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Illicit financial flows and country-by-country reporting in extractive industries

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Abstract: Economic data are important in governing the international political economy. Some of the most widely used macro statistics risk being undermined by systematic misalignment in reporting of economic activity due to illicit financial flows, as well as tax-minimizing financial transactions by multinational corporations. Measuring these misalignments may prove a way to correct old statistical standards, if adequate data can be obtained. We evaluate whether new transparency and reporting regimes that require country-by-country reporting by multinational corporations could prove a feasible way to appropriate the amount of tax avoidance and use these figures to correct macro statistics. We evaluate the existing data for two of the standards through previous literature and provide original analysis of a third standard that is applied to the extractive industries. We find that the standards lack coherence and workability, and that particularly the extractive industry standard falls short of enabling thorough research on profit reporting and tax-motivated misalignments by multinational corporations.

Key words: economic data, tax avoidance, illicit financial flows, country-by-country reporting, extractive industries

JEL classification: C82, E01, H25, G28

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1 Introduction

Global economic governance requires knowledge of what and where economic activity is occurring. This is the reason for the reliance by policy-makers, international organizations, and researchers on international data standards, through which they can compile measures of economic activity on investment, trade, tax, finance, and growth. Recently, debates have emerged on underlying conceptual as well as accuracy issues in widely used international macro statistics (Blanchard and Acalin 2016; Linsi and Mügge 2019; Zucman 2013) and their political foundations (Alenda-Demoutiez 2022; Mügge 2020). A particular focus is the effect of illicit financial flows, stemming from for example corruption or tax avoidance, which undermine public finances as well as the reliability of international economic figures (Damgaard et al. 2019; Ergen et al. 2021; Guvenen et al. 2021).

Many of the measures we use to evaluate the economy were developed a long time ago. National economic aggregates and bilateral trade statistics, in particular, were first compiled during the economic depression of the 1930s (Linsi and Mügge 2019). The changing composition of the world economy, not least the rise of multinational corporations (MNCs) with intra-firm trade and intangible assets, presents a challenge for statistical conventions from a 'simpler' time (Ergen et al. 2021). The tax-minimization techniques undertaken by these corporations skew the figures by which the international economy is governed and thereby call into question fundamental economic facts and potentially decades of empirical research based on these figures (Blanchard and Acalin 2016; Damgaard et al. 2019; Zucman 2013). The challenge of improving international economic statistics is huge, not least given the sensitive and political nature of illicit financial flows. Given that tax avoidance is the cause of some of the problems with economic figures, a better measurement of intra-company tax payment might be used as an instrument to correct existing statistics. Multiple studies have appraised the size of tax-minimization misalignments and a few have even attempted to provide 'corrected' macro figures (e.g., Tørsløv et al. 2020). Such corrections using existing macro data, however, also suffer from problems based on differences in accounting standards (Blouin and Robinson 2020). Improvements in economic data might have to rest upon bottom-up approaches which take micro-level accounting standards into account.

While current statistical standards were developed long ago, accounting standards have changed iteratively (Crawford 2017). Occasionally, completely new reporting standards are invented, particularly motivated by demands for transparency or for an ability to compare and rank actors when new factors are considered important (Bennedsen and Zeume 2018; Lamberton 2005). A recent and prominent example of a new reporting standard which has become widespread is CBCR, the reporting of tax and financial data on a country-by-country basis, which is meant to provide clarity on mismatches between economic activity and tax payments (Murphy 2003). If successful in measuring such misalignments, CBCR may provide an avenue towards improving our measures of global capital flows and correcting international macro statistics (Cobham and Janský 2020; Reuter 2012; Wójcik 2015). Since the idea of CBCR was first put forward, however, it has become the global standard, but with different governing entities and requirements across sectors and firm sizes.

In this paper we evaluate the implemented CBCR standards for banks (EU CRDIV standard), large multinationals (OECD BEPS standard), and extractive industries (EITI and EU standards). We provide new evidence on the CBCR standards applied to extractive industries and show that they are far from living up to their promise of filling gaps in our knowledge of the global economy. We find that the limited nature of the implemented country-by-country standards restricts their

ability to track tax avoidance and therefore this new reporting regime is not fully equipped to provide improvements in macro statistics.

The rest of the paper is structured as follows. In Section 2 we outline the background to our study, the role of data and data standards in our understanding of the global economy, and previous attempts to devise new standards. Section 3 provides the background to the different CBCR regimes. Section 4 presents our empirical analysis of data generated by the standard for extractive industries. A discussion follows in Section 5, and Section 6 concludes.

2 Background

2.1 Data construct the international political economy

Economic data are the chief governance tool we use to understand, navigate in, and control the international political economy. These range from unit-specific reporting on the activities of single economic agents to aggregate numbers on trade, finance, and growth between countries. The growing realization of their importance has meant that improving data is now a priority in development initiatives (Gates Foundation 2016). But economic data, much like economic models, also work to construct rather than merely reflect the economy (Callon 2020; MacKenzie 2008; Mügge 2020). Economic data are made up from standards and definitions which we have predefined on the basis of what we perceive to be important and meaningful in the economy (Perry and Nölke 2006). Asking the right questions about the economy is crucial, as the data such questions generate in turn change our perception of the economy and the significance of its components.

The increasing complexities of global trade and finance have undermined many existing data standards. Data standards on the international economy are made to fit standard transactions, in which a good or service is traded from country A to country B. Longer and more complex streams of production which involve multi-jurisdictional trade (Ergen et al. 2021) or factoryless manufacturing (Coyle and Nguyen 2022) have made such transactions more complex, and created problems for registering trade data (Linsi and Mügge 2019). At the same time, MNCs have a newfound ability to register financial assets strategically to gain tax advantages (Seabrooke and Wigan 2017; Zucman 2015). This obscures the ownership and transactions of financial assets and undermines our picture of international capital flows (Damgaard et al. 2019; Guvenen et al. 2021; Tørsløv et al. 2020).

It is evident that the data standards created in a different time, for a different global economy, have become less useful as economies have changed. This creates gaps in our knowledge and understanding of the global economy, which undermines our ability to govern it. Missing data or imprecise measurements in economic data are common, particularly in the developing world, and undermine the value of statistics. Potentially even more troublesome are the figures which are used widely and viewed as reliable, but suffer from problems in their conceptual underpinnings (Linsi and Mügge 2019; Mügge 2020). How we should address these weaknesses in current data systems and measurement remains an open question. Increased harmonization might help with problems of data accuracy, but it will not help with any misalignment between concept and reality. The complex interactions of international trade and finance remain a challenge for measuring bilateral relationships, as indicated by challenges encountered in empirical analyses of bilateral tax treaties (e.g., Janský et al. 2021b; Petkova et al. 2020) or bilateral information exchanges (e.g., Bilicka and Fuest 2014; Janský et al. 2021c).

