8.7 ALLIANCE

Measuring child labour, forced labour and human trafficking in global supply chains: A global Input-Output approach

Technical Paper

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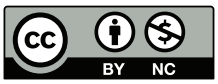

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FOREWORD

This technical paper accompanies the report on *Ending child labour, forced labour and human trafficking in global supply chains* jointly prepared by the ILO, OECD, IOM and UNICEF as a product of the Alliance 8.7 Action Group on Supply Chains (hereafter the Alliance 8.7 Report). The Alliance 8.7 Report responds to the Ministerial Declaration of the July 2017 meeting of the Group of Twenty (G20) Labour and Employment Ministers, asking "the International Organisations in cooperation with the Alliance 8.7 for a joint report containing proposals on how to accelerate action to eliminate the worst forms of child labour, forced labour and modern slavery in global supply chains including identifying high risk sectors, and how to support capacity building in the countries most affected". It also responds to the Buenos Aires Declaration on Child Labour, Forced Labour and Youth Employment, November 2017, which called for "research on child labour and forced labour and their root causes (…) pay[ing] particular attention to supply chains".

According to the 2016 ILO global estimates, there are a total of 152 million children in child labour and 25 million children and adults in forced labour in the world today. Governments, business, the financial sector and civil society must take strong action to address the root causes and determinants of these human rights violations. The Alliance 8.7 Report and this technical working paper are a contribution to these efforts.

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INTRODUCTION

This technical paper explains in detail the methodology and datasets used to produce the results published in Chapter 1 of the Alliance 8.7 Report on *Ending Child Labour, Forced Labour and Human Trafficking in Global Supply Chains* on how child labour, forced labour and human trafficking are linked with global supply chains. It is a result of a collaboration between OECD, ILO, IOM and UNICEF. This technical paper is also the first output of joint research and collaboration between the OECD Directorate for Financial and Enterprise Affairs (DAF) and the OECD Directorate for Science, Technology and Innovation (STI) on impacts of responsible business conduct (RBC) in global value chains, which falls under the DAF work stream on RBC and the STI work stream on the application the 2018 Inter-Country Input-Output (ICIO) infrastructure beyond Trade in Value Added database.

The social and environmental impact of firm participation in global supply chains is an area of increasing policy interest. On the one hand, global supply chains (GSCs) have the potential to generate growth, employment, skill development and technological transfer. On the other hand, decent work deficits (including child labour, forced labour and human trafficking) have been linked to economic activity supported by GSCs. The complexity and interconnectedness in the global markets presents a challenge for conventional statistics and accounting methods. For example, tracing back the origins of a final product or even its components requires capturing statistics not only in the market where the product is "consumed", but also along its supply chain. Many times, such statistics – if they exist at all – are full of gaps.

While developing a consistent quantitative means of tracing social and environmental impacts in GSCs is very challenging, certain aspects can and have been measured. For example, analysis of CO_2 emissions in the context of GSCs has already been integrated in the OECD Trade in Value-Added (TiVA) database.[1] Similar methodology has also been applied to understand the role of skills in countries' comparative advantage and industry performance in global value chains (see Grundke *et al*., 2017). When it comes to labour, ILO and the OECD have estimated labour content in trade (OECD, 2019a; Kizu *et al*, 2016) and share of jobs associated with global production. The basis for all this research are the Input-Output (IO) tables.

1 For example, CO_2 embodied in foreign demand. See: http://oe.cd/io-co2.

RATIONALE BEHIND USING THE GLOBAL INPUT-OUTPUT APPROACH

The basis for the research in this technical paper are the OECD Inter-Country Input Output (ICIO) tables, the datasets from ILO, UNICEF and IOM on employment, child labour and human trafficking, and the results from the 2016 Global Estimates on Modern Slavery. IO tables are commonly used by national statistical offices to describe the relationship between producers and consumers within an economy at an industry level. They account for final and intermediate goods and services, allowing statisticians to identify and isolate the direct and indirect impact of, for instance, a specific industry into the whole economy. Several initiatives at the international level, including the OECD ICIO tables,[2] have aimed to expand these tables to also analyse interdependencies between countries. These expanded datasets have provided researchers with tools to analyse several aspects of international trade and its impacts. Of particular relevance to this technical paper are attempts in literature to use global IO models to estimate the impact of international trade on social indicators, including country-specific analysis on child labour (see for example Alsamawi *et al.*, 2017; Gomez-Paredes *et al.*, 2016). This paper is a contribution to those and the aforementioned efforts on environmental and economic analyses.

Child labour standards, definitions and tools related to collection of child labour data are nowadays well-established statistical areas. In 1998, the Statistical Information and Monitoring Programme on Child labour (SIMPOC) was created at the ILO to improve gathering of statistical data on child labour. In 2008, the International Conference of Labour Statisticians (ICLS) adopted a resolution formalising the international criteria to measure child labour (ILO, 2008), in line with the ILO Conventions.[3] Many countries include child labour data collection in their national statistical systems' activities, for example through expanded age groups in labour force surveys (covering not only adults, but also children aged 5 years and older) or by including child labour modules in generic household or labour force surveys; others conduct ad-hoc national child labour surveys, many of which have been funded through technical co-operation projects. Every 4 years, the ILO publishes global estimates of child labour. The most recent estimates indicate that 152 million children were in this situation in 2016. Data on child labour are also collected at regular intervals as part of the Multiple Indicator Cluster Survey (MICS) programme, which was developed by UNICEF in mid-nineties to assist countries in collecting data on a numbers of wellbeing indicators for children and their families. Data on child labour have been collected in MICS since 2000 in close to 150 surveys through a standard module questionnaire. The MICS module covers children 5 to 17 years old and includes questions on the type of work a child does and the number of hours he or she is engaged in it. Every year, UNICEF publishes global, regional and country-level estimates of child labour in its flagship publication, *The State of the World's Children*.

When it comes to forced labour, measurement of forced labour is a relatively new statistical area. After about 15 years of pilot studies to measure the prevalence and characteristics of forced labour in different contexts or using different techniques, in 2018, the ICLS endorsed Guidelines to measure forced labour (ILO, 2018a). They reflect a framework to statistically measure the legal concept of ILO Convention 29. Forced labour is a rare statistical event, which often requires special (over)sampling techniques to reach a representative sample size to obtain robust statistical figures. Every 4 years the ILO publishes global estimates of forced labour. In 2017, jointly with the Walk Free Foundation and

2 More information about the OECD-ICIO, the full dataset, and methodology notes is available at http://oe.cd/icio.

3 The Resolution concerning measurement of child labour has been amended in 2018 to take into account the new statistical definitions on work and employment.

IOM, estimates of modern slavery (including forced marriage) were published – this extended concept of modern slavery is out of the scope of this paper. According to the Global Estimates of Modern Slavery, on any given day in 2016, 25 million people were in forced labour in the world (ILO and Walk Free Foundation, 2017). Similarly, the measurement of human trafficking for forced labour is an area of ongoing efforts. In particular, the ILO, UNODC and IOM are working together on the development of joint survey tools to study and estimate the prevalence of trafficking for forced labour at both national and sectoral levels. This will lead to better statistical data allowing for deeper analysis of forced labour and trafficking in global supply chains.

There are currently no global or regional estimates of the prevalence of human trafficking. Relatively few examples of estimates related to human trafficking exist (IOM, 2018). Having said that, the 2017 Global Estimates of Modern Slavery estimated that out of the 40 million people that were victims of modern slavery in 2016, approximately 25 million people were in forced labour, including 16 million in forced labour in the private economy. Some national, but still experimental estimations, exist. For example, Multiple Systems Estimation (MSE) can be used to estimate the total number of (unidentified and identified) victims of trafficking at country level. MSE is a method based on the analysis of multiple lists of human trafficking cases provided by different actors in the counter-trafficking field, such as NGOs, law enforcement, international organizations and other authorities. Currently, this method cannot be applied globally. However, researchers are developing the method estimate that could potentially be used to cover approximately 50 countries around the world. Initial estimates are already available in several countries, including the UK and the Netherlands (UNODC, 2016). Finally, some sectoral estimates of human trafficking also exist using Respondent-Driven Sampling (RDS).[4] While these are still limited, there is increasing evidence that using RDS in multiple waves could bring more insight and come closer to more representative-like study results.

Relating child labour, forced labour and human trafficking figures to global supply chains is a separate and significant challenge. A growing number of mixed methods (using both qualitative and quantitative approaches) and sectoral surveys are providing valuable insights into how these phenomena are involved in the global economy. Some businesses are also contributing to such insights, as they map the labour violation risks they are exposed to in the context of their human rights or social impact assessments and transparency efforts. Nevertheless, the scope of these efforts has mostly been restricted to identifying child labour, forced labour or human trafficking in the production of goods and services of particular industries or in their main suppliers. These methods may miss collecting information on workers that are not in the immediate supply chain - for example, upstream suppliers of intermediate goods. Additionally, due to the complexity of global production networks, quantitative accounting of these relationships is not straightforward.

This technical paper describes the joint effort undertaken by the OECD, ILO, IOM and UNICEF to contribute to the body of work that can help fill this gap. It is the first application of the IO approach by international organisations as related to implementation of responsible business conduct principles and standards and decent work deficits. This is the first time that datasets from the OECD, ILO, IOM and UNICEF have been combined in this way, and the first time that this methodology has been applied in such a wide range of countries by international organisations. The paper is structured as follows: PART 1 describes the definitions and data sources used; PART 2 describes how the datasets were combined and the additional tests that were undertaken to probe the impacts assumptions and limitations; and PART 3 gives an overview of the results.

