METHODOLOGICAL REPORT

Impact Assessment and Input-Output Tables: Data Selection

Guidelines for Impact Assessments of companies using Global MRIO Tables

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Executive Summary

Impact Valuation concept has evolved out of the need to identify, understand, improve, and demonstrate the benefits and costs of business activities. It aims to ensure long-term and sustainable value creation for all stakeholders by taking a macro-societal perspective on the business contribution to society. A popular methodology to quantify a company's impact is the Input-Output-Analysis (IO-Analysis). IO-Analysis can detect environmental and socio-economic hotspots with comparatively low effort.

The paper at hand firstly describes the overall framework of IO-Analysis and its fields of application. Input-Output analysis was originally developed by Leontief (1) to describe the industrial structure of an economy. Applying this technique, it is possible to trace the inputs of production along the entire supply chain. This allows for the calculation of upstream and downstream impacts of a company.

To perform a profound IO-Analysis the choice of the correct data source (IO-Table) is essential. It determines the size and respective characteristics of the impact factors under study. IO-Tables are constantly being published by the scientific community and the discussions are dynamic in nature. The research field of IO-Analysis is highly dynamic and rapidly growing. "The fast-increasing trend indicates that more and more researchers will use input–output analysis."(2) Therefore, it must be stressed that the results are only a spotlight, which will quickly become obsolete when existing databases are updated or new tables are provided. The paper provides parameters of the existing datasets and describes useful decision criteria on data source selection for various applications. The discussed criteria are the degree of reliability, country coverage, sector coverage, actuality, and processing workload.

The analysis illustrates the fact that one size fits all solution does not exist. A comprehensive MRIO database which fulfil all the requirements of a rigorous Impact Assessment does not exist. No database couples a high level of harmonized sector detail with high country resolution. Currently available databases either aggregate minor countries into rest-of-the-world (WIOD and EXIOBASE 3), or high-country resolution is achieved at the cost of non-harmonized or lower sectoral detail (EORA, ICIO or GTAP-MRIO). The choice of the appropriate model is determined by the scope of the impact assessment and related company specifics. Therefore, additional data preparations and adjustments of existing MRIO Tables are unavoidable.

1 Background and motivation

Companies become increasingly aware of their impact outside of the financial market in the presence of on-going environmental degradation and persistent social matters such as inequalities in the labour market. Business behaviour creates with positive and negative externalities that affect society, ecosystems, and the planet. More and more companies are willing to strive towards enhancing the socio-economic and environmental conditions of their direct and indirect accountable activities.

"Creating a strong business and building a better world are not conflicting goals - they are both essential ingredients for long-term success" - Bill Ford

Impact Valuation was borne out of the need to identify, understand, improve, and demonstrate the benefits and costs of business activities.
Impact Valuation has the power to ensure long-term, successful, and sustainable value creation for all stakeholders by taking a macro-societal perspective on the business contribution to society. This is achieved by a more comprehensive reporting, integrated thinking, better risk assessment and strategic decision making.

Impact Valuation holds various benefits, for instance: compliance with an increasingly rigorous legislation, potential to save costs through enhanced efficiency in supply chains, cut down of emissions and assure an emerging green consumer. While these benefits appear desirable, they are bound to have a certain cost. Decision makers tend to turn down these efforts to focus on short-term results, especially with a recession knocking on the door. In a targeted stakeholder dialogue, knowing the planned investments' impact is hence key to justify certain expenditures on economic grounds.