With regard o the reporting of single economic agents, such as corporate accounting, the stakes are no less high when it comes to the effects of problematic data. Accounting standards are the building blocks of economic data and vital for economic governance (Mügge and Stellinga 2015). Accounting standards are inherently political, as they produce figures which both are a function of and shape social market structures (Perry and Nölke 2006). What we ask companies to report conveys what parts of their activities hold significance for society. It is also constitutive for how we perceive the economy. In the words of Power (1997: 94), 'accounting information systems do not simply describe a pre-existing economic domain but, to varying degrees, serve to constitute a realm of facts to make a world of action visible and hence controllable in economic terms'. Data and reporting standards hold the potential to be not merely constitutive, but transformational. Using data standards as a governance mechanism (Cust 2018), such as CBCR, is therefore a strategy aimed not just at measuring a phenomenon, but at changing it.

2.2 Illicit financial flows and macro statistics

How tax avoidance, corruption, and other illicit activities are often intertwined has been highlighted by the Panama, Paradise and Pandora Papers released by the International Consortium of Investigative Journalists (e.g., ICIJ 2018). The same countries that help MNCs avoid taxes are often implicated in corruption cases and in other schemes in which money flows out of countries illicitly. Illicit financial flows originate from countries worldwide for a variety of reasons including drug trafficking, political bribery, tax evasion by wealthy individuals, and tax avoidance by MNCs, and is routed through jurisdictions which act as offshore financial centres (UNODC and UNCTAD 2020). Illicit financial flows have devastating effects on the development of countries at all levels of income per capita: they reduce government revenues, tax morale, private investment, and trust in a country's institutions (Janský 2015).

Recent research highlights how corporate tax avoidance in particular systematically undermines the reliability of existing statistics, including such basic measures as gross domestic product (GDP) or trade deficit. For example, Guvenen et al. (2021) show how tax avoidance by US MNCs affects several key measures of the US economy: it reduces the trade deficit, decreases the apparent return on US foreign direct investment abroad, raises measured productivity growth rates, and artificially lowers labour's share of income. In general, corporate profits are overreported in tax havens and underreported in countries where the real economic activity takes place. This changes the reporting of foreign direct investment (Damgaard et al. 2019; Haberly and Wójcik 2015) or bank liabilities (Haberly and Wójcik 2020). Since corporate tax avoidance poses challenges to the old data standards (Ergen et al. 2021) and since corporate tax avoidance has increased over the past three decades (Garcia-Bernardo et al. 2021), challenges to the old data standards have likely increased, too.

Given that tax minimization is behind some of the manipulation of intra-company trade which skews international statistics, a better measurement of intra-company tax payment might correct existing statistics. For example, Damgaard et al. (2019) provide a measure of FDI based on correcting for corporate shell companies. Tørsløv et al. (2020) estimate the misreporting of profits and provide corrected macro statistics for GDP, trade balances, and factor shares corrected for profit shifting for all OECD countries. However, such measures using asymmetries in bilateral FDI have been called into question as accounting conventions on income from indirectly owned affiliates differ, which leads to misallocation and double counting (Blouin and Robinson 2020). It is therefore unlikely that international macro statistics can be 'fixed' without engaging with underlying accounting conventions and building corrections from the ground up. If we are to improve international statistical figures in ways that are not skewed by illicit financial flows, new standards are needed.

While the different regimes for CBCR by MNCs have different origins and motivations, they all aim to increase transparency in respect of illicit financial flows stemming from tax avoidance or corruption. If they are able to detect misalignments at the micro level of multinational corporations, they may be used as an instrument to improve macro statistics. We test the ability of CBCR to measure misalignments related to tax, surveying the literature of the usefulness of CBCR data and providing original analysis of the CBCR data in the extractive sector. We find that while CBCR might impact the behaviour of MNCs in ways which limit tax avoidance, the data produced from its application is not in itself of high enough quality to improve macro statistics.

2.3 New reporting standards: addressing illicit financial flows

New data do not come into existence by themselves, but are rather a consequence of new demands for accountability. Increased transparency and improved reporting standards are used as tools to increase accountability by economic agents and limit undesirable behaviour. Transparency is codified through pre-defined categories which agents need to report on or account for. These are pre-defined in the sense that transparency works backwards (Strathern 2000), as we can only make transparent the 'known unknowns'. This is a weakness in any transparency or accounting regime, as these categories may be ill defined, wrongly chosen, or easy to manipulate. Once the questions are answered and the reporting is done, the data which this process produces may or may not be useful for accountability. The concept of transparency projects an idea of everything being visible when in reality this is not the case (Roberts 2009). Rather, what is being disclosed are carefully considered measures. Therefore, the availability of these figures will lead the discussion into exactly the areas they are designed to cover. Data which lack relevant context can make the economy seem more governable, as quantifiable terms are always easier to deal with, but will ultimately prove more elusive (Kranke and Yarrow 2019).

Asking the right questions is particularly important when it comes to economic phenomena where companies might have an interest in a lack of clarity, as in the case of corporate taxation. Tax aggressiveness by MNCs undermines public finances (e.g., Garcia-Bernardo and Janský 2021; Tørsløv et al. 2020) and therefore constitutes a key challenge for global economic governance. Through transfer pricing, MNCs are able to shift profits to lower-tax jurisdictions to reduce their global tax payments through global wealth chains (Finér and Ylönen 2017; Seabrooke and Wigan 2017; Sikka and Willmott 2010). This is done in a race towards increasing shareholder value by using offshore financial centres in ways that constitute tax avoidance and sometimes tax evasion (Otusanya 2011; Picciotto 2018). These practices are particularly harmful to developing countries (e.g., Cobham and Janský 2018; Crivelli et al. 2016; Fuest et al. 2011; Johannesen et al. 2020) and are especially prevalent in the extractive industries sector (e.g., Beer and Loeprick 2017; Daniel et al. 2017; Finér and Ylönen 2017; Otusanya 2011; UN Department of Economic and Social Affairs 2018).

Tax collection has historically motivated the invention of economic measurements (Graeber 2011; Mügge 2020). In modern times, tax collection is still motivating the invention of new data standards. One proposal which has gained political traction is to require MNCs to file reports of their activity on a country-by-country basis in the hope that this will improve tax collection. The history of CBCR goes back at least to 1977, when the Group of Experts on International Standards of Accounting and Reporting (GEISAR) convened within the UN Commission for Transnational Corporations (UNCTC). They proposed a requirement for each company operated by an MNC to publish financial reports (Cobham et al. 2018; Rahman 1998; Ylönen 2017).