4 See for instance illegal gold mining in South America (Verité, 2016) and fishing in South-Eastern Asia (IOM, 2016).

PART 1: DEFINITIONS AND DATA SOURCES

1.1 OECD INTER-COUNTRY INPUT-OUTPUT TABLES

Wassily Leontief developed the first Input-Output (IO) table for the US economy in the 1930s and investigated the extension of the IO work to interregional analysis in 1953. He won the Nobel Prize for Economics in 1973 for his work on IOs. IO techniques have been used in literature in various applications since then, particularly in recent years *(e.g.* water, see Feng *et al.* 2011; materials, see Wiedmann *et al*. 2013; CO_2, see Hertwich and Peters 2009; net primary production, see Haberl *et al,* 2007; employment, see Alsamawi, Murray and Lenzen, 2014).

The most significant feature of the IO model lies in the fact that it allows statisticians to identify and isolate the direct and indirect impact of a specific industry into the whole economy. IO tables in general consist of three main parts:

1. **intermediate demand (Z)** which describes, in monetary terms, the intermediate flows of goods and services within an economy;[5]
2. **final demand (F)** which shows the purchases of final goods and services by households and government as well as information about gross fixed capital formation, changes in inventories, and exports; and[6]
3. **value added (V)** which includes information about value-added by each industry and its components, e.g. compensation of employees, gross operating surplus, and other taxes on production (See FIGURE 1).

FIGURE 1: SYMMETRIC INPUT-OUTPUT TABLE FRAMEWORK

	INTERMEDIATE DEMAND			FINAL EXPENDITURE			OUTPUT
	Industry 1	…	Industry 36	Final consumption and capital formation	Exports cross-border	Direct purchases by non-residents	
Industry 1							
…		Intermediate matrix			Final demand matrix		
Industry 36							
Taxes less subsidies on intermediate and final products							
Total intermediate / final expenditure							
Value-added							
of which, compensation of employees							
of which, other net taxes on production		Value added matrix					
of which, gross operation surplus							
Output (total production)							

5 See: https://stats.oecd.org/glossary/detail.asp?ID=1431.

6 See: https://stats.oecd.org/glossary/detail.asp?ID=5526.

However, national IO tables give an incomplete picture of the global economy. Questions related to who is boosting exports or who is the final consumer of domestic production are not possible to answer by looking only at the IO tables, which are country specific.

The OECD-ICIO tables attempt at resolving this issue. In simple terms, the OECD-ICIO tables can be considered "a global IO table". They harmonize a number of national IO tables, reinforced and complemented with additional data sources[7]. They are built based on statistics compiled according to the 2008 System of National Accounts (SNA 2008) from national, regional and international sources and use an industry list based on the International Standard Industrial Classification (ISIC) Revision 4.

The latest edition of the tables (2018) is used for the purposes of this report. The published tables provide detailed data for 64 economies,[8] including all OECD, EU28 and G20 countries, most East and South-east Asian economies and a selection of South American countries. The edition also includes a category called Rest of the World. ANNEX 1 indicates the full list. Additionally, the authors have used additional unpublished data that cover a total of 198 economies in order to expand the analysis in this technical paper and the Alliance 8.7 Report. Thirty-six unique[9] and harmonised industrial sectors are represented within the hierarchy, including aggregates for total manufactures and total services, as shown in ANNEX 1. The 2018 edition covers the period 2005 to 2015, with preliminary projections to 2016 for some indicators. For this paper, ICIO tables for the year 2015 have been used.

Other examples of currently available ICIO databases include: EORA, EXIOBASE, IDE-JETRO, and WIOD. Each of these tables has a different time series, industry details and country coverage. The choice of OECD-ICIO tables for this analysis is based on their acceptance and validation by OECD member countries, expectation to maintain the datasets and methodologies in the long-term, and strong institutional links with national statistics offices; and finally the availability of cross-border exports and direct purchases by non-residents shown separately.

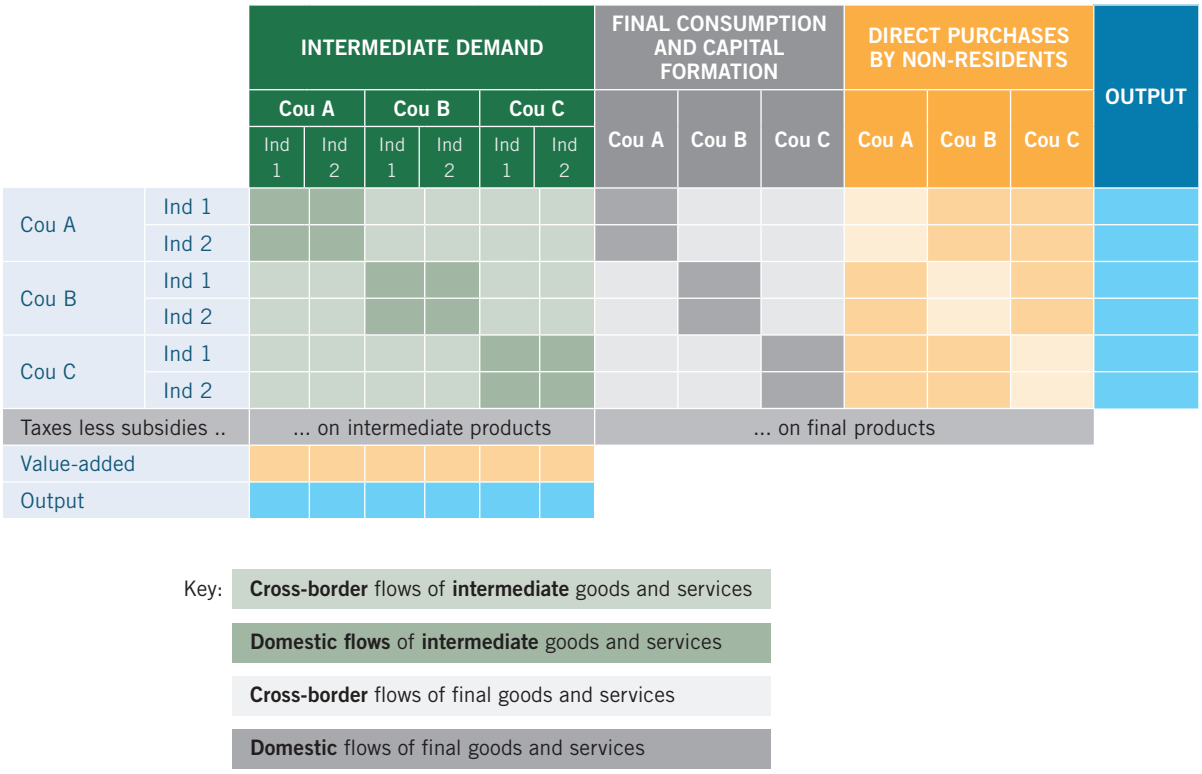
The ICIO structure is similar to that of the national IO tables. The Z matrix or intermediate demand matrix of an ICIO ($N\ x\ N$ dimensions, where N is the number of industries/products) hold the monetary flows of intermediate goods and services with an element $Z_{i,j,c}$ from supplying sector $i,\ i=1...\ N$, into a using sector $j,\ j=1...\ N$, and for country c. The F matrix ($N\ x\ M$ dimensions, where M is the number of final demand categories) holds information on private (Households and Non-Profit Institutions Serving Households, NPISH) and public consumption (government consumption), gross fixed capital formation (GFCF), changes in inventory, and exports of final goods and services, for domestic and foreign final demands with an element $F_{i,c,l,k}$ from supplying sector $i,\ i=1...\ N$ in country c into final demand categories $k,\ k=1...\ M$ and a foreign final demand country l, where $c \neq l$. Finally, the V matrix or primary input matrix ($S\ x\ N$ dimensions, S being the number of primary input categories) holds information on value added and output (total production) with elements $V_{j,c}$ and $X_{j,c}$ respectively (see FIGURE 2).

7 Complementary data sources include international bilateral trade statistics, tourism satellite accounts and other national accounts constraints.

8 See: www.oecd.org/industry/ind/tiva-2018-countries-regions.pdf.

9 See: http://stats.oecd.org/wbos/fileview2.aspx?IDFile=c0787cf5-ec31-4130-8ddf-8667773e66ed.

FIGURE 2: INTER-COUNTRY INPUT-OUTPUT FRAMEWORK

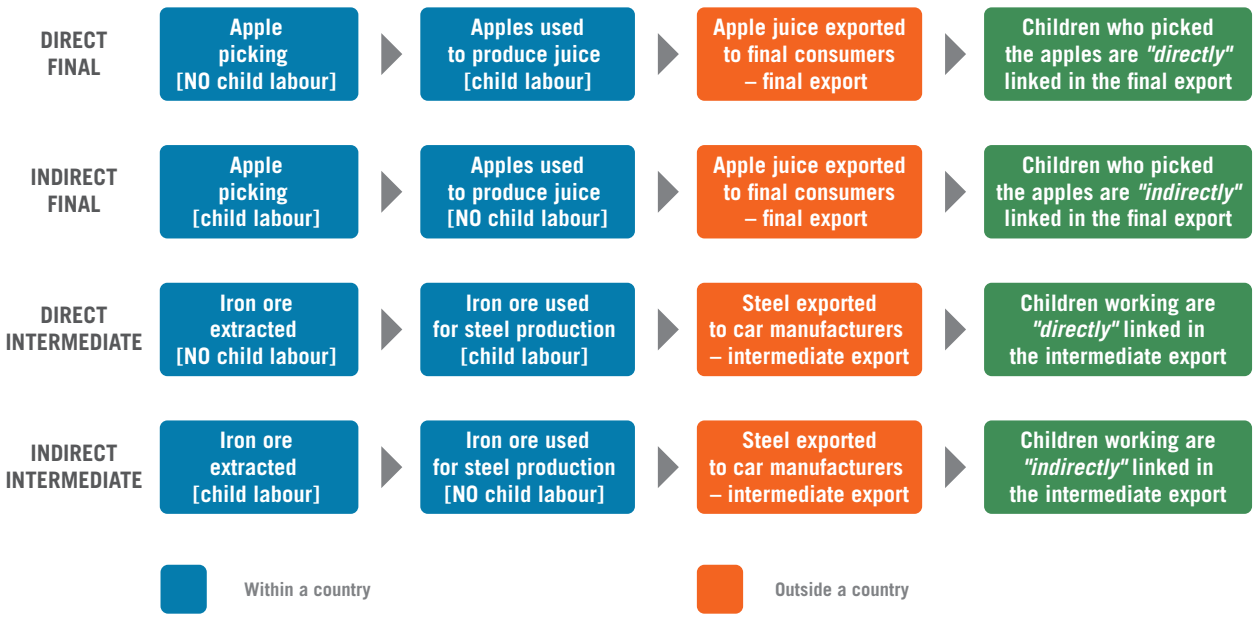


Note: Taxes less subsidies on products are not part of the value added. Value added covers labour compensations, capital and other taxes less subsides on productions. White areas in the direct purchases block refer to zero elements.

