

Examinations of the Relations Between Tax-Motivated Income Shifting and Private and Public Country-  
by-Country Reporting

by

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## **Author's Declaration**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

## Abstract

Multinational corporations' (MNCs') tax-motivated income shifting concerns governments and policymakers worldwide. In this thesis, I examine how disclosure can address this concern by studying the relation between mandatory private country-by-country reporting (CbCR) disclosure, voluntary public CbCR disclosure, and MNCs' tax-motivated income shifting.

Extant research has failed to find robust evidence that mandatory private CbCR disclosure to the tax authorities has significantly decreased MNCs' tax-motivated income shifting. These results have been widely cited and interpreted as evidence that MNCs' income shifting did not decrease in the post-CbCR implementation period. I revisit this question by replicating the results of prior research, lengthening the sample period, and expanding the sample beyond the European Union. Using affiliate-level income shifting models, I find robust evidence that MNCs shift significantly less income in the post-CbCR implementation period. On average, MNCs have decreased their income shifting by half since the implementation of CbCR, and these decreases are monotonic across MNC size and not concentrated amongst MNCs subject to mandatory private CbCR. Altogether, I show that the objective of CbCR in reducing income shifting was achieved around the time CbCR was implemented; however, I provide compelling evidence that the CbCR consolidated revenue threshold did not matter, making it unlikely that it was the CbCR disclosure to the tax authorities that resulted in the decrease in income shifting. Consistent with the overarching focus of the Organisation for Economic Cooperation and Development's Base Erosion and Profit Shifting (BEPS) framework, I find that MNCs headquartered in countries with strong regulatory environments, an interest deduction limitation consistent with BEPS *Action 4*, and no preferential tax regimes named in BEPS *Action 5*, exhibit greater decreases in income shifting relative to MNCs headquartered in countries with weak regulatory environments and not compliant with *Action 4* or *Action 5*. These findings have important implications for governments and policymakers worldwide as they work to curb MNCs' income shifting and implement BEPS action items.

Then, I consider MNCs that voluntarily disclose CbCR publicly to determine whether this disclosure is a credible signal of their tax behavior. I use a unique hand-collected dataset of MNCs that disclose CbCR in their sustainability reporting, consistent with the Global Reporting Initiative's sustainability-tax reporting standard. After explicitly modelling the endogenous disclosure decision and controlling for the post-CbCR implementation period, I find that MNCs that voluntarily disclose CbCR publicly significantly decrease tax-motivated income shifting in conjunction with disclosure, relative to the pre-disclosure period. The propensity for reduced income shifting is greater amongst MNCs that provide detailed CbCR disclosure, which is consistent with the costliness of such a detailed disclosure. Overall, I find that sustainability reporting is a mechanism within which MNCs differentiate themselves, consistent with a separating equilibrium, by demonstrating that the voluntary disclosure of complex tax information that is not easily verifiable can be a credible signal of the underlying tax behavior. This evidence has important implications for stakeholders interested in utilizing voluntary tax disclosures.

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## **Dedication**

To Otis. I couldn't have done it without you.

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# Chapter 1

## Introduction

### 1.1 Motivation and Summary of the Thesis

Tax authorities, policymakers, media, and the public scrutinize multinational corporations' (MNCs') international tax planning activities (e.g., The Guardian [2009], Bergin [2012], Gilleard [2012], Organisation for Economic Co-operation and Development (OECD) [2013], Wayne et al. [2014], Bowers [2017]). Due to their international footprint and resource availability, MNCs have historically exploited opportunities or gaps in international tax laws and shifted income amongst their geographically-dispersed affiliates. Income shifting is the act of reporting income in a jurisdiction other than where the income was earned, usually to take advantage of preferential tax rates and regulations. Shifting income to low-tax or no-tax jurisdictions can improve after-tax income by reducing the MNC's global income tax burden. Although this behavior is legal, some consider it unethical or aggressive. In particular, shifting income to countries with little to no corresponding change in real economic activity is considered particularly aggressive and is the type of income shifting I study in this thesis.

The OECD [2024a] estimates that income shifting behavior is significant, resulting in lost global tax revenues of 100-240 billion USD annually. Disclosure is one potential method of addressing this global tax challenge (OECD [2024a]). In this thesis, I study the following research questions: Did mandatory private country-by-country reporting (CbCR) disclosure to the tax authorities significantly decrease the tax-motivated income shifting of MNCs? Do MNCs that voluntarily disclose CbCR publicly further decrease their tax-motivated income shifting in conjunction with disclosure?

To combat base erosion and profit shifting (BEPS), the OECD developed a framework comprising 15 action items. As of May 28, 2024, 147 countries have agreed to the BEPS framework (OECD [2024a]). One of the first items implemented, *Action 13 Country-by-Country Reporting*,

requires large MNCs to prepare CbCR for submission to the tax authorities (hereinafter referred to as “private CbCR”; see Appendix A for private CbCR regulations by country). The OECD [2015] has issued guidance and a template on information disclosed in CbCR; this includes total and related-party revenue, pre-tax income, income taxes paid and accrued, stated capital, accumulated earnings, and real activities (tangible assets, number of employees) in each country (see Appendix B for an example of CbCR). The OECD [2013] proposes that the level of real activity in a jurisdiction is the key driver of the appropriate income reported in that jurisdiction, suggesting that CbCR can be used to identify MNCs’ income shifting behavior. Tax authorities can then use this information to improve their tax audit selection and increase the cost of MNCs’ income shifting behavior.

While disclosure has the potential to alter tax planning behavior, prior research has failed to find robust evidence that private CbCR disclosure has resulted in a significant decrease in MNCs’ income shifting: Joshi [2020] finds some evidence that European MNCs subject to private CbCR exhibit a small decrease in income shifting in 2018, as detailed below, whereas Nessa et al. [2022] fail to find evidence that US MNCs decrease their income shifting any year after the implementation of CbCR. Instead, prior research has found that MNCs, except for US MNCs (Nessa et al. [2022]), increase their real activities in low-tax European countries after the implementation of private CbCR (De Simone and Olbert [2022]), likely to substantiate the income reported in these countries.

Using a sample of affiliate-years belonging to MNCs headquartered in the European Union (EU) from 2010 to 2018, Joshi [2020] finds some evidence that EU MNCs subject to private CbCR exhibit a small decrease in income shifting in 2018. However, this evidence is found in only one of three regressions using her unrestricted sample of MNCs and their affiliates. Joshi [2020] also finds that affected EU MNCs with affiliates located in countries with above-median tax enforcement dollars (scaled by GDP) decrease their income shifting after the implementation of private CbCR. Joshi [2020]

interprets her results as private CbCR having “a limited effect on tax-motivated income shifting” (p. 334).

That private CbCR did not appear to significantly decrease MNCs’ income shifting is worth further examination, which I conduct in Chapter 3. International income shifting typically involves highly complex structures spanning multiple countries and multiple layers of corporate entities. These structures are costly to implement in terms of both time and money and, therefore, can take significant time to dismantle and replace with other tax-efficient structures. Thus, it is plausible that the effect of private CbCR on income shifting would be seen in the lengthening of the sample period. Additionally, there may be country-level differences in MNCs’ income shifting responses, consistent with Joshi’s [2020] evidence of a decrease in income shifting among affiliates located in countries with stronger tax enforcement. Thus, it is also plausible that the effect of private CbCR on income shifting would be seen in the expansion to a global sample of MNCs.

To answer my first research question, I begin by replicating the results of Joshi [2020]. I then expand beyond the sample of Joshi [2020]. First, I remove the sample restriction that all MNCs must have an international securities identification number (ISIN) listed in *Orbis*, which effectively limits the sample to very large public MNCs. Simply by eliminating this restriction to allow for smaller public MNCs and private MNCs in the sample, I find that EU MNCs – both those subject to private CbCR and those below the reporting size threshold – significantly decrease their income shifting after the implementation of private CbCR, on average.

Next, I lengthen the sample period from 2018 to 2021 and expand the sample to MNCs headquartered in any country with a private CbCR regulation implemented during the sample period. I again find statistically significant evidence that both treated and untreated MNCs, on average, exhibit a significant decrease in income shifting in the post-CbCR implementation period.

As described in detail in Chapter 3, I formally test my first hypothesis by using the Huizinga and Laeven [2008] and De Simone et al. [2017] affiliate-level income shifting models modified for difference-in-differences designs surrounding the implementation of private CbCR regulations. I find statistically significant evidence that MNCs' income shifting has significantly decreased alongside the implementation of CbCR, with estimates suggesting that, on average, MNCs have decreased their income shifting by approximately half.<sup>1</sup> However, based on the difference-in-differences coefficients and the monotonic decreases in income shifting across MNC size, I provide compelling evidence that the CbCR consolidated revenue threshold did not matter, making it unlikely that it was the CbCR disclosure to the tax authorities that resulted in the decrease in income shifting.

Several possible explanations exist for the observed effect on non-treated MNCs, such as peer effects or anticipation that the regulations would extend to smaller MNCs. I assert that it is the OECD's BEPS framework and the related policies of the member countries that contribute to the reduction in income shifting. Several other BEPS action items that target income shifting were introduced alongside private CbCR, such as *Action 4 Limitation on Interest Deductions*. Notably, these action items generally apply to all MNCs by having *de minimis* thresholds below that of private CbCR – meaning that they apply to the non-treated MNCs in my sample.

In additional analysis, I explore cross-sectional differences in the regulatory environments of MNCs' headquarter-countries to provide evidence for this assertion. I find that MNCs headquartered in countries with stronger regulatory environments exhibit greater decreases in income shifting in the post-period than MNCs headquartered in countries with weaker regulatory environments. This finding is consistent with countries with strong regulatory environments being more likely to implement and enforce the BEPS action items, increasing the cost of MNCs' income shifting in those countries. In a

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<sup>1</sup> Table 5 Panel B:  $CbCR=0: (1.155 - 0.671) / 1.155$ ,  $CbCR=1: (0.786 - 0.335) / 0.786$

more direct test, I find some evidence that MNCs headquartered in countries not compliant with BEPS *Action 4 Limitation on Interest Deductions* or *Action 5 Harmful Tax Practices – Preferential Tax Regimes* exhibit smaller decreases in income shifting in the post-period than MNCs headquartered in countries that comply with *Action 4* and *Action 5*. This result is consistent with my assertion that the BEPS framework and related policies contribute to the reduction in income shifting.

Then, in Chapter 4, I consider the tax-motivated income shifting behavior of MNCs that voluntarily disclose CbCR publicly. To further combat MNCs' income shifting behavior and to provide firm stakeholders with greater information about MNCs' tax behavior and global economic activity, various policymakers and standard setters have called for MNCs to disclose CbCR publicly.<sup>2</sup> For example, on December 21, 2021, the European Commission's *Directive 2021/2101* came into force for EU member states. MNCs with a presence in the EU and consolidated annual revenue greater than €750 million must issue public CbCR effective the first fiscal year beginning on or after June 22, 2024 (Ernst & Young LLP [2021]). Similarly, on June 5, 2024, the Australian government introduced draft legislation on public CbCR. If implemented, MNCs with a presence in Australia and consolidated annual revenue greater than 1 billion AUD must issue public CbCR effective the first fiscal year beginning on or after July 1, 2024 (Ernst & Young LLP [2024]). In 2017, the Global Reporting Initiative (GRI), the world's most used sustainability reporting standard, announced its intention to develop the first sustainability-tax reporting standard, which includes the disclosure of CbCR. Although this disclosure is not mandatory, it is "required" for firms wishing to state that their sustainability reporting complies with GRI standards (GRI [2019]).

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<sup>2</sup> This is in contrast to mandatory public CbCR for EU financial institutions (Eberhartinger et al. [2020], Joshi et al. [2020], Overesch and Wolff [2021]).

After the OECD announced CbCR in 2013, and particularly after CbCR regulation was first enacted in 2016, firm stakeholders became aware that MNCs had compiled country-by-country tax and economic activity information that they were not required to disclose through other channels. This information gap has become particularly salient given the repeated calls for MNCs to issue CbCR publicly.

However, some MNCs already voluntarily disclose CbCR publicly (hereinafter referred to as “voluntary public CbCR”; see Appendix B for an example). The voluntary public disclosure of a firm’s private tax information, also called voluntary tax transparency, has recently exploded in practice in conjunction with the rise in sustainability reporting, particularly the GRI’s sustainability-tax reporting standard, and the OECD’s and the public’s increased attention to MNCs’ international tax planning activities. For example, in 2010, approximately 1% of publicly listed MNCs voluntarily disclosed some tax information within their sustainability reporting.<sup>3</sup> As of 2020, the propensity to voluntarily disclose tax information has increased to 20% (Adams et al. [2024]). Nevertheless, prior research does not provide definitive evidence regarding firms’ voluntary public tax disclosure decisions and their relation with the corresponding tax planning behavior (Dyreng and Maydew [2018], Müller et al. [2020]).

Economic theories of disclosure suggest that MNCs that are not aggressive income shifters would then voluntarily disclose CbCR publicly to signal their “type,” differentiating themselves from “worse” firms. Aggressive income shifters would refrain from disclosure, allowing stakeholders to categorize the firms consistent with a separating equilibrium (e.g., Spence [1973], Grossman and Hart [1980], Grossman [1981], Milgrom [1981], Milgrom and Roberts [1986]).

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<sup>3</sup> For brevity, I use the term “sustainability reports” to also refer to environmental, social, and governance reports, corporate social responsibility reports, integrated reports, and annual reports with a dedicated sustainability section.

In a supplemental test, Adams et al. [2024] find some evidence consistent with this theory: MNCs that exhibit above-median income shifting aggressiveness, on average, voluntarily disclose less detailed CbCR information in their sustainability reporting, controlling for other determinants. However, Adams et al. [2024] focuses on determinants and consequences of tax disclosure in sustainability reporting, rather than CbCR specifically. Adams et al.'s [2024] supplemental test uses a time-invariant binary variable to capture income shifting behavior and does not consider MNCs that do not voluntarily disclose tax information in their sustainability reporting. Thus, it is unknown whether the MNCs that voluntarily disclose CbCR publicly have always been less aggressive income shifters relative to the general population of MNCs and whether voluntary CbCR disclosure is related to a change in income shifting over time. In other words, whether stakeholders can use voluntary CbCR disclosure as a credible signal of MNCs' income shifting behavior remains an open question.

To answer my second research question, I use *Corporate Register* to identify MNCs that voluntarily disclose CbCR in their sustainability reporting.<sup>4</sup> I explicitly model the endogenous CbCR disclosure decision using Adams et al.'s [2024] disclosure model. As described in detail in Chapter 4, I formally test my second hypothesis by using Xu's [2021] two-step instrumental variables method and the Huizinga and Laeven [2008] and De Simone et al. [2017] affiliate-level income shifting models modified for difference-in-differences designs surrounding the MNCs' disclosure initiation years. I find statistically significant evidence that, on average, MNCs that voluntarily disclose CbCR publicly exhibit significantly less income shifting during disclosure compared to their income shifting levels in the pre-disclosure period.

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<sup>4</sup> Sustainability reporting is mandatory for some MNCs in my sample, however, the inclusion of tax information in the reports is not mandatory.

Then, I utilize the characteristics of the voluntary public CbCR disclosures to provide evidence for my assertion that the disclosure is consistent with a separating equilibrium. For this to be the case, it must be costly for aggressive income shifters to mimic their non-aggressive counterparts. Thus, I expect that the MNCs that voluntarily disclose detailed CbCR are not aggressive income shifters, as it would be very costly for aggressive income shifters to disclose such detailed information. To conduct this analysis, I split the voluntary public CbCR discloser sample into those with relatively more versus less detailed CbCR disclosures. I find that the propensity for reduced income shifting is concentrated amongst MNCs with more detailed disclosures, which is consistent with the costliness of detailed disclosure, and with the voluntary public disclosure of detailed CbCR being a credible signal of MNCs' income shifting behavior.

## **1.2 Contribution**

This thesis makes several contributions. First, my results are important to governments and policymakers worldwide, particularly the OECD. I provide much-needed and timely insight into whether disclosure is addressing the ongoing global BEPS challenge. This evidence is critical to document before the implementation of mandatory public CbCR in 2024, so as not to confound the impacts of the regulations. Additionally, my results suggest that mandatory public CbCR and the OECD's proposed BEPS Pillar II rules (global anti-base erosion rules, e.g., the implementation of a global minimum tax) may have limited effectiveness since large MNCs have already drastically decreased their income shifting levels. Pillar II is a legislated and even more complex response to income shifting relative to the solution of private CbCR disclosure.

These results should also be of interest to academic researchers. It has been widely cited that MNCs' income shifting has not decreased after the implementation of private CbCR. To my knowledge, I provide the first global evidence to amend this perception by showing that income shifting has

decreased significantly in the post-CbCR implementation period, and I reconcile this with prior results. I note that Joshi [2020] was clear about the ISIN sample restriction and included a caveat that her results may not hold in a broader sample of MNCs. However, the sample restriction and caveat are generally not mentioned in subsequent citations of Joshi [2020], which may have contributed to this perception. I further provide evidence to suggest that a broader exploration of all the BEPS provisions may yield important insights.

I also contribute to the tax disclosure and the international tax planning literatures by furthering our understanding of how voluntary tax disclosures relate to tax behavior, an understudied area (Dyreng and Maydew [2018], Hoopes et al. [2023]). Specifically, to the best of my knowledge, no global evidence exists on the voluntary public disclosure of CbCR to date except for a supplemental test in Adams et al [2024], as mentioned previously, and the *EU Tax Observatory*'s public CbCR repository and related working paper, which benchmarks the report contents to financial statement information (Aliprandi et al. [2022], Aliprandi and von Zedlitz [2023]).

Moreover, I apply signaling theory to the economically important topic of tax-motivated international income shifting. I find that the rise of sustainability reporting has provided a mechanism for MNCs to differentiate themselves, consistent with a separating equilibrium, by demonstrating that the voluntary public disclosure of complex tax information that is not easily verifiable can be a credible signal of firms' tax behavior. This evidence is distinct from prior research, which generally finds that firms do not exhibit different tax behavior after voluntary tax disclosure (Hoopes et al. [2023]). My finding that this voluntary disclosure is generally inconsistent with greenwashing should be of interest to stakeholders interested in firms' tax transparency and sustainability reporting.

Lastly, I provide evidence to suggest that MNCs that voluntarily disclose CbCR publicly forgo potential tax-saving opportunities in favor of greater transparency. That these MNCs do not appear to

be motivated by tax savings through income shifting is very different from the behavior attributed to the general population of MNCs.

### **1.3 Thesis Organization**

This thesis is organized into five chapters, including this introduction. Chapter 2 reviews the literature relevant to this thesis. This review includes separate discussions of mandatory tax disclosure and voluntary tax disclosure. This review describes recent studies on mandatory private CbCR disclosure and tax-motivated income shifting. It also highlights the lack of empirical research on voluntary tax disclosure and tax planning behavior.

Chapter 3 addresses the first research question on mandatory private CbCR and tax-motivated income shifting. This chapter develops the first hypothesis and details the sample selection procedure and the empirical model designed to test the first hypothesis. This chapter reports the results from the empirical analysis of hypothesis 1 and contains robustness tests and additional analyses to support the inferences drawn from the empirical analysis of hypothesis 1.