More recently, around the turn of the 21st century, CBCR was advocated in proposals by activist organizations and experts including the Tax Justice Network (Crawford 2017; Seabrooke and Wigan 2015) and Richard Murphy (e.g., Murphy 2003) as well as the campaign Publish What You

Pay. While Murphy's original (2003) proposal applied to all MNCs, much of the early implementation of CBCR occurred around extractive industries (oil and gas, and mining). In 2003, the Extractive Industries Transparency Initiative proposal encouraged voluntary CBCR disclosure for extractives companies and governments. In 2013 the EU formalized this by introducing mandatory CBCR for the extractive and logging sectors. A further extension of mandatory CBCR was simultaneously adopted by the EU with the introduction of public CBCR for the financial sector. In 2015, the OECD adopted the BEPS Action 13, which implemented a standard for CBCR in all sectors. The resulting data are reported to tax authorities (Müller et al. 2020).

While more comprehensive, however, it applies only to very large MNCs. Large MNCs have thus been sharing their CBCR since 2016 according to the OECD standard, but only with the tax authorities of the headquarter countries (Garcia-Bernardo and Janský 2021), only some of which, such as the US, are sharing their aggregated statistics with the public (Clausing 2020; Garcia-Bernardo and Janský 2021; Garcia-Bernardo et al. 2021) or exchanging them with other governments (Janský et al. 2021a). Most recently, in June 2021, the EU agreed that large MNCs would need to share their reports in the future with the public, albeit only in an aggregated form and without a fully global country-by-country breakdown (Rusina 2020). Thus, CBCR standards are emerging as a global reporting regime and, while they are not uniformly applied, they have incrementally become more extensive in terms of application, coverage, or public availability (Cobham et al. 2018).

3 Background of the different country-by-country reporting regimes

As stated above, early discussion about CBCR dates back to the 1970s (Cobham et al. 2018) and the more recent pressure coincided with Richard Murphy's 2003 proposal (Murphy 2003). Governments discussed it within the OECD BEPS around 2013–15, agreeing on it in 2015–16, with private CBCR starting in 2016–17, and aggregate data published in 2020 for the first reporting year of 2016. We now describe and compare the three standards in relation to four categories: actors, objectives, content, and data.

3.1 Actors

The EITI, and consequently its CBCR standard, was created in 2003 by a combination of actors, including governments (the United Kingdom in particular), companies (those in extractive industries in particular), and civil society (e.g., Publish What You Pay), while the implementation of CBCR standards in the EU's Accounting Directive, approved in July 2013 by the European Parliament, was restricted to the extractive industries. It was described as a victory for civil society organizations, which had long been campaigning for increased transparency and accountability through CBCR (Chatzivgeri et al. 2020). On the same day in July 2013, the European Parliament approved another directive, the Capital Requirements Directive, and, seemingly in response to the restriction of the other directive to extractive industries, this included a CBCR requirement. Although it has not been discussed much previously (Wójcik 2015: 1177), Richard Murphy argues that little was done to adapt the extractives standard to the banking sector (Murphy et al. 2019: 4). Finally, between 2013 and 2015, CBCR for large MNCs was agreed by dozens of governments worldwide as part of the G20-led and OECD-coordinated Base Erosion and Profit Shifting project (BEPS Action 13) (OECD 2015a).

While civil society organizations had been contributing to the emergence of all three of these standards, governments had always in the end played the decisive role in bringing about formal regulatory processes (Cobham et al. 2018). The OECD standard for large MNCs in particular

could not have been legislated so widely without the support of governments worldwide (Adebayo et al. 2021; Chatzivgeri et al. 2020), even though several governments did not support certain aspects of CBCR; Germany, for example, was against public CBCR (Meinzer 2017).

In the case of MNCs, CBCR includes both voluntary and mandated disclosures and, in the developed world in particular, MNCs face both civil society pressure for voluntary disclosure and legally binding reporting requirements which increase their openness to stakeholders (Crawford 2017; Lamberton 2005). Some of the current main actors across the three standards are, indeed, MNCs. This is despite many MNCs' opposition to CBCR (Meinzer 2017), visible for example in public consultations at the OECD (Christensen 2018).

Some of the key actors in bringing CBCR to fruition, including experts and organizations favouring CBCR (Seabrooke and Wigan 2015), keep proposing improvements to the existing CBCR standards (e.g., Murphy et al. 2019 for the banking standard). But the multitude of actors involved with the standards is reflected in the incoherence and differences between them, as different compromises have been reached over their coverage and accessibility.

3.2 Objectives

CBCR objectives can be numerous in theory. For example, Murphy (2003: 2) envisioned that CBCR standards should provide information that would assist those seeking to appraise an organization with regard to its corporate social responsibility, investment, and tax risks, its contribution by way of value added to the societies in which it operates, and its contribution to national wellbeing by way of tax payments within those locations. In practice, the specific CBCR standards are formally motivated by one or two specific stated objectives.

The EITI originated in 2003 from the need to increase transparency over payments and revenues in the extractive sector, motivated partly by an increase in corruption. It later developed one of the CBCR standards, which has inspired similar standards in other countries (Canada, Norway) or groups of countries (the EU, also implemented later by the already post-Brexit UK, as discussed by Chatzivgeri et al. 2020). The objectives of these standards, and their success or otherwise, differed in the various contexts. Baudot and Cooper (2021), for example, examined responses to pressures to act on extractives firm CBCR by three regulators—the International Accounting Standards Board, the European Commission, and the Securities and Exchange Commission—and found imprecise notions of purpose, objectives, and interests in regulatory mandates. This imprecision, Baudot and Cooper (2021: 17) argue, suggests that what is at stake in regulatory responses and understandings of mandates are issues of what types of knowledge are made visible and acted on, and what the consequences are of such choices.

The EU extractives CBCR's objective was to 'improve the transparency of payments made to governments all over the world by the extractive and logging industries'. Disclosure was intended to 'provide civil society in resource-rich countries with the information needed to hold governments to account for any income made through the exploitation of natural resources, and also to promote the adoption of the Extractive Industries Transparency Initiative (EITI) in these same countries' (European Commission 2013). Whether this objective was achieved is a question we will revisit in this paper.

While tax payments are the main reported figure, tax payment is not the main focus behind this early industry-specific version of CBCR. In contrast to the standard developed by Murphy (2003), the extractive industries' CBCR focuses on detecting corruption, not tax avoidance. CBCR reporting in the extractive industries was not intended to create tax transparency, but rather transparency in government finances to halt corruption. The report by Porsch et al. (2018) lists as

the first goal of the accounting directive to enable civil society to hold governments responsible for the revenues received from the natural resources industry. It even states that attempts by civil society to hold companies accountable for the revenues are an unfortunate side effect. It is clear that the goal of the policy is merely to hold governments accountable after the fact of tax receipt, not to question the tax base allocation by corporations. We do not evaluate the effect of limiting corruption in this paper but note that this plays strongly into the motivation behind the standard, in contrast to other standards.