In other words, the ICIO tables describe flows of intermediate and final goods and services among countries in monetary terms, hence allowing inter-industry and inter-country transactions to be recorded and analysed. This global interconnectedness captured by the ICIO tables means that the downstream use of an industry's output by other industries, be they domestic or foreign, can be identified. Equally, ICIO tables can identify the inputs required for a particular industry from home or abroad. In other words, the ICIO tables allow for estimating how much input is required by each industry per unit of total output which is consumed either domestically or exported. For example, an increase in food processing supply may lead to an increase in demand for agricultural products, which in turn requires inputs from other upstream industries (e.g. electricity, fuel and chemical products). Through ICIO, all the total requirements needed to produce a product (both direct and indirect) can be determined. A schematic representation of the concepts of direct and indirect impacts is shown in FIGURE 3.

Direct impact captures the contribution of an industry in a specific country related to the production of goods and services for exports whereas *indirect* impact represents the contribution of other upstream industries that are incorporated in the production of goods and services for exports. ICIO also captures *final* and *intermediate* products. *Final* products are exported from country A to B to be finally consumed in country B (without additional transformation), while *intermediate* products are exported from country A to country B, where they are either transformed for final consumption or exported to country C.

FIGURE 3: SCHEMATIC REPRESENTATION OF THE CONCEPTS OF DIRECT AND INDIRECT



Note: Total exports equal intermediate plus final exports.

1.2 CHILD LABOUR

Child labour is any work that deprives children of their childhood, their potential and dignity, and that is harmful to physical and mental development. It is defined by the ILO Minimum Age Convention, 1973 (No. 138), and the Worst Forms of Child Labour Convention, 1999 (No. 182), and by the United Nations Convention on the Rights of the child. This paper uses the statistical definitions for measurement of child labour as defined by the International Conference of Labour Statisticians in 2008 (the standards body in this area).[10] This measurement framework is structured in two main areas focusing on: (i) the age of the child; and (ii) the activities of the child (their nature, conditions and duration). Activities include economic activities (i.e. paid or unpaid work for someone who is not a member of the household, work for a family farm or business) as well as children's engagements in own-use production of services (i.e. household chores). It is worth noting that the child labour definition used in this paper only relates to children in economic productive activities covered by the System of National Accounts (SNA).[11] In particular, the operational definitions used in this paper use the international harmonization of the indicator of the 2017 ILO Global Estimates of Child labour.

The following children are considered to be as in child labour:

- Children aged 5-11 engaged in economic activity for at least 1 hour in the reference week;
- Children aged 12-14 engaged in economic activity for at least 14 hours in the reference week;
- Children aged 15-17 engaged in economic activity for at least 43 hours in the reference week;
- Children aged 5-17 engaged in hazardous occupations and branches of economic activities.

This paper uses datasets on child labour from 65 nationally representative surveys (see ANNEX 2). These include ILO-supported Labour Force Surveys or Child labour Surveys, UNICEF-supported Multiple Indicator Cluster Surveys (MICS)[12] and USAID-supported Demographic and Health Surveys (DHS). The datasets from these surveys contain information on about 50% of children estimated to be in child labour globally.

Within this set, 30 countries released their surveys with sectoral information related to child labour (ω) at ISIC rev 3/3.1/4 standard codes. The child labour figures were then harmonised to match the OECD-ICIO's classifications and rescaled to the year 2015 using the following formula:

$$\omega_{j,c,2015} = \omega_{j,c,(year)}(UN_{pop,c,2015}/UN_{pop,c,(year)})$$

where $\omega_{j,c}$ is the absolute number of children in child labour in industry j, country c, and year of survey $(year)$; $UN_{pop,c}$ is the total population of children aged between 5 and 17 when expanding the survey weights in country c.

10 More information can be found in ILO, 2008. Readers should note that the statistical definition was amended in 2018 to take into account new definitions of work and employment, which, in particular, break down the 2008 definition of children in employment into own-use production work by children and employment work by children (see ILO, 2018b); the 2008 definition is still used in this paper, however, due to data availability.

11 The concept of child labour is broader than the SNA and also can include (depending on the measurement framework adopted by countries) children engaged in own-use production of services (household chores).

12 Data on child labour have been collected in MICS on both economic activities (paid or unpaid work for someone who is not a member of the household, work for a family farm or business) and domestic work (household chores such as cooking, cleaning or caring for children). The MICS child labour module also collects information on hazardous working conditions.

Additional assumptions had to be made for the remaining 35 countries. In this regard, countries where industry information proportions in a region A were available were used to estimate child labour by industry for countries that had released only the total number (normalized to 100%). The rationale for using this approach is that, based on available data with sectoral information, the proportionality of child labour is expected to be similar across countries. Additional information on compensation of employees per industry was incorporated to avoid bias to a specific country. The use of compensation of employees is envisioned to help avoid bias toward large available datasets in a region. Moreover, compensation of employees' dataset can be used as a proxy to provide an approximate figures of total employment per industry. Thus, for countries where only total child labour information was available, ω is as follow:

$$\omega_{j,c} = \left\{ \frac{1}{\sum \left(\frac{\sum_1^c \omega_{j,A}}{\sum_1^c \sum_1^j \omega_A} + \frac{\partial_{j,c}}{\sum_1^j \partial_c} \right)} \int_1^j \left(\frac{\sum_1^c \omega_{j,A}}{\sum_1^c \sum_1^j \omega_A} + \frac{\partial_{j,c}}{\sum_1^j \partial_c} \right) dj \right\} \omega_c$$

It should also be noted that Europe, Northern America and Oceania are not included in the analysis due to lack of available data. child labour in these regions is relatively marginal and therefore the impacts on the overall results can be assumed to be minimal. The results for Eastern and South-Eastern Asia should also be used with caution due to data limitations, notably the absence of child labour data for its most populous country China. The full list of regions, country and population coverage is included in ANNEX 2.

1.3 TRAFFICKING FOR FORCED LABOUR

Human trafficking and forced labour are considered to be rare events, statistically speaking. Methodologies to capture reliable prevalence numbers are recent, and the availability of national datasets is lower than for child labour (see ANNEX 2). In addition, even for countries where there are national forced labour estimates, datasets rarely provide the sectoral distribution. Forced labour is often concentrated in "pocket" areas or sub-sectors (ILO and Walk Free Foundation, 2017), which would require specific statistical (over)sampling methods (ILO, 2018a) to provide reliable figures on sectoral distribution of forced labour that could then be linked with ICIO. Similarly, the measurement of human trafficking for forced labour is an area of ongoing efforts.

In the context of this research, an experimental effort was made to replicate the methodology adopted for the child labour analysis by: (i) modelling industry-level country estimates of victims with existing datasets and the results from the 2016 ILO global estimates on forced labour; and (ii) estimating the contribution of industries with trafficking for forced labour to global supply chains. The results presented should only be interpreted as indicative of the nature of this issue.

Several datasets were used in the context of this research:

- The human trafficking data used in this exercise are 2006 to 2016 country aggregates from the Counter Trafficking Data Collaborative (CTDC) which include victim case data from IOM and partner organizations.[13] Curated by IOM, CTDC is the first global data portal on human trafficking, with data contributed by multiple agencies. The data used in this report combine the three largest case-level "victim of human trafficking" datasets in the world, from IOM, Polaris and Liberty Shared. As for all administrative victim data collected by counter-trafficking organizations, data on identified cases of human trafficking are best understood as a sample of the unidentified population of victims. This sample may be biased if some types of trafficking cases are more likely to be identified than others, but the extent of this bias is unknown. Nevertheless, there are few, if any, alternative sources of data on the distribution of human trafficking by industry across countries (IOM, 2018).
- The regional results on forced labour in the private economy from the 2017 Global Estimates of Modern Slavery;
- ILO harmonized datasets on adult employment by industry.[14]

These three datasets were merged as follows. First, it was assumed that all countries within a region had the same total prevalence of human trafficking for forced labour, using the results from the Global Estimate. The regional prevalence figures were distributed proportionally according to total employment figures to obtain an estimate of the total number of victims per country. Second, the country-level numbers were distributed by broad industry using human trafficking data from CTDC. Here, broad industry sectors refer to the 1-digit ISIC industry from Revision 4. Third, the 1-digit sectoral aggregates were distributed to the ISIC 2-digit level, using the distribution of within-industry adult employment. In total, 30 countries were used in the estimation. Note that Oceania, Central and Southern Asia, and Latin America and the Caribbean are not included because of low data availability. As for child labour, country coverage is indicated in ANNEX 2.