Chapter 4 addresses the second research question on voluntary public CbCR and tax-motivated income shifting. This chapter develops the second hypothesis and details the sample selection procedure and the empirical model designed to test the second hypothesis. This chapter reports the results from the empirical analysis of hypothesis 2 and contains robustness tests and additional analyses to support the inferences drawn from the empirical analysis of hypothesis 2.

Finally, Chapter 5 concludes by summarizing the evidence and the main conclusions of this thesis.

## **Chapter 2**

### **Literature Review**

This chapter reviews extant research that is relevant to this thesis. Section 2.1 discusses mandatory tax disclosure and reviews recent studies on mandatory private CbCR disclosure and tax-motivated income shifting. Section 2.2 discusses voluntary tax disclosure and highlights the lack of empirical research on voluntary tax disclosure and tax planning behavior.

#### **2.1 Mandatory Tax Disclosure**

Governments and regulators mandate tax disclosure. Most of the disclosures are private (i.e., submitted to the tax authorities and not released publicly).<sup>5</sup> Other disclosures, such as financial statements for publicly listed firms, are public. Both private and public disclosures are believed to constrain tax behavior by altering the net benefit of undertaking the tax planning activity via three hypothesized mechanisms (Müller et al. [2020]). First, disclosure gives the tax authorities more information, improving their tax audit selection and efforts to ensure compliance with the tax law. Second, policymakers can use the information to find and revise gaps in tax legislation, potentially leading to new, stricter laws. Third, public disclosure can result in public scrutiny and attention to overly aggressive choices, giving firms a greater sense of accountability. Extant research has found that mandatory tax disclosure can discipline tax behavior in many settings, especially those where firms do not have much discretion over the quantity or quality of the information provided (see review by Hoopes et al. [2023]).

The OECD announced mandatory private CbCR disclosure in 2013, and it was implemented in 2016 in the EU and several other countries, including the United States, Australia, and Canada.

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<sup>5</sup> Some exceptions exist, such as the Australian Tax Office's public disclosure of large corporations' total income, taxable income, and taxes payable (Hoopes et al. [2018]; Kays [2022]).

Approximately 115 countries have implemented private CbCR regulations to date (OECD [2024b]). Appendix A details the private CbCR regulations for all countries in this thesis’s global sample.

Mandatory private CbCR disclosure to the tax authorities is hypothesized to constrain tax behavior, specifically tax-motivated income shifting, through Müller et al.’s [2020] first and second mechanisms. Except for the US Internal Revenue Service (IRS), which requires foreign corporation reporting and foreign disregarded entity reporting, tax authorities worldwide were generally not privy to the international activities of MNCs and their affiliates. Thus, CbCR constituted new information that the tax authorities could use in risk assessments and audits. The increased tax authority information and the threat of better-targeted audits alter the net benefit of income shifting. Potential responses include decreasing aggressive income shifting behavior or reallocating real activity to low-tax countries; the latter aims to substantiate the income reported in those countries (Hanlon [2018]).

Prior research has failed to find robust evidence that private CbCR has resulted in a significant decrease in MNCs’ income shifting. In Joshi’s [2020] primary income shifting test, she uses a modified version of the Huizinga and Laeven [2008] affiliate-level income shifting model on a sample MNCs headquartered in the EU from 2010 to 2018. She finds a positive but insignificant coefficient on the interaction of  $C$ , the tax incentive to shift income, and  $CbCR$ , the indicator variable for MNCs subject to private CbCR; a positive but insignificant coefficient on the interaction of  $C$  and  $Post$ , the indicator variable for the years after the implementation of private CbCR in 2016; and a negative but insignificant coefficient on the interaction of  $C$ ,  $CbCR$ , and  $Post$ .<sup>6</sup> When she separately considers the three post-implementation years in her sample, she finds evidence to suggest that EU MNCs subject to mandatory private CbCR decrease their income shifting in 2018. However, this evidence is found in only one of

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<sup>6</sup> Note that Joshi [2020] refers to the Huizinga and Laeven [2008]  $C$  variable as “ $\pi$ ” and reports standard errors which I convert into  $t$ -statistics for ease of comparability.

three regressions using her full sample of EU MNCs and their affiliates. Joshi [2020] also finds that affected EU MNCs with affiliates located in countries with above-median tax enforcement dollars (scaled by GDP) decrease their income shifting after the implementation of private CbCR.

De Simone and Olbert [2022] consider whether MNCs respond to CbCR regulations by altering their economic footprint to better match where their income is reported. Using a sample of EU MNCs from 2012 to 2018, they find that affected MNCs reduce their number of affiliates located in tax haven countries and increase their tangible assets and labor expenses in low-tax European countries after the implementation of private CbCR. Broadly consistent with De Simone and Olbert's [2022] evidence, Joshi et al. [2023] use country-level aggregate CbCR data and foreign direct investment data from the International Monetary Fund (IMF) to show that MNCs realign their fixed assets across countries since the implementation of CbCR, such that the location of their fixed assets better match where their income is reported. These actions reduce the measured intensity of income shifting.

Using a modified version of the Huizinga and Laeven [2008] affiliate-level income shifting model with confidential taxpayer return data from 2011 to 2018, Nessa et al. [2022] fail to find evidence that affected US MNCs decrease their income shifting after the implementation of private CbCR. Then, they modify the income shifting model to examine the sensitivity of tangible assets and compensation expense to the tax incentive to shift income in the post-CbCR implementation period for affected MNCs. They fail to find evidence that affected US MNCs alter their real activities to better match where their income is reported. The authors posit that this may be because of the lack of new information that CbCR provides to the IRS due to the pre-existing foreign corporation and foreign disregarded entity reporting.

In summary, extant research has failed to show that MNCs decrease their tax-motivated income shifting after the implementation of mandatory private CbCR. Instead, evidence suggests that MNCs

subject to private CbCR reduce their number of affiliates in tax haven countries and realign their economic activity with where their income is reported.

## **2.2 Voluntary Tax Disclosure**

Firms voluntarily disclose information to improve capital market participants' information set about the firm and to address information asymmetry, adverse selection, and its negative effects on the firms' costs of capital (e.g., Healy and Palepu [2001], Beyer et al. [2010]). As mandatory public tax disclosures are often insufficient to determine the extent of a firm's true tax planning strategies, as described in greater detail below, a firm and its stakeholders may turn to voluntary tax disclosures to address the resulting information asymmetry. Consistent with this theory, N. X. Chen et al. [2023] find that firms with noisy effective tax rates are more likely to voluntarily provide tax rate forecasts in conference calls. Similarly, Chen et al. [2019] examine firms with negative media coverage about their tax planning behavior and find that these firms will voluntarily disclose more tax information after the media coverage. However, they fail to find evidence that these firms alter their tax planning behavior after voluntary tax disclosure.

Signaling theory suggests that better firms, from the public's perspective, voluntarily disclose their private information to signal their "type," differentiating themselves from other firms. Firms that are aggressive for tax purposes would refrain from disclosure, allowing stakeholders to categorize the firms consistent with a separating equilibrium (e.g., Spence [1973], Grossman and Hart [1980], Grossman [1981], Milgrom [1981], Milgrom and Roberts [1986]). Consistent with signaling theory, Middleton and Muttonen [2020] posit that non-tax aggressive firms are more likely to voluntarily disclose tax information to signal their virtue. In Adams et al.'s [2024] study on the determinants of voluntary tax disclosure within sustainability reporting, they find evidence consistent with virtue signaling and signaling theory more generally, whereby less tax aggressive firms, on average, are more

likely to voluntarily disclose tax information. Similarly, in the context of the financial statements, Hope et al. [2013] find that firms that voluntarily disclose geographic segments after the implementation of Statement of Financial Accounting Standards No. 131 are less tax aggressive than firms that do not disclose.

There are also significant costs of disclosure, such as compliance and proprietary costs (e.g., Healy and Palepu [2001], Verrecchia [2001]). First, collecting and disseminating relevant information may be very costly. Second, disclosing certain information may result in competitors obtaining proprietary information about the firm, threatening its competitive position. Disclosing tax information is considered exceptionally costly under proprietary cost theory (Müller et al. [2020]), as tax authorities actively monitor and analyze public tax disclosures (Bozanic et al. [2017], Chi et al. [2023]) and may use the disclosed information to re-assess a firm's tax liabilities. This monitoring may even translate into monetary costs, such as tax audit costs, tax penalties, or relocating economic activities to substantiate existing tax plans. The likelihood of these costs is especially high for cross-country transfer pricing. Over the past few decades, countries have created more stringent transfer pricing rules and strengthened enforcement, resulting in MNCs adopting multi-year transfer pricing agreements to avoid regular audits (Becker et al. [2017]). Creating and defending these agreements are very costly in terms of time and legal expenses. Despite having agreements and documentation in place, transfer pricing is prone to significant subjectivity, especially concerning intangibles with no observable fair market value. Thus, the risk of audit and penalties is non-trivial.

Lastly, potential reputational costs stemming from negative media attention may also be a significant cost of tax disclosure (Hanlon and Slemrod [2009], Dyreng et al. [2016]). In their survey of tax managers, Graham et al. [2014] find that firm reputation is the second most important factor when deciding to undertake a specific tax plan. Despite this concern, Asay et al. [2024] do not find evidence

of consumers boycotting firms due to their tax planning activities, and Gallemore et al. [2014] do not find evidence of firms suffering reputational costs resulting from tax shelter participation.

In summary, the decision to disclose information voluntarily is subject to a cost-benefit analysis, whereby the firm will disclose if the benefits outweigh the costs.

## **Chapter 3**

### **Mandatory Private Country-by-Country Reporting and Tax-Motivated Income Shifting**

This chapter addresses my first research question on mandatory private country-by-country reporting and tax-motivated income shifting. Section 3.1 develops the hypothesis. Section 3.2 describes the sample selection methodology, and Section 3.3 outlines the research design used to test my hypothesis. Section 3.4 examines the summary statistics relevant to the test of my hypothesis. Section 3.5 replicates the results of Joshi [2020], and Section 3.6 explores the impact of the sample restriction used in Joshi [2020]. Section 3.7 tests my first hypothesis. Sections 3.8, 3.9, and 3.10 contain robustness tests and additional analyses to support the inferences drawn from the test of my hypothesis.

#### **3.1 Hypothesis Development**

As detailed in Chapter 2, extant research has failed to show that MNCs decrease their tax-motivated income shifting after the implementation of mandatory private CbCR. There are at least two reasons why the relation between private CbCR regulation and income shifting may differ from that found by prior research. First, Joshi [2020] finds some evidence that affected EU MNCs decrease their income shifting beginning in 2018. This evidence is consistent with the notion that income shifting structures may take considerable time to dismantle and replace with other tax-efficient structures, especially in the presence of significant adjustment costs (e.g., Guceri and Albinowski [2021]; Z. Chen et al. [2023]). If this is the case, stronger evidence of decreased income shifting may be seen in a longer sample period.

Second, many countries have implemented CbCR beyond the EU and the US. Given that Joshi [2020] finds a decrease in income shifting among affiliates located in countries with greater tax enforcement, and Nessa et al. [2022] fail to find evidence that US MNCs decrease their income shifting, there are country-level differences in MNCs' income shifting response to private CbCR regulation.

Thus, it is also plausible that stronger evidence of decreased income shifting would be seen in the expansion to a global sample of MNCs.

I state my first hypothesis as follows:

**H1:** *Relative to MNCs not subject to mandatory private CbCR, MNCs subject to mandatory private CbCR exhibit a greater decrease in their tax-motivated income shifting after the implementation of mandatory private CbCR.*

Alternatively, it is possible that MNCs did not alter their income shifting behavior after the implementation of private CbCR. Although private CbCR constitutes new information for most tax authorities, it is not necessarily new information tax authorities can act on, as income shifting is typically implemented through legal structures. Thus, MNCs may not have felt pressure to decrease their income shifting, especially in the presence of significant adjustment costs (e.g., Guceri and Albinowski [2021]; Z. Chen et al. [2023]).

It is also possible that all MNCs decrease their income shifting alongside the implementation of private CbCR, not just MNCs subject to private CbCR disclosure to the tax authorities. Mandatory private CbCR regulation was part of a broader groundswell of policy efforts to reduce income shifting, and all MNCs may have reacted to the group of policy efforts.

For example, BEPS *Action 4 Limitation on Interest Deductions* was introduced in 2015 and implemented by 67 countries as of 2019 (OECD [2024a]). *Action 4* directly addresses one of the most well-known and easiest income shifting techniques MNCs have available to them – the structuring of debt such that the interest deductions are disproportionately taken in high tax jurisdictions to offset income reported in those jurisdictions and, in the case of related party debt, the interest income is reported in low- or no-tax jurisdictions. *Action 4* addresses this by generally limiting the interest deductible for tax purposes based on the MNC’s income reported in a country. Unlike *Action 13 Country-by-Country Reporting*, *Action 4* generally applies to all MNCs by having *de minimis* thresholds

below that of *Action 13*.<sup>7</sup> It also directly attacks a specific and easy method of shifting income versus simply providing better disclosure. Thus, all MNCs, on average, may have decreased income shifting alongside the implementation of private CbCR, given that a key income shifting technique has been significantly limited in the same time period.

Consistent with this conjecture, an international tax Partner at a Big 4 accounting firm said the following in our discussion about my study:<sup>8</sup>

That the introduction of CbC reporting was followed by a decrease in profit shifting by in-scope MNEs is not surprising. However, in my opinion, the profit shifting behaviours of MNEs were significantly more responsive to the substantive law changes introduced in many countries during the period covered by the study. Such substantive law changes were largely inspired by OECD BEPS Action Reports finalized in 2015, including BEPS Action 2 Neutralizing the effects of hybrid mismatch arrangements (curtailing the use of hybrid entities and instruments that had been used to achieve deduction/no inclusion and double deduction outcomes, among other things); Action 4 Limitations on Interest Deductions (implementing in effect a global formulary approach – based on operating income – to limit base erosion through interest expense in any particular country); Action 5 Harmful tax practices (adopting a modified nexus approach in an effort to better align reported profits with local activities and control over functions and risks – even prompting some countries to modify their patent and intellectual property box (and similar) regimes in an effort to keep profits onshore); and Actions 8-10 Transfer Pricing (which lead to further updates to the OECD’s Transfer Pricing Guidelines in the ensuing years).

### 3.2 Sample Selection

Consistent with Joshi [2020], I begin with the population of global ultimate owner (GUO) corporations in *Orbis* that have at least one affiliate located in a country other than the GUO’s headquarter-country. I drop all GUOs that are financial institutions because they are subject to unique regulations, including the EU’s public CbCR mandate. To remain consistent with Joshi [2020], I also drop all GUOs in extractive industries because most are subject to ‘payments to governments’ reporting, which includes

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<sup>7</sup> For example, the US had a *de minimis* gross receipts threshold of USD 25 million in 2019 for their interest limitation rule, and the UK had a *de minimis* consolidated interest expense threshold of GBP 2 million in 2019 for their earnings stripping rule.

<sup>8</sup> Ethics approval was obtained from the Research Ethics Board at the University of Waterloo (#45454).

total taxes paid by country. Then, I drop all GUOs headquartered outside of the EU and GUOs missing consolidated revenue or total assets. I then obtain all affiliates belonging to these MNCs. I drop all affiliates missing NACE industry codes and required financial statement data, and I drop loss affiliates.<sup>9</sup> As detailed in Table 1 Panel A, my EU sample has 289,231 affiliate-years from 2010 to 2021.

I follow the same sample selection procedure for my global sample. However, instead of dropping all GUOs headquartered outside of the EU, I drop all GUOs headquartered in countries that did not implement a private CbCR regulation in the sample period.<sup>10</sup> I then obtain all affiliates belonging to the global sample of MNCs. After sample restrictions for missing data and loss firms, my global sample consists of 510,324 affiliate-years from 2010 to 2021. Detailed sample selection criteria can be found in Table 1 Panel A. Sample composition by year can be found in Table 1 Panel B, which shows that the number of affiliates belonging to MNCs subject to mandatory private CbCR is fairly consistent over the sample period. 2010 and 2011 have relatively small observations due to *Orbis* data limitations. Table 1 Panel C shows the sample composition by affiliate country. Several countries comprise less than one percent of the sample. I do not drop these countries in order to get a more complete picture of MNCs' tax-motivated income shifting behavior. Lastly, sample composition by affiliate industry can be found in Table 1 Panel D. The largest industries represented in the sample are trades/vehicle repair and manufacturing, consistent with other global income shifting studies (e.g., De Simone et al. [2022]).

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<sup>9</sup> To get a more complete picture of MNCs' tax-motivated income shifting behavior, I do not drop affiliates operating in extractive or financial industries in my main sample. In Table 5 Panel D, I drop affiliates operating in extractive and financial industries and all inferences remain unchanged.

<sup>10</sup> To get a more complete picture of MNCs' tax-motivated income shifting behavior, I do not restrict the sample to affiliates located in countries that implemented a private CbCR regulation in the sample period.

### 3.3 Research Design

I test hypothesis 1 using the Huizinga and Laeven [2008] and De Simone et al. [2017] affiliate-level income shifting models modified for a difference-in-differences design surrounding the implementation of private CbCR as follows:<sup>11</sup>

$$\begin{aligned} \ln EBIT_{i,t} = & \beta_0 + \beta_1 C_{i,t} + \beta_2 CbCR_M + \beta_3 CbCR_M \times PrivatePost_t + \beta_4 C_{i,t} \times CbCR_M \\ & + \beta_5 C_{i,t} \times PrivatePost_t + \beta_6 C_{i,t} \times CbCR_M \times PrivatePost_t + \beta_7 \ln FixedAssets_{i,t} \\ & + \beta_8 \ln Compensation_{i,t} + \beta_{9-12} Controls_{i,t} + FixedEffects + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where  $C$  equals either the Huizinga and Laeven [2008] revenue-weighted tax rate differential:

$$C_{i,t}^{HL} = \frac{1}{(1 - \tau_i)} \frac{\sum_{j \neq i}^n \left( \frac{B_j}{1 - \tau_j} \right) (\tau_i - \tau_j)}{\sum_{j=i}^n \left( \frac{B_j}{1 - \tau_j} \right)} \quad (2a)$$

or the De Simone et al. [2017] capital-weighted tax rate differential:

$$C_{i,t}^{DKS} = \frac{\sum_{n \neq i} K_n (\tau_i - \tau_n)}{\sum_n K_n} \quad (2b)$$

In equation 1, the dependent variable,  $\ln EBIT$ , equals the natural logarithm of affiliate  $i$ 's earnings before interest and tax.  $C$  measures the affiliate's tax incentive to shift income per equation 2a or 2b, which is alternatively the revenue-weighted or capital-weighted tax rate differential between the affiliate and all other affiliates of the MNC  $M$  in year  $t$ , where  $B$  is the affiliate's revenue,  $K$  is the affiliate's capital, and  $\tau$  is the affiliate's statutory tax rate.  $CbCR$  is an MNC-level indicator variable that equals one where the MNC group is subject to private CbCR based on either an ultimate parent entity filing obligation or a local filing obligation as outlined in Appendix A, and zero otherwise.  $PrivatePost$  is a time-period indicator variable that equals one for the years when private CbCR is

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<sup>11</sup> Income shifting models are discussed in greater detail in Appendix C.

required as outlined in Appendix A, and zero otherwise. *PrivatePost* is not included in equation 1 as it is subsumed by year fixed effects.

