODA values expressed per capita and estimated the change in each benefit indicator introduced in **Section 3.5.1** for a one-off[124] 1 dollar increase in child-related ODA per capita.

The key findings of this analysis have demonstrated that an increase in the level of child-related ODA has a statistically significant impact on health and education domains.

The impact on the child mortality indicator amounts to approximately 0.348 deaths averted before the age of 5 with a $1m increase in child-related ODA. This result is in line with prior studies such as Winkleman and Adams (2017)[125] which report a statistically significant negative impact of ODA on child mortality.[126]

Results for child stunting under the age of 5, indicated a statistically significant and positive impact; where for every $1m increase in ODA targeting children per country approximately 278 children under the age of 5 would no longer be stunted in each country. The stunting result was consistent with other studies such as the *Enhancing Nutrition Services to improve Maternal*

Figure 18 - The results of benefit attribution

2. Statistical Benefit Attribution

2. Identify the impact of child-related ODA on different benefit domains.

$1m increase in child-related ODA per country

Health Domain

0.348 deaths before the age of 5 are averted.

278 children are no longer stunted.

Education Domain

Expected days of schooling increases by **0.95 days**

Mean days of schooling increases by **0.41 days**

Living Standards

No statistically significant impact on Gross National Income

EY Analysis

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[124] A one-off $1m increase in child-related ODA assumes the attributed benefits are from additional investment in a single year. If the increase in investment was ongoing, associated benefits would be larger.

[125] Winkleman, T. F., & Adams, G. B. (2017). An empirical assessment of the relationship between Official Development Aid and child mortality, 2000-2015. *International journal of public health*, *62*(2), 231–240. https://doi.org/10.1007/s00038-017-0940-2

[126] Winkleman and Adams's find an impact of 0.037 per 1,000 live births in a given year. After rescaling and adjusting the results of this study (to forecast benefits for 15 years, instead of 10); this study finds 0.020 per 1,000 live births in a given year. The results from the two studies are very similar but cannot be directly compared due to differences in the scope of ODA included, and development stage of countries analysed.

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and Child Health in Africa and Asia (ENRICH) program. [127] [128]

A statistically significant and positive impact of child-related ODA has also been found for the education domain measured as expected years of schooling and mean years of schooling. The two indicators capture the broader benefits to two subpopulations based on the timing when they are measured. The expected years of schooling is measured at the school entrance age while the mean years of schooling at the age of 25 years or older. Hence, the impact on the expected years of schooling from the level of investment in the previous year is expected to be lower and realized later in individual's life. For ease of interpretation; the results from the expected/mean years of schooling were rescaled to expected/mean days of schooling respectively. The results of the regression analysis show that expected days of schooling increase by 0.95 days with $1m increase in child-related ODA per country, while the mean days of schooling increases by 0.41 days. Arndt, Jones and Tarp (2015) also found that consistent results; where increasing the average annual aid results in increasing expected years of schooling.[129]

In line with the large stand of literature explored in **Section 2.2.1**, the estimated impact on the GNI indicator for living standards in this study is found to be close to zero and statistically insignificant.[130] Benefits from child-specific ODA in improving living standards are likely to be realized in the longer term.[131] The current analysis focuses on short to medium impacts from child-related ODA, the intermediary benefit of ODA on GNI is likely to be captured by changes in education and schooling, which will subsequently increase GNI in the future.

Other explanations from the literature for a statistically insignificant impact of aid on living standards, include GNI being driven by country specific factors, such as good policy conditions,[132] institutional environments[133] and political favoritism.[134]

4.3 Monetization Results

The benefit attribution analysis estimates the impact on each benefit indicator a year after child-related ODA. This value has then been monetized to determine the return on investment for every $1 of ODA invested.

The analysis uses proxy value indicators from peer-reviewed research studies to determine how a change in each indicator is associated additional social value for a representative average recipient country-based ODA analysis sample as described in detail in **Section 3.6**.

Figure 19 presents the key findings of the economic appraisal. It is estimates that 1 dollar invested in child-related ODA results in **$4.04** return on health domain and **$9.90** return on the education

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[127] World Vision Canada, (2021), Annual Results Report 2021. Accessed here: ENRICH Program Cost Benefit Analysis

[128] The (ENRICH) program found that for a $52 million investment into nutrition, 5,334 cases of stunting would be averted. The results for this study were rescaled to be comparable to the ENRCIH program, by forecasting the benefits for 5 years (as opposed to 10 years in the rest of this study) and re-scaling the ODA in Canadian dollars. Rescaling the results of this study, anticipate that for an additional $52m Canadian ODA 6,466 cases of stunting would be averted.

[129] The modelling of the methodology used in Arndt, Jones and Tarp (2015) represents aid as a share of GDP, preventing an objective comparison of the study with this analysis.

[130] Signor, J. and J. Vandernoot (2021). Does Foreign Aid contribute to HDI improvement? Advances in Management & Applied Economics 11(2): 1-2.

[131] Groβ, E., & Nowak-Lehmann Danzinger, F. (2022). What effect does development aid have on productivity in recipient countries? Review of Development Economics, 26, 1438–1465.

[132] Burnside, C. and D. Dollar (2000), Aid, Policy and Growth, The American Economic Review 90 (4): 847-868.

[133] Drifferd, N. and C. Jones (2013), Impact of FDI, ODA and Migrant Remittances on Economic Growth in Developing Countries: A Systems Approach. European Journal of Development Research 25(2): 173 – 196.

[134] Dreher, A., et.al (2016), Geopolitics, Aid, and Growth: The Impact of UN Security Council Membership on the Effectiveness of Aid. Policy Research Working Paper 7771. The World Bank, Washington, DC.

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domain. The analysis indicates the benefit to society from the education domain for every $1 increase in child-related ODA is higher than the benefit to society from the health domain.

Taking the average between two monetary values as described in **Section 3.7** the total social value as a result of child-related ODA is approximately **$6.97**.[135] [136]

Source: EY Analysis

4.4 Social Multiplier Results

The social multiplier analysis attributed additional benefits from empowering children and communities to the monetized results.[137]

Broader Health Benefit results

Section 3.7.2 described the importance of incorporating additional benefits from health-related projects and programs, that may not be captured by health or education domains. This includes the significant role of knowledge and information exchange promoting the peer vaccination and medicine adoption. Evidence to support capturing these benefits was derived from peer reviewed literature. For example, Banerjee et.al (2019)[138] conducted a randomized control trial to test for vaccination adoption across 521 villages in Haryana. They identified an additional **27 percent** impact in villages with the diffusion of information about vaccines. This value was used as a proxy to estimate additional benefits from information diffusion in child-related healthcare interventions such as HIV vaccinations and water purification tablets.

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[135] Since the results from the living standard domain were statistically insignificant, they were not included when the average was performed.

[136] Note, the benefit of $6.4 will not be realized from an additional $1 ODA invested. The cost benefit analysis approach averages across all (existing and additional) benefits and costs to determine the ratio for return on investment.

[137] While a large portion of the economics literature has also focused on quantifying multipliers from GNI, GDP and other measures of living standards. Since the current analysis did not find a statistically significant result for GNI, multipliers for living standards were not further explored.

[138] Banerjee et.al, (2019), Using Gossips to Spread Information: Theory and Evidence from Two Randomized Controlled Trials, The Review of Economic Studies, Volume 86, Issue 6, November 2019, Pages 2453–2490, https://doi.org/10.1093/restud/rdz008

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Enhancing Education and Income results

Section 3.7.1 described the ability of improved social norms and friendship networks to generate social multipliers that further enhance benefits from education interventions. ODA targeted at interventions that work towards changing the norms around child protection and gender inequality are described to decrease child labor and improve access to education. Based on the analysis by Zhang, C., Huang, Z (2023),[139] and Kim, J., Olsen, W. & Wiśniowski, A. (2022)[140] the social multiplier associated with child protection and gender equality were estimated to be **3.8 percent** and **4.4 percent** respectively. Furthermore, List. Et.al (2023)[141] found that friendship networks can generate an additional social multiplier of **40 percent**. Collectively, education related social multipliers were found to increase benefits from child-specific ODA by **47.2 percent.**

Proxy values informing broader health benefits and from enhancing education and income were collated as per **Equation (18) and Equation (15),** respectively. Social multipliers were applied to the social value as per **Equation (20)** to determine the results presented in **Figure 20**.