The banking CBCR's objective was to

> allow stakeholders to gain a better understanding of the structures of financial groups, their activities and geographical presence and help [them] to understand whether taxes are being paid where the actual business activity takes place. Mandatory country-by-country reporting is an important element of the corporate responsibility of institutions towards stakeholders and society and will help to restore trust in the banking sector (European Parliament and Council of the European Union 2013: 18).

Whether this objective has been achieved is a question examined by Murphy et al. (2019), who reveals a lack of understanding of the technical and structural weaknesses of accounting in a transnational context in the design of the regulation.

The full name of the CBCR BEPS Action 13 was 'Transfer Pricing Documentation and Country-by-Country Reporting' and, indeed, the final report specifies the objectives for CBCR together with those for transfer pricing documentation:

> Taken together, these three documents (master file, local file and Country-by-Country Report) will require taxpayers to articulate consistent transfer pricing positions and will provide tax administrations with useful information to assess transfer pricing risks, make determinations about where audit resources can most effectively be deployed, and, in the event audits are called for, provide information to commence and target audit enquiries. This information should make it easier for tax administrations to identify whether companies have engaged in transfer pricing and other practices that have the effect of artificially shifting substantial amounts of income into tax-advantaged environments. The countries participating in the BEPS project agree that these new reporting provisions, and the transparency they will encourage, will contribute to the objective of understanding, controlling, and tackling BEPS behaviours (OECD 2015b: 9).

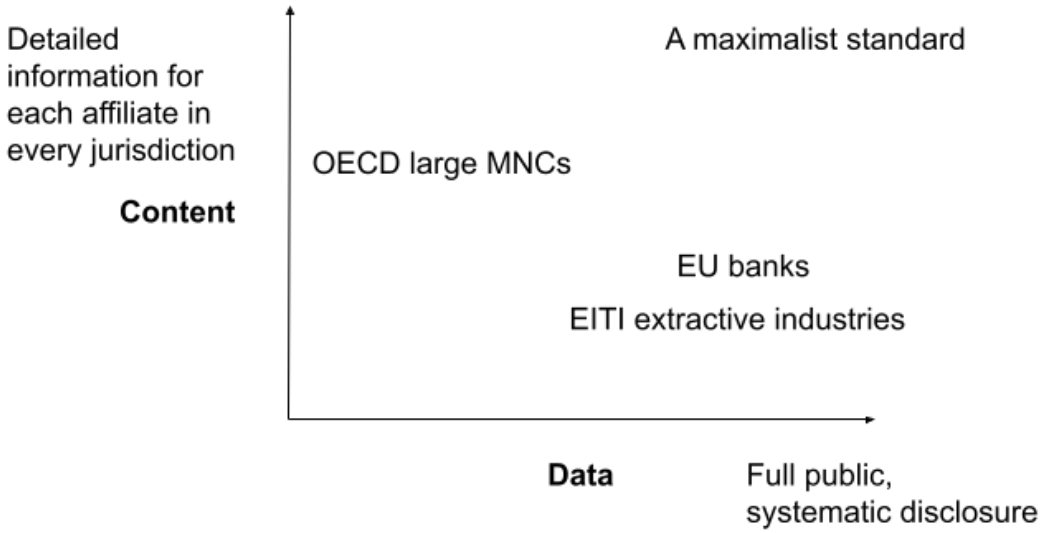
While experts currently use CBCR to estimate the scale and nature of tax avoidance, such use is notably not included in the stated objectives, where the focus is more narrowly on auditing and tax authority use (OECD 2015b). The focus is thereby on the accountability of single companies, while the potential for macro-economic insights is not included.

3.3 Content

The amount of information and the financial reporting variables being disclosed have increased with each new CBCR standard. The content has progressed from information on payments to governments only in the EITI standard to five and eight relevant variables in the banks' and large MNCs' standards, respectively. Nevertheless, the amount of detailed information on each affiliate in each jurisdiction still falls short of the maximalist standard envisaged by Richard Murphy (e.g., Murphy 2003) (Figure 1). The number of variables alone is low compared with what is usually

observed in the consolidated accounts of MNCs. The three standards require less than ten variables, whereas Murphy (2003: 10–12) proposes an extensive list of key financials, activities, and intra-group transactions (see Cobham et al. 2017).

Figure 1: The CBCR standards according to content and data



Source: authors' construction based on Murphy (2003).

The choice and the quality of these variables is, however, even more important and the fact that assets, for example, are not included in the banks' standard is significant. In terms of the quality of the data, an important concern in the large MNCs' CBCR standard is double counting (Garcia-Bernardo et al. 2021). The resulting data might double count profits since some MNCs include as profits tax-exempt dividends flowing through subsidiaries. This potential double counting was identified early on and rectified in 2019, with clarified reporting starting in 2020 and the resulting aggregate data soon to be published, but some issues with accounting conventions remain (Blouin and Robinson 2020).

3.4 Data availability

How the resulting data can be accessed and by whom differs across the three CBCR standards. Companies in both the extractive and financial sectors need to disclose their data publicly and usually do so through their websites. Extractive industry companies' data are assembled in the EITI database, which we utilize in the empirical section of this paper.

In the case of banks, multiple research teams (e.g., Dutt et al. 2019b) manually collect the CBCR data from the banks' websites, but no centralized or systematic continuous collection by an official body takes place. Some banks' data are scattered across multiple websites or not available for early years. Still, all the data from both the extractive firms' and banks' standards are publicly available.

In contrast, the public nature of the disclosure of the first two standards was not upheld, since according to the OECD large MNCs are only required to report to the tax authorities in their headquarter countries (the Data dimension displayed in Figure 1 and discussed below). This information can then be shared with other tax authorities (Janský et al. 2021a) and, in anonymized and aggregated form, with the public (OECD 2021). While there was a lack of a developed system of quality assurance, reporting coordination, and data compilation for the first two standards (for example, with banks publishing data on their websites and differing use of concepts or aggregating), the OECD standard is more robust and tax authorities regularly peer-review each other.