The coefficient on the interaction of  $C$  and  $CbCR$ ,  $\beta_4$ , is an empirical estimate of the average response to the tax incentive to shift income for MNCs subject to private CbCR, compared to those not subject to private CbCR in the period before the implementation of private CbCR. The coefficient on the interaction of  $C$  and *PrivatePost*,  $\beta_5$ , is an empirical estimate of the average response to the tax incentive to shift income for MNCs not subject to private CbCR in the years after the implementation of private CbCR, relative to the years before the implementation of private CbCR. Joshi [2020] found neither of these coefficients to be statistically different from zero.

The coefficient on the interaction of  $C$ ,  $CbCR$ , and *PrivatePost*,  $\beta_6$ , is my coefficient of interest.  $\beta_6$  is the standard difference-in-differences coefficient.  $\beta_6$  is an empirical estimate of the differential average response to the tax incentive to shift income for MNCs subject to private CbCR in the years after versus before the implementation, relative to MNCs not subject to private CbCR. I expect  $\beta_6$  to be positive, consistent with hypothesis 1; however, Joshi [2020] found this coefficient to be generally statistically indistinguishable from zero. Because tax-motivated income shifting implies the coefficient on  $C$ ,  $\beta_1$ , is negative, a positive coefficient is consistent with MNCs subject to private CbCR decreasing their tax-motivated income shifting after the implementation of private CbCR to an extent greater than MNCs not subject to private CbCR.

Based on the income shifting literature (Huizinga and Laeven [2008], De Simone et al. [2017], De Simone et al. [2022]), I control for various factors that predict the affiliate's economic earnings. In the Huizinga and Laeven [2008] variation of the income shifting model, I control for the affiliate's fixed assets (*lnFixedAssets*), the affiliate's labor expense (*lnCompensation*), and industry fixed effects to control for industry profitability, as these are critical to the Cobb-Douglas production function. I also include country-level GDP per capita (*lnGDPperCapita*) to proxy for economic shocks.

In the De Simone et al. [2017] variation of the income shifting model, I control for the affiliate's fixed assets (*lnFixedAssets*), the affiliate's labor expense (*lnCompensation*), and industry profitability (*IndustryROA*), as these are critical to the Cobb-Douglas production function. I also include the change in country-level GDP ( $\Delta GDP$ ) to proxy for economic shocks, the age of the affiliate (*lnAge*), and the change in the industry market size ( $\Delta MktSize$ ), as these factors may affect profitability.

In both models, year fixed effects are included and standard errors are clustered at the MNC level. All data are in US dollars, and all variables are defined with their sources in Appendix D.

### 3.4 Summary Statistics

Summary statistics are reported in Table 2 Panel A and are largely consistent with the income shifting literature (e.g., the summary statistics of the global sample in De Simone et al. [2022]). I separately report summary statistics for affiliates of MNCs that are and are not subject to private CbCR. The last three columns of Table 2 Panel A indicate significant differences between these affiliate groups. Affiliates of MNCs that are subject to private CbCR are more profitable, larger, have greater compensation expenses, and are older. They are more likely to operate in countries with greater GDP but lesser GDP per capita. As detailed below, I use entropy balancing to address these observable differences and balance the proportion of the sample groups (Hainmueller [2012]). Entropy balancing is a form of pseudo-matching that reweights the groups to ensure that at least the first and second moments of each group's covariate distribution are alike. This approach helps to address measured confounding between the groups.

Pearson correlation coefficients are reported in Table 2 Panel B, with correlations statistically significant at the five percent level denoted in bold. Correlations are generally low except for similar measures (e.g., the alternate definitions of *C*), which are not used together in the same model, and the profitability measures with assets and compensation.

### 3.5 Replication of Joshi's [2020] Results

Before testing my hypothesis, I first replicate the results of Joshi [2020]. To match Joshi's [2020] sample, I retain all affiliates of EU MNCs in Table 1 Panel A with observations from 2010 to 2018, which gives me 192,595 affiliate-year observations. Then, I implement Joshi's [2020] sample restriction that all MNCs must have an ISIN listed in *Orbis*, which gives me 134,070 affiliate-year observations. This is very close to Joshi's [2020] main sample of 123,920 affiliate-year observations in her Table 8 Panel A column 2.

I then amend the affiliate-level income shifting model in equation 1 for Joshi's [2020] variable definitions. Instead of using  $\ln EBIT$  as the dependent variable, Joshi [2020] uses  $\ln PTI$ , the natural logarithm of the affiliate's pre-tax income. Joshi [2020] also uses the natural logarithm of GDP ( $\ln GDP$ ) as a control variable. Joshi's [2020] Table 8 Panel A column 2 states that MNC fixed effects are used; however, the  $CbCR$  indicator variable is not subsumed in the model, so it is unclear whether MNC fixed effects are used and do not include them in my replication in Table 3.<sup>12</sup>

Joshi's [2020] Table 8 Panel A column 2 is included in Table 3 column 1 alongside my replication in column 2. Consistent with Joshi [2020], I find positive but insignificant coefficients on the interactions of  $C$  with  $CbCR$  and  $C$  with  $PrivatePost$ . The coefficient on the interaction of interest,  $C \times CbCR \times PrivatePost$  is negative and insignificant, again consistent with the results of Joshi [2020]. These coefficients are also of similar magnitude to the coefficients reported in Joshi [2020]. Altogether, this test fails to find evidence that this sample of EU MNCs subject to private  $CbCR$  decreases their income shifting after the implementation of private  $CbCR$ , relative to EU MNCs not subject to private  $CbCR$ .

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<sup>12</sup> In Table 5 Panel E, I include MNC fixed effects and all inferences remain unchanged.

Next, I explore the impact of the ISIN sample restriction. Joshi [2020] implemented this restriction to match MNC-year observations in *Orbis* to *Compustat*, as she required *Compustat*'s cash taxes paid variable in order to conduct other tests in her research, namely the change in effective tax rates after the implementation of private CbCR. As income shifting models do not require cash taxes paid, I remove this restriction and estimate Joshi's [2020] model on the sample of 192,595 affiliate-year observations from 2010 to 2018 that belong to EU MNCs. I report this in Table 3 column 3.

Interestingly, the coefficient on the interaction of *C* and *PrivatePost* is positive and statistically significant at the one percent level (0.752, *t*-statistic of 3.308). This result suggests that EU MNCs not subject to private CbCR exhibit a significant decrease in income shifting in the post-CbCR implementation period. However, the coefficient on the interaction of interest,  $C \times CbCR \times PrivatePost$ , is negative and statistically significant at the five percent level (-0.553, *t*-statistic of -2.068). Put together, these results fail to find evidence that EU MNCs subject to CbCR decrease their income shifting in the post-CbCR implementation period to the same extent as EU MNCs not subject to CbCR. However, I do not make any formal conclusions until considering the global sample of MNCs from 2010 to 2021.

Next, I use two variations of income shifting models on the sample of EU MNC affiliates from 2010 to 2018 to determine if the model and variable definitions affect the results. Results using the Huizinga and Laeven [2008] and De Simone et al. [2017] income shifting models are reported in Table 3 columns 4 and 5, respectively, and provide similar inferences to the results in column 3.

### **3.6 The Impact of the ISIN Sample Restriction**

Given that the ISIN sample restriction drives these substantially different results, I explore the differences in characteristics of EU MNCs with and without an ISIN listed in *Orbis*. As detailed in Table 4 Panel A, affiliates of EU MNCs with an ISIN listed in *Orbis* are more profitable, larger, have

greater compensation expense, and are more likely to operate in countries with a higher GDP and GDP per capita compared to affiliates of EU MNCs without an ISIN listed in *Orbis*. I explore the role of MNC size in greater detail below.

In Table 4 Panel B, I detail the sample composition based on MNC headquarter-country for the samples with and without the ISIN restriction. For brevity, I list only countries that account for more than five percent of the broader sample. By restricting the sample to EU MNCs with an ISIN listed in *Orbis*, MNCs headquartered in France and MNCs headquartered in the UK are overrepresented; in contrast, MNCs headquartered in Germany, Spain, and Italy are underrepresented.

To explore whether the overrepresentation affected results, I estimate the Huizinga and Laeven [2008] and De Simone et al. [2017] income shifting models on MNCs headquartered in France or the UK. I report these results in Table 4 Panel C columns 1 and 2. In columns 3 and 4, I estimate the Huizinga and Laeven [2008] and De Simone et al. [2017] income shifting models, respectively, on MNCs headquartered in all other EU countries.

In both columns 1 and 2, the coefficients on  $C \times PrivatePost$ ,  $C \times CbCR$ , and  $C \times CbCR \times PrivatePost$  are all insignificant. Thus, I fail to find evidence that MNCs headquartered in France and the UK have decreased their income shifting after the implementation of private CbCR. In columns 3 and 4, the coefficients on  $C \times CbCR$  and  $C \times CbCR \times PrivatePost$  are all insignificant. However, the coefficients on  $C \times PrivatePost$  are positive and statistically significant at the five percent level or greater (0.694,  $t$ -statistic of 2.651 in column 3; 0.855,  $t$ -statistic of 2.330 in column 4). This evidence suggests that, on average, MNCs headquartered in all other EU countries except for France and the UK that are not subject to private CbCR exhibit a significant decrease in income shifting in the post-CbCR implementation period.

To explore this result further, I create a 2x2 matrix of France and UK MNCs'  $C$  coefficients from column 1. I report this matrix in Table 4 Panel D.  $F$ -tests of the implied coefficients on  $C$  in each

of the  $CbCR=1$ ,  $PrivatePost=0$ ;  $CbCR=0$ ,  $PrivatePost=1$ ; and  $CbCR=1$ ,  $PrivatePost=1$  quadrants reveal that all are statistically significantly different than zero at the five percent level or greater. This result is consistent with France and UK MNCs still engaging in significant income shifting after the implementation of private CbCR, and the overrepresentation of these MNCs in the Joshi [2020] sample may have driven the results she found.

### 3.7 Test of Hypothesis 1

I formally test my hypothesis on the EU sample of MNCs from 2010 to 2021 in Table 5 Panel A columns 1 and 2, and on the global sample of MNCs from 2010 to 2021 in columns 3 and 4. I estimate the Huizinga and Laeven [2008] income shifting model in columns 1 and 3 and the De Simone et al. [2017] income shifting model in columns 2 and 4.

In the EU sample, the coefficients on the interaction of  $C$  and  $CbCR$  are positive but not statistically significant at conventional levels. In the global sample, the coefficient on the interaction of  $C$  and  $CbCR$  is positive and statistically significant at the ten percent level in column 3 (0.369,  $t$ -statistic of 1.710) and positive and statistically significant at the five percent level in column 4 (0.712,  $t$ -statistic of 2.091). These tests provide some evidence that MNCs subject to private CbCR were originally less aggressive income shifters than those not subject to private CbCR.

The coefficients on the interaction of  $C$  and  $PrivatePost$  are positive across all specifications and are statistically significant at the five percent level or greater in the EU sample (0.661,  $t$ -statistic of 3.073 in column 1; 0.678,  $t$ -statistic of 1.988 in column 2) and at the one percent level in the global sample (0.484,  $t$ -statistic of 2.675 in column 3; 0.645,  $t$ -statistic of 2.267). As in Table 3, this result suggests that MNCs not subject to private CbCR exhibit a decrease in income shifting in the post-CbCR implementation period.

The coefficient on the interaction of  $C$ ,  $CbCR$ , and  $PrivatePost$  is my coefficient of interest. Per hypothesis 1, I predict this coefficient will be positive. A positive coefficient is consistent with MNCs subject to private CbCR decreasing their tax-motivated income shifting after the implementation of private CbCR, relative to MNCs not subject to private CbCR. However, I do not find evidence to support this hypothesis. The coefficients on  $C \times CbCR \times PrivatePost$  are negative and not statistically significant across all specifications.

To better understand these results, I create a 2x2 matrix of the  $C$  coefficients from the global sample of MNCs in column 3. This matrix is reported in Table 5 Panel B. These coefficients illustrate the main results: (1) MNCs subject to private CbCR exhibit less aggressive income shifting behavior in the pre-period, relative to MNCs in the pre-period that are not subject to private CbCR, as shown by the coefficient on  $C \times CbCR$  (0.369,  $t$ -statistic of 1.710 in column 3), and (2) after the implementation of private CbCR, all MNCs in the sample decrease their income shifting, on average, as shown by the coefficient on  $C \times PrivatePost$  (0.484,  $t$ -statistic of 2.675 in column 3) and the sum of the coefficients on  $C \times PrivatePost$  and  $C \times CbCR \times PrivatePost$  (0.484-0.033,  $F$ -statistic of 29.93 in column 3). I posit that since MNCs subject to private CbCR already had lower income shifting in the pre-period, these MNCs do not have much more income shifting to decrease in the post-period relative to the income shifting reductions of the MNCs not subject to private CbCR. Thus, no significant difference is observed in the treated group in the post-period.

In Table 5 Panel C, I estimate the regression results using an entropy balanced sample. In columns 1 and 3, I entropy balance on the key control variables used in the Huizinga and Laeven [2008] income shifting model:  $\ln FixedAssets$ ,  $\ln Compensation$ , and  $\ln GDPperCapita$ . In columns 2 and 4, I entropy balance on the key control variables used in the De Simone et al. [2017] income shifting model:

*lnFixedAssets*, *lnCompensation*,  $\Delta GDP$ , *lnAge*,  $\Delta MktSize$ , and *IndustryROA*. All inferences remain unchanged.

In Table 5 Panel D, I estimate the regression results after dropping affiliates operating in extractive or financial industries from the sample. I report the Huizinga and Laeven [2008] income shifting model in columns 1 and 3 and the De Simone et al. [2017] income shifting model in columns 2 and 4. All inferences remain unchanged.

In Table 5 Panel E, I estimate the regression results using MNC fixed effects to control for the innate profitability of the MNC. MNC fixed effects subsume the *CbCR* indicator variable. I report the Huizinga and Laeven [2008] income shifting model in columns 1 and 3 and the De Simone et al. [2017] income shifting model in columns 2 and 4. All inferences remain unchanged.

In Table 5 Panel F, I estimate the regression results after restricting the EU and global samples to MNCs with an ISIN listed in *Orbis*. I report the Huizinga and Laeven [2008] income shifting model in columns 1 and 3 and the De Simone et al. [2017] income shifting model in columns 2 and 4. Consistent with Joshi [2020], I fail to find statistically significant coefficients on  $C \times PrivatePost$  and  $C \times CbCR \times PrivatePost$ . This evidence lends support to my conclusion that the ISIN sample restriction drives substantially different results.

In summary, the difference-in-differences estimator does not allow me to make a causal statement that CbCR reporting to the tax authorities decreased treated MNCs' income shifting. However, on average, MNCs subject to private CbCR shift significantly less income across the entire sample period than MNCs not subject to private CbCR. Moreover, in the post-CbCR implementation period, all MNCs shift significantly less income, on average. Thus, the objective of CbCR in reducing income shifting was achieved around the time CbCR was implemented. I explore the role of the CbCR consolidated revenue threshold in greater detail below.

### 3.8 Stacked Difference-in-Differences Design

When the global sample of MNCs is used, staggered treatment timing exists due to the various private CbCR implementation years listed in Appendix A. To the extent that treatment effects are not homogenous, the difference-in-differences design employed in equation 1 would not be an appropriate tool to use with the staggered treatment timing as the difference-in-differences estimator uses already-treated observations as controls, which may violate the parallel trends assumption (Barrios [2021], Goodman-Bacon [2021], Sun and Abraham [2021]). However, this bias is unlikely to be of significant concern in my setting given that 97% of the global sample is subject to CbCR effective 2016.

Nonetheless, I implement a stacked variation of equation 1 following Cengiz et al. [2019] and Baker et al. [2022]. I report the results of this regression on the EU sample of MNCs in Table 5 Panel G columns 1 and 2, and on the global sample of MNCs in columns 3 and 4. I estimate the Huizinga and Laeven [2008] income shifting model in columns 1 and 3 and the De Simone et al. [2017] income shifting model in columns 2 and 4. Note that all treated observations are “stacked” so that all MNCs are treated at relative time 0 (i.e., all MNCs are subject to private CbCR beginning at time 0). Thus,  $CbCR \times PrivatePost$  is an indicator variable equal to relative time 1 and greater and is subsumed by the relative time fixed effects, as relative time (other than time 0) only exists for observations where  $CbCR=1$ . Another feature of the stacked regression is the creation of individual cohorts for each treatment event, leading to increased observations. I include cohort fixed effects to control for factors relating to each treatment event, which subsumes the  $CbCR$  indicator variable.

Both the magnitude of the coefficients and the standard errors of the stacked difference-in-differences design are similar to that of the staggered difference-in-differences design, which suggests that the staggered difference-in-differences design employed in equation 1 is not subject to the aforementioned bias. All inferences remain unchanged.

### 3.9 Finer Gradations on Time and Size

Given that both the time period and MNC size are associated with a significant decrease in income shifting, I split the two key indicator variables, *PrivatePost* and *CbCR*, into finer gradations to better understand these relations. In Table 6 Panel A, I explore how income shifting has changed over time. As income shifting structures can take time to change, and there may not be significant change year-to-year, I separate the *PrivatePost* indicator into three groups of two years: 2016-2017, 2018-2019, and 2020-2021, and I also include 2014-2015, the two years before the first implementation of private CbCR. I report the results of this analysis on the global sample, using the Huizinga and Laeven [2008] income shifting model in column 1 and the De Simone et al. [2017] income shifting model in column 2.

Consistent with Table 5 Panel A, there is evidence to suggest that MNCs subject to private CbCR were originally less aggressive income shifters than the control group; the coefficients on the interaction of *C* and *CbCR* are positive and statistically significant at the ten percent level or greater in both columns. Additionally, MNCs exhibited statistically significant decreases in income shifting from 2016 to 2019, as evidenced by the positive and statistically significant coefficients on the interactions of *C* with 2016-2017 and *C* with 2018-2019. In Figure 1 Panel A, I graph the yearly *C* coefficients in column 1 to illustrate the decrease in income shifting over time for the group subject to private CbCR and the group not subject to private CbCR. The blue and black lines represent the income shifting of the group subject to private CbCR and the group not subject to private CbCR, respectively. The graph shows that the group subject to private CbCR has, on average, ceased income shifting by 2020-2021, whereas the group not subject to private CbCR continues to have a negative coefficient on *C*, but has still exhibited a significant decrease in income shifting. Interestingly, the slope of the income shifting line from 2018-2019 to 2020-2021 for the group not subject to private CbCR is statistically different from zero ( $F$ -statistic 3.42, 0.064), providing some evidence that these MNCs have increased their

income shifting over this period. I look forward to future research exploring whether this behavior continues.