Figure 20: Social Multiplier Results
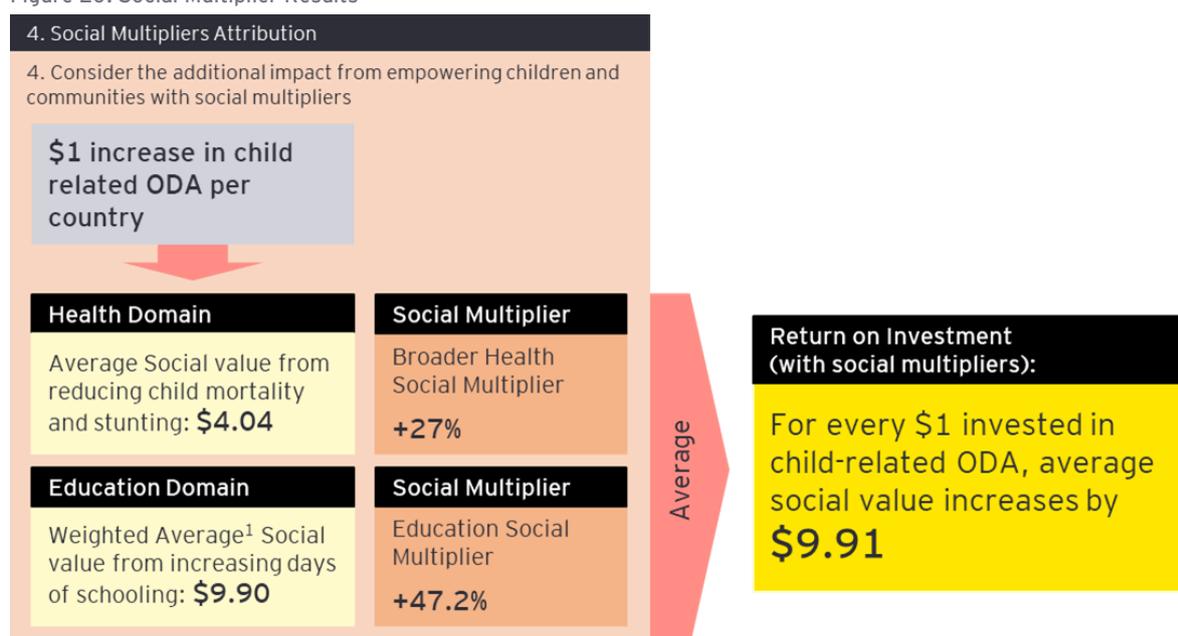
Source: EY Analysis

After accounting for the additional benefits generated from social multipliers, the social value as a result of child-related ODA is approximately **$9.91**.

Trends in the attribution of monetary benefits over time are presented in **Figure 21**.

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[139] Zhang, C., Huang, Z. Foreign Aid, Norm Diffusion, and Local Support for Gender Equality: Comparing Evidence from the World Bank and China's Aid Projects in Africa. St Comp Int Dev (2023). https://doi.org/10.1007/s12116-023-09381-4

[140] Kim, J., Olsen, W., & Wiśniowski, A. (2022). Predicting Child-Labour Risks by Norms in India. Work, Employment and Society, 0(0). https://doi.org/10.1177/09500170221091886

[141] List. Et.al (2023), Neighborhood Spillover Effects of Early Childhood Interventions, Working Paper.

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Figure 21 - Benefit profile per $1 of child-related ODA
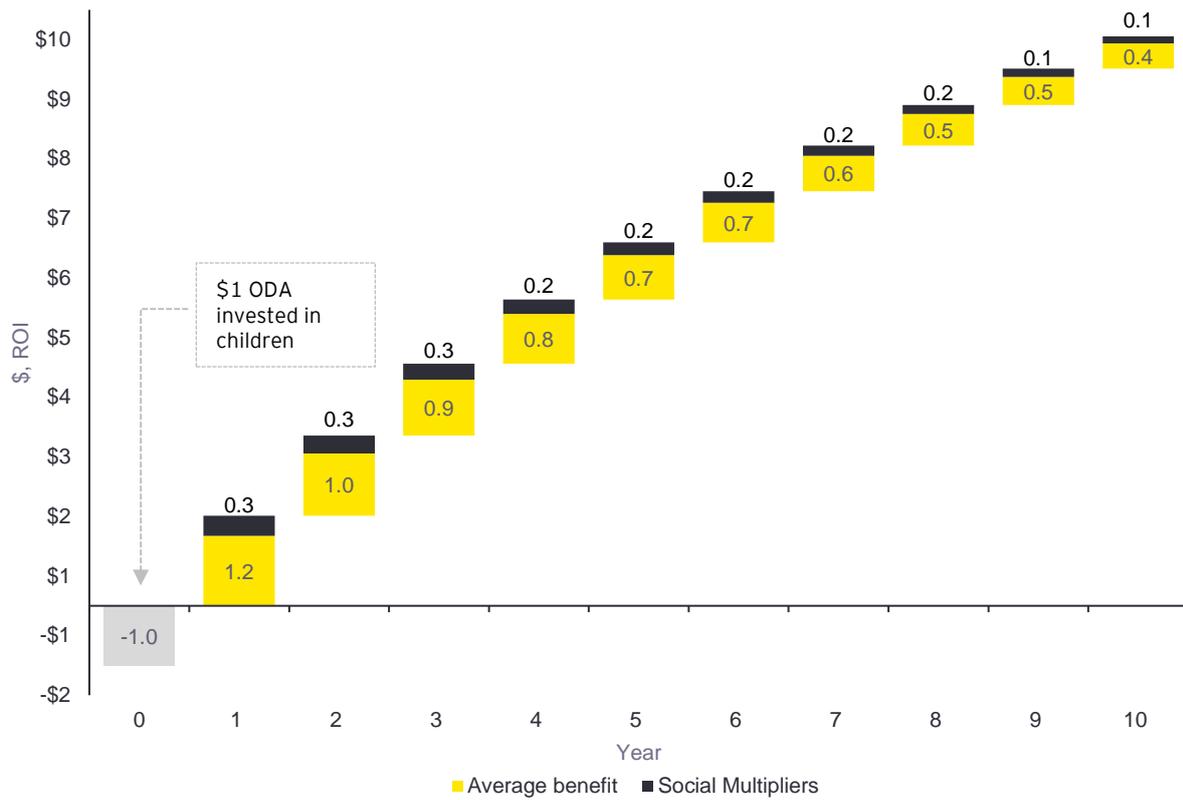
Source: EY Analysis

Figure 21 visualizes how the net $9.91 benefit to society is distributed over time. The analysis finds that the highest returns occur immediately after the investment, this could be explained by short-term interventions (such as the provision of medical supplies) where the largest benefit to society occurs right after the intervention. The analysis also finds that a proportion of the benefits are sustained up to 5-10 years after the intervention; this could be explained by longer-term interventions such as building a school, where the benefit from the initial intervention is long lasting and intergenerational.

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5. Exclusions and key limitations

The methodology of the economic appraisal acknowledges the following limitations that may impact the estimated findings.

Misrepresentative information in the OECD CRS database

The OECD CRS database captures a variety of information that is entered by the user. The information is either restricted by a list of input values or includes user written inputs, such as text only fields. The level of detail of data input can differ among users, resulting in variations in the completeness and accuracy of how ODA contributions are described. This variance may lead to the omission of important details such as the purpose and intended outcome(s) of the investment.

Data cleaning and check activities have been performed to ensure that the data is as complete and accurate as possible, however a measurement error may occur in cases when the inaccuracy cannot be observed. It is expected that text fields such as project title, short- and long-term descriptions may not fully describe a project or a program, preventing the ODA classification algorithm from utilizing the selection of keywords used in the statistical model. The model in addition controls for other factors related to the country and investment-related characteristics to minimize the impact of inaccurately specified information.

Benefit Attribution – the validity of the instrument

The benefit attribution analysis relies on the population as the instrument for child-related ODA expressed in per capita terms. A large body of literature has employed this instrument, suggesting that the population size is unlikely to be correlated with the economic growth expressed as GDP or GNI. Whilst statistically significant, the results of the first stage regression suggest that the ability of the instrument to explain child-related ODA is moderate. One of the reasons, explaining the moderate instrument's strength is that the analysis focus on the share of total ODA that targets children, rather than the total ODA as previously discussed in the research literature. It is expected that an indicator that may be more closely related to child-related ODA can improve the strength of the first stage regression and the accuracy of the benefit attribution. To reduce potential impacts on the benefit attribution results, the regression in addition includes the mean age at childbearing that coupled with the population size may better reflect the levels of child-related ODA.

Benefit Attribution – monetization challenges

Developing a robust assessment of the benefits of child-related ODA relies on the availability of indicators describing human development. One of the most comprehensive data currently available is social development indicators capturing a broad range of human development factors. Challenges that data custodians face in collecting this data from developing countries prevent from utilizing the available information in the benefit attribution and monetization. The economic appraisal relies on the most complete indicators such as child under five mortality, education-related indicators, and living standards as proxy values to describe the human development. To capture other impact on human development that may not be observed using these indicators the appraisal extends the ROI methodology by introducing the social multipliers. The estimation of social multipliers rely on available peer-reviewed literature in development economics.

Regional and bilateral investments (unspecified)

A small portion of investments in the OECD CRS database are specified as regional or bilateral, unspecified investments and does not provide further information about the recipient countries. To ensure that the economic appraisal is informed by the value of these investments, the economic appraisal performed the redistribution of regional investments. However, due to limited information

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about bilateral investments, the economic appraisal required to exclude these investments from the benefit attribution analysis to avoid measurement errors. The share of these investments is small, and it is expected that the impact on the ROI results are minor. To account for any other aid the country received the statistical models for benefit attribution in addition controls for the levels of foreign aid.