13 Accessed on 01/09/2019 and available at https://www.ctdatacollaborative.org/.

14 See the ILO Harmonized Microdata webpage: www.ilo.org/ilostat.

While there are some national level estimates of prevalence, there are currently no global or regional prevalence estimates. Moreover, for the existing forced labour prevalence estimate, the sectoral data are not stable, particularly at lower levels of geographic disaggregation (i.e. country level) - hence the need to combine these datasets and provide estimates of trafficking for forced labour. In addition, because the forced labour estimate isn't available at the country level, employment data had to be used to distribute the forced labour estimate.

It should be noted also that for both forced labour and human trafficking, there is not much sectoral data available at the ISIC 2-digit level, compared to child labour. This study exemplifies the need to bring the forced labour and human trafficking data up to the 2-digit level, in order to obtain the same level of quality detail as the child labour results over the coming years.

PART 2: COMBINING THE DATASETS

2.1 FROM DATA SOURCES TO ESTIMATES

The ICIO combined with a social indicator (in this case child labour and trafficking for forced labour) allows to estimate how the indicator is linked with the production of goods and services for the domestic and foreign markets. In the example of child labour, to capture all direct and indirect impacts that ripple throughout the complex supply chains of the entire economy, a global Leontief inverse $\mathbf{B}$ needs to be computed, with

$$\mathbf{B} = (\mathbf{I} - \mathbf{A})^{-1}$$

where I is an identity matrix (NxN) and $\mathbf{A}$ is a matrix of technical coefficients with elements $a_{i,j,c} = {Z_{i,j,c}}/{X_{j,c}}$, where $Z_{i,j,c}$ represent the amount in the intermediate matrix $\mathbf{Z}$ of supplying industry i, $i = 1 \ldots N$, into a using industry j, $j = 1 \ldots N$, and for country c (see Millar and Blair, 2010 for more information). The matrix $\mathbf{A}$ holds the direct links between industries whilst the matrix $\mathbf{B}$ contains all direct and indirect links. In this regard, the *multiplier* matrix can be written as $\hat{\boldsymbol{\rho}}\mathbf{B} = diag\left(\boldsymbol{VX^{-1}}\right)\mathbf{B}$ where $\hat{\boldsymbol{\rho}}$ is a vector (diagonalized) with an element $\rho_{j,c} = {V_{j,c}}/{X_{j,c}}$.

Similarly, to estimate the amount of child labour linked with exported goods and services $\mathbf{(S)}$, the following equation was used:

$$\mathbf{S} = \hat{\boldsymbol{\rho}}\mathbf{B}\,\mathbf{F} \quad \ldots\ldots\ldots(1)$$

where $\hat{\boldsymbol{\rho}}$ is a diagonalized indicator of vector $\boldsymbol{\rho}$, with an element $\rho_{j,c} = {\omega_{j,c}}/{X_{j,c}}$, where child labour account ω is a vector that holds the amount of child labour per industry and country $(1 \times N)$, and $\rho_{j,c}$ describes the amount of child labour intensities that hold the amount of child labour recruited per one unit of total output in a given supplying industry and country. $\mathbf{F}$ here is only represented by export category of final demand. While the vector $\boldsymbol{\rho}$ captures the direct impacts, the multiplier $\hat{\boldsymbol{\rho}}\mathbf{B}$ describes the amount of child labour that are directly and indirectly required to satisfy one unit of final demand. Hence, the outcome of this calculation $\mathbf{S}$ is a matrix (Nxl) that presents the domestic child labour in sourcing industry i (*directly* from industry i and *indirectly* from other upstream industries) in country c into final destination country l.

FIGURE 4: FROM DATA SOURCES TO MODEL ESTIMATES

In order to estimate the direct and indirect cases of child labour that are linked with gross exports, equation (1) can be rewritten as follows:

$$\hat{\mathbf{S}}_{direct} = \hat{\boldsymbol{\rho}}\,\tilde{\mathbf{B}}\,\mathbf{F} \quad \text{.....(2)}$$

where $\tilde{\mathbf{B}}$ is a diagonalized matrix of $\mathbf{B}$, with zero elements in the off diagonal. $\tilde{\mathbf{B}}$ captures all the direct impacts. $\hat{\mathbf{S}}_{\text{direct}}$ has the same dimensions as in equation (1), but only includes the direct impact (i.e. children from industry i working in the production of products exported by industry i). Therefore, indirect impact can be calculated as follows:

$$\hat{\mathbf{S}}_{indirect} = \hat{\boldsymbol{\rho}}\,\ddot{\mathbf{B}}\,\mathbf{F} \quad \text{.....(3)}$$

Where $\ddot{\mathbf{B}}$ is the off diagonal matrix of $\mathbf{B}$, with zero elements in the main diagonal. $\ddot{\mathbf{B}}$ captures all the indirect impacts.

Additional analysis was carried out on the structural layer decomposition (i.e. tiers). Estimating the contributions of other upstream industries j into exporting industry i is very valuable to give more insight into the total impact. However, the impact in each layer of production is vague. Using structural layer decomposition technique, we are able to estimate the amount, for instance, of child labour in each layer of the production, and with direct and indirect information. The Leontief inverse matrix $\mathbf{B}$ can be decomposed into an infinite number of layers where

$$\mathbf{B} = \mathbf{I} + \mathbf{A} + \mathbf{A^2} + \mathbf{A^3} + \mathbf{A^4} + \cdots$$

In this paper, four layers have been estimated, and for completeness, the rest of layers can be estimated as

$$\mathbf{B}_{rest} = \mathbf{B} - (\mathbf{I} + \mathbf{A} + \mathbf{A^2} + \mathbf{A^3} + \mathbf{A^4})$$

Thus, the direct and indirect impact by each tier of the production can be estimated as follows:

$$\mathbf{Q} = \widehat{\boldsymbol{\rho}}(\mathbf{I} + \mathbf{A} + \mathbf{A^2} + \mathbf{A^3} + \mathbf{A^4} + \mathbf{B}_{rest})\mathbf{F}$$

where $\mathbf{Q}$ represents a set of matrices that hold the amount of child labour associated in each stage of the production process. While in some cases the first two-three tiers of production occupy almost the whole impact, this may not necessarily be the case.

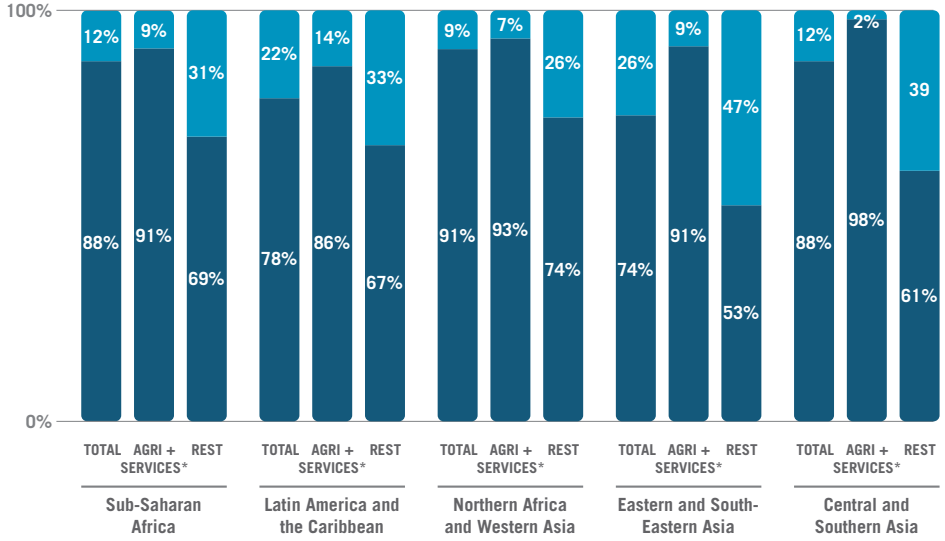
2.2 ASSUMPTIONS AND LIMITATIONS

It is important to recognise that the data and methodology both present limitations and that assumptions had to be made, and do impact the results. Data limitations for child labour include lack of data coverage for certain regions; lack of specific sectoral information in child labour surveys; limited coverage of children for some regions. Data limitations for trafficking for forced labour include the facts that forced labour is considered to be a rare event, statistically speaking and that methodologies to capture reliable prevalence numbers are recent. The availability of national datasets is lower than for child labour, and therefore less statistical confidence can be granted to the results in this technical paper for trafficking for forced labour. The main limitation for the human trafficking data was outlined earlier: data on identified cases of human trafficking are best understood as a sample of the unidentified population of victims (as for all administrative victim data collected by counter-trafficking organizations). This sample may be biased if some types of trafficking cases are more likely to be identified than others, but the extent of this bias is unknown. Nevertheless, there are few, if any, alternative sources of data on the distribution of human trafficking by industry across countries (IOM, 2018). It is also necessary to reiterate that the trafficking for forced labour data that are "plugged" into the ICIO model are experimental estimates, based on the procedure described above.

There are also limitations related to the methodology. A number of assumptions had to be made due to data limitations. Notably, data were not available on the share of child labour between domestic and export markets by industry. Therefore, each unit of production in a given industry (whether it is part of global supply chains or not) is assumed to use the same amount of child labour. The implication of this assumption results in an underestimation of child labour in global supply chains in industries and countries where child labour is disproportionately concentrated in export production, and an overestimation in industries and countries where child labour is disproportionately concentrated in domestic production.