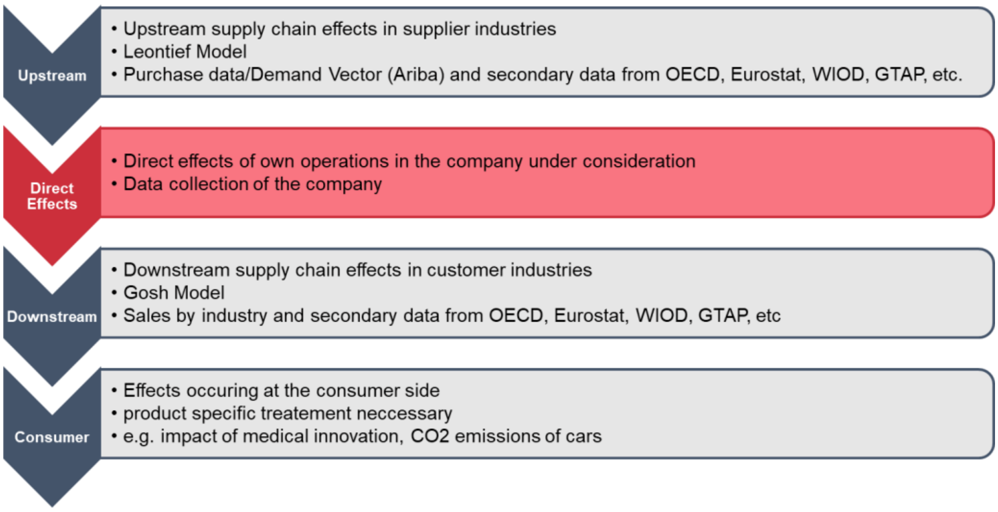
Impact can either be evaluated from bottom-up or top-down. One popular approach to measure impact from bottom-up is the process-based lifecycle assessment (LCA). Another one is the collection of supplier and / or sales data. The advantage is the predominant use of primary data. However, the results are product or vendor specific and represent only pieces of the company's overall impact. It is also considered a labour-intensive task. On the contrary, when measuring impact from top-down, mostly secondary data is used. A popular methodology is the Input-Output-Analysis (IO-Analysis). IO-Analysis can detect environmental and socio-economic hotspots with comparatively low effort. It is often used to estimate the up- and downstream impacts in the supply chain of a company. The main difference to a process-based methodology is the scope. In Input-Output-Modelling, the entire value chain can be accounted for. These estimations are based on primary financial data (a detailed list with region-specific information regarding the type amount and type of goods purchased and sold) that are then translated into economic, socio-economic, and environmental indicators. As both approaches deliver valuable results, efforts were made to match bottom-up and top-down approaches.(3) Integrating results from bottom-up assessments into the top-down Input-Output-Framework allows to enhance data quality while not restricting the scope of analysis.

When it comes to company specific Impact assessment using economic input output tables, the choice of the correct data source is very important. It determines the size and respective characteristics of the impact factor under study. There is no one fits all solution regarding the choice of the data to use. Various data sources / models / IO Tables deliver different results (and operative conclusions) despite using the same model inputs (company spend and sales data).

The paper at hand provides guidelines on the existing datasets and provides recommendations on which dataset to use.

2 Overall framework

Input-Output analysis was originally developed by Leontief (1) to describe the industrial structure of an economy. Applying this technique, it is possible to trace the inputs of production along the entire supply chain.



UPSTREAM EFFECTS AT SUPPLIER INDUSTRIES

In addition to the direct effects, which describe the immediate economic effects directly generated by a company, input-output analysis allows for the calculation of indirect and induced economic effects. Indirect effects are effects arising due to the input the company demands from other economic agents. Order placements result in an increase of economic activity at commissioned agents and their suppliers. This stimulus increases the gross value added (GVA) and other key figures along the supply chain, which are summarized under the term indirect effects.

Induced effects originate from the expenditure and accompanying increase in demand of directly and indirectly generated incomes. While in the traditional model households belong to the final demand sector (are exogenous), their activities can be included in the model and treated as endogenous by using the “fictitious industrial sector approach”. Including household into the model enables the analyst to calculate induced effects. The combined effect of indirect and induced economic effects is called spillover effect.

The basis for the calculation of the spillover effects is an equilibrium equation first introduced by Wassily Leontief (1). The model comes with an array of assumptions[1], however it is widely agreed that it is well suitable for impact analysis.