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Appendix A Detailed list of data inputs with data sources

Table 13 - List of variables within the CRS dataset

Variable	
#	Name in dataset
1	DONOR
2	RECIPIENT
3	SECTOR
4	FLOW
5	CHANNEL
6	AMOUNTTYPE
7	FLOWTYPE
8	AIDTYPE
9	YEAR
10	Donor Name
11	Donor Agency
12	OECD ID
13	Donor Project ID
14	Recipient Name
15	Region
16	Income Group
17	Channel of Delivery Code
18	Channel of Delivery Name
19	Category Code
20	Category Name
21	FinanceType Code
22	FinanceType Name
23	BiMulti Code
24	Type of Aid Code
25	Type of Aid Name
26	Short Description
27	Project title
28	Purpose Code
29	Purpose Name
30	Sector
31	Long Description
32	SDG Focus
33	Gender equality
34	Environment
35	PDGG
36	Trade Development
37	RMNCH
38	DRR
39	Nutrition

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40	Disability
41	Biodiversity
42	Climate Mitigation
43	Climate Adaptation
44	Desertification
45	Amount
46	Amount Type
47	Amount Tied USD million
48	Amount Untied USD million
49	Amount Partially Untied USD million
50	Nature of Submission
51	Value

Table 14 - Purpose code classifications for the algorithm

Purpose code categorization		
Child-specific	**Child-benefitting**	**Not child-related**
11220 - Primary education	11110 - Education policy and administrative management	11230 - Basic life skills for adults
11231 - Basic life skills for youth	11120 - Education facilities and training	11232 - Primary education equivalent for adults
11240 - Early childhood education	11130 - Teacher training	11420 - Higher education
11250 - School feeding	11182 - Educational research	11430 - Advanced technical and managerial training
11260 - Lower secondary education	11330 - Vocational training	12320 - Tobacco use control
11320 - Upper Secondary Education (modified and includes data from 11322)	12110 - Health policy and administrative management	12330 - Control of harmful use of alcohol and drugs
13020 - Reproductive health care	12181 - Medical education/training	13010 - Population policy and administrative management
15261 - Child soldiers (prevention and demobilization)	12182 - Medical research	13030 - Family planning
	12191 - Medical services	13040 - STD control including HIV/AIDS
	12220 - Basic health care	15110 - Public sector policy and administrative management
	12230 - Basic health infrastructure	15111 - Public finance management (PFM)
	12240 - Basic nutrition	15112 - Decentralization and support to subnational government
	12250 - Infectious disease control	15113 - Anti-corruption organizations and institutions
	12261 - Health education	15114 - Domestic revenue mobilization
	12262 - Malaria control	15125 - Public Procurement
	12263 - Tuberculosis control	15130 - Legal and judicial development
	12264 - COVID-19 control	15142 - Macroeconomic policy
	12281 - Health personnel development	15150 - Democratic participation and civil society
	12310 - NCDs control, general	15151 - Elections
	12340 - Promotion of mental health and well-being	15152 - Legislatures and political parties

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	12350 - Other prevention and treatment of NCDs	15153 - Media and free flow of information
	12382 - Research for prevention and control of NCDs	15210 - Security system management and reform
	13081 - Personnel development for population and reproductive health	15240 - Reintegration and SALW control
	14010 - Water sector policy and administrative management	16020 - Employment creation
	14015 - Water resources conservation (including data collection)	16062 - Statistical capacity building
	14020 - Water supply and sanitation - large systems	16063 - Narcotics control
	14021 - Water supply - large systems	16080 - Social dialogue
	14022 - Sanitation - large systems	21010 - Transport policy and administrative management
	14030 - Basic drinking water supply and basic sanitation	21020 - Road transport
	14031 - Basic drinking water supply	21030 - Rail transport
	14032 - Basic sanitation	21040 - Water transport
	14040 - River basins development	21050 - Air transport
	14050 - Waste management/disposal	21061 - Storage
	14081 - Education and training in water supply and sanitation	21081 - Education and training in transport and storage
	15160 - Human rights	22010 - Communications policy and administrative management
	15170 - Women's rights organizations and movements, and government institutions	22020 - Telecommunications
	15180 - Ending violence against women and girls	22030 - Radio/television/print media
	15190 - Facilitation of orderly, safe, regular and responsible migration and mobility	22040 - Information and communication technology (ICT)
	15220 - Civilian peace-building, conflict prevention and resolution	23181 - Energy education/training
	15230 - Participation in international peacekeeping operations	24010 - Financial policy and administrative management
	15250 - Removal of land mines and explosive remnants of war	24020 - Monetary institutions
	16010 - Social Protection	24030 - Formal sector financial intermediaries
	16030 - Housing policy and administrative management	24040 - Informal/semi-formal financial intermediaries
	16040 - Low-cost housing	24050 - Remittance facilitation, promotion and optimization
	16050 - Multisector aid for basic social services	24081 - Education/training in banking and financial services
	16061 - Culture and recreation	25010 - Business policy and administration
	16064 - Social mitigation of HIV/AIDS	25020 - Privatization
	16070 - Labour rights	25030 - Business development services
	23110 - Energy policy and administrative management	25040 - Responsible business conduct
	23182 - Energy research	32110 - Industrial policy and administrative management
	23183 - Energy conservation and demand-side efficiency	32120 - Industrial development

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	23210 - Energy generation, renewable sources - multiple technologies	32130 - Small and medium-sized enterprises (SME) development
	23220 - Hydro-electric power plants	32140 - Cottage industries and handicraft
	23230 - Solar energy for centralized grids	32163 - Textiles, leather and substitutes
	23231 - Solar energy for isolated grids and standalone systems	32164 - Chemicals
	23232 - Solar energy - thermal applications	32165 - Fertilizer plants
	23240 - Wind energy	32166 - Cement/lime/plaster
	23250 - Marine energy	32169 - Basic metal industries
	23260 - Geothermal energy	32170 - Non-ferrous metal industries
	23270 - Biofuel-fired power plants	32171 - Engineering
	23310 - Energy generation, non-renewable sources, unspecified	32172 - Transport equipment industry
	23320 - Coal-fired electric power plants	32173 - Modern biofuels manufacturing
	23330 - Oil-fired electric power plants	32174 - Clean cooking appliances manufacturing
	23340 - Natural gas-fired electric power plants	32182 - Technological research and development
	23350 - Fossil fuel electric power plants with carbon capture and storage (CCS)	32210 - Mineral/mining policy and administrative management
	23360 - Non-renewable waste-fired electric power plants	32220 - Mineral prospection and exploration
	23410 - Hybrid energy electric power plants	32261 - Coal
	23510 - Nuclear energy electric power plants and nuclear safety	32262 - Oil and gas (upstream)
	23610 - Heat plants	32263 - Ferrous metals
	23620 - District heating and cooling	32264 - Nonferrous metals
	23630 - Electric power transmission and distribution (centralized grids)	32265 - Precious metals/materials
	23631 - Electric power transmission and distribution (isolated mini-grids)	32266 - Industrial minerals
	23640 - Retail gas distribution	32267 - Fertilizer minerals
	23641 - Retail distribution of liquid or solid fossil fuels	32268 - Offshore minerals
	23642 - Electric mobility infrastructures	32310 - Construction policy and administrative management
	31110 - Agricultural policy and administrative management	33110 - Trade policy and administrative management
	31120 - Agricultural development	33120 - Trade facilitation
	31130 - Agricultural land resources	33130 - Regional trade agreements (RTAs)
	31140 - Agricultural water resources	33140 - Multilateral trade negotiations
	31150 - Agricultural inputs	33150 - Trade-related adjustment
	31161 - Food crop production	33181 - Trade education/training
	31162 - Industrial crops/export crops	33210 - Tourism policy and administrative management
	31163 - Livestock	43082 - Research/scientific institutions

	31164 - Agrarian reform	51010 - General budget support-related aid
	31165 - Agricultural alternative development	53030 - Import support (capital goods)
	31166 - Agricultural extension	53040 - Import support (commodities)
	31181 - Agricultural education/training	60010 - Action relating to debt
	31182 - Agricultural research	60020 - Debt forgiveness
	31191 - Agricultural services	60030 - Relief of multilateral debt
	31192 - Plant and post-harvest protection and pest control	60040 - Rescheduling and refinancing
	31193 - Agricultural financial services	60061 - Debt for development swap
	31194 - Agricultural co-operatives	60062 - Other debt swap
	31195 - Livestock/veterinary services	60063 - Debt buy-back
	31210 - Forestry policy and administrative management	91010 - Administrative costs (non-sector allocable)
	31220 - Forestry development	99810 - Sectors not specified
	31261 - Fuelwood/charcoal	99820 - Promotion of development awareness (non-sector allocable)
	31281 - Forestry education/training	
	31282 - Forestry research	
	31291 - Forestry services	
	31310 - Fishing policy and administrative management	
	31320 - Fishery development	
	31381 - Fishery education/training	
	31382 - Fishery research	
	31391 - Fishery services	
	32161 - Agro-industries	
	32162 - Forest industries	
	32167 - Energy manufacturing (fossil fuels)	
	32168 - Pharmaceutical production	
	41010 - Environmental policy and administrative management	
	41020 - Biosphere protection	
	41030 - Biodiversity	
	41040 - Site preservation	
	41081 - Environmental education/training	
	41082 - Environmental research	
	43010 - Multisector aid	

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	43030 - Urban development and management	
	43040 - Rural development	
	43050 - Non-agricultural alternative development	
	43060 - Disaster Risk Reduction	
	43071 - Food security policy and administrative management	
	43072 - Household food security programs	
	43073 - Food safety and quality	
	43081 - Multisector education/training	
	52010 - Food assistance	
	72010 - Material relief assistance and services	
	72040 - Emergency food assistance	
	72050 - Relief co-ordination and support services	
	73010 - Immediate post-emergency reconstruction and rehabilitation	
	74020 - Multi-hazard response preparedness	
	93010 - Refugees/asylum seekers in donor countries (non-sector allocable)	