The analysis in Table 6 Panel A and the graph in Figure 1 Panel A use the staggered difference-in-differences design. Since 97% of the global sample is subject to CbCR effective 2016, the results and the graph do not significantly differ when a stacked design is used.

In Table 6 Panel B, I explore whether the CbCR consolidated revenue threshold matters or whether income shifting decreases consistently across MNC sizes. To do this, I remove the *CbCR* indicator from the income shifting models. I split the MNC sample into four groups: two groups not subject to private CbCR based on a median split of these MNCs' consolidated revenue, and two groups subject to private CbCR based on a median split of these MNCs' consolidated revenue. I report the results on the global sample, using the Huizinga and Laeven [2008] income shifting model in columns 1 to 4 and the De Simone et al. [2017] income shifting model in columns 5 to 8.

In Figure 1 Panel B, I graph the *C* coefficients from columns 1 to 4 to illustrate the decrease in income shifting for MNCs of different sizes. The black and green lines represent the income shifting of the groups not subject to private CbCR, where black represents the smaller MNCs and green represents the larger MNCs. The purple and blue lines represent the income shifting of the groups subject to private CbCR, where purple represents the smaller MNCs and blue represents the larger MNCs. The graphs show that the smaller MNCs not subject to private CbCR were generally more aggressive income shifters in the pre-period than the other groups, as evidenced by the magnitude of the coefficients on *C* across the columns in Table 6 Panel B. All MNCs, on average, decreased their income shifting alongside the implementation of private CbCR (the coefficients on the interaction of *C* and *PrivatePost* are positive and statistically significant at the ten percent level, one-tailed, or greater in all columns); however, the MNCs not subject to private CbCR appear to be participating in the greatest income shifting in the post-period.

The graph suggests that, on average, income shifting has decreased monotonically across MNC sizes. This provides compelling evidence that the CbCR consolidated revenue threshold did not matter, and it is not the CbCR to the tax authorities itself that resulted in the decrease in income shifting. I assert that, consistent with practitioner opinion, it is likely the OECD's BEPS framework and the related policies of the member countries that resulted in the decrease in income shifting.

### **3.10 Additional Analysis**

In this section, I explore cross-sectional differences in MNCs' headquarter-countries to explore whether the OECD's BEPS framework and the related policies of the member countries contributed to MNCs' decreases in income shifting. In these analyses, I drop the CbCR indicator variable from the income shifting models because my evidence strongly suggests that CbCR disclosure to the tax authorities is not the main cause of the decrease in income shifting.<sup>13</sup>

First, I explore whether MNCs headquartered in countries with stronger regulatory environments exhibit a greater decrease in income shifting than MNCs headquartered in countries with weaker regulatory environments. Countries with stronger regulatory environments are more likely to implement and enforce the BEPS action items, increasing the cost of MNCs' income shifting during this time period. This would be broadly consistent with Joshi's [2020] evidence of a decrease in income shifting among affiliates in countries with greater tax enforcement. I focus on headquarter-countries instead of affiliate-countries given that income shifting decisions require coordination across affiliates and are typically made at the parent level.

I proxy for high regulation using a median-split of a country-level regulation factor variable (*HighRegn*; Adams et al. [2024]). Extant research has used various societal and institutional

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<sup>13</sup> I also drop the indicator variable for the years 2014-2015 as my results suggest that there is no statistically significant difference in MNCs' income shifting in 2014-2015 compared to 2010-2013.

characteristics to proxy for the strength of regulation in a country, such as the strength of auditing and accounting standards, the absence of corruption, and government effectiveness. As many of these characteristics are highly correlated, a factor analysis is needed to draw out the common proxy for regulation. Greater detail on the factor variable is provided in Appendix D. Countries where *HighRegn* equals one include countries such as Germany, Switzerland, and the UK; countries where *HighRegn* equals zero include countries such as Chile, Colombia, and Mexico.

I interact *HighRegn* with *C* and the year indicators. The results of this additional analysis using the global sample are reported in Table 7 Panel A, with the Huizinga and Laeven [2008] income shifting model in column 1 and the De Simone et al. [2017] income shifting model in column 2. Note that the sample decreases in this analysis as the World Economic Forum's *Global Competitiveness Report*, which reports on many of the variables used in the factor analysis, does not cover every country-year in the sample.

In Figure 2 Panel A, I graph the yearly *C* coefficients in column 1 to illustrate the decrease in income shifting over time for the group headquartered in countries with above-median regulatory environment strength (represented by the green line) and the group headquartered in countries with below-median regulatory environment strength (represented by the black line). The graph shows that the group headquartered in countries with stronger regulatory environments exhibit greater decreases in income shifting from 2016-2017 to 2020-2021, relative to the group headquartered in countries with weaker regulatory environments (the coefficients on the interactions of *C*, *HighRegn*, and the years of interest are positive and statistically significant at the ten percent level or greater). The group headquartered in countries with stronger regulatory environments has, on average, ceased income shifting by 2020-2021. This result is consistent with my conjecture that MNCs headquartered in countries with a stronger regulatory environment would exhibit greater decreases in income shifting as these countries would be more likely to implement and enforce the various BEPS action items.

I also explore whether MNCs headquartered in countries that the OECD has named as having an “issue” with BEPS *Action 4 Limitation on Interest Deductions* or *Action 5 Harmful Tax Practices – Preferential Tax Regimes* exhibit a smaller decrease in income shifting than MNCs headquartered in countries that the OECD has not named. I refer to countries that have not implemented an interest deduction limitation rule consistent with *Action 4* or that have a harmful preferential tax regime named in the OECD’s 2017 Action 5 progress report as having an “issue” with the respective action item.

I posit that, consistent with the practitioner’s quote in the hypothesis development section, MNCs headquartered in countries that have implemented an interest deduction limitation following *Action 4* and have no harmful preferential tax regimes listed in *Action 5* would exhibit a greater decrease in income shifting. Countries not implementing these action items, despite agreeing to the BEPS framework, suggest they may not have been as concerned about income shifting. Further, MNCs headquartered in countries with no interest deduction limitation or a preferential tax regime have relatively more income shifting alternatives available to them and, consequently, likely have a greater net benefit of continuing their income shifting behavior.

I focus on BEPS action items 4 and 5 as the OECD has produced publicly available documents outlining country compliance with both. To my knowledge, the OECD has not completed a comprehensive country survey of compliance with the other action items mentioned by the practitioner, *Action 2 Neutralising the Effects of Hybrid Mismatch Arrangements* and *Actions 8-10 Transfer Pricing*.

I review the OECD’s 2019 review of interest limitation rules and the 2017 progress report on preferential tax regimes. I use these reports as they reflect “issues” in the early-to-middle stage of my post-period. If I had chosen “issues” as of 2016, many more countries would fall into this subset, given that the interest limitation rules were not released until 2015. Similarly, I do not choose “issues” as of 2021, as very few countries still have outstanding “issues” as of this time. Thus, these analyses would not be insightful.

To conduct my analysis, I create an indicator variable, *Action4or5issue*, which equals one if one of the following is met: (1) the MNC’s headquarter-country does not have an interest deduction limitation rule in place as of the OECD’s 2019 review, or (2) the MNC’s headquarter-country had a harmful preferential tax regime that was named in the OECD’s 2015 BEPS *Action 5* report and still had not been amended or abolished by the time of the OECD’s 2017 progress report. *Action4or5issue* equals zero if neither of the preceding conditions are met. Countries in my sample with an *Action 4* “issue” include Austria, Bahamas, Bermuda, British Virgin Islands, Cayman Islands, Hong Kong, Ireland, Panama, Qatar, Singapore, Tunisia, United Arab Emirates, and Vietnam; countries with an *Action 5* “issue” include France, Italy, and Türkiye.

I interact *Action4or5issue* with *C* and the year indicators. The results of this additional analysis using the global sample are reported in Table 7 Panel B, with the Huizinga and Laeven [2008] income shifting model in column 1 and the De Simone et al. [2017] income shifting model in column 2. In Figure 2 Panel B, I graph the yearly *C* coefficients in column 1 to illustrate the decrease in income shifting over time for the group headquartered in countries with no *Action 4* or *Action 5* issue (represented by the blue line) and the group headquartered in countries with an *Action 4* or *Action 5* issue (represented by the purple line). The graph shows that the group headquartered in countries that comply with *Action 4* and *Action 5* has, on average, ceased income shifting by 2020-2021. The group headquartered in countries that do not comply with *Action 4* or *Action 5* has still exhibited decreases in income shifting in the post-period. However, there is evidence to suggest that these decreases are not as large as the decreases of the group headquartered in countries compliant with *Action 4* and *Action 5* (the coefficients on  $C \times Action4or5issue \times 2016-2017$  and  $C \times Action4or5issue \times 2020-2021$  are negative and statistically significant at the ten percent level, one-tailed). This result is broadly consistent with the practitioner’s quote and my conjecture that the BEPS framework and the related policies of the member countries contributed to the reduction in income shifting; however, I look forward to future

research that conducts a more detailed exploration of the various BEPS action items as this will be necessary before a formal conclusion can be made.

## **Chapter 4**

### **Voluntary Public Country-by-Country Reporting and Tax-Motivated Income Shifting**

This chapter addresses my second research question on voluntary private country-by-country reporting and tax-motivated income shifting. Section 4.1 develops the hypothesis. Section 4.2 describes the sample selection methodology, Section 4.3 outlines the research design used to test my hypothesis, and Section 4.4 discusses the endogeneity present in my setting. Section 4.5 examines the summary statistics relevant to the test of my hypothesis, and Section 4.6 examines the characteristics of voluntary public CbCR disclosures. Section 4.7 tests my hypothesis without addressing endogeneity, and Section 4.8 considers an alternative research design. Section 4.9 tests my hypothesis while addressing endogeneity. Sections 4.10 and 4.11 contain robustness tests and additional analyses to support the inferences drawn from the test of my hypothesis.

#### **4.1 Hypothesis Development**

As discussed in detail in Chapter 2, mandatory private CbCR provides the tax authority with a country-by-country breakdown of key tax and economic activity information. This information is not required to be disclosed in any public forum. For example, geographic segment reporting in the financial statements only requires the disclosure of “material” segments, which gives MNCs significant discretion over the countries they determine to be material (Gramlich and Whitaker-Poe [2013], Dyreng et al. [2016], Dyreng et al. [2020]). Regarding global information in the tax disclosures, MNCs can aggregate tax information into a “foreign tax” category without specifying the countries that constitute the category. Moreover, effective tax rates are not an informative measure of the tax planning strategies employed by MNCs and the corresponding tax risk MNCs undertake (e.g., Wilde and Wilson [2018], Belnap and Hoopes [2021]), and firm stakeholders likely do not have the data to utilize the income

shifting measures developed in the academic literature (Adams et al. [2024]). Finally, while the tax authority can share CbCR with other tax authorities, it cannot release the information publicly.

If disclosed publicly, CbCR could be informative to firm stakeholders for at least two reasons. First, the country-by-country breakdown of tax information provides better insight into MNCs' tax planning strategies and related tax audit risk. Given that tax payment volatility is associated with the firm's overall market volatility (Guenther et al. [2017]), firm stakeholders would be interested in knowing the tax payments made to the tax authorities on a per country basis. Second, CbCR also reveals key operations information, such as return on sales and return on assets per country. Firm stakeholders would be interested in using this information to better assess the firm's profitability and supply chain in general.

Thus, the introduction of CbCR and the repeated calls for public CbCR have made salient to firm stakeholders that this information exists within and has been compiled by MNCs subject to mandatory private CbCR, and this information is new, potentially useful, and cannot be obtained elsewhere. Firm stakeholders can then observe MNCs taking one of two actions: voluntarily disclosing CbCR or withholding the information.

Under signaling theory, above-average firms will voluntarily disclose to signal their type, provided they are incentivized to differentiate themselves from other firms. I posit that the above-average firms in this setting are MNCs that are not aggressive income shifters that voluntarily disclose CbCR publicly to differentiate themselves from those who are aggressive income shifters.<sup>14</sup> These MNCs are incentivized to differentiate themselves as the voluntary public disclosure of CbCR would

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<sup>14</sup> I assert that MNCs may voluntarily disclose vague CbCR information, but will at least be consistent with their other filings. Hence, MNCs will not lie in their voluntary public CbCR disclosure; they will instead refrain from disclosing. Thus, in my setting of interest, I posit that cheap talk is not plausible. Cheap talk refers to the ability to disclose less than truthful information, which can occur when misreporting is costless (e.g., Crawford and Sobel [1982]; see Verrecchia [2001] and Beyer et al. [2010] for a review).

reduce information asymmetry between the MNC and its stakeholders. Consistent with this conjecture, Adams et al. [2024] find that the voluntary disclosure of quantitative tax information in sustainability reporting is associated with lower bid-ask spreads. As information asymmetry is both theoretically and empirically linked to the firm's cost of capital, this reduced cost would incentivize MNCs to voluntarily disclose CbCR publicly.

In addition, these MNCs may want to demonstrate that they are subject to relatively less tax risk than aggressive income shifters. Given the relation between the volatility of tax payments and the firm's market volatility (Guenther et al. [2017]), this would be important information for the MNC to convey to its stakeholders.

Lastly, from the perspective of firms contributing to society through paying their "fair share" of taxes, income shifting aggressiveness is considered a negative firm characteristic. This societal expectation has changed drastically over the last decade, with the increased spotlight on BEPS (OECD [2013], OECD [2015]) and the rise in sustainability reporting (e.g., GRI [2019]). Thus, MNCs that can respond to this societal expectation and are willing to reduce their income shifting will voluntarily disclose CbCR publicly to receive societal value from the disclosure.

For a separating equilibrium to occur, the cost structure of disclosure must differ between the above-average and below-average firms such that it is costly for the below-average firms to mimic the above-average firms. I posit that it would be very costly for aggressive income shifters to mimic those who are not aggressive and disclose CbCR publicly, as disclosure would provide evidence that would be interpreted as aggressive income shifting. For example, an aggressive income shifter may report greater related-party revenue and profit in low-tax jurisdictions with fewer assets and employees, and lesser related-party revenue and profits in high-tax jurisdictions. This disclosure may lead to high reputational costs, as seen by the substantial media coverage of MNCs accused of such behavior (e.g., Starbucks, Bergin [2012], Gilleard [2012]; Apple, Bowers [2017]). To avoid these reputational costs,

aggressive income shifters could alter their economic activity (i.e., move assets and/or employees) to better match where their income is reported. However, this would take significant time and resources (e.g., adjustment costs, see Guceri and Albinowski [2021] and Z. Chen et al. [2023]) and limit the income shifting opportunities available to these MNCs. Thus, it would be very costly for aggressive income shifters to mimic their non-aggressive counterparts.<sup>15</sup>

Provided these cost structures differ, firm stakeholders can categorize the MNCs based on whether they voluntarily disclose CbCR. In other words, the voluntary public disclosure of CbCR would be a credible signal that the MNC is not an aggressive income shifter. Consistent with this conjecture, in a supplemental test, Adams et al. [2024] find that MNCs that exhibit above-median income shifting aggressiveness, on average, voluntarily disclose less detailed CbCR information, controlling for other determinants. However, Adams et al.'s [2024] test uses a time-invariant binary variable to capture income shifting behavior and does not consider MNCs that do not voluntarily disclose tax information. Thus, it remains an open question whether MNCs that voluntarily disclose CbCR publicly decreased their income shifting relative to the general population of MNCs, and if so, when.

My second hypothesis is as follows:

***H2: Relative to the pre-period, MNCs decrease their tax-motivated income shifting in conjunction with the voluntary public disclosure of country-by-country reporting.***

Alternatively, it is possible that the voluntary public disclosure of CbCR is not a credible signal. Sustainability reports, the most common disclosure channel for voluntary public CbCR in this sample,

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<sup>15</sup> I note that compliance costs and proprietary costs regarding the tax authority are not considered in this setting, as all MNCs in my sample are subject to mandatory private CbCR. Thus, all MNCs have already compiled the relevant information and provided it to the tax authority.

are seldom audited, raising the question of whether the information is reliable. CbCR information can also be complex, and some firm stakeholders may be unable to draw conclusions from CbCR.

## 4.2 Sample Selection

Consistent with Chapter 3, I begin with the population of GUO corporations in *Orbis* that have at least one affiliate located in a country other than the GUO's headquarter-country. I drop all GUOs that are financial institutions as they are subject to unique regulations, such as the EU's public CbCR mandate. To remain consistent with other CbCR research (e.g., Joshi [2020]), I also drop all GUOs in extractive industries as most are subject to 'payments to governments' reporting, which includes total taxes paid by country. Then, I drop all GUOs missing consolidated revenue or total assets.

I restrict my sample to GUOs headquartered in OECD member countries or in advanced economies as defined by the IMF, as MNCs headquartered in developing economies likely face different incentives to voluntarily disclose CbCR publicly than those I study here (Adams et al. [2024]). I restrict my sample to MNCs subject to mandatory private CbCR beginning in 2016 based on either an ultimate parent entity filing obligation or a local filing obligation as detailed in Appendix A, as MNCs not required to prepare CbCR face different costs of income shifting and disclosure. I obtain all affiliates belonging to these MNCs. I drop all affiliates missing NACE industry codes and required financial statement data, and I drop loss affiliates.

To identify the "treatment" group of voluntary CbCR disclosers, I begin with the same data as Adams et al. [2024]: all English language firm-issued sustainability reports and annual reports with a dedicated sustainability section from *Corporate Register*. After using fuzzy matching techniques to match the firms' sustainability reporting to *Orbis*, I search the reports for the keywords "country-by-country," "country reporting," "CbCR," and [GRI standard] "207-4". I hand-verify all hits to ensure accuracy. If the report states that the CbCR is in a different publicly available document, I obtain that

document. I “verify” the sample of voluntary CbCR disclosers with the *EU Tax Observatory*’s public CbCR repository (Aliprandi et al. [2022]).<sup>16</sup> As detailed in Table 8, my sample of voluntary CbCR disclosers consists of 5,896 firm affiliate-years, representing 59 unique MNCs (parents) headquartered in fifteen countries.

To identify the control group of mandatory private-only CbCR disclosers, I use the remaining MNC-years. I restrict the sample to MNCs headquartered in countries where there are also MNCs headquartered in those countries that voluntarily disclose CbCR.<sup>17</sup> As detailed in Table 8, my sample of mandatory CbCR disclosers that do not voluntarily disclose CbCR publicly consists of 291,897 firm affiliate-years, representing 2,461 unique MNCs (parents) headquartered in fifteen countries.

Sample composition by year can be found in Table 8 Panel B, which shows that the percentage of affiliates belonging to MNCs that voluntarily disclose CbCR publicly in the year has increased over the sample period. As mentioned in Chapter 3, 2010 and 2011 have relatively small observations due to *Orbis* data limitations. Table 8 Panel C shows the sample composition by affiliate country. As mentioned in Chapter 3, several countries comprise less than one percent of the sample. I do not drop these countries in order to get a more complete picture of MNCs’ tax-motivated income shifting behavior. Lastly, sample composition by affiliate industry can be found in Table 8 Panel D. The largest industries represented in the sample are trades/vehicle repair and manufacturing, consistent with Chapter 3 and with other global income shifting studies (e.g., De Simone et al. [2022]).