In the absence of detailed information, it is not possible to understand which countries and industries might suffer from underestimation or overestimation out of the whole sample. However, because it is well-known that agriculture has the most own-use production of goods (which by definition are not exported), we would expect this effect to be most pronounced in agriculture. FIGURE 5 looks at the difference between export and domestic markets through the lens of different industry aggregates. Agriculture and other services which are domestic- oriented (e.g. financial services) are presented next to total numbers as well as other industries like manufacturing which are more broadly linked with exports. There is variation between regions as to the impact this assumption may have on the broader analysis. In order to be more precise, separate data would be needed that differentiates firms into exporters and non-exporters, which is currently not available. Therefore, in the absence of detailed information, it is not possible to be precise on the effect of this assumption on the results either in terms of overestimation or underestimation. Future datasets in this regard could make the data more precise.

FIGURE 5: ESTIMATES OF CHILD LABOUR FOR EXPORTED GOODS AND SERVICES AND DOMESTIC DEMAND, BY REGION, BY DIFFERENT INDUSTRY AGGREGATES (2015)



Note: "Total" refers to total industries; "Agri + services" refers agriculture and some domestic services (utilities, construction, telecoms, IT services, finance & insurance, real estate, other business services, public administration, education, health, private households); "Rest" refers to mining, manufacturing and the main and remaining services which have tourism-like characteristics. For more information, see Annex 1.
Source: Authors' calculation based on (a) child labour data from the 65 country datasets used in the 2016 ILO Global Estimates of child Labour (including ILO-supported national surveys on child labour or child labour modules in national Labour Force Surveys; UNICEF-supported Multiple Indicator Cluster Surveys (MICS); and USAID-supported Demographic and Health Surveys); and (b) OECD Inter-Country Input-Output (OECD-ICIO) tables (2018 edition).

Another inherent assumption made is that outputs across the whole industry are produced in the same way with the same inputs. Difference in capital and labour intensity of production and the size of the firms involved across the industry are not fully accounted for, with the exemption of the fact that additional information on compensation of employees per industry was incorporated to avoid bias to a specific country (see section 1.2). Compensation of employees was envisioned as a proxy to provide an approximate figures of total employment per industry.

These are the reasons why the results in Chapter 1 of the Alliance 8.7 were not presented in absolute values. They should rather be considered as snapshots that allow more insight into the main characteristics of the phenomena linked to global supply chains in each region. They represent a starting point for further investigation and a foundation for cooperation and concerted action on the part of stakeholders of global supply chains. The reader should take into account the fact that the prevalence and extent of child labour (and forced labour and human trafficking) vary greatly across regions. Once more data are available by country and by industry, it will be possible to refine and update the results.

2.3 ADDITIONAL ROBUSTNESS TESTS

Additional exercises were completed to analyse and probe the assumptions and limitations of the data and the methodology. Their purpose was to examine the extent to which detailed datasets may lead to a better estimates and results.

Aggregation vs Disaggregation – A perspective from a detailed national IO table

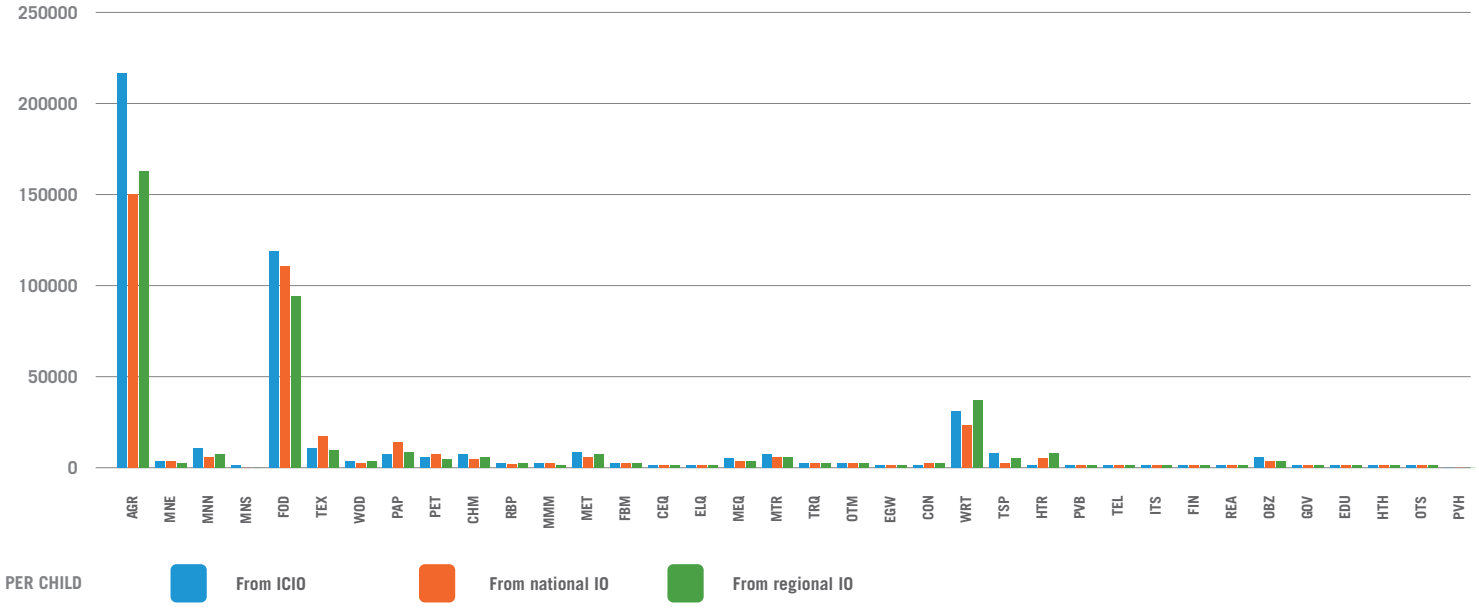
The extent to which detailed IO datasets lead to a better estimate of demand-based analyses has been investigated in literature (see Lenzen, 2011, for an example related to environmental indicators). Using a dataset available for Brazil in 2011, an additional test was conducted to look at how child labour was linked with domestic and foreign final demand using 149 industries. The difference between using this detailed set versus the 36 industries in the ICIO database was about 3%, with respective results for child labour linked with exports standing at 17.3% for the ICIO data (see PART 3) and 14.1% for the detailed national data. This difference is because of how domestic and foreign demand are considered and may be due to a misallocation of international trade (traded vs non-traded industries) in the 36 industry analyses. For instance, hotel and restaurant industries have the highest difference compared with other industries due to mostly serving domestic demands.

Regional national IO

Another perspective can be gained by using regional national IO tables. These tables give additional information on exports by each region within a country. Consider two regions (e.g. north and south) and consider that both produce the same products. However, production in the north involves children, while in the south it does not. In that case, if the production in the north purely serves the domestic market and if all the exports come from south, then there will be no prevalence of child labour linked in global supply chains. The opposite pattern holds for the south.

The regional national IO table for Brazil includes 27 regions and 149 industries for the year 2011 in purchasing prices. The ICIO and the detailed national IO is in basic prices. FIGURE 6 shows the differences between ICIO, detailed national IO, and the regional IO in Brazil. The differences stand at 17.3% for the ICIO data, 14.1% for the detailed national data, and 14.2% for the regional national IO. The impact of the fact that regional national IO is in purchasing prices is only expected to be felt in margin-based industries like wholesale and retail.

FIGURE 6: COMPARISON OF CL LINKED FOR EXPORTS BETWEEN ICIO, MORE DETAILED NATIONAL IO, AND REGIONAL NATIONAL IO DATASETS – BRAZIL (2011)



Note: Results driven from the detailed and regional tables were aggregated into 36 ICIO industries for comparison. More information about industry names is available in Annex 1.
Source: a) OECD-ICIO model, b) The Brazilian Institute of Geography and Statistics (IBGE) c) Guilhoto *et. al.*, (2019).

PART 3: RESULTS

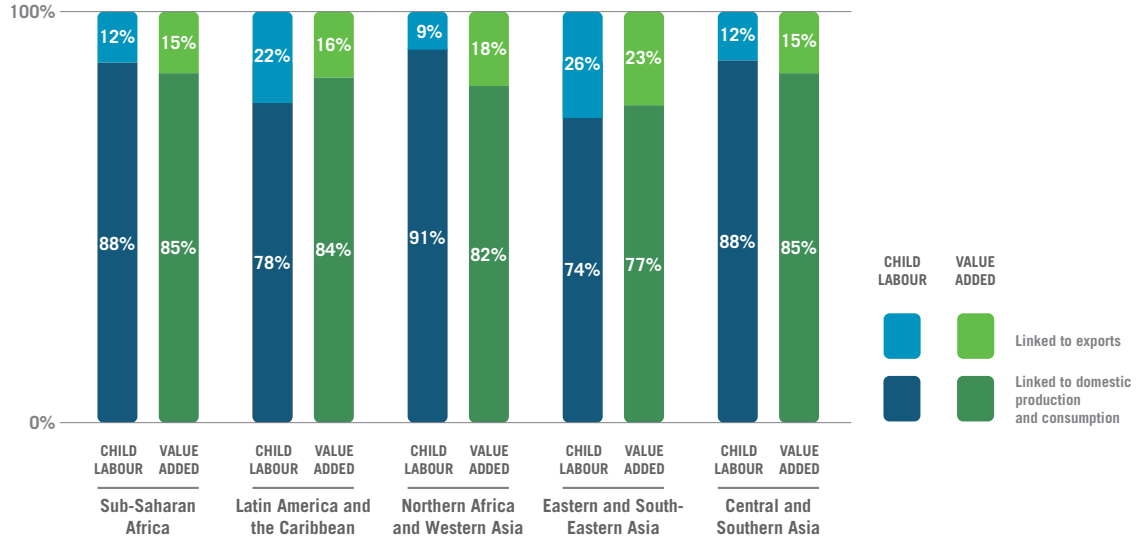
Chapter 1 of the Alliance 8.7 report presents the results of the analysis for both child labour and trafficking for forced labour.