Table 15 – Classification algorithm keyword list

English words	
Children words	**Not Children words**
Boy	Adult
Girl	Man
Child	Woman
Baby	Elderly
Babies	Government
Infant	Infrastructure
Youngest	Trade
Child Development	Agriculture
ECD	Tax
Teenager	Road
Childhood	Vote
Adolescent	Election
Young	Energy
Youth	Finance
Toddler	Financial Services
Minor	University
Primary School	Grown-up
Nutur	Matureperson
Orphan	Mature
Earlybrain	
Neurodevelopment	
Youngest	
Youngchild	
Under5	
Braindevelopment	

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Neonatal	
Birth	
Developmentdisorder	
Nursery	
Deworming	
Antenatal	
Earlylearning	
Pre-primary	
Pre-school	
Preschool	
Safespace	
Earlystimulation	
Childcare	
Daycare	
Stimulation	

French words

Children words	Not Children words
Enfant	Adulte
Enfants	Homme
Enfance	Femme
Garcon	Age
Fille	Gouvernement
Jeune	Infrastructure
Enfance	Commerce
Adolescent	Agriculture
Homme	Impot
Jeunesse	Route
Nourisson	Vote
Bebe	Election
Nouveaunee	Energie
nouveaune	Finance
	Services financiers
	Universite
	Adulte
	Personne mature
	Mature

Table 16 - Keyword interaction terms

Keyword interaction terms

Combination
Teenager x Adult
Adolescent x Adult
Young x Adult
Youth x Adult
Teenager x Child
Adolescent x Child
Young x Child
Youth x Child

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Table 17 - List of controls

Variable	Mean (SD)
Benefit indicators	
Children under 5 mortality rate (expressed as number of deaths per 1,000 live births)	36.74 (28.30)
Children under 5 stunting (% of children aged 0–59 months who are below minus two standard deviations from median height-for-age of the WHO Child Growth Standards).	0.21 (0.13)
Mean years of schooling	7.60 (2.78)
Expected years of schooling	12.30 (2.46)
GNI per capita (ln)	8.77 (0.89)
Independent variable of interest, instrument	
Child-related ODA per capita	16.3 (46.29)
Total Population (instrument)	49378.43 (176828.33)
Country-specific characteristics	
Population Growth Rate, %	1.41 (1.20)
Population Sex Ratio (expressed as number of males per 100 females)	99.37 (5.70)
Female Deaths (expressed in thousands)	165.68 (582.30)
Mean Age Childbearing (expressed in years)	28.61 (1.17)
Net Migration Rate (per 1,000 population)	-1.84 (6.74)
Inflation rate, %	7.65 (27.43)
Foreign direct investment, net inflows	0.04 (0.07)
Government expenditure on education, total (% of GDP)	3.25 (2.77)
ODA-specific characteristics	
RMNCH, principal objective (% of investments per year)	0.03 (0.02)
RMNCH, significant objective (% of investments per year)	0.54 (0.12)
Gender equality, principal objective (% of investments per year)	0.26 (0.07)
Gender equality, significant objective (% of investments per year)	0.44 (0.10)
Channel of delivery - Not specified (% of investments per year)	0.06 (0.06)
Channel of delivery (10000) - Public institutions (% of investments per year)	0.37 (0.13)
Channel of delivery (20000) - NGOs and civil society (% of investments per year)	0.22 (0.11)
Channel of delivery (30000) - Public-Private partnerships (% of investments per year)	0.00 (0.00)
Channel of delivery (40000) - Multilateral organizations (% of investments per year)	0.17 (0.10)
Channel of delivery (50000) - Teaching institution (% of investments per year)	0.05 (0.03)
Channel of delivery (60000) - Private sector institution (% of investments per year)	0.09 (0.09)
Channel of delivery (90000) - Other (% of investments per year)	0.04 (0.10)
Observations, N	639
Clusters, recipient country	131

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Appendix B SDG Indicators and their impact on the community

Table 18 - Impact of Sustainable Development Indicators on the community

#	SDG Indicator	Impact on the community	Benefit
1.1.1	Population living below the international poverty line	The proportion of the population that live below the poverty line is a representation of the gross national income of residents in the country and can be capture through the impact on gross national income. The increase in the gross national income would impact the living standards for children and the broader society.[142]	• Improvements in living standards • Improvements in health
1.2.1	Population living below the national poverty line		
1.3.1	Population covered by social protection floors/systems	Social protection systems are designed to support vulnerable people. This includes government support in crises and shocks such as natural disasters, access to health, education and employment opportunities and protect the aging population.[143] Improvements in social protection systems would impact children and the broader society by improving the living standards measured through the gross national income. [144]	• Improvements in living standards Improvements in health • Improvements in education • Improvements in employability
2.2.1	Prevalence of stunting among children aged less than 5	Stunting expressed as a low height for age ratio is often related to malnutrition, poor maternal health and poor living standards.[145] High prevalence of stunting is found to be associated with the premature mortality among children aged less than 5 and impact their physical and cognitive potential in education and beyond.[146]	• Improvements in health • Improvements in education
2.2.2	Prevalence of malnutrition among children under 5 years of age	Malnutrition encompasses two key indicators: stunting and wasting, both of which can lead to premature death and reduced physical and cognitive potential.[147] Reducing the prevalence of malnutrition will positively impact health and education outcomes and deliver benefits to the broader society through improved living standards and increase gross national income.[148]	• Improvements in health • Improvements in education • Improvements in living standards
2.2.3	Prevalence of anemia in women aged 15 to 49 years, by pregnancy status	Anemia is a condition when body does not have enough healthy red blood cells. The condition affecting maternal age women would significantly affect children survival, particularly at birth[149] and may further affect the development of the child.[150]	• Improvements in health • Improvements in education

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[142] G. Vaggi and C Capelli (2014), *A better indicator for standard of living: The Gross National Disposable Income.* CEPR. Available at: https://cepr.org/voxeu/columns/better-indicator-standard-living-gross-national-disposable-income

[143] World Bank, (2022), Social Protection. World Bank: Accessed (2023) https://www.worldbank.org/en/topic/socialprotection

[144] Ibid.

[145] World Health Organisation, Malnutrition, Accessed (2023): Link: https://www.who.int/health-topics/malnutrition#tab=tab_1

[146] J Nutr (2021), Wasting and Stunting in Infants and Young Children as Risk Factors for Subsequent Stunting or Mortality, Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8245889/

[147] The World Bank, The World Bank in Social Protection, Source: https://www.worldbank.org/en/topic/socialprotection

[148] Hodonitt, J., et.al. (2013). The economic rationale for investing in stunting reduction. Matern Child Nutr 9(2): 69-82.

[149] USAID, The Impact of Anaemia on Child Mortality, Source: https://www.spring-nutrition.org/publications/resource-review/updates/impact-anemia-child-mortality-updated-review#:~:text=Results%20indicated%20that%20for%20each,Hb%20by%201%20g%2FdL.

[150] Nelly Zavaleta and Laura Astete-Robilliard (2017), Effect of anaemia on child development: long-term consequences, Source: https://pubmed.ncbi.nlm.nih.gov/29364424/

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3.1.1	Maternal mortality ratio	Maternal mortality due to poor maternal health and available healthcare support, is usually due to obstetric complications such as eclampsia, sepsis or obstructed labor, place a significant risk on the newborn. The research evidence suggests that children born to the women who died during birth are at significant risk for dying.[151]	• Improvements in health
3.1.2	Proportion of births attended by skilled health personnel	A skilled health professional, such as a midwife, nurse, obstetrician or pediatrician, provides the necessary medical support during birth and is crucial to ensure the safety of the mother and newborn. It is evident that increasing the proportion of births attended by such professional will increase the likelihood of survival, reduce the number of stillbirths and deliver benefits to the broader community.[152]	• Improvements in health
3.2.1	Under-5 mortality rate	Children under age of 5 mortality rate reflects the benefits to the child and the broader community from the death averted.	• Improvements in health
3.2.2	Neonatal mortality rate	Neonatal mortality rate is captured through the 3.2.1 indicator and represents benefits to the child and the broader community from the death averted.	• Improvements in health
3.3.1	Number of new Human Immunodeficiency Virus (HIV) infections per 1,000 uninfected population, by sex, age and key populations	'HIV is a virus that weakens the immune system, leading to Acquired Immune Deficiency Syndrome (AIDS). HIV destroys the body's ability to fight off infection and disease, which can ultimately lead to death. Without treatment, median survival from the time of infection is about 10.5 years for males and 11.5 years for females.' [153] Presence of HIV also impacts the productivity of children and teachers in the education system.[154]	• Improvements in health • Improvement in education
3.3.3	Malaria population incidence	Children under 5 account for 80% of deaths by Malaria in Africa.[155] Malaria also impacts years of education and income.[156]	• Improvements in health • Improvement in education
3.7.2	Adolescent birth rate (aged 10-14 years; aged 15-19 years) per 1,000 women in that age group	The death of infants born during adolescent pregnancies is 50% higher than newborns of mothers aged 20-29.[157] It is also more likely to decrease expected years of schooling and subsequently future income.[158]	
3.8.1	Coverage of essential health services	Provision of essential health services during early childhood is likely to reduce child mortality.[159]	• Improvement in health

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[151] Moucheraud, C., Worku, A., Molla, M. et al. Consequences of maternal mortality on infant and child survival: a 25-year longitudinal analysis in Butajira Ethiopia (1987-2011). Reprod Health 12 (Suppl 1), S4 (2015). https://doi.org/10.1186/1742-4755-12-S1-S4

[152] Reproductive Health, True cost of maternal death, Source: https://reproductive-health-journal.biomedcentral.com/articles/10.1186/1742-4755-12-S1-S4#:~:text=Children%20born%20to%20women%20who,of%20these%20women%20(7%25).