MULTI-REGIONAL INPUT-OUTPUT TABLES

The calculation of the indirect and the induced effects is based on national or multi-regional Input-Output tables (see section three for details about availability as well as details about advantages and disadvantages of the different sources). Input-Output tables show the production structure of an economy or multiple economies in case of a multi-regional Input-Output (MRIO) table.

Multi-Regional Input -Output table (MRIO) with two Countries (A and B) with two sectors (1 and 2) each

Input / Output →							Total		Final Demand			Output
	Country	A	A		B	B	Intermediates		Y			x
Country	Sector	1	2		1	2			A		B	
A	1	330	150	Trans-	140	70	690	Total I.	630		450	1770
A	2	190	280	action	10	90	570	provided	650	Y	580	1800
B	1	20	190	matrix	330	220	760	by each	220		360	1340
B	2	330	80	T	190	240	840	sector	310		170	1320
Total Intermediate Inputs		870	700		670	620	2860		1810		1560	6230
		Total I. received by each sector										X = T + Y
Total value added		900	1100		670	700	3370					
Production value (input) = Output		1770	1800		1340	1320	6230					

Satellite Accounts

	Country	A	A	B	B
Indicator	Unit/ Sector	1	2	1	2
Value added	Money	900	1100	670	700
Employment	HC in FTE	1200	1550	2100	1990
GHG emission	tons of CO2	920	880	400	790

The figure above shows a simplified example of a symmetrical MRIO, including the satellite accounts. Transaction matrix T depicts the intermediate consumption of an economy in basic prices. It reads as follows: Sector 1 in country A supplies good or services worth $ 150 to sector 2 in country A. The satellite accounts are an extension that can be integrated into the input-output framework. These can be used inter alia for an environmentally extended input-output analysis (21).

[1] The assumptions of the Leontief model are: 1) Constant returns to scale, meaning that regardless of the level of production, the same quantity of inputs is needed per unit of output. 2) No Supply Constraints, meaning there are no restrictions to raw materials, services or other inputs such as employment. 3) Fixed Input Structure: meaning that there is no input substitution in response to a change in output.

MATHEMATICAL BACKGROUND

The basis for the calculation of indirect effects can be illustrated by the following equilibrium equation:

$$x = Ax + y \leftrightarrow x = (I - A)^{-1}y \quad (1)$$

where x represents the vector of total gross output of a sector and y represents the vector of final demand and includes domestic consumer spending, assets, changes in inventories and exports. A represents the matrix of intermediate consumption per unit of output.

Equation (1), with $L = (I - A)^{-1}$ being the Leontief inverse, can be determined by the following mathematical transformation:

$$x = Ax + y$$

$$y = x - Ax$$

$$y = (1 - A)x$$

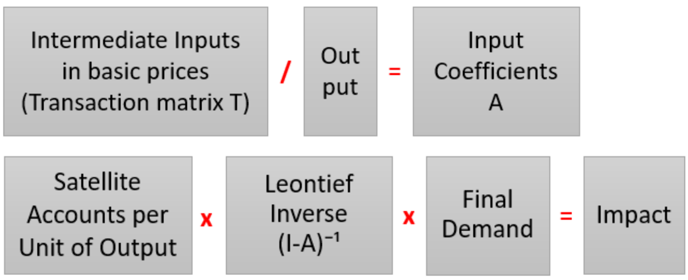
since $(I - A)^{-1} * (I - A) = 1$, with I being the identity matrix $x = \frac{y}{1-A}$ equals

$$x = (1 - A)^{-1}y$$

The spillover effect can be calculated similarly by extending matrix A by labor income and the corresponding consumption coefficients (7).

With x, the output triggered by a given demand y, the corresponding GVA can be derived using country and sector specific ratios of GVA to output. Employment effects are calculated analogously.

See the illustration below for the structure of the model:



DOWNSTREAM EFFECTS AT CUSTOMER INDUSTRIES

While the Leontief model is suitable to measure the upstream effects, there are also customer industries that have significant impacts on society. Input-output analysis can be employed to measure the downstream effects which are enabled by the sales activities of the company. The analytical background for the calculation of downstream effects was first introduced in 1958 by Ghosh (4).