3.1 CHILD LABOUR

The extent to which child labour within a region is estimated to contribute to exports to other regions varies across regions (see FIGURE 7). While the results demonstrate that a child in child labour is far more likely to be involved in production for the domestic economy, there is a non-negligible risk that this child will be contributing to global supply chains, with 9 to 26 per cent of child labour estimated to be linked to exports across regions. Furthermore, a narrow focus on eliminating child labour, forced labour and human trafficking within the production settings that form part of global supply chains – without addressing the common set of legal gaps and socio-economic pressures at their root – risks simply displacing the abuses into sectors of the local economy that are not linked to global supply chains, meaning in turn that our ultimate goal, ending *all forms* of child labour, forced labour and human trafficking, regardless of where they occur, would be no closer. While the unique complexities of global supply chains present special challenges, efforts to end child labour, forced labour and human trafficking in global supply chains cannot be divorced from broader efforts towards ending these abuses generally.

Regional variation also exists in terms of whether child labour is disproportionately concentrated in industries that contribute to global supply chains. As shown below, part of the child labour estimated to contribute to exports is contributed indirectly through upstream industries, making due diligence efforts and visibility/traceability challenging. While in most regions, the proportion of children estimated to be linked to exports is close to the proportion of value added that is exported, this is not always the case. For instance, in Latin America and the Caribbean, 16% of value added goes to the export sector, against 22% of child labour. This could suggest that the sectors in which children work tend to be export sectors more often than in other regions, or that the value added in the export sector is relatively low compared to the domestic sector. These results should be considered with the caveats mentioned above regarding the distribution of child labour between domestic and export markets.

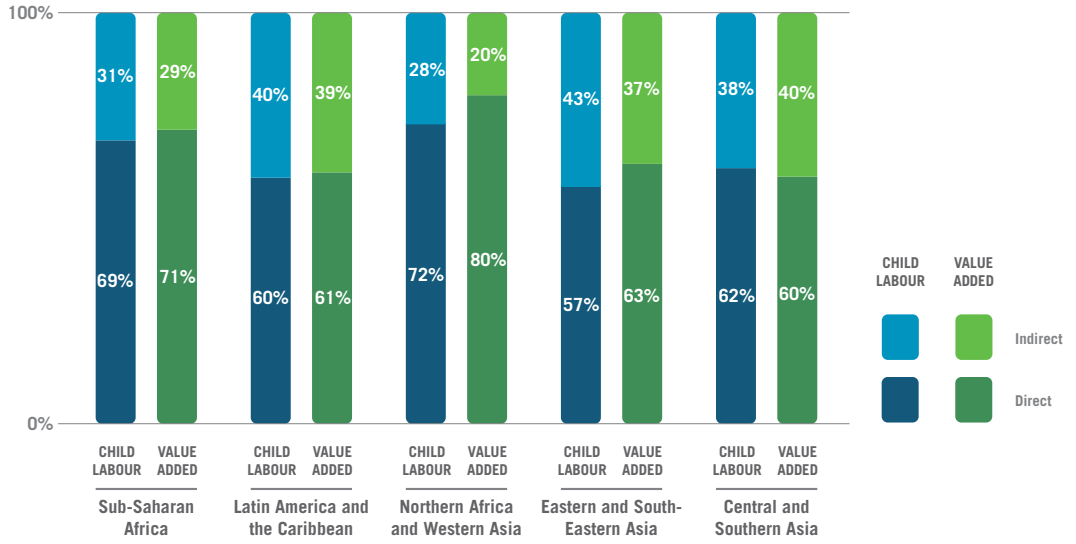
FIGURE 7: ESTIMATES OF CHILD LABOUR AND VALUE ADDED FOR EXPORTED GOODS AND SERVICES, AND DOMESTIC DEMAND, BY REGION (2015)



Source: Authors' calculation based on (a) Child labour data from the 65 country datasets used in the 2016 ILO Global Estimates of Child Labour (including ILO-supported national surveys on Child labour or Child labour modules in national Labour Force Surveys; UNICEF-supported Multiple Indicator Cluster Surveys (MICS); and USAID-supported Demographic and Health Surveys); and
(b) OECD Inter-Country Input-Output (OECD-ICIO) tables (2018 edition);
(c) Value Added data from OECD (Annual National Accounts & Structural Analysis Databases), UN main aggregates and UN National Accounts Official Country Data.

The empirical analysis also provides insights into where child labour is concentrated along supply chains. The results in FIGURE 8 indicate that, across regions, between 28 and 43 per cent of the child labour estimated to contribute to exports does so indirectly, through preceding tiers of the supply chain (e.g. extraction of raw materials or agriculture). The values for each region represent the aggregation of countries with available trafficking for forced labour data. In other words, a child in child labour who is contributing to exports in Eastern and South-Eastern Asia is more likely to be contributing to exports indirectly, in preceding tiers of the supply chain, than a child in child labour in other regions. Nevertheless, across all regions, there is a significant risk that a child in child labour who is contributing to exports will be contributing indirectly, in upstream industries of the supply chain where risk may be more difficult to identify and mitigate. These results make clear that efforts against child labour in global supply chains will be inadequate if they do not extend beyond immediate suppliers, i.e. downstream suppliers closer to final production and also cover actors in preceding tiers of supply chains, including those involved in upstream production activities such as raw material extraction and agriculture serving as inputs to other industries.

FIGURE 8: ESTIMATES OF CHILD LABOUR FOR EXPORTED GOODS AND SERVICES, DIRECT AND INDIRECT, BY REGION (2015)



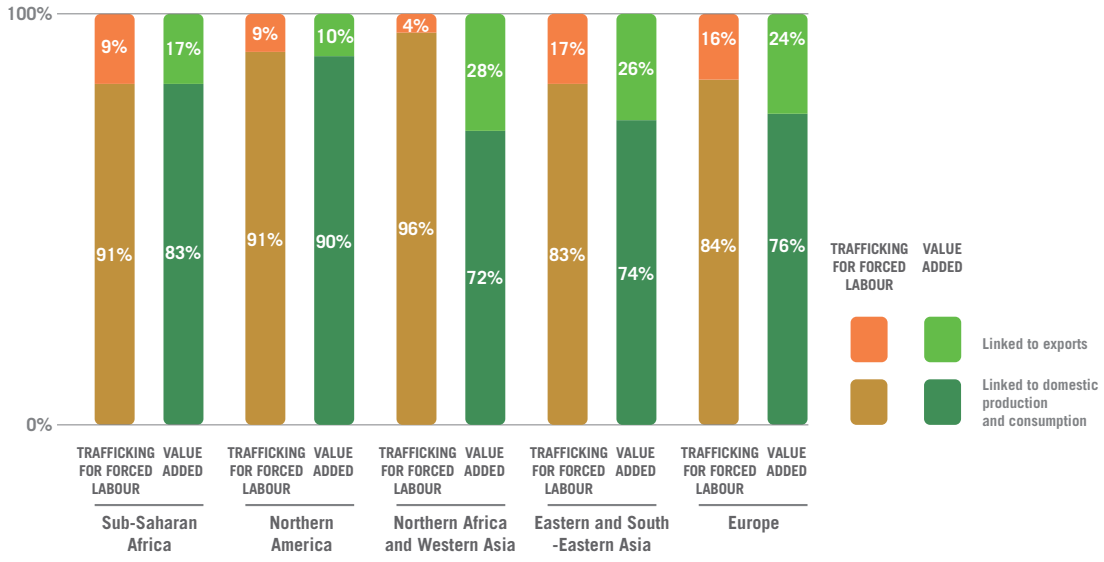
Source: Authors' calculation based on (a) Child labour data from the 65 country data sets used in the 2017 ILO Global Estimates of Child Labour (including ILO-supported national surveys on Child labour or Child labour modules in national Labour Force Surveys, UNICEF-supported Multiple Indicator Cluster Surveys (MICS), and USAID-supported Demographic and Health Surveys);
(b) OECD ICIO tables (2018 edition); and
(c) value added data from the OECD (Annual National Accounts and Structural Analysis Databases), United Nations main aggregates and United Nations national accounts official country data.

3.2 TRAFFICKING FOR FORCED LABOUR

FIGURE 9 indicates that the share of trafficking for forced labour contributing to exports varies across regions. Across all regions, the estimated share of trafficking for forced labour present in exports is lower than the share of value added these industries contributed to exports. This means that industries with higher trafficking for forced labour prevalence are less likely to contribute to global supply chains. Nevertheless, a non-negligible part of trafficking for forced labour does contribute to global supply chains and further industry-level analysis and comparison is needed to better understand and address the risks.

Pending further industry-level analysis, these results are partly driven by the role played specifically by trafficking into construction and support services such as domestic work and cleaning. Domestic work is often not well captured by ICIO tables and does not contribute to value added production processes but rather supports the activities of private households. While construction clearly plays a role in value added production processes, it is a structural zero in terms of its direct contribution of exports due to the way it is defined and recorded by national accounts for national IO tables.