The private nature of the large MNCs' CBCR standard might prove only a temporary setback for transparency since, for example, the EU approved legislation in 2021 to require large MNCs to share parts of their CBCR data with the public and there is pressure from civil society for full public disclosure (Janský et al. 2021a). We might expect the first such data to be published around 2023/24 (exemplifying the often substantial time lags between discussion, approval, and publication). To sum up, about 20 years ago, Richard Murphy set out a renewed vision for CBCR that was maximalist along several dimensions (Murphy 2003). In terms of background, his objectives are broader than and inclusive of each stated objective of the three standards discussed above, aiming 'to provide information that will assist those seeking to appraise the organisation with regard to: its corporate social responsibility; [its] investment risk; [its] tax risk; its contribution by way of value added to the societies in which it operates; its contribution to national well-being by way of tax payment within those locations' (Murphy 2003: 2). Content-wise, all the implemented CBCR standards are much less demanding in terms of the reported information. Cobham et al. (2018) argue that such maximalist public CBCR is key to re-establishing appropriate disclosure and ultimately the accountability of MNCs. However, most of the actual CBCR implementations are more minimalist, covering only some information, such as payments to governments, and have not been adopted uniformly across the different applications and proposals (Wójcik 2015). A summary of the three existing CBCR standards in terms of their actors, objectives, content, and data is given in Table 1.

Table 1: The three CBCR standards in terms of their actors, objectives, content, and data

Standard	Actors	Objectives	Content	Data
EITI extractive industries	MNCs in extractive industries, EITI, EU, individual governments such as Canada and Norway	Originated in 2003 from the need to increase transparency over payments; the EU in 2013 aimed to 'improve the transparency of payments made to governments all over the world' C 2013)	Payments to governments	Public disclosure (on MNCs' websites)
EU banks	Banks, EU, governments of EU countries	Originated in 2013 'to understand whether taxes are being paid where the actual business activity takes place' (European Parliament and Council of the European Union 2013: 18)	Profit, tax, turnover, number of employees and public subsidies for each country a bank operates in	Public disclosure (on the MNCs' websites)
OECD large MNCs	Large MNCs worldwide, OECD, governments	Originated in 2015 to 'require taxpayers to articulate consistent transfer pricing positions and provide tax administrations with useful information to assess transfer pricing risks' (OECD 2015b: 9)	Revenues (related- and unrelated-party), profit, tax (cash basis and accrued), stated capital, accumulated earnings, number of employees, tangible assets	Private disclosure (to tax authorities), public only aggregated and anonymized data for some headquarter countries

Source: authors' construction based on the cited sources.

4 Empirical analysis

International economic statistics on key indicators such as trade, GDP, or FDI are increasingly misleading as measures of real economic activity due to the strategic misreporting for tax reasons undertaken by MNCs. Therefore, anyone interested in the accuracy of these key statistics should be excited that new reporting standards have emerged which are aimed at measuring specifically the activities of MNCs. If these new data standards enable us to measure misalignments between economic activities and tax base, we may be able to fill the gaps in international economic statistics.

It is possible to use existing macro statistics to estimate the size of illicit financial flows and corporate tax avoidance, though the estimates vary widely. A recent book (Cobham and Janský 2020) and paper (Cobham et al. 2021) compare different data sources and methods to estimate tax avoidance, and find that CBCR data are currently the most suitable data source for estimating the scale of illicit financial flows by MNCs. These data have been used in studies which have advanced the debate on tax avoidance and illicit financial flows (Brandt 2020; Collin 2020; Johannesen and Pirttilä 2016). This section evaluates the extent to which the different CBCR standards can be used to estimate tax avoidance in ways that will improve macro statistics.

4.1 CBCR in banking

EU banks have been required to publicly report data on profit, number of employees, turnover, and tax on a country-by-country basis since 2014. The resulting CBCR data for banks have been used to measure the extent of tax avoidance in an increasing number of studies (e.g., Aliprandi et al. 2021; Bouvatier et al. 2018; Brown et al. 2019; Dutt et al. 2019b; Fatica and Gregori 2020; Janský 2020; Murphy 2015; Murphy et al. 2019). These studies use the CBCR data to measure tax avoidance and provide granularity not found in aggregate statistics, such as which specific banks or tax havens are most closely linked with tax avoidance. The studies are well aware, however, of limitations to the data, which make them unable to fully detect tax avoidance and therefore even less suitable for correcting macro statistics. Each study provides an informative discussion of the problems with the data and their potential consequences, including limited comparability across CBCR from different banks. In this approach, Murphy et al. (2019) likely go furthest and blame the quality of the CBCR standard itself for the significant problems with the data. Their findings reveal a lack of understanding of the technical and structural weaknesses of accounting in a transnational context in the design of this standard. Furthermore, they argue that the CBCR is destined to fail in achieving its regulatory objectives unless reform of the regulation is undertaken—reform that has been only partly addressed by the OECD standard for large MNCs.

On balance, the evidence based on the CBCR data in banking does provide some useful information about tax avoidance that was not available with the old data sources, but it is not suitable for correcting international economic statistics. In other words, since the CBCR data can be used to track misalignments only in a limited way, it remains doubtful whether this CBCR standard is able to improve our measurement of the economy.

4.2 CBCR for large MNCs

While CBCR data for large MNCs are not as widely available as those for banks, they have been used to measure the extent of tax avoidance in a range of papers (Bratta et al. 2021; Clausing 2020; Cobham et al. 2021; De Mooij et al. 2019; Fuest et al. 2022; Garcia-Bernardo et al. 2021; Garcia-Bernardo et al. 2022). In comparison with the old data sources (macro statistics), Garcia-Bernardo et al. (2021) argue, CBCR includes the most reliable country-level information about MNCs' tax payments and profits to date and it covers an extensive range of countries, including tax havens

often omitted from existing data sources. It therefore represents a great improvement in the potential for correcting international economic measures of illicit financial flows, though some issues remain, in relation to both accessibility and reliability.

Remaining issues include different reporting requirements by governments for dividend payments (Horst and Curatolo 2020) and inconsistency in the required data sources across reporting entities. These make it difficult to produce reliable results on an aggregated level, as reporting standards on the micro level are not homogeneous (Blouin and Robinson 2020). However, there is a proven commitment from the OECD to improve this CBCR standard. For example, there was some double counting in profits (Garcia-Bernardo et al. 2022), which has already been resolved by changes in the regulation.

Another challenge for this data standard is its confidential nature, in that only tax authorities have access to the disaggregated data. Public access to the data would enable researchers to improve appropriations of the scope of profit shifting by large MNCs. Some progress has been made in this area, as Bratta et al. (2021) and Fuest et al. (2022) have been granted access to data by governments in Italy and Germany, respectively. The usefulness of these CBCR data therefore presently depends on the willingness of governments to share them and the resources to replicate this research across countries.