While the Leontief model is widely accepted for the use of impact analysis, the Ghosh model is resisted by several authors due to implausibility of the supply driven approach (e.g. 5).[2] According to Lenzen (6), the consensus in the literature is that the Ghosh model can be used for the identification of key sectors as well as for international comparative studies but should not be used for impact studies.

DATA COLLECTION ISSUES

The IOT is a synthesis of the supply and use tables, which represent the basic tables of the system of national accounts (SNA). Applying an input-output analysis requires the collection and transformation of company specific data according to the SNA. For the analysis of upstream effects, procurement data on product/service level representing the purchase of intermediate consumption from domestic or foreign vendors need to be collected. For the calculation of downstream effects, sales data per customer country and industry is needed.

Both, procurement as well as sales data need to be aligned with the concept of the input-output table in use. More specifically there are two major issues which need to be considered:

- There are two price concepts: the basic prices and the purchase prices. The basic price of a good is the sum of the cost of the goods and services used as intermediate consumption and the remuneration of the production factors required to produce it. Thus, the basic price includes all production or manufacturing costs (factor charges, intermediate consumption) excluding taxes on products. The purchaser price is the price actually paid by a purchaser for goods at the time of purchase. It includes all costs incurred by the purchaser in production, transport, trade, and taxation (taxes less subsidies on products), irrespective of the route of supply and the form of settlement. To calculate the interdependency effects of an IO

[2] It is especially argued that the Ghosh model cannot be combined with the Leontief model towards one total index since both are built up on assumption which are inconsistent with each other (fixed input vs. fixed output coefficients).

model, the price concept of the spend or sales data must be compared with the macro data of the IO Table.

- In the input-output framework, the rows and columns of the transaction matrix either represents industries (sectors) or commodities (products). In general, the classification of both is the same; commodities are defined by the characteristics of the corresponding industries. Since some producing units produce more than one good, the assumption of a homogenous branch is made, by which an industry produces only one product. If a production unit produces more than one unit, it is assigned to the commodity which accounts for the greatest part of its output. In real world, an industry produces more than one type of good. To account for by-products and secondary products, more complicated commodity-by-industry frameworks have been introduced (7). There are various types of industry-by-industry and commodity-by-commodity models, each with its own advantages and disadvantages. However, the level of secondary products as well as the production of products in secondary industries seems to be relatively low. The manual of Eurostat and European Commission (8) thus concludes that “the difference between product-by-product input–output tables and industry-by-industry input-output tables is relatively small. Both transformations can be regarded as valid options for impact analysis.”

3 Overview of data sources

The compilation of input-output tables (IOT) is described in the system of national accounts (9). Similarly, the compilation of environmental satellite accounts is described in System of Environmental-Economic Accounting 2012 (10). The provision of national input-output tables is thus a task which is carried out by national statistical offices. Such tables are very well suited to calculate the national economic footprint of an organization for example.

To analyze global value chains and the increasing international fragmentation of production, a multi-regional input-output framework is needed. These kinds of tables can be regarded as a set of national input–output tables that relate to each other by bilateral international trade flows. They provide comprehensive summaries of all transactions in the global economy between industries and final users across countries in a particular year.[3]

The estimation of a multi-regional IOT requires significant individual data and computation capability and is labor intensive. For a detailed multi-regional IOT, it would be necessary to measure worldwide economic consistently and uniformly across all sectors and production stages of the economy. Since such an approach is not feasible, MRIOs are constructed with the help of national accounts and trade data. The tables differ with respect to the data sources, construction philosophy and the selection of countries. Not surprisingly, there are a lot of different approaches to deal with data gaps and inconsistencies. Each dataset was developed for specific questions with different intentions. Different methods were used in each case.

The issue of limited comparability is a well-known and discussed phenomenon within the scientific community. (11–19) The purpose of this chapter is to provide guidance on the rigorous selection of the correct data source.

[3] Until now, statistical offices do not calculate official MRIOs. One exception are the experimental FIGARO MRIO tables produced by Eurostat.