[153] United Nations, Sustainable Development Goals Handbook

[154] Nelson Ijumba,, Impact of HIV/AIDS on education and Poverty. UN https://www.un.org/en/chronicle/article/impact-hivaids-education-and-poverty

[155] World Health Organisation, (2023), Malaria WHO https://www.who.int/news-room/fact-sheets/detail/malaria

[156] Gallup et.al, (2001), The Intolerable Burden of Malaria. American Society of Tropical Medicine and Hygiene.

[157] WHO. (2018). Maternal mortality ratio (per 100 000 live births). Available at: http://www.who.int/healthinfo/statistics/indmaternalmortality/en/.

[158] World Bank: Educating girls ending child marriage. Link: https://www.worldbank.org/en/news/immersive-story/2017/08/22/educating-girls-ending-child-marriage

[159] Ahmed, et, al (2022), Healthcare utilization and maternal and child mortality during COVID-19. PLoS Med. 2022 Aug 30;19(8):e1004070. doi: 10.1371/journal.pmed.1004070. PMID: 36040910; PMCID: PMC9426906

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3.9.1	Mortality rate associated with household and ambient air pollution	Air pollution is the biggest environmental risk to health. Changes to this indicator will track reductions in deaths from hazardous air pollution.[160]	• Improvement in health
4.1.1	Proportion of young children meeting minimum proficiency level in reading and mathematics	Minimum proficiency level corresponds to the minimum set of skills or knowledge required for a given subject such as reading or mathematics. Additional years of schooling are likely to increase minimum proficiency level and school completion rate – which is likely to increase future earning potential.[161]	• Improvement in education • Improvement in work
4.1.2	Schooling completion rates		
4.2.2	Participation rate in organized learning (one year before the official primary entry age)	Early childhood and primary education programs are examples of organized learning programs. This indicator shows representation of quality early childhood development, which is likely to increase years of schooling and earning potential.[162]	• Improvement in education
4.a.1	Proportion of schools offering basic services	Key basic services and facilities that are necessary to ensure a safe and effective learning environment for all students which is likely to increase years of schooling and earning potential.[163]	• Improvement in education
5.2.1	Proportion of ever-partnered women and girls aged 15 years and older subjected to violence by current or former partner	Decreases in violence experienced by women and girls inflicted by their partner may lead to increases in basic human rights.[164]	• Improvements in health • Improvements in human rights • Improvements in education/work
5.3.1	Proportion of women aged 20–24 years who were married or in a union before age 15 and before age 18	Delaying marriage or union until at least the age of 18 years allows girls to access education to develop their skills, potentially leading to higher income and improved life opportunities. The research evidence also suggests that delaying marriage may also reduce the risk of psychical violence from an intimate partner.[165]	• Improvements in education • Improvements in health
5.3.2	Proportion of girls and women aged 15–49 years who have undergone female genital mutilation	Reducing female genital mutilation improves the health and well-being of girls and women and increases their human rights.[166]	• Improvements in health • Improvements in human rights
6.1.1	Proportion of population using safely managed drinking water services	Access to clean and safely managed drinking water reduces the risk of populations contracting water borne diseases which may adversely affect their health.[167]	• Improvements in health
7.1.2	Proportion of population with primary reliance on clean fuels and technology	Higher usage of clean fuels and technologies reduces impact to the environment and air pollution. This may has ripple effects to population health and income (particularly populations who rely on the environment to generate income).	• Improvement in environment • Improvement in air pollution

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[160]World Health Organisation, Air Pollution Link: https://www.who.int/health-topics/air-pollution#tab=tab_1

[161] Ibid.

[162] Ibid.

[163] Ibid.

[164] Fan and Koski, (2022), The health consequences of child marriage: a systematic review of the evidence. PubMed (nih.gov)

[165] BMC Public Health, Child Marriage, Source: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-022-12707-xy

[166] World Health Organisation, Female genital mutilation, Source: https://www.who.int/news-room/fact-sheets/detail/female-genital-mutilation

[167] World Health Organisation, Drinking Water, Source: https://www.who.int/news-room/fact-sheets/detail/drinking-water

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13.1.1	Deaths, missing persons and directly affected persons attributed to disasters	Countries with lower rates of reporting for persons affected by disaster would likely be able to respond to emergency more quickly and effectively and provide targeted resource allocation to those most in need. A reduction in deaths and missing persons in society is also likely to be associated with an increase in mental wellbeing, and subsequently higher productivity and GNI.[168]	• Improvements in health • Improvements in targeted emergency response
16.1.1	Intentional homicide rates	Lower homicide is a key indicator for safety and security in institutions. Psychological security and protection from crime represent the satiability and predictability of daily life which encourage individuals to save, invest and innovate these factors are essential for institutions to thrive and grow.[169] As such, lower homicide rates means fewer deaths and may lead to an increase in a countries, employability, productivity, sense of well-being and GNI.	• Improvements in health • Improvements in living standards
8.7.1[170]	Proportion and number of children aged 5-17 years engaged in child labor, by sex and age	Engaging and trapping children in labor compromises their future. Children occupied in child labor have reduced opportunity to engage with the education system which results in reduces subsequent earning potential.[171]	• Improvement in education/work
16.2.1[172]	Proportion of children aged 1-17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month	Psychological aggression is characterized by the act of raising one's voice, shouting, yelling, or using offensive language towards a child. Physical or corporal punishment involves actions that aim to inflict physical pain or discomfort without causing injuries. Employing violent disciplinary methods, whether physical or verbal, goes against children's rights and can have both immediate and long-term effects. Immediate consequences may include negative impacts on education outcomes, while long-term repercussions can affect income and subsequently living standards. This form of violence against children is prevalent and most widely accepted in society.[173]	• Improvement in education/work
16.2.3[174]	Proportion of young women and men aged 18-29 years who experienced sexual violence by age 18	Sexual abuse involving children can occur when one child engages in sexual activities with another child, particularly if the offender is considerably older or uses power, threats, or coercion. Such experiences of sexual violence during childhood hinder various aspects of development, including physical, psychological/emotional, and social well-being. In addition to the physical harm that may arise, extensive research has consistently shown that child sexual abuse is linked to numerous negative mental health consequences and unfavorable behavioral outcomes in adulthood. This abuse has the potential to impede expected years of education and subsequently limit future income-earning prospects.[175]	• Improvement in health • Improvement in education • Improvement in living standards

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[168] United Nations Office of Drugs and Crime, Comprehensive Strategies For Crime Prevention Towards Social And Economic Development

[169] Acemoglu and Robinson (2012), Why Nations Fail.

[170] 8.7.1 has been classified as a Tier 2 indicator as at 31st March 2023, however has still been included in this analysis due to the importance of child protection in its alignment with World Vision priorities.

[171] International Labour Office (2003), *An Economic study of the costs and benefits of eliminating child labour*. ILO

[172] 16.2.1 and 16.2.3 have been classified as Tier 2 indicators as at 31st March 2023, however has still been included in this analysis due to the importance of child protection in its alignment with World Vision priorities.

[173] Violent Discipline. UNICEF. Retrieved on 14 July, 2023 from Violent Discipline

[174] Ibid.

[175] Violence against children. UNICEF. Retrieved on 14 July, 2023 from Violence against children

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16.9.1	Proportion of children under 5 years of age whose births have been registered with a civil authority	Registering children at birth is the first step in securing their recognition before the law, safeguarding their rights, and ensuring any violation of their rights does not go unnoticed.[12] Higher rates of reporting allows authorities to track and monitor demographics allowing them to target resource allocation to children in need.	• Improvement in health and development • Improvements in living standards
17.8.1	Proportion of individuals using the Internet	Access to the internet can help create jobs in tech, engineering and other sectors, as well as help catalyze job skills development. Higher rates of access are an important avenue toward poverty reduction and shared prosperity which would likely lead to higher education outcomes.[176]	• Improvement in education
17.19.2	Proportion of countries that - A) have conducted at least one population and housing census in the last 10 years; and - B) have achieved 100 percent birth registration and 80 percent death registration	Censuses are the first step to provide strong population data which is crucial for capacity building, improved data, monitoring and accountability. Birth registration and death registrations are major milestones which form the first step in securing an individuals' recognition before the law, safeguarding their rights, and ensuring any violation of their rights does not go unnotced.[12]	• Improvement in resource allocation • Improvement in targeted social welfare programs

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[176] World Bank, Connecting for inclusion: Broadband access for all: Source: https://www.worldbank.org/en/topic/digitaldevelopment/brief/connecting-for-inclusion-broadband-access-for-all#:~:text=It%20can%20help%20create%20jobs,poverty%20reduction%20and%20shared%20prosperity.