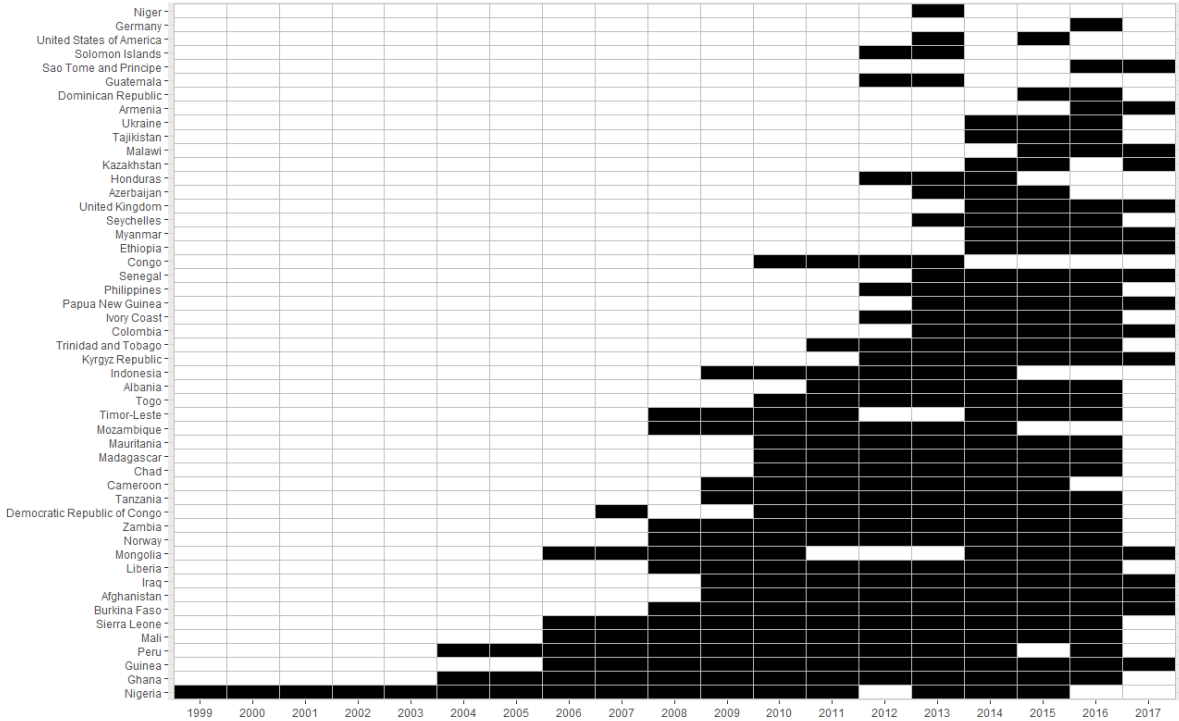
Despite the CBCR for large MNCs being private and not public and therefore data on individual MNCs not generally being available, there are reasons for optimism, particularly due to the EU's introduction of partial public access in 2021, which could make the standard useful for correcting macro statistics for tax-motivated illicit financial flows by large MNCs.

4.3 CBCR for extractive industries

Misalignment has not yet been estimated with the CBCR data for the extractive industries, as far as we know. Given that the extractive sector has been covered by CBCR for longer than the banking sector, one might expect to find a host of similar studies analysing these data. However, Adebayo et al. (2021) is one of few papers using the data from CBCR in extractive industries—in this case for gold mining projects—and it finds that political economy variables correlate with government revenue, but does not estimate the extent of the missing revenue. We evaluate the CBCR standard in extractive industries in this section.

We obtain a summary database of payments reported under EITI for the period 1999–2017 from resourcedata.org (EITI Complete Summary Data Table 2021). The database contains data on government revenues per revenue stream and company and includes payments of companies operating in 50 countries. It is generated from EITI API. Figure 2 illustrates the coverage of the database: black cells mean that data are available. Data availability has clearly improved over time as data are becoming available for more and more countries, but it is still not comprehensive and, for many of the countries covered, data for specific years are missing. For example, in what is the longest-running time series, data are available for Nigeria for every year between 1999 and 2015, except for 2012. In total they cover 65,393 transactions between respective companies and government entities classified according to the Government Finance Statistics coding system. Nevertheless, the database alone is of little use as it does not provide any information on the fiscal regime relevant to each recorded transaction.

Figure 2: Coverage of the EITI database



Note: black cells represent years for which data from EITI are available for a given country. Ordering is by number of years covered, which is the most relevant dimension for this study.

Source: authors' construction based on EITI Complete Summary Data Table (2021).

The fiscal regime for extractive companies is often determined on a discretionary basis in the negotiation of contracts (UN Department of Economic and Social Affairs 2018), which often includes the concession of tax advantages such as tax holidays or lower corporate income tax rates (Stausholm 2022). In addition to these, companies might use various strategies to lower their tax bill, such as transfer pricing. If the question is whether the right amount of tax has been paid relative to the profitability of the extractive project, both the tax advantages given by the government and the tax arrangements made through international structuring of the company are relevant to the discussion.

A wider context including all the tax provisions a firm is qualified for is necessary to determine the level of tax a firm is supposed to pay. Without knowledge of the tax rate, tax credits, tax holidays, and other tax incentives that are used to attract inward foreign direct investment (Linsi 2020; Reurink and Garcia-Bernardo 2020), it is impossible to link the fact that a company has paid zero or very low levels of tax in a country to aggressive tax planning (or tax avoidance) strategies. As the fiscal regime in the extractive sector is often determined not only by statutory laws but also by discretionary arrangements made in contracts, details of these contracts are crucial as a link to CBCR data and a key to what tax payments mean in context. To identify whether the 'right' amount of tax has been paid, a researcher or civil society organization would need to know the details of the fiscal regime, the profitability of the project, and how much tax has been paid. This allows the effective tax rate to be calculated and compared with the fiscal terms of the legislation and contract.

To evaluate the CBCR in the extractive sector the data need to be combined with other sources to give an indication of activities and fiscal regimes. We use two data sets to focus on the same payments by companies in an effort to gain the context necessary to evaluate the tax payments in the sector. We use the resourceonctracts.org database (Resource Contracts 2021) as a source of information about fiscal regimes relating to transactions covered by the EITI database. The