The most prominent MRIO data sets (and related references) used for impact assessment are:

- FIGARO (8,20,21)
- OECD ICIO (22,23)
- EORA (24,25)
- GTAP (26,27)
- WIOD (28–31)
- ADB MRIO (32)
- EXIOBASE (33–35)
- Global MRIO Lab (36)

All selected Databases have different methodical backgrounds and properties regarding regional, temporal, and sectoral coverage. Most of them are updated regularly and are therefore available in different versions, and they are differently equipped with additional information with respect to economic, environmental, and social satellite accounts (see Table 1 for an overview). A rigorous impact analysis framework relies on the choice of an appropriate model for the measurement and analysis of various impact factors of a company. The correct data choice makes it possible to adapt the modelling framework to the needs of the company more easily. Several **decision criteria** can be used as guidance.

DEGREE OF RELIABILTY

One option is to choose a reliable and official data source that fulfil high standards of data quality. If one wants to use this criterion only, then one should choose official FIGARO tables produced by Eurostat for the year 2010. The FIGARO tables are a tool for analyzing the socio-economic and environmental effects of globalization in the European Union (EU) – through studies on competitiveness, growth, productivity, employment, environmental footprint, and international trade (e.g. global value chains). The FIGARO project compiles EU inter-country Supply, Use and Input-Output Tables (EU-IC-SUIOTs**)**. FIGARO is the first project to compile official inter-country supply, use and input-output data at EU level.

Table I: Overview of relevant MRIO Datasets

Source	Version	Resolution: regional	Resolution: temporal	Resolution: sectoral	sectoral classification standard	Satellite Accounts: Economic	Satellite Accounts: Environmental	Satellite Accounts: Social	License	Regular update	Institution	Info
FIGARO	experi-mental	27 Countries (EU-28 and USA)	2010 (pro-duction of time series in progress)	64 industries	ISIC Rev. 4	yes	not ready to use	not ready to use	free	experimental version, yearly up-dates and time-series planned	Eurostat	https://ec.europa.eu/euro-stat/web/experimental-statis-tics/figaro
OECD ICIO	2018	65 Countries (37 OECD, 29 non-OECD, 1 RoW)	2005-2015	34 industries	ISIC Rev. 4	yes	not ready to use	not ready to use	free	yes	OECD	http://oe.cd/icio
EORA	EORA??	187 countries	1990-2016	varying across countries; sim-plified version with 26 indus-tries	ISIC Rev. 3	yes	good coverage (GHG, land, water, air pollution and bi-odiversity etc.)	no	not free	yes	KGM & As-sociates Pty (originally University of Sydney)	https://worldmrio.com/
EXIOBASE	3.7	44 countries, (5 RoW Aggre-gates)	1995-2016	163 industries, 200 products	ISIC Rev. 3	yes	very good cover-age (Energy sup-ply and use, GHG emissions, pollu-tants, water use, land use, material flows, nitrogen loads, phosphorus loads, LFC impact coefficients, etc.)	yes, few indica-tors are availa-ble (e.g. em-ployment by skill-level and gender)	free	yes	Norwegian University of Science and Technologiy	http://exiobase.eu
GTAP	Version 10	121 Countries (20 RoW Aggre-gates)	2004, 2007, 2011, 2014	65 industries	ISIC Rev. 4	yes	good coverage (Co2 emissions, Energy volumes, land use)	Five labor skill categories	$320 - $6,240 (Versions 1 to 8 can be downloaded for free)	yes, on irreg-ular basis	Center for Global Trade Analysis, Department of Agricul-tural Eco-nomics,Pur-due Univer-sity	https://www.gtap.agecon.pur-due.edu/databases/v10/in-dex.aspx
ADB MRIO	2019	62 countries (1 RoW)	2000, 2007-2018	varying SUT dimensions, harmonized to 35 industries	ISIC Rev. 3	yes	no	no	free	planned	Asian Devel-opment Bank	http://mrio.adbx.online/
WIOD	Release 2016	44 countries, 1 ROW	2000-2014	57 industries (some Zero-Sectors availa-ble)	ISIC Rev. 4	yes, full set of socio-eco-nomic varia-bles	good coverage (GHG Emissions, Gross and emis-sion relevant en-ergy-use esti-mated by JRC, other environmen-tal indicators just available for previ-ous version)	labor by skill-level available for previous versions	free	yes, on irreg-ular basis (depends on funding)	University Groningen	http://www.wiod.org
Global MRIO-Lab	-	All	as long as available	flexible (more than 5700 products)	flexibel	yes	covered (data availability de-pends on project purpose and sec-toral resolution)	covered (data availability de-pends on pro-ject purpose and sectoral resolution)	depends on the workload	yes, realtime in nature	University of Sydney	https://ielab.info/