FIGURE 9: ESTIMATES OF TRAFFICKING FOR FORCED LABOUR AND VALUE ADDED FOR EXPORTED GOODS AND SERVICES, BY REGION (2015)

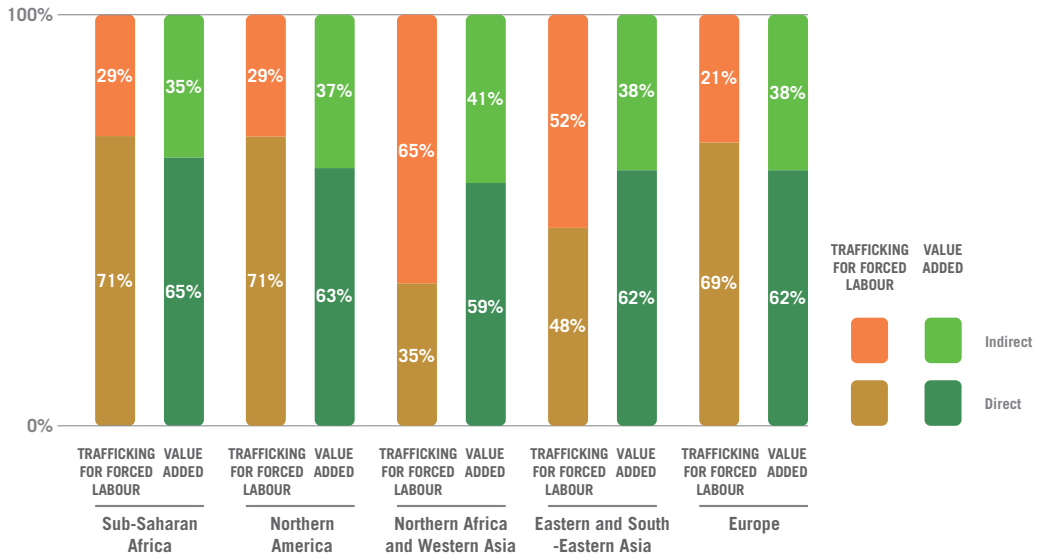


Sources: Author's calculation using (a) CTDC non-k-anonymized data between 2006 and 2016;
(b) results of the Alliance 8.7 Global Estimates of Modern Slavery;
(c) ILO Harmonized Microdata (by Industry);
(d) OECD Inter-Country Input-Output (OECD-ICIO) tables (2018 edition); and
(e) Value Added data from OECD (Annual National Accounts & Structural Analysis Databases), UN main aggregates and UN National Accounts Official Country Data.

Preliminary results from FIGURE 10 show that, across all regions, there is significant risk that a person trafficked for forced labour who is contributing to exports will be contributing indirectly, in upstream industries, where risk may be more difficult to identify and mitigate.

Assessing trafficking for forced labour contextualised with the value added contributing indirectly to exports indicate different regional patterns. Across all regions, while the levels of indirect value added in exports are similar, there is great variation in the estimate of trafficking for forced labour indirectly exported. These differences could be explained by the fact that trafficking for forced labour is concentrated in specific industries and regions.

FIGURE 10: ESTIMATED TRAFFICKING FOR FORCED LABOUR AND VALUE ADDED FOR EXPORTED GOODS AND SERVICES, DIRECT AND INDIRECT, BY REGION (2015)



Based on (a) Counter-Trafficking Data Collaborative non-k-anonymized data between 2006 and 2016;
(b) the 2017 ILO-Walk Free Foundation Global Estimates of Modern Slavery;
(c) ILO harmonized microdata (by industry);
(d) OECD ICIO tables (2018 edition); and
(e) value added data from OECD (Annual National Accounts and Structural Analysis databases), United Nations main aggregates and United Nations national accounts official country data.

CONCLUSIONS

The results show that child labour and trafficking for forced labour is a problem affecting the whole of the global supply chain, and that a significant share of child labour and trafficking for forced labour occurs upstream, in the production of raw materials and other inputs to final exports products, making due diligence efforts, including visibility and traceability, challenging. Across regions, between 28 and 43 per cent of the child labour estimated to contribute to exports does so indirectly, through preceding tiers of the supply chain (such as extraction of raw materials or agriculture). Company due diligence beyond immediate suppliers could thus present one of the most significant opportunities to eradicate these abuses.

The results presented in the report break new ground by offering an initial quantitative picture of the presence of child labour and trafficking for forced labour in global supply chains. They also provide a critical foundation for further data collection efforts aimed at generating a more granular picture of the extent, nature and location of these violations in global supply chains. Collaboration with the private industry, and among governments, social partners and other stakeholders, can further enhance data availability and transparency as well as promote the harmonization of statistical standards and tools, and thereby also contribute to devising better-targeted approaches.

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ANNEXES

ANNEX 1. OECD – ICIO 2018 GEOGRAPHICAL COVERAGE AND INDUSTRY LIST

1	AUS	Australia	23	NLD	Netherlands	45	COL	Colombia
2	AUT	Austria	24	NZL	New Zealand	46	CRI	Costa Rica
3	BEL	Belgium	25	NOR	Norway	47	HRV	Croatia
4	CAN	Canada	26	POL	Poland	48	CYP	Cyprus
5	CHL	Chile	27	PRT	Portugal	49	IND	India
6	CZE	Czechia	28	KOR	Republic of Korea	50	IDN	Indonesia
7	DNK	Denmark	29	SVK	Slovakia	51	KAZ	Kazakhstan
8	EST	Estonia	30	SVN	Slovenia	52	MYS	Malaysia
9	FIN	Finland	31	ESP	Spain	53	MLT	Malta
10	FRA	France	32	SWE	Sweden	54	MAR	Morocco
11	DEU	Germany	33	CHE	Switzerland	55	PER	Peru
12	GRC	Greece	34	TUR	Turkey	56	PHL	Philippines
13	HUN	Hungary	35	GBR	United Kingdom	57	ROU	Romania
14	ISL	Iceland	36	USA	United States of America	58	RUS	Russian Federation
15	IRL	Ireland	37	ARG	Argentina	59	SAU	Saudi Arabia
16	ISR	Israel	38	BRA	Brazil	60	SGP	Singapore
17	ITA	Italy	39	BRN	Brunei Darussalam	61	ZAF	South Africa
18	JPN	Japan	40	BGR	Bulgaria	62	THA	Thailand
19	LVA	Latvia	41	KHM	Cambodia	63	TUN	Tunisia
20	LTU	Lithuania	42	CHN	China	64	VNM	Viet Nam
21	LUX	Luxembourg	43	HKG	China, Hong Kong SAR	65	ROW	Rest of the World
22	MEX	Mexico	44	TWN	Taiwan Province of the People's Republic of China			

	Code	ISICA	Labels	Short labels	3-char code
0	DTOTAL		TOTAL	Total	TOT
1	D01T03	01,02,03	Agriculture, hunting, forestry and fishing	Agriculture	AGR
2	D05T06	05,06	Mining and extraction of energy producing products	Mining, energy	MNE
3	D07T08	07,08	Mining and quarrying of non-energy producing products	Mining, non-energy	MNN
4	D09	09	Services to mining and quarrying	Mining, services	MNS
5	D10T12	10,11,12	Food products, beverages and tobacco	Food products	FOD
6	D13T15	13,14,15	Textiles, textile products, leather and footwear	Textiles & apparel	TEX
7	D16	16	Wood and products of wood and cork	Wood	WOD
8	D17T18	17,18	Paper products and printing	Paper & printing	PAP
9	D19	19	Coke and refined petroleum products	Coke & petroleum	PET
10	D20T21	20,21	Chemicals and pharmaceutical products	Chemicals	CHM
11	D22	22	Rubber and plastics products	Rubber & plastics	RBP
12	D23	23	Other non-metallic mineral products	Non-metal minerals	NMM
13	D24	24	Basic metals	Basic metals	MET
14	D25	25	Fabricated metal products	Fabricated metals	FBM
15	D26	26	Computers, electronic and optical products	ICT & electronics	CEQ
16	D27	27	Electrical equipment	Electrical equipment	ELQ
17	D28	28	Machinery and equipment, nec	Machinery	MEQ
18	D29	29	Motor vehicles, trailers and semi-trailers	Motor vehicles	MTR
19	D30	30	Other transport equipment	Other transport	TRQ
20	D31T33	31,32,33	Manufacturing nec; repair of machinery and equipment	Other manufacturing	OTM
21	D35T39	35to39	Electricity, gas, water supply, sewerage, waste and remediation services	Utilities	EGW
22	D41T43	41,42,43	Construction	Construction	CON
23	D45T47	45,46,47	Wholesale and retail trade; repair of motor vehicles	Wholesale & retail	WRT
24	D49T53	49to53	Transport, storage and postal services	Transport & storage	TSP
25	D55T56	55,56	Accommodation and food services	Accommodation & food	HTR
26	D58T60	58,59,60	Publishing, audiovisual and broadcasting activities	Publishing & broad-casting	PVB
27	D61	61	Telecommunications	Telecoms	TEL
28	D62T63	62,63	IT and other information services	IT services	ITS
29	D64T66	64,65,66	Financial and insurance activities	Finance & insurance	FIN
30	D68	68	Real estate activities	Real estate	REA
31	D69T82	69to82	Other business sector services	Other business services	OBZ
32	D84	84	Public admin. and defence; compulsory social security	Public admin	GOV
33	D85	85	Education	Education	EDU
34	D86T88	86,87,88	Health and social work	Health	HTH
35	D90T96	90to96	Arts, entertainment, recreation and other personal service activities	Other services	OTS
36	D97T98	97,98	Private households with employed persons	Private households	PVH

ANNEX 2. LIST OF REGIONS, COUNTRY COVERAGE, AND TARGET POPULATION COVERAGE

A. REGIONAL GROUPINGS, FOLLOWING THE UNITED NATIONS STATISTICAL DIVISION'S STANDARD COUNTRY OR AREA CODES FOR STATISTICAL USE (M49)*

Sub-Saharan Africa

Angola
Benin
Botswana
Burkina Faso
Burundi
Cabo Verde
Cameroon
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Djibouti
Equatorial Guinea
Eritrea
Ethiopia
Eswatini
Gabon
Gambia, the
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mayotte
Mozambique
Namibia
Niger
Nigeria
Réunion
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
South Sudan
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Northern Africa and Western Asia

Algeria
Armenia
Azerbaijan
Bahrain
Cyprus
Egypt
Georgia
Iraq
Israel
Jordan
Libya
Morocco
Oman
Qatar
Saudi Arabia
State of Palestine
Sudan
Syrian Arab Republic
Tunisia
Turkey

* Taken from https://unstats.un.org/sdgs/indicators/regional-groups/, last accessed on August 8, 2019.