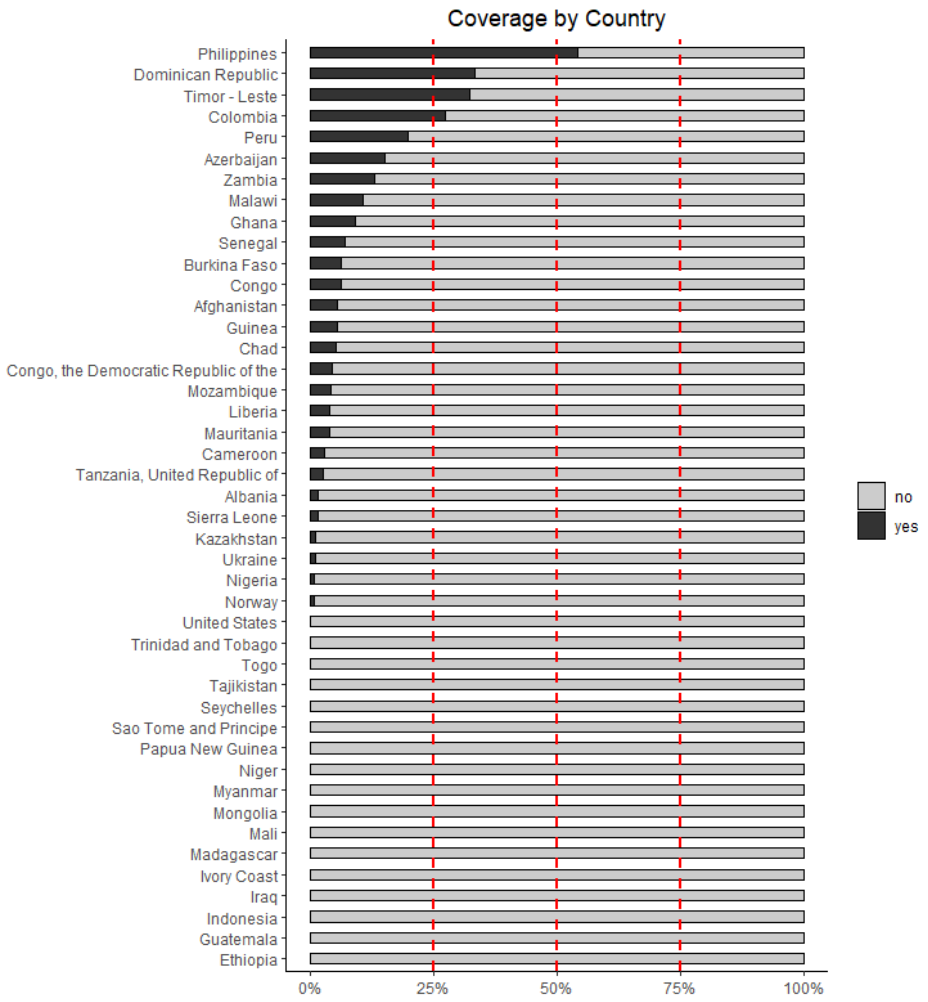
database contained 2,590 contracts from 97 countries at the moment of our access. Of these, 44 countries are also covered by the EITI database. This leaves 1,745 potentially relevant contracts. Nevertheless, not all these contracts relate to payments reported in the EITI database. Therefore, we need to connect the databases to identify relevant contracts and, in turn, transactions in the EITI database for which the fiscal regime is available.

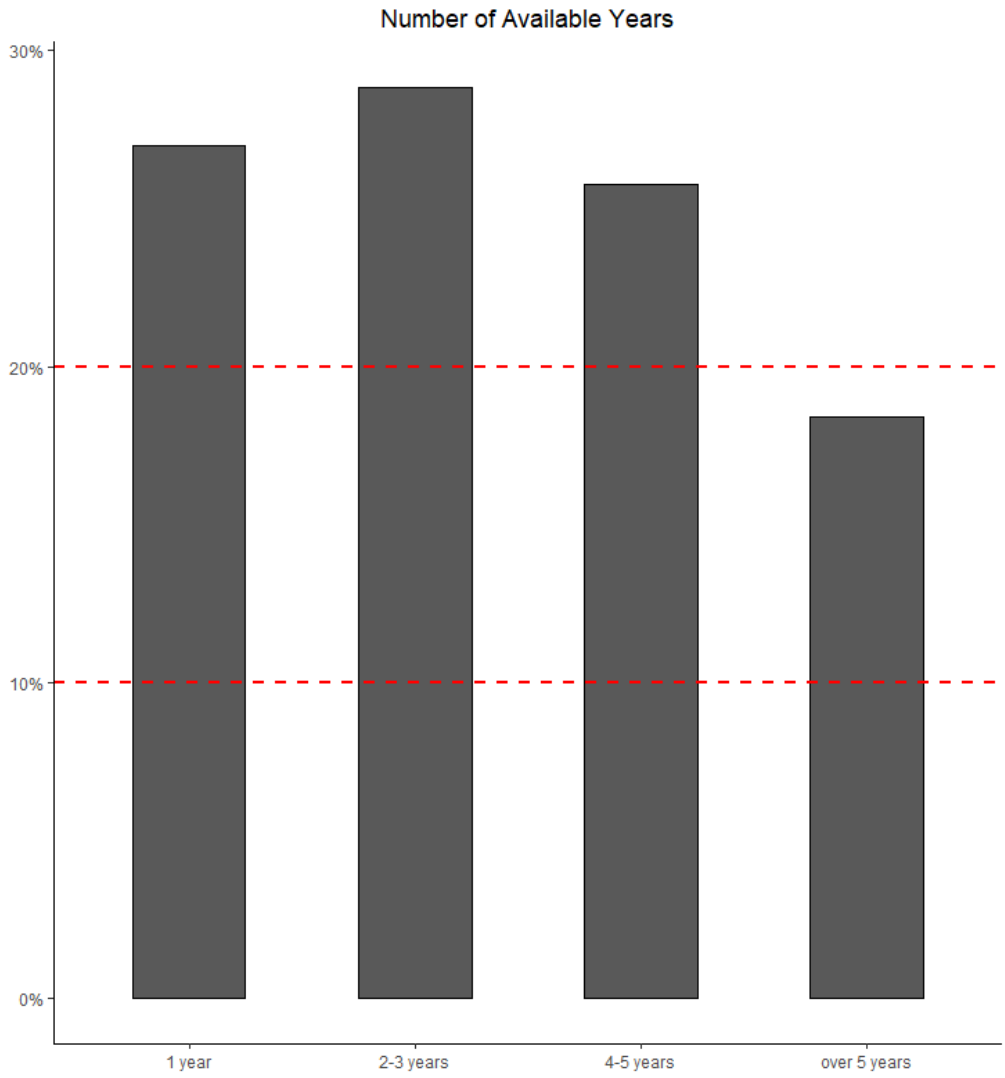
We adopt the following approach to matching the EITI and resourceontracts.org databases. First, we split up both databases by country and conduct all matching by country. This eliminates the risk of matching companies operating in multiple countries. Second, we use the company name to match the transaction with a relevant contract. We process all recorded names in the following way. We convert the name to lower case, remove punctuation and spaces, remove common words and abbreviations which might be written differently in different databases (e.g., 'limited' and 'ltd'), and remove all accents. We then use the processed names to identify companies covered in both databases. We conduct a second match based on company identification number to obtain a more precise identification of covered transactions from the EITI database. However, while the company identification number is available for the majority of companies in the EITI database, it is lacking for a significant portion of those in the resourcecontracts.org database. This leads us to base the first round of matching on company names. Nevertheless, when available, the company id enables us to match additional companies. As a further check we use the year of origin of the respective contract, as some transactions reported in the EITI database might have occurred before the contract was in place.