Source: Own depiction based on references and inspection of data.

The downsides of using FIGARO are that not all countries are covered (EU28 and USA) and that data only exist for the year 2010. Furthermore, the production of the MRIO has been mostly driven by the data available at each stage of the building process. Therefore, FIGARO tables should be considered experimental until:

- more official data has been incorporated
- the methods have been further agreed among EU countries
- the tables are being produced regularly by Eurostat and integrated into the OECD's overall inter-country input-output tables.

The OECD inter-country input-output table (ICIO) was developed during an OECD-WTO project to measure the value added contained in trade (Trade in Value Added-TiVA). Trade in Value Added was developed as indicator, because flows of goods and services within global production chains are not always reflected in conventional measures of international trade. TiVA indicators are designed to better inform policymakers by providing new insights into the commercial relations between nations. Thus, the reliability of the data is quite high because of the suitability to national statistics. On the other hand, satellite accounts are not made available which makes it impossible to calculate impacts without collecting additional data. Another downside of using ICIO is the relatively low degree of sectoral and country coverage. Depending on the regional scope of the Impact Assessment, the low degree of country can be problematic.

DEGREE OF COUNTRY COVERAGE

The need of a high geographical resolution was one of the reasons to build EORA. The rationale was to include all countries of the world and as many extensions as possible. Additionally, the construction process envisaged to be as automized as possible. Therefore, the building process of EORA was driven by a different approach compared to other data sources. SUTs and IOTs were used in their original format, to avoid the stepwise optimization and harmonization. Thus, EORA covers all countries in the world, but heavily relies on imputation methods to fill up the many blanks in data for countries with less well-developed statistical systems. This lowers the degree of reliability and underlines the trade-off between coverage and data quality.
WIOD, for example, is based on official and publicly available data from statistical institutes to ensure a high level of data quality. The database is constructed within the framework of the International System of National Accounts and is in line with its concepts and accounting identities. It was designed to trace developments over time through benchmarking to time-series of output, value added, trade and consumption from national accounts statistics. In

contrast, other datasets (like GTAP) have been compiled for benchmark years and cannot be used in analyses over time (30). If there is a significant need of benchmarking the company and its impacts with official statistics, one would use WIOD. This especially holds for time-dependent benchmarking. The natural downside of WIOD is, that it covers 44 countries only. All the other countries are aggregated to one region called Rest of the World (Row). Depending on the properties of the company and the regional hotspots of spent and sales data, it can be more appropriate to use WIOD or EXIOBASE.

DEGREE OF SECTOR COVERAGE

Besides the degree of reliability and regional coverage, the number of sectors and related products is a very important decision criterion. To calculate the upstream impact of goods purchased by a company, these goods are mapped into economic sectors of the MRIO. The more detailed the classification of goods and services in the MRIO, the better the mapping of company-specific inputs / products purchased, and the more product-specific impacts can be calculated (and used for operational decisions). Additionally, a higher sector resolution correlates positively with the reliability of the results.

Looking at the ready-made databases and ignoring MRIO-lab, EXIOBASE has the highest level of sectoral detail (of 129 sectors and 200 products) applied to all countries covered in its database. This can be advantageous, e.g. when analyzing the impacts for agriculture or resource extraction when consumption patterns change. EXIOBASE provide detailed and robust analysis of links between production and consumption, with a focus on environmental impacts and natural resource use. EXIOBASE also makes the combination / incorporation of LCA data possible (3).