To the extent that an MNC voluntarily discloses CbCR publicly but does not mention it in their sustainability reporting and the *EU Tax Observatory* also missed collecting it, the MNC will be erroneously classified as an MNC that is subject to mandatory private CbCR but does not voluntarily

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<sup>16</sup> The *EU Tax Observatory* also collects voluntary CbCR disclosures, however, their sample is smaller than mine.

<sup>17</sup> To get a more complete picture of MNCs’ tax-motivated income shifting behavior, I do not restrict the sample to affiliate-level countries for which there are affiliates of MNCs that voluntarily disclose CbCR publicly.

disclose CbCR publicly. Misclassification would bias against finding support for my hypothesis due to smaller effect sizes.

### 4.3 Research Design

I test my hypothesis using the Huizinga and Laeven [2008] and De Simone et al. [2017] affiliate-level income shifting models modified for a difference-in-differences design surrounding MNCs' various voluntary public CbCR disclosure initiation years as follows:

$$\begin{aligned}
 \ln EBIT_{i,t} = & \beta_0 + \beta_1 C_{i,t} + \beta_2 C_{i,t} \times PrivatePost_t + \beta_3 PublicTreat_M \\
 & + \beta_4 PublicTreat_M \times PublicPost_t + \beta_5 C_{i,t} \times PublicTreat_M \\
 & + \beta_6 C_{i,t} \times PublicTreat_M \times PublicPost_t + \beta_7 \ln FixedAssets_{i,t} \\
 & + \beta_8 \ln Compensation_{i,t} + \beta_{9-12} Controls_{i,t} + FixedEffects + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

where  $C$  equals either the Huizinga and Laeven [2008] revenue-weighted tax rate differential as outlined in equation 2a or the De Simone et al. [2017] capital-weighted tax rate differential as outlined in equation 2b.

In equation 3,  $\ln EBIT$ ,  $C$ , and  $PrivatePost$  are defined the same as in equation 1.  $PrivatePost$  is not included in equation 3 as it is subsumed by year fixed effects. The coefficient on the interaction of  $C$  and  $PrivatePost$ ,  $\beta_2$ , is an empirical estimate of the average response to the tax incentive to shift income in the years after the implementation of private CbCR. All MNCs in the sample are subject to private CbCR, so an MNC-level treatment indicator variable is not required in equation 3.

$PublicTreat$  is an MNC-level indicator variable that equals one for MNCs that voluntarily disclose CbCR publicly at some point in the sample period, and zero otherwise.  $PublicPost$  is a time-period indicator variable that equals one for the years when the MNC has voluntarily disclosed CbCR publicly pertaining to that year, and zero otherwise.  $PublicPost$  is not included in equation 3 as it is subsumed by year fixed effects.

The coefficient on the interaction of  $C$ ,  $PublicTreat$ , and  $PublicPost$ ,  $\beta_6$ , is my coefficient of interest.  $\beta_6$  is an empirical estimate of the average response to the tax incentive to shift income after the MNC begins to voluntarily disclose CbCR publicly, relative to the pre-period. I expect  $\beta_6$  to be positive, consistent with hypothesis 2. A positive coefficient is consistent with a decrease in tax-motivated income shifting in conjunction with the voluntary public CbCR disclosure.

Based on the income shifting literature (Huizinga and Laeven [2008], De Simone et al. [2017], De Simone et al. [2022]), I control for various factors that predict the affiliate's economic earnings. In the Huizinga and Laeven [2008] variation of the income shifting model, I control for the same variables used in Chapter 3: the affiliate's fixed assets ( $lnFixedAssets$ ), the affiliate's labor expense ( $lnCompensation$ ), industry fixed effects, and country-level GDP per capita ( $lnGDPperCapita$ ).

In the De Simone et al. [2017] variation of the income shifting model, I control for the same variables used in Chapter 3: the affiliate's fixed assets ( $lnFixedAssets$ ), the affiliate's labor expense ( $lnCompensation$ ), industry profitability ( $IndustryROA$ ), the change in country-level GDP ( $\Delta GDP$ ), the age of the affiliate ( $lnAge$ ), and the change in the industry market size ( $\Delta MktSize$ ).

In both models, year fixed effects are included and standard errors are clustered at the MNC level. All data are in US dollars, and all variables are defined with their sources in Appendix D.

#### 4.4 Endogeneity

There may be unobservable differences between the affiliates of MNCs that voluntarily disclose CbCR and those that do not. As an MNC chooses whether and when it voluntarily discloses CbCR (i.e., the “treatment” is a choice variable), it is plausible that unobserved characteristics jointly affect the choice to voluntarily disclose CbCR and my outcome variables of interest. Moreover, this setting does not afford an exogenous shock, which is the important feature in difference-in-differences models that allows causal inference.

I address the potential correlated omitted variable bias using a two-stage least squares model with an adapted version of Adams et al.'s [2024] model capturing the decision to voluntarily disclose tax information in sustainability reporting. As the dependent variable in the disclosure model is binary (i.e., the first stage is not linear), I cannot use logit to estimate the model and then use the predicted  $\widehat{PublicTreat}$  to estimate the second stage, as the predicted  $\widehat{PublicTreat}$  would not be unrelated to the second stage error term (Wooldridge [2010]). Instead, I employ Xu's [2021] two-step instrumental variables method using fitted probabilities, whereby I first use logit to estimate the disclosure model along with the control variables from equation 3 as follows:

$$\begin{aligned}
\widehat{PublicTreat}_M = & \alpha_0 + \alpha_1 TaxAggress_{i,t} + \alpha_2 MandESG_{c,t} + \alpha_3 MandTax_{c,t} \\
& + \alpha_4 AvgESGscore_{c,t} + \alpha_5 CodeLaw_c + \alpha_6 Regn_{c,t} + \alpha_7 IndvVoice_{c,t} \\
& + \alpha_8 EnvScore_{M,t} + \alpha_9 SocScore_{M,t} + \alpha_{10} GovScore_{M,t} + \alpha_{11} GRI_{M,t} \\
& + \alpha_{12} Competition_{M,t} + \alpha_{13} PrivatePost_{M,t} + \alpha_{14} Haven_M + \alpha_{15} Loss_{M,t} \\
& + \alpha_{16} Size_{M,t} + \alpha_{17} RD_{M,t} + \alpha_{18} ROA_{M,t} + \alpha_{19} Leverage_{M,t} + \alpha_{20} lnAnalysts_{M,t} \\
& + \alpha_{21} InstOwnPRI_{M,t} + \alpha_{22} InstOwnNonPRI_{M,t} + \alpha_{23} StdRet_{M,t} + \alpha_{24} C_{i,t} \\
& + \alpha_{25} lnFixedAssets_{i,t} + \alpha_{26} lnCompensation_{i,t} + \alpha_{27-30} Controls_{i,t} \\
& + IndFE + YearFE + \varepsilon_{i,t}
\end{aligned} \tag{4}$$

In equation 4, the dependent variable,  $PublicTreat$ , is defined the same as in equation 3.  $TaxAggress$  is the MNC  $M$ 's adjusted negative effective tax rate, which equals the statutory tax rate minus the effective tax rate, where the effective tax rate equals total tax expense divided by pre-tax income, winsorized at zero and one, and set to zero if pre-tax income is negative.

The next six variables represent headquarter country-level institutional features related to disclosure decisions.  $MandESG$  is an indicator variable for whether the country requires ESG disclosures, and  $MandTax$  is an indicator variable for whether the country has some form of mandatory tax disclosure beyond financial reporting.  $AvgESGscore$  is the average annual ESG score of all firms in the country covered by *Refinitiv*, and  $CodeLaw$  is an indicator variable for whether the country

follows code law. Lastly, *Regn* and *IndvVoice* are country-year factor variables capturing the strength of the regulatory environment and freedom of individual voice and media expression, respectively. Greater detail on these factor variables is provided in Appendix D.

The next seven variables represent MNC-level features related to reporting. *EnvScore*, *SocScore*, and *GovScore* are the MNC's environmental, social, and governance pillar scores, respectively. *GRI* is an indicator variable for whether the MNC reports under the GRI framework, *Competition* is the level of competition the MNC faces in its country-industry, *PrivatePost* is an indicator variable for whether the MNC is subject to mandatory private CbCR in the year, and *Haven* is an indicator variable for whether the MNC has an affiliate located in a tax haven.

MNC-level financial variables include an indicator variable for whether the MNC reports a loss for accounting purposes in the year (*Loss*), MNC size (*Size*), research and development expense (*RD*), return on assets (*ROA*), and the leverage ratio (*Leverage*).

The next four variables represent MNC-level features related to the reporting environment. *lnAnalysts* is the natural logarithm of the number of analysts following the MNC, *InstOwnPRI* and *InstOwnNonPRI* are the percentage of the MNC's stock owned by institutional investors who are and are not Principles for Responsible Investment (PRI) signatories, respectively, and *StdRet* is the standard deviation of the MNC's monthly stock returns in the fiscal year.

The last seven variables are affiliate-level control variables from equation 3 and are defined as previously mentioned. Industry and year fixed effects are also included in equation 4. In contrast with Adams et al. [2024], I do not include indicator variables for whether the MNC operates in an extractive industry or whether the firm is domestic-only as I dropped all extractive MNCs and all domestic-only firms in the sample selection process.

I utilize several instruments in the first stage disclosure model. These instruments are appropriate to include as treatment factors, as Adams et al. [2024] demonstrate that these instruments

influence the decision to voluntarily disclose tax information in sustainability reporting. Several of these instruments are plausibly exogenous with my outcome variable of interest. For example, the percentage of the MNC's stock owned by institutional investors that are not PRI signatories is likely not directly associated with the MNC's profit and corresponding tax-motivated income shifting.

After estimating equation 4, I follow Xu [2021] and use the predicted  $\widehat{PublicTreat}$  in place of the instruments in equation 4 as follows:

$$\begin{aligned} \widehat{PublicTreat}_M = & \gamma_0 + \gamma_1 \widehat{PublicTreat} + \gamma_2 C_{i,t} + \gamma_3 \ln FixedAssets_{i,t} \\ & + \gamma_4 \ln Compensation_{i,t} + \gamma_{5-8} Controls_{i,t} + IndFE + YearFE + \varepsilon_{i,t} \end{aligned} \quad (5)$$

Then, the predicted  $\widehat{PublicTreat}$  is used in place of  $PublicTreat$  in the second stage as follows:

$$\begin{aligned} \ln EBIT_{i,t} = & \beta_0 + \beta_1 C_{i,t} + \beta_2 C_{i,t} \times PrivatePost_t + \beta_3 \widehat{PublicTreat}_M \\ & + \beta_4 \widehat{PublicTreat}_M \times PublicPost_t + \beta_5 C_{i,t} \times \widehat{PublicTreat}_M \\ & + \beta_6 C_{i,t} \times \widehat{PublicTreat}_M \times PublicPost_t + \beta_7 \ln FixedAssets_{i,t} \\ & + \beta_8 \ln Compensation_{i,t} + \beta_{9-12} Controls_{i,t} + FixedEffects + \varepsilon_{i,t} \end{aligned} \quad (6)$$

All variables in equations 5 and 6 are defined as previously mentioned. Standard errors are clustered at the MNC level. All data are in US dollars, and all variables are defined with their sources in Appendix D.

## 4.5 Summary Statistics

Summary statistics are reported in Table 9 Panel A and are largely consistent with the income shifting literature (e.g., the global sample in De Simone et al. [2022]). I separately report summary statistics for affiliates of MNCs that do and do not voluntarily disclose CbCR publicly. The last three columns of Table 9 Panel A indicate that there are significant differences between these groups. MNCs that voluntarily disclose CbCR publicly have substantially greater revenue, are larger, and have fewer affiliates than MNCs that do not voluntarily disclose CbCR publicly. Affiliates of MNCs that

voluntarily disclose CbCR publicly are more profitable, have greater fixed assets and compensation expenses, and are younger. They are more likely to operate in countries with lower GDP per capita and less profitable country-industries.

Pearson correlation coefficients are reported in Table 9 Panel B, with correlations statistically significant at the five percent level denoted in bold. Correlations are generally low except for similar measures (e.g., the alternate definitions of *C*), which are not used together in the same model, the profitability measure with assets and compensation, and interacting variables with their related variables.

#### **4.6 Characteristics of Voluntary Public Country-by-Country Reporting Disclosures**

I next provide descriptive evidence on the content of MNCs' voluntary public CbCR disclosures by comparing the disclosures to the OECD's best practices, which I use in additional analysis below. The OECD's [2015] guidance on what information to provide in CbCR includes the countries where the MNC operates or reports income, and by country, revenue, related-party revenue, pre-tax income, income taxes paid and accrued, stated capital, accumulated earnings, tangible assets, and the number of employees. However, as public CbCR is voluntary for all disclosers in my sample, these MNCs have significant discretion over the quality and quantity of information they provide within their CbCR, which may fall well short of the OECD's recommended best practice. Consistent with this discretion, Aliprandi and von Zedlitz [2023] find that MNCs use varying definitions of key CbCR information, limiting comparability across MNCs.

Summaries of the information content of the 193 voluntary public CbCR disclosures belonging to the 59 disclosing MNCs in my sample are provided in Figure 3. I note several interesting observations. First, as expected, only ten reports contain all the information per the OECD's [2015]

guidance. The most common item reported per country is tax paid (176 reports); the least common items are stated capital and accumulated earnings (10 reports each). Less than half of the reports (94 reports) contain pre-tax income, and only 74 (43) reports contain the number of employees (tangible assets). This lack of information makes benchmarking income against real activity in a country difficult. Regardless, these disclosures still contain information above and beyond mandated tax disclosures in the financial statements.

Based on reading hundreds of voluntary public CbCR disclosures, I also note three interesting disclosure choices commonly considered: reporting amounts on a country-by-country basis or aggregating to continents, reporting all countries separately or aggregating to an “other foreign countries” category, and reporting income tax amounts or aggregating with other forms of taxes (e.g., sales tax, payroll tax). I assert that the latter in each disclosure choice listed is less informative for stakeholders, making MNCs’ income shifting behavior extremely difficult to estimate and circumventing the OECD’s intended purpose of CbCR. As detailed in Figure 3, 41 of the 193 voluntary public CbCR disclosures aggregate countries to the continent level, 104 aggregate countries into an “other foreign countries” category, and 62 aggregate income taxes with other forms of taxes. I use these data in the additional analysis below.

#### **4.7 Test of Hypothesis 2 without Xu’s [2021] Two-Step Instrumental Variables Method**

First, I estimate the affiliate-level income shifting model in equation 3 without using Xu’s [2021] computationally intensive two-step instrumental variables method. I report the Huizinga and Laeven [2008] and the De Simone et al. [2017] models in Table 10 Panel A columns 1 and 2, respectively.

All coefficients are generally consistent with prior literature (e.g., De Simone et al. [2017]; De Simone et al. [2022]). The coefficient on  $C$ , the tax incentive to shift income, is negative and statistically

significant at the one percent level in both columns (-0.591, *t*-statistic of -5.481 in column 1; -0.709, *t*-statistic of -4.054 in column 2). A negative coefficient on *C* represents income shifting, by reporting higher earnings before interest and taxes in affiliates located in countries with lower statutory tax rates, relative to expected economic earnings.

The coefficient on the interaction of *C* and *PrivatePost* is positive and statistically significant at the one percent level in both columns (0.443, *t*-statistic of 4.590 in column 1; 0.647, *t*-statistic of 4.299 in column 2). This evidence suggests that MNCs exhibit significantly less tax-motivated income shifting after the implementation of mandatory private CbCR, consistent with the results found in Chapter 3.

The coefficient on the interaction of *C* and *PublicTreat* is positive and statistically significant at the ten percent level in column 1 (1.049, *t*-statistic of 1.737), but not statistically significant at conventional levels in column 2 (1.120, *t*-statistic of 1.230). This result provides some evidence to suggest that MNCs that voluntarily disclose CbCR publicly were originally less aggressive income shifters than those that do not voluntarily disclose CbCR publicly.

The coefficient on the interaction of *C*, *PublicTreat*, and *PublicPost* is my coefficient of interest. Per hypothesis 2, I predict this coefficient will be positive. A positive coefficient is consistent with MNCs that voluntarily disclose CbCR publicly decreasing their tax-motivated income shifting in the voluntary CbCR disclosure period, relative to MNCs that do not voluntarily disclose CbCR publicly. However, the coefficients on  $C \times PublicTreat \times PublicPost$  are negative and not statistically significant in both columns (-0.157, *t*-statistic of -0.220 in column 1; -0.127, *t*-statistic of -0.142 in column 2). Thus, I fail to find evidence to support my hypothesis using the difference-in-differences design in equation 3. However, I do not make any formal conclusions until I consider the results from Xu's [2021] two-step instrumental variables method, which addresses endogeneity.

## 4.8 Stacked Difference-in-Differences Design

As I discuss in Chapter 3, the difference-in-differences design employed in equation 3 is not always suitable when there is staggered treatment timing because the parallel trends assumption may be violated when treatment effects are not homogenous (Barrios [2021], Goodman-Bacon [2021], Sun and Abraham [2021]). However, in my setting, this bias is unlikely to be of significant concern due to the large proportion of MNCs in my sample that never voluntarily disclose CbCR publicly: the Goodman-Bacon [2021] decomposition reveals that greater than 90% of the difference-in-differences estimator's weight is placed on individual difference-in-differences comparing never-treated MNCs to those treated at some point in the sample. Therefore, equation 3 is likely unaffected by the aforementioned bias.

Nonetheless, I implement a stacked variation of equation 3 following Cengiz et al. [2019] and Baker et al. [2022]. I report the results of this regression using the Huizinga and Laeven [2008] and De Simone et al. [2017] models in Table 10 Panel B columns 1 and 2, respectively. Note that all treated observations are “stacked” so that all MNCs are treated at relative time 0 (i.e., all MNCs begin to voluntarily disclose CbCR publicly at time 0). Thus, *PublicTreat* × *PublicPost* is an indicator variable equal to relative time 1 and greater and is subsumed by the relative time fixed effects, as relative time (other than time 0) only exists for observations where *PublicTreat*=1. I also include the indicator variable *PrivatePost* for the years where mandatory private CbCR is required. Another feature of the stacked regression is the creation of individual cohorts for each treatment event, leading to increased observations from Panel A to Panel B. I include cohort fixed effects to control for factors relating to each treatment event, which subsumes the *PublicTreat* indicator variable.

Both the magnitude of the coefficients and the standard errors of the stacked difference-in-differences design are very similar to that of the staggered difference-in-differences design. The coefficients on *C* continue to be negative and statistically significant at the one percent level (-0.588, *t*-statistic of -5.438 in column 1; -0.794, *t*-statistic of -4.564 in column 2), and the coefficients on the

interaction of *C* and *PrivatePost* continue to be positive and statistically significant at the one percent level (0.435, *t*-statistic of 4.512 in column 1; 0.611, *t*-statistic of 3.997 in column 2).