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Appendix C Data sources and other supporting evidence

Table 19 - EY/World Vision Co-design workshop 1

Co-design workshop 1, ODA Classification Algorithm		
On March 22, 2023, EY and World Vision International held a co-design workshop to discuss a classification algorithm for identifying ODA targeting children using the OECD CRS dataset. The workshop agenda included the following items: a discussion on prior research into ODA classification, an exploration of the objectives and goals of the classification, and a presentation on a proposed data-driven approach		
Company	**Person**	**Role**
World Vision	Chris Derksen-Hiebert	Director, Policy and Advocacy Strategy
World Vision	Lisa Bos	Senior Director, Pubic Policy
World Vision	Martin Fischer	Director, Policy and Advocacy Strategy
World Vision	Erica Hall	Manager, Policy and Strategic Advisory
World Vision	Tamara Tutnjevic	Senior Advisor, Policy
World Vision	Josh Folkema	Senior Product Manager, Impact Data Analytics, Quality and Effectiveness

Table 20 - EY/World Vision Co-design workshop 2

Co-design workshop 2, ROI Methodology		
On May 17, 2023, EY and World Vision International held a co-design workshop to discuss the approach and methodology for quantifying the benefits of ODA targeting children. The workshop agenda involved a discussion on the approach to monetize benefits from ODA. Specifically, the topics discussed were ODA classification, benefit attribution, monetization, and qualitative analysis		
Company	**Person**	**Role**
World Vision	Chris Derksen-Hiebert	Director, Policy and Advocacy Strategy
World Vision	Lisa Bos	Senior Director, Pubic Policy
World Vision	Martin Fischer	Director, Policy and Advocacy Strategy
World Vision	Erica Hall	Manager, Policy and Strategic Advisory
World Vision	Tamara Tutnjevic	Senior Advisor, Policy
World Vision	Abby Jones	Policy & Campaigns Adviser

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Appendix D Detailed list of assumptions with supporting evidence

The following table lists the assumptions that form the basis of benefit attribution and monetization.

Table 21 – Benefit monetization assumptions

Variable	Amount	Description	Source
$SDisc$	12%	A hyperbolic social discount rate of 12 % is applied for economic evaluations to reflect the net present value.	Belli P., J. Anderson, H. Barnum, J. Dixon, and J. Tan. 1998. Handbook on Economic Analysis of Investment Operations. World Bank, Washington, DC.
$\overline{LB}$	209,000	Median number of live births in 2021, the mean average number of live births were 791,400	ODA Analysis Data
VSL	$15.6m	Value of Statistical Life represents how much society is willing to pay to reduce the risk of death. This source reflects the global VSL estimate based on a meta-analysis conducted by OECD.	OECD, Meta Analysis of Value of Statistical Life Estimates. Accessed June 2023: https://www.oecd.org/env/tools-evaluation/env-value-statistical-life.htm
$\overline{\overline{POP}}$	9.85m	Average Population	ODA Analysis Data
$\overline{\overline{POP}}^{C}$	30%	Average proportion of school aged children.	Statista, (2019), *Total number of school aged children worldwide from 1950 to 2100, by age group,* Available here: https://www.statista.com/statistics/914490/school-aged-children-worldwide-age-group.
$\overline{\overline{POP}}^{W}$	62%	Average proportion of working population.	Labour Force Participation Rate, total (% of total population ages 15+) (modeled ILO estimate), World Bank. Available here: https://databank.worldbank.org/source/jobs
$\overline{\overline{POP}}^{I}$	11.2%	Average proportion of children under the age of 5	Total Population by five-year age group - Average across 2017-2021 of both low and low-middle income countries, United Nations, Department of Economic and Social Affairs, Population Division. (2022). World Population Prospects 2022. Online Edition.
$QALY^{S}$	4.4%	Quality Adjusted Life Year (QALY) equivalence for stunting.	Connery, et.al, (2021), Parent Report of Health Related Quality of Life in Young Children in Rural Guatemala: Implementation, Reliability, and Validity of the PedsQL in Stunting and Wasting, Global Pediatric Health. 2021(6) doi: 10.1177/2333794X21991028
SVS	19%	The additional social value of schooling from every additional year of education. This is based on a meta-analysis conducted by World Bank to determine individual and social returns associated with increasing years of schooling.	Psacharopoulos, Patrinos, (2018), Returns to Investment in Education. World Bank Group.
$\overline{w}$	$9096	Average annual wages Africa ($USD 2022). This assumption is based on the average salaries in Africa.	Nicholas Mushayi, (2022), Africa's Average Salaries by Country. The Human Capital Hub; Salary Explorer. (2022). Available at: salaryexplorer.com.
$\overline{LE}$	72	Median Average Life Expectancy (years), for the analysis sample of countries.	United Nations, (2023), *Human Development Index; Life Expectancy.* Available at: https://hdr.undp.org/data-center/human-development-index#/indicies/HDI
$\emptyset^{FN}$	40%	Social multipliers associated with Friendship Networks improving education outcomes.	List. Et.al (2023), Neighborhood Spillover Effects of Early Childhood Interventions, Working Paper.
$\emptyset^{H}$	27%	Social multipliers associated with broader health benefits further amplifying health benefits	Banerjee et.al, (2019), Using Gossips to Spread Information: Theory and Evidence from Two Randomized Controlled Trials, The

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			Review of Economic Studies, Volume 86, Issue 6, November 2019, Pages 2453–2490, https://doi.org/10.1093/restud/rdz008
$\eta^{ODA \to GE}$	4.34%	% Impact of ODA from changing the norm of gender inequality by 1%	Zhang, C., Huang, Z. Foreign Aid, Norm Diffusion, and Local Support for Gender Equality: Comparing Evidence from the World Bank and China's Aid Projects in Africa. St Comp Int Dev (2023). https://doi.org/10.1007/s12116-023-09381-4
$\eta^{ODA \to CP}$	5%	An assumption, based on a paper estimating the impact of ODA on gender inequality norms.	
$\eta^{CP \to CL}$	1.35%	% impact for the decreases as a result of changing the norm for child protection by 1%	Kim, J., Olsen, W., & Wiśniowski, A. (2022). Predicting Child-Labour Risks by Norms in India. Work, Employment and Society, 0(0). https://doi.org/10.1177/09500170221091886
$\eta^{GE \to CL}$	1.76%	% impact for the decreases as a result of changing the norm for gender inequality by 1%	
$\eta^{CL \to E}$	75%	Share of children that are likely to commence education after averting child labor, based on the probability of a child dropping out of school after ~6 hours of work a day.	
	6 hours	Child labor is defined by estimating the average number of hours worked per day, exceeding this threshold.	
C^F	51%	Proportion of children that are female – Estimated from Population Sex Ratio.	Population Sex Ratio - Average across 2017-2021 of both low and low-middle income countries, United Nations, Department of Economic and Social Affairs, Population Division. (2022). World Population Prospects 2022. Online Edition.

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Appendix E Detailed results

Table 22 - The results of ODA classification algorithm

	Estimated coefficient	Robust std. err.	z	P>z	95 % Confidence interval	
Keywords, number of times mentioned						
Boy						
Once	0.658	0.208	3.160	0.002	0.250	1.066
Twice	1.663	0.611	2.720	0.007	0.465	2.862
>3 times	0.970	0.560	1.730	0.083	-0.128	2.068
Girl						
Once	-0.810	-0.099	-8.190	0.000	-0.616	-1.004
Twice	-1.196	-0.232	-5.150	0.000	-0.741	-1.651
>3 times	-1.180	-0.237	-4.970	0.000	-0.715	-1.646
Child						
Once	1.921	0.088	21.950	0.000	1.749	2.092
Twice	2.314	0.128	18.130	0.000	2.064	2.564
>3 times	2.572	0.208	12.340	0.000	2.164	2.980
Baby						
Once	0.000	(empty)				
Twice	0.000	(empty)				
Babies						
Once	0.393	0.739	0.530	0.595	-1.056	1.841
Twice	3.102	1.697	1.830	0.068	-0.224	6.428
Infant						
Once	1.074	0.272	3.950	0.000	0.541	1.608
Twice	-0.092	0.672	-0.140	0.891	-1.410	1.226
>3 times	0.375	0.855	0.440	0.661	-1.302	2.051
Youngest						
Once	-1.242	1.539	-0.810	0.419	-4.258	1.773
Childdevelopment						
Once	-1.548	0.667	-2.320	0.020	-2.855	-0.242
Twice	-3.206	1.060	-3.020	0.002	-5.283	-1.128
>3 times	0.000	(empty)				
Ecd						
Once	-0.195	0.363	-0.540	0.591	-0.906	0.516
Twice	2.231	0.241	9.260	0.000	1.759	2.703
>3 times	0.864	0.192	4.490	0.000	0.487	1.241
Teenager						
Once	1.674	1.184	1.410	0.157	-0.646	3.995
Twice	0.000	(empty)				
Childhood						
Once	2.188	0.436	5.010	0.000	1.332	3.043