Kuwait
Lebanon
United Arab Emirates
Yemen

Central and Southern Asia

Afghanistan
Bangladesh
Bhutan
India
Iran (Islamic Republic of)
Kazakhstan
Kyrgyzstan
Maldives
Nepal
Pakistan
Sri Lanka
Tajikistan
Turkmenistan
Uzbekistan

Eastern and South-Eastern Asia

Brunei Darussalam
Cambodia
China
China, Hong Kong SAR
China, Macao SAR
Democratic People's Republic of Korea
Indonesia
Japan
Lao People's Democratic Republic
Malaysia
Mongolia
Myanmar
Philippines
Republic of Korea
Singapore
Thailand
Timor-Leste
Viet Nam

Latin America and the Caribbean

Anguilla
Antigua and Barbuda
Argentina
Aruba
Bahamas
Barbados
Belize
Bolivia (Plurinational State of)
Bonaire, Sint Eustatius and Saba
Brazil
British Virgin Islands
Cayman Islands
Chile
Colombia
Costa Rica
Cuba
Curaçao
Dominica
Dominican Republic
Ecuador
El Salvador
Falkland Islands (Malvinas)
French Guiana
Grenada
Guadeloupe
Guatemala
Guyana
Haiti
Honduras
Jamaica
Martinique
Mexico
Montserrat
Nicaragua
Panama
Paraguay
Peru
Puerto Rico
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Sint Maarten (Dutch part)
South Georgia & the South Sandwich Islands
Suriname
Trinidad and Tobago
Turks and Caicos Islands
United States Virgin Islands
Uruguay
Venezuela (Bolivarian Republic of)

Northern America

Bermuda
Canada
Greenland
United States of America

Europe

Åland Islands
Albania
Andorra
Austria
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Channel Islands
Croatia
Czechia
Denmark
Estonia
Faroe Islands
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Isle of Man
Italy
Latvia
Liechtenstein
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Netherlands, the
Norway
North Macedonia
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Ukraine
United Kingdom of Great Britain and Northern Ireland

Oceania

Australia
Fiji
New Caledonia
New Zealand
Papua New Guinea
Solomon Islands
Micronesia
Polynesia

B. LIST OF COUNTRIES USED AS UNDERLYING DATA FOR REGIONAL ESTIMATES

Child labour in global supply chains

- Central and Southern Asia:
  Afghanistan*, Bangladesh, Bhutan*, India, Kyrgyzstan, Nepal*, and Pakistan
- Eastern and South-Eastern Asia:
  Cambodia, Indonesia, Lao People's Democratic Republic, Mongolia, Philippines, Timor-Leste, and Viet Nam
- Latin America and the Caribbean:
  Argentina*, Barbados*, Brazil, Chile, Colombia, Dominican Republic*, Ecuador, El Salvador, Haiti*, Jamaica*, Mexico, Nicaragua, Panama, Peru, Saint Lucia*, Suriname*, and Venezuela (Bolivarian Republic of)
- Sub-Saharan Africa:
  Benin*, Burkina Faso*, Burundi*, Cabo Verde, Cameroon*, Central Africa Republic*, Chad*, Comoros*, Congo*, Côte d'Ivoire*, Democratic Republic of Congo*, Eswatini*, Ethiopia, Gabon*, the Gambia, Ghana, Liberia, Malawi, Mali*, Mauritania*, the Niger*, Nigeria*, Senegal*, Sierra Leone*, South Sudan, Togo*, Uganda, United Republic of Tanzania
- Northern Africa and Western Asia:
  Armenia, Egypt*, Georgia, Iraq*, Tunisia*, and Yemen*

*Additional assumptions regarding sectoral distribution had to be made for the countries marked with * due to the lack of this information in the original micro datasets. Usually those are the cases in which MICS or DHS datasets were used.*

Trafficking for forced labour in global supply chains

- Sub-Saharan Africa:
  Ethiopia, Ghana, Mali, Mozambique, Rwanda, Sierra Leone, and Uganda
- Northern Africa and Western Asia:
  Armenia, Egypt, Georgia, Sudan, Turkey, United Arab Emirates, and Yemen
- Eastern and South-Eastern Asia:
  Indonesia, Lao People's Democratic Republic, Philippines, Thailand, and Timor-Leste
- Northern America:
  United States of America
- Europe:
  Austria, Bosnia and Herzegovina, Czechia, France, Greece, Italy, Portugal, Serbia, Switzerland, and United Kingdom of Great Britain and Northern Ireland

C. SOURCES OF SURVEY DATA FOR CHILD LABOUR

Country	Year	Survey
Afghanistan	2011	Multiple indicator cluster survey
Argentina	2012	Multiple indicator cluster survey
Armenia	2015	National child labour survey
Bangladesh	2013	Labour force and child labour survey
Barbados	2012	Multiple indicator cluster survey
Benin	2011	Enquête modulaire intégrée sur les conditions de vie des ménages
Bhutan	2010	Multiple indicator cluster survey
Brazil	2015	Pesquisa nacional por amostra de domicilios
Burkina Faso	2010	Enquête démographique et de santé et à indicateurs multiples
Burundi	2010	Enquête démographique et de santé
Cabo Verde	2012	Inquérito nacional sobre as actividades das criancas
Cambodia	2012	Labour force and child labour survey
Cameroon	2011	Enquête démographique et de santé et à indicateurs multiples
Central African Republic	2010	Multiple indicator cluster survey
Chad	2010	Multiple indicator cluster survey
Chile	2012	Encuesta nacional de actividades de niños, niñas y adolescentes
Colombia	2014	Gran encuesta integrada de hogares
Comoros	2012	Enquête démographique et de santé et à indicateurs multiples
Congo	2012	Enquête démographique et de santé
Côte d'Ivoire	2012	Demographic and health survey
Democratic Republic of the Congo	2014	Enquête démographique et de santé
Dominican Republic	2011	Encuesta nacional de hogares de propósitos múltiples
Ecuador	2012	Encuesta nacional de trabajo infantil
Egypt	2014	Enquête démographique et de santé
El Salvador	2015	Encuesta de hogares de propósitos múltiples
Eswatini	2010	Multiple indicator cluster survey
Ethiopia	2015	National child labour survey
Gabon	2012	Enquête démographique et de santé
Gambia, the	2012	Labour force survey
Georgia	2015	Labour force survey
Ghana	2013	Ghana living standards survey round 6
Haiti	2012	Enquête mortalité, morbidité et utilisation des services
India	2012	National sample survey round 68
Indonesia	2009	Labour force and child labour survey
Iraq	2011	Multiple indicator cluster survey
Jamaica	2011	Multiple indicator cluster survey
Kyrgyzstan	2014	National child labour survey
Lao People's Democratic Republic	2010	Labour force and child labour survey
Liberia	2010	Labour force survey
Malawi	2015	National child labour survey
Mali	2013	Enquête démographique et de santé
Mauritania	2011	Multiple indicator cluster survey
Mexico	2015	Encuesta nacional de ocupación y empleo
Mongolia	2012	Labour force and child labour survey
Nepal	2014	Multiple indicator cluster survey
Nicaragua	2012	Encuesta continua de hogares
Niger, the	2012	Enquête démographique et de santé et à indicateurs multiples
Nigeria	2011	Multiple indicator cluster survey
Pakistan	2011	Labour force survey
Panama	2014	Encuesta del mercado laboral
Peru	2015	Encuesta sobre trabajo infantil
Philippines	2011	Labour force and child labour survey

Saint Lucia	2012	Multiple indicator cluster survey
Senegal	2014	Enquête démographique et de santé continue
Sierra Leone	2013	Demographic and health survey
South Sudan	2008	Population and housing census
Suriname	2010	Multiple indicator cluster survey
Timor-Leste	2016	National child labour survey
Togo	2014	Enquête démographique et de santé
Tunisia	2012	Multiple indicator cluster survey
Uganda	2012	Labour force and child labour survey
United Republic of Tanzania	2014	National child labour survey
Venezuela (Bolivarian Republic of)	2012	Encuesta de hogares por muestreo
Viet Nam	2012	Labour force and child labour survey
Yemen	2013	National health and demographic survey

D. COVERAGE IN TERMS OF TARGET POPULATION

Child Labour

Region	Population living in countries with survey data (5-17 years old, thousands)	Total population in the region (5-17 years old, thousands)	Coverage
Central and Southern Asia	450 000	483 000	93%
Eastern and South-Eastern Asia	113 000	391 000	29%
Latin America and the Caribbean	123 000	140 000	88%
Northern Africa and Western Asia	46 000	119 000	39%
Sub-Saharan Africa	235 000	320 000	73%
World (including other regions)	**967 000**	**1 619 000**	**60%**

Trafficking for Forced Labour

Region	Population coverage (15-64 years old, thousands)	Total population in the region (15-64 years old, thousands)	Coverage
Eastern and South-Eastern Asia	292 000	1 592 000	18%
Europe	162 000	495 000	33%
Northern America	212 000	237 000	89%
Northern Africa and Western Asia	158 000	308 000	51%
Sub-Saharan Africa	123 000	517 000	24%
World (including other regions)	**947 000**	**4 848 000**	**20%**

Population based on UN Population Prospects 2019, for the year 2015.

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