However, the coefficients on the interaction of *C* and *PublicTreat* are positive but not statistically significant at conventional levels (1.017, *t*-statistic of 1.514 in column 1; 1.109, *t*-statistic of 1.166 in column 2). My coefficient of interest, the coefficient on the interaction of *C*, *PublicTreat*, and *PublicPost*, continues to be negative and not statistically significant (-0.373, *t*-statistic of -0.512 in column 1; -0.278, *t*-statistic of -0.310 in column 2). That the results of the stacked difference-in-differences design are very similar to those of the staggered difference-in-differences design is consistent with the results of the Goodman-Bacon [2021] decomposition and suggests that the staggered difference-in-differences design employed in equation 3 is not subject to the aforementioned bias. Again, I do not make any formal conclusions regarding my hypothesis until I address the endogeneity present in this setting.

## 4.9 Test of Hypothesis 2 with Xu’s [2021] Two-Step Instrumental Variables

### Method

Next, I address the potential correlated omitted variables bias by utilizing Xu’s [2021] two-step instrumental variables method using fitted probabilities, outlined in equations 4 to 6. I report the results using the Huizinga and Laeven [2008] income shifting model in Table 11 Panel A and the results using the De Simone et al. [2017] income shifting model in Table 11 Panel B. The results of the first stage logit model are reported in column 1 of both panels.<sup>18</sup> The results are consistent with expectations. The Cobb-Douglas production function variables are not statistically significant, except for *lnFixedAssets* in Table 11 Panel B, which is statistically significant at the five percent level. The strength of regulation in the MNC’s headquarter-country reduces the propensity to voluntarily disclose CbCR publicly,

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<sup>18</sup> I do not include *ΔMktSize* or *IndustryROA* in the first stage models because industry fixed effects are included.

whereas the level of freedom of individual voice and media expression increases the propensity to disclose. The MNC's social pillar score and whether the MNC reports under the GRI framework increase the propensity to disclose.

The result of the modified first stage model is reported in column 2 of both panels, which uses the predicted  $\widehat{PublicTreat}$  values from the first stage logit model in place of the instruments. As expected, the coefficient on  $\widehat{PublicTreat}$  is very close to one (1.021, z-statistic of 9.458 in Panel A; 1.026, z-statistic of 10.828 in Panel B) and the remaining coefficients are very close to zero.

The results of the second stage Huizinga and Laeven [2008] and De Simone et al. [2017] income shifting models are reported in columns 3 of Table 11 Panel A and Table 11 Panel B, respectively. Consistent with the results from Table 10, the coefficients on  $C$  are negative and statistically significant at the ten percent level or greater in both panels (-0.775, z-statistic of -4.645 in Panel A; -0.429, z-statistic of -1.951 in Panel B), and the coefficients on the interaction of  $C$  and  $PrivatePost$  are positive and statistically significant at the one percent level in both panels (0.451, z-statistic of 3.598 in Panel A; 0.515, z-statistic of 2.932 in Panel B).

The coefficients on the interaction of  $C$  and  $\widehat{PublicTreat}$  are not statistically significant at conventional levels (-0.337, z-statistic of -0.391 in Panel A; -1.313, z-statistic of -1.033 in Panel B). However, unlike the results in Table 10, the coefficients on the interaction of  $C$ ,  $\widehat{PublicTreat}$ , and  $PublicPost$ , my coefficients of interest, are positive and statistically significant at the ten percent level or greater (2.508, z-statistic of 1.661 in Panel A; 5.094, z-statistic of 2.926 in Panel B). This result supports hypothesis 2 and suggests that MNCs that voluntarily disclose CbCR publicly decrease their tax-motivated income shifting in conjunction with voluntary disclosure, relative to the pre-period.

In Table 11 Panel C, I utilize Xu's [2021] two-step instrumental variables method in a stacked difference-in-differences design. I report the second stage using the Huizinga and Laeven [2008] model

in column 1 and the De Simone et al. [2017] model in column 2. I do not report the first stage coefficients as they are the same as in Table 11 Panel A. The coefficient on the interaction of  $C$ ,  $\widehat{PublicTreat}$ , and  $PublicPost$  continues to be positive and statistically significant at the ten percent level or greater (2.962,  $z$ -statistic of 1.857 in column 1; 5.307,  $z$ -statistic of 2.343 in column 2), consistent with the staggered difference-in-differences model not being affected by the bias discussed by Barrios [2021], Goodman-Bacon [2021], and Sun and Abraham [2021].

#### 4.10 The Impact of the Reduced Sample Size

Xu's [2021] two-step instrumental variables method requires more variables, significantly decreasing sample size. To address the concern that the change in sample drives these results, instead of modelling the endogenous disclosure decision, I explore characteristics of the reduced sample and I estimate equation 3 on the reduced sample.

Table 12 Panel A contains summary statistics for the reduced sample. Unsurprisingly, the availability of the additional variables results in a reduced sample of relatively larger MNCs in terms of greater revenue, assets, and number of affiliates. All fifteen countries in the full sample continue to be represented in the reduced sample, and there is a greater proportion of MNCs that voluntarily disclose CbCR publicly in the reduced sample.

The results of the Huizinga and Laeven [2008] and the De Simone et al. [2017] models on the reduced sample are reported in Table 12 Panel B columns 1 and 2, respectively, and are consistent with that of the full sample in Table 10. In both columns, the coefficients on the interaction of  $C$  and  $PublicTreat$  are positive but not statistically significant at conventional levels (0.766,  $t$ -statistic of 1.004 in column 1; 0.545,  $t$ -statistic of 0.437 in column 2), and the coefficients on the interaction of  $C$ ,  $PublicTreat$ , and  $PublicPost$  are negative but not statistically significant (-0.188,  $t$ -statistic of -0.233 in column 1; 0.178,  $t$ -statistic of 0.150 in column 2). This evidence supports the conjecture that the

modelling of the endogenous disclosure decision drives the results in Table 11 instead of sample differences; however, I cannot rule out the possibility that the results in Table 11 may not generalize beyond the sample of large MNCs for which there are sufficient data available (e.g., MNCs for which *Refinitiv* has environmental, social, and governance pillar scores).

#### 4.11 Additional Analysis

In additional analysis, I utilize the characteristics of the voluntary public CbCR disclosures to provide evidence for my assertion that the voluntary public disclosure of CbCR is consistent with a separating equilibrium. For this to be the case, it must be costly for aggressive income shifters to mimic their non-aggressive counterparts. Thus, I expect that the MNCs that voluntarily disclose relatively detailed CbCR are not aggressive income shifters, as it would be very costly for aggressive income shifters to disclose such detailed information. In other words, I expect the results for hypothesis 2 to be stronger for MNCs with more detailed voluntary public CbCR disclosures.

To conduct my analysis, I assign one point to an MNC's CbCR for each piece of information disclosed according to the OECD's [2015] guidance and each of the three other disclosure choices discussed in section 4.6. I then split the voluntary public CbCR discloser sample into two groups based on a median split of the CbCR disclosure scores and create an indicator variable, *More*, which equals one where the voluntary CbCR disclosure has above-median detail relative to other voluntary CbCR disclosures in the sample, and zero otherwise.

The results of this additional analysis are reported in Table 13 Panel A. I report the second stage using the Huizinga and Laeven [2008] model in column 1 and using the De Simone et al. [2017] model in column 2. I do not report the first stage coefficients in Table 13 as they are the same as in Table 11. The coefficient on  $C \times \widehat{PublicTreat} \times PublicPost \times More$  is positive and significant at the ten percent level in column 1 (5.184, z-statistic of 1.859), and positive and significant at the ten percent

level (one-tailed) in column 2 (4.373, z-statistic of 1.300). This evidence suggests that MNCs that voluntarily disclose detailed CbCR publicly exhibit significant decreases in income shifting, on average, in conjunction with disclosure, relative to MNCs that voluntarily disclose vague CbCR.

To explore this result further, I create a 2x2 matrix of the implied  $C \times \widehat{PublicTreat}$  coefficients from column 1. I report this matrix in Table 13 Panel B. *F*-tests of the implied coefficients on  $C \times \widehat{PublicTreat}$  in the *More*=0 quadrants reveal that both coefficients are not statistically different from zero, and the coefficient on  $C \times \widehat{PublicTreat} \times PublicPost$  (1.273, z-statistic of 0.608 in column 1) shows that the coefficients are not statistically different from each other. Therefore, I fail to find evidence that MNCs that voluntarily disclose vague CbCR exhibit changes in their income shifting in conjunction with disclosure. Furthermore, the coefficients on  $C \times \widehat{PublicTreat}$  (0.258, z-statistic of 0.210 in column 1) and  $C \times \widehat{PublicTreat} \times More$  (-2.070, z-statistic of -1.303 in column 1) suggest there is no statistically significant difference in the income shifting behavior in the pre-period of MNCs that voluntarily disclose vague CbCR, MNCs that voluntarily disclose detailed CbCR, and the general population of MNCs that do not voluntarily disclose CbCR.

The *F*-tests of the implied coefficients on  $C \times \widehat{PublicTreat}$  in the *More*=1 quadrants reveal that both coefficients are statistically significantly different from zero at the ten percent level or greater. This finding suggests that MNCs that disclose detailed CbCR were, on average, not always less aggressive income shifters relative to the general population of MNCs. Consistent with my assertion, the evidence from this analysis suggests that MNCs with more detailed CbCR disclosures significantly decreased their tax-motivated income shifting alongside such a costly disclosure. Thus, the main results in Table 11 are driven by the MNCs that voluntarily disclose detailed CbCR. In other words, my results are consistent with MNCs that are unwilling to be less aggressive income shifters, on average, being less willing to disclose CbCR voluntarily, especially detailed CbCR.

My tests do not show evidence of a decrease in income shifting prior to the initiation of voluntary public disclosure. This finding is consistent with MNCs deciding to reduce income shifting and voluntarily disclose CbCR publicly, and both occurring simultaneously, given that income shifting structures are complex and can take significant time to dismantle. Overall, my results suggest that the voluntary public disclosure of detailed CbCR is a credible signal of MNCs' income shifting behavior.

## **Chapter 5**

### **Conclusion**

In this thesis, I examine how disclosure can address the global BEPS challenge by studying the relation between mandatory private CbCR, voluntary public CbCR, and the tax-motivated income shifting of MNCs.

Extant research has failed to find robust evidence that MNCs' tax-motivated income shifting has significantly decreased after the implementation of mandatory private CbCR disclosure to the tax authorities. In this thesis, I revisit this question by replicating the results of prior research, expanding the sample to include smaller public MNCs and private MNCs, lengthening the sample period to 2021, and expanding to a global sample of MNCs. Using affiliate-level income shifting models, I find robust evidence that MNCs shift significantly less income in the post-CbCR implementation period, and these decreases are monotonic across MNC size. Altogether, I show that the objective of CbCR in reducing income shifting was achieved around the time CbCR was implemented; however, because I observe significant decreases in income shifting among MNCs not subject to private CbCR, it is unlikely that the CbCR disclosure to the tax authorities resulted in the decrease in income shifting. Additional tests on other BEPS action items lend credibility to this conclusion.

To my knowledge, this thesis provides the first global evidence to correct the misperception in the literature that MNCs' income shifting has not decreased after the implementation of private CbCR. I show that CbCR is associated with a significant decrease in income shifting although this relation is not causal. This evidence has important implications for the literature and policymakers worldwide. Given that MNCs have already drastically decreased their income shifting, my evidence questions whether public CbCR and Pillar II are necessary, particularly considering the complexity and the compliance burden of Pillar II's proposed global minimum tax rules.

Given that estimates suggest that MNCs have, on average, decreased their income shifting by half after the implementation of mandatory private CbCR, I look forward to future research exploring the implications of this change on other tax planning strategies. I also look forward to future research on the individual BEPS action items that appear to contribute to the significant reduction in income shifting.

Further, extant research has generally found that firms do not exhibit different tax behavior after voluntary tax disclosure (Hoopes et al. [2023]). In this thesis, I consider MNCs that voluntarily disclose CbCR publicly to determine whether this disclosure is a credible signal of their tax behavior. Using affiliate-level income shifting models, and after explicitly modelling the endogenous disclosure decision and controlling for the effect of mandatory private CbCR disclosure to the tax authority, I find that, on average, MNCs that voluntarily disclose CbCR publicly significantly decrease tax-motivated income shifting in conjunction with disclosure. The propensity for reduced income shifting is greater amongst multinationals that provide detailed CbCR disclosure, which is consistent with the costliness of such a detailed disclosure. Overall, my finding that the voluntary public CbCR disclosure is a credible signal of MNCs' tax behavior has important implications for stakeholders interested in utilizing these disclosures.

As I am only able to explicitly model the endogenous disclosure decision for MNCs that have the necessary data available to estimate Adams et al.'s [2024] disclosure model, I note that this paper's results may not generalize beyond the sample of large MNCs (e.g., MNCs for which *Refinitiv* has environmental, social, and governance pillar scores).

Finally, I note that the empirical analysis employed cannot offer evidence on whether the motivation to voluntarily disclose CbCR publicly changes tax-motivated income shifting behavior or vice versa, or whether a third factor influences both. I look forward to future research, particularly using survey or field methods, to better address these underlying motivators.

## References

- Adams, J. R., E. Demers, and K. J. Klassen. 2024. Tax aggressive behavior and voluntary tax disclosures: Evidence from corporate sustainability reporting. *Working paper*.
- Aliprandi, G., K. Borders, F. Gabriel, and G. von Zedlitz. 2022. *Public country-by-country reports: A new database*. EU Tax Observatory.
- Aliprandi, G., and G. von Zedlitz. 2023. Benchmarking country-by-country reports. *Working paper*.
- Asay, H. S., J. L. Hoopes, J. R. Thornock, and J. H. Wilde. 2024. Tax boycotts. *The Accounting Review*, 99(1), 1-29.
- Baker, A. C., D. F. Larcker, and C. C. Y. Wang. 2022. How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics*, 144, 370-395.
- Barrios, J. M. 2021. Staggeringly problematic: A primer on staggered DiD for accounting researchers. *Working paper*.
- Becker, J., R. B. Davies, and G. Jakobs. 2017. The economics of advance pricing agreements. *Journal of Economic Behavior & Organization*, 134, 255-268.
- Belnap, A., and J. Hoopes. 2021, October 1. *Stop shaming corporations with meaninglessly low effective tax rates*. Fortune. <https://fortune.com/2021/10/01/stop-shaming-corporations-with-meaninglessly-low-effective-tax-rates/>
- Bergin, T. 2012, October 15. *Special report: How Starbucks avoids UK taxes*. Reuters. <https://www.reuters.com/article/us-britain-starbucks-tax-idUSBRE89E0EX20121015>
- Beyer, A., D. A. Cohen, T. Z. Lys, and B. R. Walther. 2010. The financial reporting environment: Review of the recent literature. *Journal of Accounting and Economics*, 50, 296-343.

- Bowers, S. 2017, November 7. *Apple stashed profits in new tax havens after Irish scheme drew scrutiny*. CBC. <https://www.cbc.ca/news/business/apple-ireland-1.4389313>
- Bozanic, Z., J. L. Hoopes, J. R. Thornock, and B. M. Williams. 2017. IRS attention. *Journal of Accounting Research*, 55(1), 79-114.
- Cengiz, D., A. Dube, A. Lindner, and B. Zipperer. 2019. The effect of minimum wages on low-wage jobs. *The Quarterly Journal of Economics*, 134(3), 1405-1454.
- Chen, S., Schuchard, K., & Stomberg, B. 2019. Media coverage of corporate taxes. *The Accounting Review*, 94(5), 83-116.
- Chen, N. X., S. Chi, and T. Shevlin. 2023. A tale of two forecasts: An analysis of mandatory and voluntary effective tax rate forecasts. *The Accounting Review*, 98(5), 161-186.
- Chen, Z., X. Jiang, Z. Liu, J. C. Suárez Serrato, and D. Y. Xu. 2023. Tax policy and lumpy investment behaviour: Evidence from China's VAT reform. *The Review of Economic Studies*, 90(2), 634-674.
- Chi, S., A. Persson, T. Shevlin, and O. Urcan. 2023. The deterrence effect of cross-border monitoring: Evidence from EDGAR search activity by foreign tax authorities. *Working paper*.
- Crawford, V. P., and J. Sobel. 1982. Strategic information transmission. *Econometrica*, 50(6), 1431-1451.
- De Simone, L., K. J. Klassen, and J. K. Seidman. 2017. Unprofitable affiliates and income shifting behavior. *The Accounting Review*, 92(3), 113-136.
- De Simone, L., K. J. Klassen, and J. K. Seidman. 2022. The effect of income-shifting aggressiveness on corporate investment. *Journal of Accounting and Economics*, 74(1), 1-20.

- De Simone, L., and M. Olbert. 2022. Real effects of private country-by-country disclosure. *The Accounting Review*, 97(6), 201-232.
- Dyreng, S. D., J. L. Hoopes, P. Langetieg, and J. H. Wilde. 2020. Strategic subsidiary disclosure. *Journal of Accounting Research*, 58(3), 643-692.
- Dyreng, S. D., J. L. Hoopes, and J. H. Wilde. 2016. Public pressure and corporate tax behavior. *Journal of Accounting Research*, 54(1), 147-186.
- Dyreng, S. D., and E. L. Maydew. 2018. Virtual issue on tax research published in the Journal of Accounting Research. *Journal of Accounting Research*, 56(2), 311.
- Eberhartinger, E., R. Speitmann, and C. Sureth-Sloane. 2020. Real effects of public country-by-country reporting and the firm structure of European banks. *Working paper*.
- Ernst & Young LLP. 2021, December 2. *EU Public CbCR Directive enters into force on 21 December 2021*. [https://www.ey.com/en\\_gl/tax-alerts/eu-public-cbcr-directive-enters-into-force-on-21-december-2021](https://www.ey.com/en_gl/tax-alerts/eu-public-cbcr-directive-enters-into-force-on-21-december-2021)
- Ernst & Young LLP. 2024, February 13. *Australia revises draft legislation for public country-by-country reporting*. [https://www.ey.com/en\\_gl/tax-alerts/australia-revises-draft-legislation-for-public-country-by-countr](https://www.ey.com/en_gl/tax-alerts/australia-revises-draft-legislation-for-public-country-by-countr)
- Gallemore, J., E. L. Maydew, and J. R. Thornock. 2014. The reputational costs of tax avoidance. *Contemporary Accounting Research* 31(4), 1103-1133.
- Gilleard, M. 2012, December 3. *UK politicians attack Starbucks' tax planning*. International Tax Review. <https://www.internationaltaxreview.com/article/b1fbsmhh6zh8h5/uk-politicians-attack-starbucks-tax-planning>

- Goodman-Bacon, A. 2021. Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2), 254-277.
- Graham, J. R., M. Hanlon, T. Shevlin, and N. Shroff. 2014. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review*, 89(3), 991-1023.
- Gramlich, J., and J. Whitaker-Poe. (2013). Disappearing subsidiaries: The cases of Google and Oracle. *Working paper*.
- GRI. 2019. *GRI 207: Tax 2019*. <https://www.globalreporting.org/standards/media/2482/gri-207-tax-2019.pdf>
- Grossman, S. J. 1981. The informational role of warranties and private disclosure about product quality. *The Journal of Law and Economics*, 24(3), 461-483.
- Grossman, S. J., and O. D. Hart. 1980. Disclosure laws and takeover bids. *The Journal of Finance*, 35(2), 323-334.
- The Guardian. 2009, February 2. *Firms' secret tax avoidance schemes cost UK billions*. <https://www.theguardian.com/business/2009/feb/02/tax-gap-avoidance>
- Guceri, I., and M. Albinowski. 2021. Investment responses to tax policy under uncertainty. *Journal of Financial Economics*, 141(3), 1147-1170.
- Guenther, D. A., S. R. Matsunaga, and B. M. Williams. 2017. Is tax avoidance related to firm risk? *The Accounting Review*, 92(1), 115-136.
- Hainmueller, J. 2012. Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis*, 20, 25-46.
- Hanlon, M. 2018. Country-by-country reporting and the international allocation of taxing rights. *International Bureau of Fiscal Documentation (IBFD)*, forthcoming.