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Twice	1.611	0.588	2.740	0.006	0.459	2.763
>3 times	0.000	(empty)				
Adolescent						
Once	1.123	0.234	4.790	0.000	0.664	1.583
Twice	0.804	0.404	1.990	0.047	0.012	1.595
>3 times	-0.129	0.371	-0.350	0.728	-0.856	0.598
Young						
Once	-0.212	0.116	-1.830	0.068	-0.440	0.015
Twice	0.090	0.165	0.550	0.585	-0.233	0.413
>3 times	1.152	0.266	4.330	0.000	0.631	1.674
Youth						
Once	-0.443	0.120	-3.680	0.000	-0.679	-0.207
Twice	-0.469	0.179	-2.620	0.009	-0.820	-0.118
>3 times	-0.389	0.236	-1.650	0.100	-0.853	0.074
Toddler						
Excluded - no entries	0.000	(empty)				
Minor						
Once	-0.403	0.257	-1.570	0.117	-0.907	0.101
Twice	-0.161	0.520	-0.310	0.757	-1.181	0.859
>3 times	0.020	0.825	0.020	0.981	-1.596	1.636
Primaryschool						
Once	2.715	0.247	11.000	0.000	2.231	3.199
Twice	3.822	1.067	3.580	0.000	1.731	5.912
>3 times	1.331	1.100	1.210	0.226	-0.825	3.487
Orphan						
Once	-0.689	0.452	-1.520	0.127	-1.575	0.197
Twice	0.000	(empty)				
>3 times	-0.409	0.848	-0.480	0.629	-2.071	1.253
Neurodevelopment						
Excluded - no entries	0.000	(empty)				
Neonatal						
Once	0.121	0.317	0.380	0.703	-0.500	0.741
Twice	1.615	1.037	1.560	0.120	-0.419	3.648
>3 times	-0.230	1.514	-0.150	0.879	-3.197	2.738
Birth						
Once	-0.016	0.187	-0.080	0.933	-0.383	0.351
Twice	-0.221	0.678	-0.330	0.744	-1.550	1.108
>3 times	-1.357	0.698	-1.940	0.052	-2.726	0.011
Nursery						
Once	2.664	0.854	3.120	0.002	0.990	4.338
Twice	0.000	(empty)				
>3 times	0.000	(empty)				

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Deworming						
Once	0.000	(empty)				
Antenatal						
Once	2.444	1.187	2.060	0.040	0.117	4.771
Twice	0.000	(empty)				
>3 times	0.000	(empty)				
Preprimary						
Once	0.708	0.446	1.590	0.112	-0.166	1.582
Twice	-0.681	1.335	-0.510	0.610	-3.297	1.935
>3 times	0.000	(empty)	0.000	0.000	0.000	0.000
Pre-school						
Once	2.268	0.834	2.720	0.007	0.633	3.902
Twice	0.000	(empty)				
>3 times	0.000	(empty)				
Preschool						
Once	3.158	0.933	3.380	0.001	1.328	4.987
Twice	0.093	1.500	0.060	0.951	-2.847	3.032
>3 times	0.000	(empty)				
Childcare						
Once	-4.061	1.104	-3.680	0.000	-6.225	-1.898
Twice	0.000	(empty)				
Daycare						
Once	0.592	1.146	0.520	0.605	-1.655	2.839
Twice	0.000	(empty)				
Stimulation						
Once	-0.322	0.421	-0.760	0.445	-1.147	0.504
Enfant						
Once	1.769	0.806	2.190	0.028	0.189	3.349
Twice	0.511	0.858	0.600	0.551	-1.170	2.192
>3 times	-0.633	1.048	-0.600	0.546	-2.686	1.420
Enfants						
Once	-0.814	0.814	-1.000	0.317	-2.410	0.782
Twice	0.017	0.905	0.020	0.985	-1.757	1.790
>3 times	-0.145	1.088	-0.130	0.894	-2.278	1.987
Enfance						
Once	0.096	0.409	0.230	0.815	-0.706	0.897
Twice	0.000	(empty)				
>3 times	0.000	(empty)				
Garcon						
Once	0.000	(empty)				
Fille						
Once	0.367	0.186	1.970	0.049	0.002	0.732

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Twice	0.301	0.329	0.920	0.359	-0.343	0.946
>3 times	0.490	0.354	1.380	0.166	-0.204	1.185
Jeune						
Once	-0.205	0.149	-1.380	0.167	-0.497	0.086
Twice	-0.691	0.230	-3.000	0.003	-1.142	-0.240
>3 times	-0.792	0.317	-2.500	0.013	-1.413	-0.170
Adolescents						
Once	0.208	0.273	0.760	0.445	-0.326	0.743
Twice	0.845	0.511	1.650	0.098	-0.156	1.847
>3 times	0.405	0.649	0.620	0.532	-0.867	1.677
Homme						
Once	-1.708	0.212	-8.040	0.000	-2.124	-1.291
Twice	-2.670	0.497	-5.370	0.000	-3.644	-1.695
>3 times	-1.693	0.969	-1.750	0.081	-3.592	0.207
Jeunesse						
Once	0.141	0.426	0.330	0.740	-0.694	0.976
Twice	-1.377	1.111	-1.240	0.215	-3.556	0.801
>3 times	1.775	0.701	2.530	0.011	0.401	3.150
Bebe						
Once	0.000	(empty)				
Twice	0.000	(empty)				
Adult						
Once	-2.285	0.551	-4.140	0.000	-3.365	-1.204
Twice	1.668	1.309	1.270	0.203	-0.899	4.234
>3 times	0.000	(empty)				
Man						
Once	-0.147	0.089	-1.650	0.098	-0.321	0.027
Twice	0.176	0.164	1.070	0.283	-0.145	0.496
>3 times	-0.211	0.551	-0.380	0.702	-1.290	0.869
Woman						
Once	-0.464	0.527	-0.880	0.379	-1.497	0.570
Twice	1.027	1.571	0.650	0.514	-2.053	4.106
Elderly						
Once	-4.735	1.739	-2.720	0.006	-8.144	-1.327
Government						
Once	-0.487	0.076	-6.430	0.000	-0.635	-0.338
Twice	-0.462	0.145	-3.190	0.001	-0.746	-0.179
>3 times	-0.489	0.223	-2.190	0.028	-0.925	-0.052
Infrastructure						
Once	-0.942	0.213	-4.420	0.000	-1.359	-0.524
Twice	-0.918	0.396	-2.320	0.020	-1.695	-0.142
>3 times	0.000	(empty)	0.000	0.000	0.000	0.000

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Trade						
Once	-0.987	0.174	-5.680	0.000	-1.328	-0.646
Twice	0.000	(empty)				
>3 times	0.000	(empty)				

Agriculture						
Once	-0.694	0.261	-2.660	0.008	-1.205	-0.183
Twice	-0.513	0.451	-1.140	0.255	-1.397	0.371
>3 times	0.000	(empty)				

Tax						
Once	-3.996	0.779	-5.130	0.000	-5.523	-2.469
Twice	0.000	(empty)				
>3 times	-1.464	0.483	-3.030	0.002	-2.411	-0.518

Road						
Once	-0.663	0.125	-5.290	0.000	-0.908	-0.417
Twice	-1.139	0.270	-4.210	0.000	-1.668	-0.609
>3 times	-1.153	0.299	-3.860	0.000	-1.739	-0.567

Vote						
Once	-0.869	0.522	-1.660	0.096	-1.893	0.155
Twice	0.000	(empty)				
>3 times	0.000	(empty)				

Election						
Once	-1.248	0.285	-4.380	0.000	-1.807	-0.690
Twice	-2.817	0.741	-3.800	0.000	-4.270	-1.364
>3 times	0.000	(empty)				

Energy						
Once	-0.851	0.295	-2.880	0.004	-1.430	-0.272
Twice	-1.769	0.607	-2.910	0.004	-2.958	-0.579
>3 times	0.000	(empty)				

Finance						
Once	-0.622	0.091	-6.830	0.000	-0.800	-0.444
Twice	0.141	0.203	0.700	0.486	-0.256	0.539
>3 times	-1.356	0.308	-4.400	0.000	-1.960	-0.751

Financial services						
Once	-1.651	0.406	-4.060	0.000	-2.448	-0.855
Twice	0.000	(empty)				
>3 times	0.000	(empty)				

University						
Once	-1.697	0.255	-6.660	0.000	-2.197	-1.198
Twice	-1.680	0.704	-2.390	0.017	-3.059	-0.301
>3 times	-0.850	0.624	-1.360	0.173	-2.073	0.373

Mature						
Once	-0.127	0.463	-0.270	0.784	-1.033	0.780
Twice	0.000	(empty)				