Combining the EITI and resourceontracts.org databases results in a low number of matches. We can match the payments with the respective contract for just 3.3 per cent of companies covered by the EITI database. This means that for 96.7 per cent of the companies covered by the EITI database we cannot match their payments to the respective contract. Yet the fiscal regime cannot be evaluated without access to the contract. The matched sample corresponds to 164 companies. The top panel of Figure 3 illustrates the size of the matched sample across countries.

For the 163 matched companies, annual reports are used to find measures of profitability. These are in principle available for all the companies but are not necessarily easy to use, since reporting formats differ and the databases from which they are compiled (e.g., Orbis) do not have a comprehensive coverage of companies (Bajgar et al. 2018). The amount of longitudinal data remains a challenge even in the hypothetical case of fully available annual reports. As extractives projects can often take a decade of development before being profitable, it is necessary to have several years of data to get a good idea of the tax behaviour of the companies. As the bottom panel of Figure 3 illustrates, however, most of the matched companies report tax data for less than three years. This is far too short a period for a typical extractive industry project to be profitable and pay any taxes and is therefore one of the clear limitations of the existing data.

Figure 3: Coverage of the matched EITI and resourceonctracts.org databases





Note: the top panel represents the share of companies for which the relevant contracts can be identified for each country covered by EITI; the bottom panel represents the share of covered companies reporting payments for a respective period.

Source: authors' construction based on EITI Complete Summary Data Table (2021) and Resource Contracts (2021).

5 Discussion

Some economic data are problematic because they reflect the outdated economic dynamics of their time. Illicit financial flows are a key reason for the difficulty in measuring 'real' financial and trade relationships. Misalignment and manipulation of trade and ownership relations for tax minimization purposes skew international statistics. A movement towards transparency, aimed at countering, among other things, corruption and tax avoidance, has produced new reporting standards. But do these reporting standards produce data that can illuminate the fundamental blind spots in current international statistics?

We evaluate the usefulness of three international country-by-country reporting standards on the basis of whether they can provide reliable estimates of global tax avoidance and profit misalignments, which are needed in any attempt at improving international macroeconomic

statistics. Specifically, we look at the CBCR standard for EU banks, the CBCR standard for large OECD multinationals, and the CBCR standard for extractive industries pioneered by EITI and legislated by the EU. For the last case, we provide original empirical analysis of how compatible the data generated by the standard are with other data needed to appraise the taxation of extractives projects. We find that the standard fails the test of being able to provide reliable and contextual data for the great majority of companies.

It should be noted that our research does not evaluate all objectives of transparency, and that the publication of the data may be helpful for other purposes. In other research papers using the data, Sovacool et al. (2016) find that EITI has not improved development outcomes in compliant countries and Sovacool and Andrews (2015) find that it is difficult to attribute governance improvements causally to the EITI for the cases of Azerbaijan and Liberia. This points to the standard being helpful to improve transparency but not able to overcome larger issues, including the behaviour of kleptocratic governments.

We also leave aside the issue of whether CBCR in itself leads to improved behaviour by MNCs—which is shown by De Simone and Olbert (2019) and Joshi (2020) for private CBCR, by Overesch and Wolff (2019) for public CBCR, by Dutt et al. (2019a) for banks, and by Johannesen and Larsen (2016) and Rauter (2019) for extractives. In this paper, we do not question these indications of the relative success of CBCR in leading to fewer profits booked in tax havens. Given that Johannesen and Larsen (2016) find an effect of CBCR in the market valuation of firms even before the policy was implemented, it would appear that (the threat of) transparency may be more significant than the actual data reporting. But if the underlying reporting is poor, not only may the standard not help address some of the deficiencies in current economic data, but self-policing effects may also be short lived.

Statistical measurements reflect the economic relations of their time (Mügge 2019) and have therefore in many cases become outdated. But new data standards will also reflect the economic power relationships of their time. The choices involved in creating new CBCR standards on a global level have been impacted by the compromises of different stakeholders and ended up in partial standards with limited accessibility. The adoption of a more maximalist version of CBCR would potentially remedy these issues and satisfy the needs of several stakeholders, from tax authorities to researchers and civil society—with the obvious exception of the affected companies themselves, and potentially of countries benefiting from the facilitation of illicit financial flows by the offshore financial sector.

Overall, CBCR holds some potential for producing data that can shed light on the dark corners of our current economic knowledge. However, the current standards are incomplete and lack coherence and workability, and the multitude of standards in itself makes them hard to work with. We find that the extractive industries have the poorest standard, which it is virtually impossible to use for anything other than verifying concrete payment figures; though this may be an important tool for civil society in some countries, it is not broadly helpful in improving international economic governance through statistics. Indeed all three standards, and particularly the extractive industry standard, fall short of enabling thorough research on profit reporting and tax-motivated misalignments by multinational corporations.

6 Conclusion

Our research question was whether statistical standards can be used to improve macro statistics by accounting for tax avoidance and illicit financial flows. The corrosion of international economic

statistics poses a threat to global political and economic governance. While there are few formal initiatives aimed at improving the widely established but increasingly outdated statistical standards, demands for transparency from multinational corporations and kleptocratic governments have produced new data which could provide an avenue towards correcting macro figures. Though tax avoidance by MNCs is not the only problem with international statistics, it is an important part of it. To the extent that country-by-country reporting is able to provide reliable measures of these tax-motivated misalignments, improvements in standards could have wide ranging-consequences for economic research and governance.

We evaluate the usefulness of the three implemented CBCR standards. We find that while they provide some ways to identify tax avoidance by some MNCs, some of the time, they fall far short of providing an extensive and systematic overview of global misalignments. This is particularly so for the standard for extractive industries, which is so limited that it can barely detect any multinational activity—even when combined with data from other mandatory and voluntary disclosure regimes. To be fair, correcting macro statistics has not been the objective of any of these standards, and detecting tax avoidance has not even been the objective behind the standard for extractive industries. In fact, it is seen as an unfortunate side effect (Porsch et al. 2018). The EU evaluates the CBCR standard for extractive industries as a huge success in terms of compliance, given that most companies meet the reporting requirement. While compliance might be high, however, it is important for regulation not to fall into the trap of being a 'tick the box' rule. The evaluation criterion of these initiatives should not be whether companies have complied with the submission of information but rather whether the information gathered is useful for researchers, regulators, and policy-makers more widely.

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