- Hanlon, M., and J. Slemrod. 2009. What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics*, 93(1-2), 126-141.
- Healy, P. M., and K. G. Palepu. 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31, 405-440.
- Hoopes, J. L., L. Robinson, and J. B. Slemrod. 2018. Public tax-return disclosure. *Journal of Accounting and Economics*, 66(1), 142-162.
- Hoopes, J. L., L. Robinson, and J. B. Slemrod. 2023. Corporate tax disclosure. *Journal of the American Taxation Association*, forthcoming.
- Hope, O.-K., M. S. Ma, and W. B. Thomas. 2013. Tax avoidance and geographic earnings disclosure. *Journal of Accounting and Economics*, 56(2-3), 170-189.
- Huizinga, H., and L. Laeven. 2008. International profit shifting within multinationals: A multi-country perspective. *Journal of Public Economics*, 92(5-6), 1164-1182.
- Joshi, P. 2020. Does private country-by-country reporting deter tax avoidance and income shifting? Evidence from BEPS Action Item 13. *Journal of Accounting Research*, 58(2), 333-381.
- Joshi, P., K. Markle, and L. A. Robinson. 2023. Private country-by-country reporting and the misalignment between profits and economic activity. *Working paper*.
- Joshi, P., E. Outslay, and A. Persson. 2020. Does public country-by-country reporting deter tax avoidance and income shifting? Evidence from the European banking industry. *Contemporary Accounting Research*, 37(4), 2357-2397.

- Kays, A. 2022. Voluntary disclosure responses to mandated disclosure: Evidence from Australian corporate tax transparency. *The Accounting Review* 97(4), 317-344.
- Krueger, P., Z. Sautner, D. Tang, & R. Zhong. (2024). The effects of mandatory ESG disclosure around the world. *Journal of Accounting Research*, forthcoming.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, & R. W. Vishny. (1998). Law and finance. *The Journal of Political Economy*, 106(6), 1113-1155.
- Middleton, A., and J. Muttonen. 2020. *Multinational enterprises and transparent tax reporting*. Routledge.
- Milgrom, P. R. 1981. Good news and bad news: Representation theorems and applications. *The Bell Journal of Economics*, 12(2), 380-391.
- Milgrom, P. R., and J. Roberts. 1986. Relying on the information of interested parties. *Rand Journal of Economics*, 17, 18-32.
- Müller, R., C. Spengel, and H. Vay. 2020. On the determinants and effects of corporate tax transparency: Review of an emerging literature. *Working paper*.
- Nessa, M., A. V. Persson, J. Z. Song, E. Towery, and M. Vernon. 2022. The effect of U.S. country-by-country reporting on U.S. multinationals' tax-motivated income shifting and real activities. *Working paper*.
- OECD. 2013. *Addressing base erosion and profit shifting*. OECD Publishing.
- OECD. 2015. *OECD/G20 base erosion and profit shifting project Action 13: Country-by-country reporting implementation package*. <https://www.oecd.org/ctp/transfer-pricing/beps-action-13-country-by-country-reporting-implementation-package.pdf>
- OECD. 2024a. *Base erosion and profit shifting*. <https://www.oecd.org/tax/beps/>

- OECD. 2024b. *Country-specific information on country-by-country reporting implementation*.  
<https://www.oecd.org/tax/automatic-exchange/country-specific-information-on-country-by-country-reporting-implementation.htm>
- Orica Limited. 2021. *Tax transparency report 2021*. <https://www.orica.com/ArticleDocuments/301/2021%20Orica%20Tax%20Transparency%20Report.pdf.aspx>
- Overesch, M., and H. Wolff. 2021. Financial transparency to the rescue: Effects of public country-by-country reporting in the European Union banking sector on tax avoidance. *Contemporary Accounting Research*, 38(3), 1616-1642.
- Spence, M. 1973. Job market signaling. *The Quarterly Journal of Economics*, 87(3), 355-374.
- Sun, L., and S. Abraham. 2021. Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2), 175-199.
- Verrecchia, R. E. 2001. Essays on disclosure. *Journal of Accounting and Economics*, 32, 97-180.
- Wayne, L., K. Carr, M. Walker Guevara, M. Cabra, M. Hudson, M. Williams, E. Perrin, E. Díaz-Struck, D. Reuter, F. Zalac, H. Cashore, L. Bové, K. Clerix, J. Stein, T. Plattner, M. Stäuble, M. Knus-Galán, M. Caruana Galizia, R. Carvajal, C. Lütgert, and N. Chenoweth. 2014, November 5. *Leaked documents expose global companies' secret tax deals in Luxembourg*. International Consortium of Investigative Journalists. <https://www.icij.org/investigations/luxembourg-leaks/leaked-documents-expose-global-companies-secret-tax-deals-luxembourg/>
- Wilde, J. H., and R. J. Wilson. 2018. Perspectives on corporate tax planning: Observations from the past decade. *Journal of the American Taxation Association*, 40(2), 63-81.
- Wooldridge, J. M. 2010. *Econometric analysis of cross section and panel data*. MIT Press.

Xu, R. 2021. On the instrument functional form with a binary endogenous explanatory variable.  
*Econometrics Letters*, 206, 109993.

## Appendices

### Appendix A

#### Private Country-by-Country Regulations for Countries in the Sample

| Country            | Ultimate Parent Entity Filing Effective Date | Local Filing Effective Date | Consolidated Group Revenue Threshold |
|--------------------|----------------------------------------------|-----------------------------|--------------------------------------|
| AE (UAE)           | January 1, 2019                              | N/A                         | AED 3.15 billion                     |
| AT (Austria)       | January 1, 2016                              | January 1, 2017             | EUR 750 million                      |
| AU (Australia)     | January 1, 2016                              | January 1, 2016             | AUD 1 billion                        |
| BA (Bosnia)        | January 1, 2018                              | N/A                         | EUR 750 million                      |
| BE (Belgium)       | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| BG (Bulgaria)      | January 1, 2016                              | January 1, 2017             | EUR 750 million                      |
| BM (Bermuda)       | January 1, 2016                              | N/A                         | EUR 750 million                      |
| BR (Brazil)        | January 1, 2016                              | Suspended                   | BRL 2.26 billion                     |
| BS (Bahamas)       | January 1, 2019                              | N/A                         | USD 850 million                      |
| CA (Canada)        | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| CH (Switzerland)   | January 1, 2018                              | January 1, 2018             | CHF 900 million                      |
| CI (Côte d'Ivoire) | January 1, 2018                              | N/A                         | XOF<br>491,967,750,000               |
| CL (Chile)         | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| CN (China)         | January 1, 2016                              | Suspended                   | RMB 5.5 billion                      |
| CO (Colombia)      | January 1, 2016                              | January 1, 2016             | UVT 81 million                       |
| CZ (Czechia)       | January 1, 2016                              | January 1, 2017             | EUR 750 million                      |
| DE (Germany)       | January 1, 2016                              | January 1, 2017             | EUR 750 million                      |
| DK (Denmark)       | January 1, 2016                              | January 1, 2017             | DKK 5.6 billion                      |
| EE (Estonia)       | January 1, 2016                              | January 1, 2017             | EUR 750 million                      |
| EG (Egypt)         | FYE December 31, 2018                        | N/A                         | EGP 3 billion                        |
| ES (Spain)         | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| FI (Finland)       | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| FR (France)        | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| GB (UK)            | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| GI (Gibraltar)     | January 1, 2016                              | January 1, 2017             | EUR 750 million                      |
| GR (Greece)        | January 1, 2016                              | January 1, 2016             | EUR 750 million                      |
| HK (Hong Kong)     | January 1, 2018                              | January 1, 2018             | HKD 6.8 billion                      |
| HR (Croatia)       | January 1, 2016                              | January 1, 2017             | EUR 750 million                      |

|                             |                       |                       |                    |
|-----------------------------|-----------------------|-----------------------|--------------------|
| HU (Hungary)                | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| ID (Indonesia)              | January 1, 2016       | January 1, 2016       | IDR 11 trillion    |
| IE (Ireland)                | January 1, 2016       | January 1, 2016       | EUR 750 million    |
| IN (India)                  | April 1, 2016         | January 1, 2016       | INR 5,500 crore    |
| IS (Iceland)                | January 1, 2017       | January 1, 2017       | ISK 100 billion    |
| IT (Italy)                  | January 1, 2016       | January 1, 2016       | EUR 750 million    |
| JP (Japan)                  | April 1, 2016         | April 1, 2017         | JPY 100 billion    |
| KR (Korea)                  | January 1, 2016       | January 1, 2016       | KRW 1 trillion     |
| KY (Cayman Islands)         | January 1, 2016       | N/A                   | USD 850 million    |
| LK (Sri Lanka)              | April 1, 2018         | April 1, 2018         | EUR 750 million    |
| LT (Lithuania)              | January 1, 2016       | January 1, 2016       | EUR 750 million    |
| LU (Luxembourg)             | January 1, 2016       | January 1, 2016       | EUR 750 million    |
| LV (Latvia)                 | January 1, 2016       | January 1, 2016       | EUR 750 million    |
| MA (Morocco)                | January 1, 2021       | January 1, 2021       | MAD 8.1225 billion |
| MT (Malta)                  | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| MX (Mexico)                 | January 1, 2016       | January 1, 2016       | MXN 12 billion     |
| MY (Malaysia)               | January 1, 2017       | N/A                   | MYR 3 billion      |
| NL (Netherlands)            | January 1, 2016       | January 1, 2016       | EUR 750 million    |
| NO (Norway)                 | January 1, 2016       | January 1, 2017       | NOK 6.5 billion    |
| NZ (New Zealand)            | January 1, 2016       | N/A                   | EUR 750 million    |
| OM (Oman)                   | January 1, 2020       | January 1, 2020       | OMR 300 million    |
| PA (Panama)                 | January 1, 2018       | N/A                   | EUR 750 million    |
| PK (Pakistan)               | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| PL (Poland)                 | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| PT (Portugal)               | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| QA (Qatar)                  | January 1, 2018       | Suspended             | QAR 3 billion      |
| RO (Romania)                | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| RS (Serbia)                 | January 1, 2020       | N/A                   | EUR 750 million    |
| SA (Saudi Arabia)           | January 1, 2018       | January 1, 2018       | SAR 3.2 billion    |
| SE (Sweden)                 | January 1, 2016       | January 1, 2016       | SEK 7 billion      |
| SG (Singapore)              | January 1, 2017       | N/A                   | SGD 1.125 billion  |
| SI (Slovenia)               | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| SK (Slovakia)               | January 1, 2016       | January 1, 2017       | EUR 750 million    |
| TH (Thailand)               | January 1, 2021       | Suspended             | THB 28 billion     |
| TN (Tunisia)                | January 1, 2020       | January 1, 2020       | TND 1.6388 billion |
| TR (Türkiye)                | January 1, 2019       | January 1, 2019       | EUR 750 million    |
| UA (Ukraine)                | FYE December 31, 2021 | FYE December 31, 2021 | EUR 750 million    |
| US (USA)                    | June 30, 2016         | N/A                   | USD 850 million    |
| VG (British Virgin Islands) | January 1, 2018       | January 1, 2018       | EUR 750 million    |
| VN (Vietnam)                | May 1, 2017           | May 1, 2017           | VND 18 trillion    |
| ZA (South Africa)           | January 1, 2016       | January 1, 2017       | ZAR 10 billion     |

Source: OECD [2024b]

## Appendix B

### Example of Voluntary Public Country-by-Country Reporting – Orica Limited

#### Tax Transparency Reporting (continued)

##### FY2020 COUNTRY-BY-COUNTRY REPORTING SUMMARY

The tables below disclose our country-by-country (CbC) reporting data for FY2020. This shows the scale of our activities in each of the jurisdictions we operate in and allows our stakeholders to see profits earned, taxes paid and the context of those payments.

Table 1

| Tax Jurisdiction of Residence         | Revenue Unrelated Party | Revenue Related Party | Total Revenue | Profit (Loss) Before Income Tax | Income Tax Paid (on cash basis) | Income Tax Accrued – Current Year | Number of Employees | Tangible Assets other than Cash and Cash Equivalents |
|---------------------------------------|-------------------------|-----------------------|---------------|---------------------------------|---------------------------------|-----------------------------------|---------------------|------------------------------------------------------|
| Argentina                             | 37,683,456              | 1,054,918             | 38,738,374    | 2,286,202                       | 1,051,870                       | 1,504,185                         | 96                  | 8,534,121                                            |
| Australia                             | 1,702,331,460           | 2,065,457,086         | 3,767,788,546 | 980,610,237                     | 33,157,487                      | 26,321,530                        | 3,231               | 1,985,299,247                                        |
| Austria                               | 3,911,713               | 6,732,521             | 10,644,234    | (855,952)                       | 2,878                           | 125,371                           | 14                  | 2,116,134                                            |
| Belgium                               | 12,632,153              | 974,392               | 13,606,545    | (618,431)                       | 27,831                          | (737,293)                         | 29                  | 4,446,099                                            |
| Bolivia                               | 6,418                   | 51,707                | 58,125        | (126,405)                       | –                               | (244)                             | 1                   | 388,387                                              |
| Brazil                                | 127,177,940             | 9,476,578             | 136,654,518   | (2,697,622)                     | 7,608,371                       | 2,920,708                         | 641                 | 42,076,329                                           |
| Bulgaria                              | 14,651,988              | 876,020               | 15,528,008    | 2,741,797                       | 201,188                         | 273,704                           | 41                  | 6,574,245                                            |
| Burkina Faso                          | 5,893,977               | 613,830               | 6,507,807     | 475,692                         | –                               | 151,178                           | 9                   | 2,467,802                                            |
| Canada                                | 574,963,685             | 207,945,374           | 782,909,059   | 72,780,843                      | 7,690,759                       | 22,233,829                        | 1,151               | 325,539,801                                          |
| Chile                                 | 251,070,731             | 38,616,039            | 289,686,770   | (3,155,701)                     | 1,592,279                       | 1,213,574                         | 922                 | 114,222,066                                          |
| China                                 | 1,707,818               | 76,511                | 1,784,329     | (614,850)                       | (31,986)                        | 1,209                             | 298                 | 114,103                                              |
| Colombia                              | 45,967,100              | 1,235,382             | 47,202,482    | 264,030                         | 2,156,528                       | 673,314                           | 151                 | 9,951,685                                            |
| Congo, The Democratic Republic of the | 21,634,827              | 216,440               | 21,851,267    | (609,097)                       | –                               | 439,759                           | 22                  | 1,809,020                                            |
| Costa Rica                            | –                       | 33,230                | 33,230        | 240,907                         | –                               | 70,767                            | –                   | –                                                    |
| Cote d'Ivoire                         | –                       | –                     | –             | –                               | –                               | –                                 | –                   | –                                                    |
| Czechia                               | 15,600,825              | 886,026               | 16,486,851    | 699,616                         | 94,873                          | 224,872                           | 37                  | 1,746,790                                            |
| Denmark                               | 2,709,353               | 16,879                | 2,726,232     | 380,684                         | 109,749                         | 137,035                           | 2                   | 54,558                                               |
| Dominican Republic                    | 15,967,372              | 28,272                | 15,995,644    | 4,322,951                       | 1,307,648                       | 1,172,795                         | 27                  | 1,091,918                                            |
| Estonia                               | 27,056,906              | 2,196,266             | 29,253,172    | 8,198,527                       | –                               | 3,250,765                         | 63                  | 7,368,965                                            |
| Finland                               | 35,025,075              | 221,836               | 35,246,911    | (1,168,408)                     | –                               | 770,216                           | 50                  | 7,807,047                                            |
| Georgia                               | 6,950,027               | –                     | 6,950,027     | 705,416                         | –                               | 105,811                           | 18                  | 501,141                                              |
| Germany                               | 11,501,455              | 30,808,202            | 42,309,657    | (730,990)                       | 1,505,030                       | 50,578                            | 32                  | 833,586                                              |
| Ghana                                 | 61,813,049              | 26,678                | 61,839,727    | 4,603,630                       | 2,554,465                       | 787,694                           | 80                  | 12,889,991                                           |
| Hong Kong                             | 5,837,419               | 429,705               | 6,267,124     | (739,999)                       | 377,335                         | 9,595                             | 10                  | 817,114                                              |
| India                                 | 49,356,393              | 419,712               | 49,776,105    | (1,438,550)                     | 723,112                         | 380,998                           | 832                 | 34,102,263                                           |
| Indonesia                             | 237,102,671             | 33,334,519            | 270,437,190   | 60,928,887                      | 8,790,160                       | 12,280,023                        | 761                 | 249,298,088                                          |
| Ireland                               | 5,006,046               | –                     | 5,006,046     | 1,498,519                       | 33,738                          | 50,048                            | 2                   | 612,284                                              |
| Italy                                 | 1,400,280               | –                     | 1,400,280     | (208,374)                       | –                               | –                                 | 3                   | 7,968                                                |
| Japan                                 | 4,845,268               | 119,930               | 4,965,198     | (322,618)                       | 4,836                           | (360,563)                         | 8                   | 757,158                                              |
| Kazakhstan                            | 82,171,452              | 9,070,943             | 91,242,395    | 18,838,028                      | 2,518,874                       | 3,727,147                         | 483                 | 29,110,617                                           |
| Korea, Republic of                    | 5,455,861               | –                     | 5,455,861     | 5,337,914                       | –                               | 875                               | 3                   | –                                                    |
| Malaysia                              | 9,367,914               | 514,199               | 9,882,113     | (1,759,047)                     | 195,327                         | (1,084)                           | 47                  | 2,876,737                                            |
| Mali                                  | 3,298,188               | 130,631               | 3,428,819     | 382,036                         | –                               | 92,770                            | 1                   | 4,024,426                                            |
| Mauritania                            | –                       | –                     | –             | –                               | –                               | –                                 | –                   | –                                                    |