The downsides of EXIOBASE are the relatively low country coverage[4] and the fact, that the sectoral classification can be transferred smoothly to ISIC rev. 3 only, which does not correspond to the current version 4 of the International Standard Industrial Classification of All Economic Activities (ISIC). The older standard can be problematic if a company is interested in the impact of a specific good or service, which is not separated / available in the respective classification. Additionally, it can be problematic to include updated satellite data (like actual employment or

[4] A recent study of Bjelle et al. (37) deals with this downside and expands the regional coverage of EXIOBASE from 49 regions to 214 countries, while keeping the high and harmonized sectoral detail. This is just one example of the dynamic development of the scientific field of MRIO.

GHG emission figures) published by statistical offices, because they are available in ISIC rev. 4 only (at least for the developed countries). Nevertheless, the concordant translation between different sectoral / product-related classifications is possible but is not entirely accurate and needs additional assumptions.

The newer classification ISIC rev. 4 is used in WIOD, but has a rather aggregated industry classification, particularly for the agriculture and the energy-producing sector where detail is important when it comes to analysing issues on land use, water use, or resource use. On the other hand, WIOD is the only database with a consistent annual time series in both current and previous year's prices, which is highly relevant for macroeconomic analyses.

DEGREE OF ACTUALITY

The effort to create national input-output tables is considerable. Statistical offices usually collect detailed data on purchased material and goods only every five years. Accordingly, the publication of IO tables lags considerably behind the publication of other statistics. In view of this fact, scientists use numerous methods for the extrapolation of input-output tables based on existing key figures.

To create an up-to-date impact study, one should build on the most current data possible. Thus, some balancing routines to produce an up-to date IO table are inevitable. However, one should have in mind that the tables differ greatly in the level of detail of the data used and current IO tables come with a substantial uncertainty and thus might have major revisions in the future.

In order to ensure future updates of the impact valuation, not only the actuality but also the probability of future updates should be considered. Even though GTAP is a provided by a global network of researchers and EORA by a private company, future updates are very likely. Since WIOD and EXIOBASE are large-scale research projects, the update depends strongly on the allocation of future research grants. However, the publication of ADB tables (an update of the old WIOD version with extended country coverage) shows that this research is likely to be continued even by other researchers. The alternative approach of the MRIO Lab allows to account for new input data flexibly and is therefore considered more akin to real-time, depending on the actuality of input data.

DEGREE OF PROCESSING WORKLOAD

The databases differ significantly in the effort required to carry out an impact valuation. As depicted in table 1, none of the databases includes the full range of environmental and social satellite accounts. Due to uncertainty in the data, official statistics such as FIGARO and ICIO choose not to provide satellite accounts at all. EORA provides a wide range of different indicators from different sources in the environmental dimension. These have a high-country resolution that results in a high degree of uncertainty and gaps in the database. In contrast, WIOD and EXIOBASE provide carefully compiled indicators with a significantly lower level of uncertainty.

It should also be noted that some tables come with different price concepts and different versions which might simplify the processing of the input data. EXIOBASE for instance provides two versions, one industry-by-industry table and one product-by-product table. In contrast, EORA comes with a version in purchaser prices and one in basic prices but as a mixed supply-use/Input–Output structure with hybrid sector classification which may complicate the preprocessing of input data.

CONCLUSION

As shown by the analysis above, there is no MRIO database that meets all the requirements of a rigorous impact assessment. No database couples a high level of harmonized sector detail with high country resolution. Existing databases either aggregate minor countries into rest-of-the-world (WIOD and EXIOBASE 3), or high-country resolution is achieved at the cost of non-harmonized or lower sectoral detail (EORA, ICIO or GTAP-MRIO). The choice of the appropriate model is determined by the scope of the impact assessment and related company specifics. Additional data preparations and adjustments of existing MRIO Tables are unavoidable.

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