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Homme						
Once	0.000	(empty)				
Twice	0.000	(empty)				
>3 times	0.000	(empty)				
Femme						
Once	-1.250	0.456	-2.740	0.006	-2.143	-0.357
Twice	-4.995	1.697	-2.940	0.003	-8.322	-1.669
Age						
Once	-0.274	0.111	-2.460	0.014	-0.491	-0.056
Twice	-0.311	0.221	-1.400	0.160	-0.744	0.123
>3 times	-1.565	0.533	-2.940	0.003	-2.610	-0.521
Government						
Once	-0.151	0.618	-0.240	0.807	-1.362	1.060
Twice	0.000	(empty)				
Commerce						
Once	-0.308	0.388	-0.790	0.428	-1.069	0.454
Twice	0.000	(empty)				
>3 times	0.000	(empty)				
Route						
Once	0.000	(empty)				
Twice	0.000	(empty)				
Energie						
Once	0.000	(empty)				
Twice	-1.022	1.005	-1.020	0.309	-2.991	0.947
Universite						
Once	-0.208	0.570	-0.360	0.716	-1.325	0.909
Young x Adult						
Once#Twice	0.000	3.526	0.450	0.651	-5.315	8.508
Teenager x Child						
Once#Once	0.000	(empty)				
Adolescent x Child						
Once#Once	-2.624	0.391	-6.700	0.000	-3.391	-1.857
Once#Twice	-2.867	0.468	-6.120	0.000	-3.785	-1.949
Once#>3 times	-3.845	0.592	-6.490	0.000	-5.006	-2.684
Twice#Once	-1.087	1.562	-0.700	0.486	-4.149	1.975
Twice#Twice	1.319	0.842	1.570	0.117	-0.332	2.970
Twice#>3 times	-4.040	0.663	-6.100	0.000	-5.339	-2.741
>3 times#Once	-3.866	0.641	-6.030	0.000	-5.122	-2.609
>3 times#Twice	-1.768	0.991	-1.780	0.074	-3.710	0.174
>3 times#>3 times	-2.725	1.019	-2.670	0.008	-4.723	-0.727
Young x Child						
Once#Once	0.177	0.427	0.410	0.679	-0.660	1.014
Once#Twice	-0.161	0.603	-0.270	0.790	-1.343	1.021

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Once#>3 times	-0.062	0.614	-0.100	0.920	-1.265	1.141
Twice#Once	-0.615	0.989	-0.620	0.534	-2.554	1.323
Twice#Twice	-1.249	0.706	-1.770	0.077	-2.632	0.134
Twice#>3 times	-2.025	0.654	-3.100	0.002	-3.307	-0.743
>3 times#Once	-1.003	1.122	-0.890	0.371	-3.202	1.195
>3 times#Twice	0.000	(empty)	0.000	0.000	0.000	0.000
>3 times#>3 times	-2.628	0.909	-2.890	0.004	-4.410	-0.847
Youth x Child						
Once#Once	0.893	0.361	2.470	0.013	0.185	1.600
Once#Twice	-0.713	0.380	-1.880	0.061	-1.457	0.032
Once#>3 times	-1.872	0.579	-3.230	0.001	-3.007	-0.737
Twice#Once	-0.032	0.529	-0.060	0.952	-1.068	1.004
Twice#Twice	-0.346	0.635	-0.540	0.586	-1.591	0.899
Twice#>3 times	0.537	0.618	0.870	0.385	-0.674	1.747
>3 times#Once	-1.797	0.554	-3.250	0.001	-2.882	-0.712
>3 times#Twice	-0.472	0.689	-0.690	0.493	-1.822	0.877
>3 times#>3 times	-0.784	0.654	-1.200	0.231	-2.065	0.498
Other controls						
SDG goal category 1 (=1)	-0.630	0.063	-9.940	0.000	-0.754	-0.505
SDG goal category 2 (=1)	0.447	0.081	5.510	0.000	0.288	0.606
SDG goal category 3 (=1)	0.681	0.047	14.640	0.000	0.590	0.772
SDG goal category 4 (=1)	2.051	0.032	63.400	0.000	1.987	2.114
SDG goal category 5 (=1)	-0.149	0.054	-2.750	0.006	-0.255	-0.043
SDG goal category 6 (=1)	-0.989	0.230	-4.300	0.000	-1.440	-0.539
SDG goal category 7 (=1)	-0.452	0.295	-1.530	0.125	-1.031	0.126
SDG goal category 8 (=1)	-0.862	0.049	-17.540	0.000	-0.959	-0.766
SDG goal category 9 (=1)	-1.203	0.078	-15.400	0.000	-1.356	-1.050
SDG goal category 10 (=1)	-0.343	0.071	-4.810	0.000	-0.483	-0.203
SDG goal category 11 (=1)	-1.097	0.142	-7.730	0.000	-1.374	-0.819
SDG goal category 12 (=1)	-0.986	0.206	-4.780	0.000	-1.391	-0.582
SDG goal category 13 (=1)	-1.190	0.127	-9.370	0.000	-1.439	-0.941
SDG goal category 14 (=1)	0.680	0.327	2.080	0.038	0.039	1.322
SDG goal category 15 (=1)	2.308	0.123	18.770	0.000	2.067	2.549
SDG goal category 16 (=1)	-0.784	0.043	-18.030	0.000	-0.869	-0.699
SDG goal category 17 (=1)	-1.089	0.060	-18.080	0.000	-1.207	-0.971
If multilateral donor	0.065	0.044	1.470	0.142	-0.022	0.151
Channel of delivery						
Channel of delivery (10000) - Public institutions (% of investments per year)	0.013	0.054	0.230	0.816	-0.094	0.119
Channel of delivery (20000) - NGOs and civil society (% of investments per year)	0.060	0.058	1.030	0.305	-0.054	0.174
Channel of delivery (30000) - Public-Private partnerships (% of investments per year)	-0.954	0.197	-4.850	0.000	-1.340	-0.569
Channel of delivery (40000) - Multilateral organizations (% of investments per year)	-0.155	0.052	-2.980	0.003	-0.257	-0.053
Channel of delivery (50000) - Teaching institution (% of investments per year)	-0.969	0.075	-12.950	0.000	-1.116	-0.823
Channel of delivery (60000) - Private sector institution (% of investments per year)	-1.042	0.064	-16.240	0.000	-1.168	-0.916
Channel of delivery (90000) - Other (% of investments per year)	-0.178	0.079	-2.270	0.023	-0.332	-0.024

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Income group (base: LDCs)						
LMICs	-0.237	0.030	-7.770	0.000	-0.297	-0.177
MADCTs	-0.253	0.274	-0.920	0.355	-0.791	0.284
Other LICs	-0.689	0.124	-5.570	0.000	-0.932	-0.447
Part I unallocated by income	-1.185	0.059	-20.040	0.000	-1.301	-1.070
UMICs	-0.376	0.039	-9.590	0.000	-0.453	-0.299
Region (base: Africa)						
America	0.569	0.198	2.870	0.004	0.180	0.958
Asia	0.003	0.176	0.020	0.988	-0.343	0.348
Caribbean & Central America	0.120	0.139	0.860	0.390	-0.153	0.393
Europe	-0.370	0.140	-2.630	0.008	-0.645	-0.095
Far East Asia	0.008	0.139	0.050	0.956	-0.265	0.280
Middle East	0.330	0.142	2.330	0.020	0.052	0.608
North of Sahara	-0.115	0.145	-0.790	0.428	-0.400	0.170
Oceania	0.695	0.143	4.880	0.000	0.416	0.975
Regional and Unspecified	-0.088	0.130	-0.670	0.500	-0.342	0.167
South & Central Asia	-0.012	0.137	-0.090	0.929	-0.282	0.257
South America	-0.013	0.142	-0.090	0.928	-0.291	0.266
South of Sahara	0.198	0.135	1.460	0.144	-0.068	0.463
RMNCH indicator (base: not targeted)						
Significant objective	1.069	0.076	14.120	0.000	0.920	1.217
Principal objective	2.289	0.065	35.210	0.000	2.161	2.416
Unspecified level of target - 3	1.767	0.262	6.740	0.000	1.253	2.281
Unspecified level of target - 4	1.864	0.107	17.480	0.000	1.655	2.073
Not specified	0.414	0.034	12.140	0.000	0.347	0.481
Gender Equality indicator (base: not targeted)						
Significant objective	0.433	0.029	15.190	0.000	0.377	0.489
Principal objective	0.880	0.052	16.770	0.000	0.777	0.983
Not specified	-0.241	0.036	-6.610	0.000	-0.312	-0.169
Constant	-0.495	0.148	-3.350	0.001	-0.784	-0.205
Observations	56,419					

Note: The outcome of the classification algorithm is a child-specific investment (=1). The classification algorithm controls for a number of indicators for keywords mentioned in project title, short- and long-descriptions and other controls describing the investment. Some keyword indicators have been excluded due to collinearity with other keyword indicators or missing values (never mentioned). The classification has been performed and tested using the data training sample, of which 70% of the sample is for training and 30% is for validation. The average outcome for the data training sample is 0.498. Using the average outcome and the validation sample (30%), the classification matrix demonstrates the rate for True Positives (Sensitivity) is 0.777, the rate for True Negatives (Specificity) is 0.743 and the overall accuracy is 0.759.

Table 23 – Benefit attrition: the results of two-stage least squares regression analysis

	First stage: child-related ODA	Second stage: child-related ODA				
		CM	CS	EYS	MYS	GNIpc
Total Population	-.0000456*					
	(-1.73)					
Child-related ODA, predicted, L1		-0.0026*	-0.00056**	.0041*	0.0017*	4.9
		(1.70)	(2.53)	(1.70)	(2.17)	(0.402)
Observations	639	504	188	504	500	504

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Note: The regression in addition controls for country-specific and ODA-specific characteristics, year and country fixed effects. Here: L1 – first order lag; CM – Children under 5 mortality rate, CS – Share of children under 5 stunting (missing values for six countries: Antigua and Barbuda, Dominica, Grenada, Micronesia, Palau, St Vincent and the Grenadines, Tanzania), EYS – expected years of schooling, MYS – mean years of schooling (missing for two countries: Democratic People's Republic of Korea, Nauru), GNIpc – GNI per capita. 5 observations missing the predicted ODA per capita in the first stage due to missing variable inputs for a few countries. The statistics on stunting are not available for 2019 and 2021.

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