## Tax Transparency Reporting (continued)

| Tax Jurisdiction of Residence | Revenue Unrelated Party | Revenue Related Party | Total Revenue | Profit (Loss) Before Income Tax | Income Tax Paid (on cash basis) | Income Tax Accrued – Current Year | Number of Employees | Tangible Assets other than Cash and Cash Equivalents |
|-------------------------------|-------------------------|-----------------------|---------------|---------------------------------|---------------------------------|-----------------------------------|---------------------|------------------------------------------------------|
| Mexico                        | 163,621,420             | 54,513,258            | 218,134,678   | 39,542,844                      | 1,953,509                       | 4,767,144                         | 464                 | 46,796,404                                           |
| Mongolia                      | 31,742,959              | –                     | 31,742,959    | (6,916,559)                     | 607                             | (70,954)                          | 96                  | 10,659,063                                           |
| Mozambique                    | 10,450,212              | –                     | 10,450,212    | 3,033,890                       | 2,189                           | 935,762                           | 29                  | 2,873,121                                            |
| Namibia                       | 1,456,983               | –                     | 1,456,983     | (1,500,169)                     | –                               | (60,516)                          | 3                   | 3,492,706                                            |
| New Caledonia                 | –                       | –                     | –             | (9,245)                         | –                               | –                                 | –                   | –                                                    |
| New Zealand                   | 14,985,630              | 247,012               | 15,232,642    | 310,456                         | 240,091                         | 163,893                           | 30                  | 5,099,586                                            |
| Norway                        | 119,366,264             | 13,989,506            | 133,355,770   | 5,044,619                       | 160,889                         | 85,875                            | 129                 | 17,209,508                                           |
| Panama                        | 36,871,485              | 6,723,749             | 43,595,234    | 3,574,805                       | –                               | 374,014                           | 9                   | 1,824,118                                            |
| Papua New Guinea              | 23,219,965              | 2,484,729             | 25,704,694    | 1,479,383                       | 2,675,786                       | 106,456                           | 61                  | 9,001,618                                            |
| Peru                          | 372,317,486             | 12,910,269            | 385,227,755   | (13,210,767)                    | 3,870,400                       | 8,225,996                         | 1,357               | 247,907,453                                          |
| Philippines                   | 61,487,175              | 46,645,064            | 108,132,239   | 17,212,101                      | 6,216,066                       | 6,442,517                         | 733                 | 25,056,080                                           |
| Poland                        | 49,288,789              | 27,706,595            | 76,995,384    | 9,050,482                       | 2,397,119                       | 1,809,463                         | 347                 | 23,500,996                                           |
| Portugal                      | 28,485,990              | 6,358,420             | 34,844,410    | (201,570)                       | 1,172,460                       | (488,966)                         | 75                  | 8,356,912                                            |
| Russian Federation            | 153,241,637             | 12,250,634            | 165,492,271   | 18,185,058                      | 3,761,255                       | 960,489                           | 538                 | 41,790,096                                           |
| Senegal                       | 19,010,518              | 5,500,976             | 24,511,494    | (407,891)                       | 448,344                         | (189,082)                         | 35                  | 7,326,677                                            |
| Singapore                     | 125,339,408             | 853,421,627           | 978,761,035   | 92,153,584                      | 14,136,549                      | 13,478,890                        | 365                 | 3,793,894                                            |
| Slovakia                      | 549,618                 | 271,500               | 821,118       | (4,762)                         | –                               | –                                 | 3                   | –                                                    |
| South Africa                  | 59,396,272              | 37,720,928            | 97,117,200    | 3,926,350                       | 686,688                         | 380,468                           | 253                 | 18,446,150                                           |
| Spain                         | 26,143,330              | 1,195,256             | 27,338,586    | (1,170,289)                     | (107,218)                       | (476,517)                         | 53                  | 7,628,405                                            |
| Sweden                        | 60,775,806              | 97,182,712            | 157,958,518   | (31,395,422)                    | 57,993                          | (13,924,330)                      | 415                 | 63,854,578                                           |
| Switzerland                   | –                       | –                     | –             | 21,506                          | –                               | (64)                              | –                   | –                                                    |
| Taiwan                        | –                       | –                     | –             | 24,634                          | –                               | –                                 | –                   | –                                                    |
| Tanzania, United Republic of  | 41,873,539              | 34,938                | 41,908,477    | 4,408,007                       | 344,392                         | 2,025,332                         | 74                  | 9,552,221                                            |
| Thailand                      | –                       | 159,210               | 159,210       | 376,163                         | –                               | 52,373                            | –                   | 85,477                                               |
| Turkey                        | 65,253,901              | 1,613,700             | 66,867,601    | 5,615,364                       | 509,057                         | 1,059,450                         | 206                 | 13,404,155                                           |
| United Arab Emirates          | 38,973,860              | –                     | 38,973,860    | 12,108,968                      | –                               | –                                 | 64                  | 20,542,165                                           |
| United Kingdom                | 69,660,256              | 85,913,875            | 155,574,131   | (9,754,580)                     | 2,265,587                       | 7,587,174                         | 146                 | 18,968,513                                           |
| United States                 | 796,543,676             | 354,890,188           | 1,151,433,864 | 310,839,470                     | 1,890,703                       | 4,168,426                         | 868                 | 142,825,110                                          |
| Venezuela                     | 1,994                   | 5,558                 | 7,552         | 43,631,618                      | –                               | (3,979,101)                       | 22                  | –                                                    |
| Zambia                        | 15,494,316              | 9,284,958             | 24,779,274    | (6,622,877)                     | 2,628                           | (438,977)                         | 74                  | 10,276,153                                           |

Source: Orica Limited [2021]

## Appendix C

### The Income Shifting Model

A long-standing challenge in the tax-motivated income shifting literature is the measurement of economic earnings. Unlike actual accounting earnings, economic earnings is not observable and represents the profit a firm affiliate makes in a specific country based on its productive inputs, the general profitability of the MNC to which the affiliate belongs, and overall economic trends in the industry and country. Importantly, economic earnings does not include the MNC's decision of which jurisdiction to report income in, whereas accounting earnings does.

The Huizinga and Laeven [2008] and De Simone et al. [2017] income shifting models reflects the concept that accounting earnings in a jurisdiction equals economic earnings plus (minus) income shifted in (out) of the jurisdiction. The dependent variable, accounting earnings in the jurisdiction, is captured using the natural logarithm of the affiliate's earnings before interest and tax. Expected economic earnings in the jurisdiction consists of: (i) Cobb-Douglas production function factors (capital, labor, and country-industry return on assets) to capture the affiliate's productive inputs and economic activity, (ii) year fixed effects to capture time-varying profitability of all in the sample, and (iii) MNC fixed effects to capture the innate profitability of the MNC. Finally, income shifted in or out of the jurisdiction is represented by  $C$ .  $C$  captures the tax incentive to shift income amongst the affiliates of an MNC by calculating a capital-weighted statutory tax rate differential for each affiliate relative to all other affiliates of the MNC. Not only is  $C$  correlated with statutory tax rates, but it must sum to zero within an MNC-year. This imposed added-up constraint ensures that the tax incentive to shift income balances across all affiliates of the MNC in the year (i.e., income shifted in equals income shifted out).

In my setting, I am interested in where the profitability arises (i.e., the relative profitability across the affiliates of the MNC) in correlation with statutory tax rates, while controlling for the underlying profitability of the MNC. Specifically, in my first and second hypotheses, I am interested in the change in tax-motivated income shifting over time for certain MNC groups. Thus, my test variable is  $C$  interacted with the appropriate firm and time indicator variables.

It is important to note that the income shifting model does not incorporate factors commonly used for income shifting into the estimation of economic earnings, as the locations of these factors are MNC decisions. For example, earnings before interest and taxes is used as debt choices are a known income shifting tool. Although intangible assets drive firm value, the location of intangibles is also an MNC decision used in income shifting. Thus, to include these factors as control variables is to control for what  $C$  intends to capture.

Another related issue is the availability of data. Most income shifting studies use *Orbis*, which captures financial statement data of private firms and ownership information. *Orbis* relies heavily on European and other local filing obligations to build their dataset, and disclosure requirements of these local filing obligations are sparse compared to the disclosure requirements of publicly listed US MNCs, for example. It is typical for private firm observations in *Orbis* only to have populated significant financial statement items such as revenue, cost of goods sold, earnings before interest and taxes, net income after taxes, current assets and liabilities, fixed assets, long-term liabilities, and shareholders' equity. Thus, any additional control variables in the income shifting model would cause a significant decrease in observations, which would significantly alter the picture of an MNC's geographical footprint, the calculation of the  $C$  variable, and the inferences drawn from the empirical analysis.

## Appendix D

### Variable Definitions

| Variable               | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Source                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <i>Action4or5issue</i> | indicator which equals one if one of the following is met:<br>(1) the MNC's headquarter-country does not have an interest deduction limitation rule in place as of the OECD's 2019 review, or<br>(2) if the MNC's headquarter-country had a harmful preferential tax regime that was named in the OECD's 2015 BEPS Action 5 report and still had not been amended or abolished by the time of the OECD's 2017 progress report; zero otherwise                                                                                                                 | OECD                                                                       |
| <i>lnAge</i>           | natural logarithm of year $t$ minus the year the firm incorporated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Orbis                                                                      |
| <i>C</i>               | for the Huizinga and Laeven [2008] income shifting model:<br>measure of the affiliate's tax incentive to shift income, which equals the revenue-weighted average differential statutory tax rate between the affiliate and all other related affiliates in the same group-year<br>for the De Simone et al. [2017] income shifting model:<br>measure of the affiliate's tax incentive to shift income, which equals the capital-weighted average differential statutory tax rate between the affiliate and all other related affiliates in the same group-year | Huizinga and Laeven [2008], De Simone et al. [2017], Orbis, Tax Foundation |
| <i>CbCR</i>            | indicator which equals one where the MNC is subject to private CbCR based on either an ultimate parent entity filing obligation or a local filing obligation (i.e., prior year consolidated revenue greater than or equal to the consolidated group revenue threshold detailed in Appendix A); zero otherwise                                                                                                                                                                                                                                                 | Appendix A                                                                 |
| <i>lnCompensation</i>  | natural logarithm of compensation expense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Orbis                                                                      |
| <i>lnEBIT</i>          | natural logarithm of earnings before interest and tax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Orbis                                                                      |
| <i>lnFixedAssets</i>   | natural logarithm of fixed assets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Orbis                                                                      |
| $\Delta GDP$           | change in gross domestic product for country $c$ from year $t-1$ to $t$ , scaled by lagged gross domestic product                                                                                                                                                                                                                                                                                                                                                                                                                                             | World Bank                                                                 |
| <i>lnGDP</i>           | natural logarithm of country $c$ 's gross domestic product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | World Bank                                                                 |
| <i>lnGDPperCapita</i>  | natural logarithm of country $c$ 's gross domestic product per capita                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | World Bank                                                                 |
| <i>HighRegn</i>        | median-split of a country-level regulation factor variable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | see below                                                                  |
| <i>IndustryROA</i>     | country-year-industry median ROA for all affiliates and standalone firms in Orbis                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Orbis                                                                      |
| $\Delta MktSize$       | change in country-year-industry sum of all affiliates and standalone firm sales in Orbis from year $t-1$ to $t$ , scaled by 1,000,000                                                                                                                                                                                                                                                                                                                                                                                                                         | Orbis                                                                      |
| <i>More</i>            | indicator which equals one where the MNC voluntarily discloses CbCR publicly pertaining to that year and the disclosure has an above-median detailed disclosure score; zero otherwise                                                                                                                                                                                                                                                                                                                                                                         | self-constructed                                                           |
| <i>PrivatePost</i>     | indicator which equals one for the years when private CbCR is required (see Appendix A for effective dates); zero otherwise                                                                                                                                                                                                                                                                                                                                                                                                                                   | Appendix A                                                                 |

|                    |                                                                                                                                       |                  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <i>PublicPost</i>  | indicator which equals one for the years when the MNC has voluntarily disclosed CbCR publicly pertaining to that year; zero otherwise | self-constructed |
| <i>PublicTreat</i> | indicator which equals one for MNCs that voluntarily disclose CbCR publicly at some point in the sample period; zero otherwise        | self-constructed |
| <i>lnPTI</i>       | natural logarithm of pre-tax income                                                                                                   | Orbis            |
| <i>Revenue</i>     | MNC's consolidated revenue                                                                                                            | Orbis            |
| <i>Size</i>        | natural logarithm of MNC's consolidated total assets                                                                                  | Orbis            |

D.1. Variables Required for the First Stage of Xu's [2021] Two-Step Instrumental Variables Method (Adams et al. [2024])

| <b>Variable</b>      | <b>Definition</b>                                                                                                                                                                                                                                                                                                        | <b>Source</b>          |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <i>lnAnalysts</i>    | natural logarithm of one plus the number of analysts covering the MNC                                                                                                                                                                                                                                                    | Datastream             |
| <i>AvgESGscore</i>   | the average annual ESG score of all firms in the country that are covered by the Refinitiv database                                                                                                                                                                                                                      | Refinitiv              |
| <i>CodeLaw</i>       | indicator set equal to one where the country follows code law; zero otherwise                                                                                                                                                                                                                                            | La Porta et al. [1998] |
| <i>Competition</i>   | reverse-coded Herfindahl-Hirschman Index                                                                                                                                                                                                                                                                                 | Orbis                  |
| <i>EnvScore</i>      | the MNC's environmental pillar score                                                                                                                                                                                                                                                                                     | Refinitiv              |
| <i>GovScore</i>      | the MNC's governance pillar score                                                                                                                                                                                                                                                                                        | Refinitiv              |
| <i>GRI</i>           | indicator set equal to one where the MNC reports under the Global Reporting Initiative framework; zero otherwise                                                                                                                                                                                                         | Refinitiv              |
| <i>Haven</i>         | indicator set equal to one where the MNC has an affiliate located in a tax haven country; zero otherwise                                                                                                                                                                                                                 | Orbis                  |
| <i>IndvVoice</i>     | headquarter country-year variables capturing the freedom of individual voice                                                                                                                                                                                                                                             | see below              |
| <i>InstOwnNonPRI</i> | percentage of the MNC's stock owned by institutional investors that are not signatory to the PRI                                                                                                                                                                                                                         | Factset                |
| <i>InstOwnPRI</i>    | percentage of the MNC's stock owned by institutional investors that are signatory to the PRI                                                                                                                                                                                                                             | Factset                |
| <i>Leverage</i>      | long-term debt / lagged assets                                                                                                                                                                                                                                                                                           | Orbis                  |
| <i>Loss</i>          | indicator set equal to one where pre-tax income is less than zero; zero otherwise                                                                                                                                                                                                                                        | Orbis                  |
| <i>MandESG</i>       | indicator set equal to one where the country requires ESG disclosures; zero otherwise                                                                                                                                                                                                                                    | Krueger et al. [2023]  |
| <i>MandTax</i>       | indicator set equal to one where the country requires tax disclosures; zero otherwise                                                                                                                                                                                                                                    | Müller et al. [2020]   |
| <i>RD</i>            | research and development expense scaled by lagged assets; missing values are set to zero                                                                                                                                                                                                                                 | Orbis                  |
| <i>Regn</i>          | headquarter country-year variables capturing the strength of the regulatory environment                                                                                                                                                                                                                                  | see below              |
| <i>ROA</i>           | pre-tax income / lagged assets                                                                                                                                                                                                                                                                                           | Orbis                  |
| <i>Size</i>          | natural logarithm of total assets                                                                                                                                                                                                                                                                                        | Orbis                  |
| <i>SocScore</i>      | the MNC's social pillar score                                                                                                                                                                                                                                                                                            | Refinitiv              |
| <i>StdRet</i>        | standard deviation of monthly stock returns in the fiscal year                                                                                                                                                                                                                                                           | Datastream             |
| <i>TaxAggress</i>    | the statutory rate ( <i>STR</i> ) minus the effective tax rate ( <i>ETR</i> ), where <i>ETR</i> is defined as tax expense / pre-tax income, winsorized at 0 and 1, including set to 0 if pre-tax income is negative, and where <i>STR</i> is the statutory tax rate for the country-year where the firm is headquartered | Orbis; Tax Foundation  |

Country-year factor variables from Adams et al. [2024, p. 45-46]:

Extant research has developed a wide variety of country variables that capture features of the government, economy, and society. The features may also be important to the tax disclosure decision of corporations based in the countries. Because many of these variables are highly correlated, we undertake a factor analysis to draw out the unique (uncorrelated) proxies for the various features.

Variables for country-year institutional and societal characteristics

- Strength of auditing and accounting standards (aastd) is a score that ranges from 1 to 7 with a higher score for stronger standards. Data are from the World Economic Forum Global Competitiveness Report.
- Rule of Law (rulelaw) captures the extent to which agents have confidence in and abide by the rules of the society. Data are from the World Bank.
- Absence of corruption (abscorrupt) is an index of the controls over corruption. Data are from the World Bank.
- Legal system (legalsys) is the efficiency of legal system in settling disputes. Data are from the World Economic Forum Global Competitiveness Report.
- Regulatory quality (regqual) is the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Data are from the World Bank.
- Government effectiveness (govteffect) is an overall index of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Data are from the World Bank.
- Individualism (individual) is the Hofstede (2015) measure of individualistic societies, scaled from 0 (collectivist culture) to 100 (individualist culture).
- Power distance (power) is the Hofstede (2015) measure of power-distance that captures the degree to which individuals in the society accept differential power across individuals. The metric is scaled 0 (small power distance in the culture) to 100 (large power distance in the culture).
- Voice and accountability index (voice) is the extent to which a country's citizens can select their government, freedom of expression, free media. Data are from the World Bank.
- Freedom of the press (freepress) is a measure of how free the press is (reverse coded such that 0 is completely free to 100 is completely not free) from Reporters Without Borders.

#### Factor Analysis

We determine that there are two principal factors for these 10 variables. We collect data for the years 2010 to 2020. Table C1 reports the eigenvalues for the first four factors. This eigenvalue analysis clearly identifies two factors. Table C1, Panel B provides the rotated factor loadings and the unique variance of each variable. Reference to the loadings suggest the following interpretation of the factors:

Factor 1 – strength of regulation (*Regn*). This factor is highly correlated with many of the variables that incorporate the legal and regulatory structure of the government and corporate environment, and the legal institutional features. Strongly correlated variables included the quality of the accounting and auditing standards, rule of law, absence of corruption, the legal system, regulatory quality, and the overall government effectiveness score.

Factor 2 – individual voice (*IndvVoice*). This factor is highly correlated with individual voice and accountability, free press, and to some degree with individualism, and the lack of power distance. Recall that free press is coded with high value for a lack of free press, and the variable is negatively correlated with the factor.

Detailed country-level data are available from the authors.

**Table D.1.1: Factor Analysis**

Panel A. Eigenvalues for unrotated principal factor analysis

| Factor  | Eigenvalue | Difference | Proportion | Cumulative |
|---------|------------|------------|------------|------------|
| Factor1 | 6.68       | 5.01       | 0.78       | 0.78       |
| Factor2 | 1.67       | 1.44       | 0.20       | 0.98       |
| Factor3 | 0.22       | 0.14       | 0.03       | 1.01       |
| Factor4 | 0.09       | 0.06       | 0.01       | 1.02       |

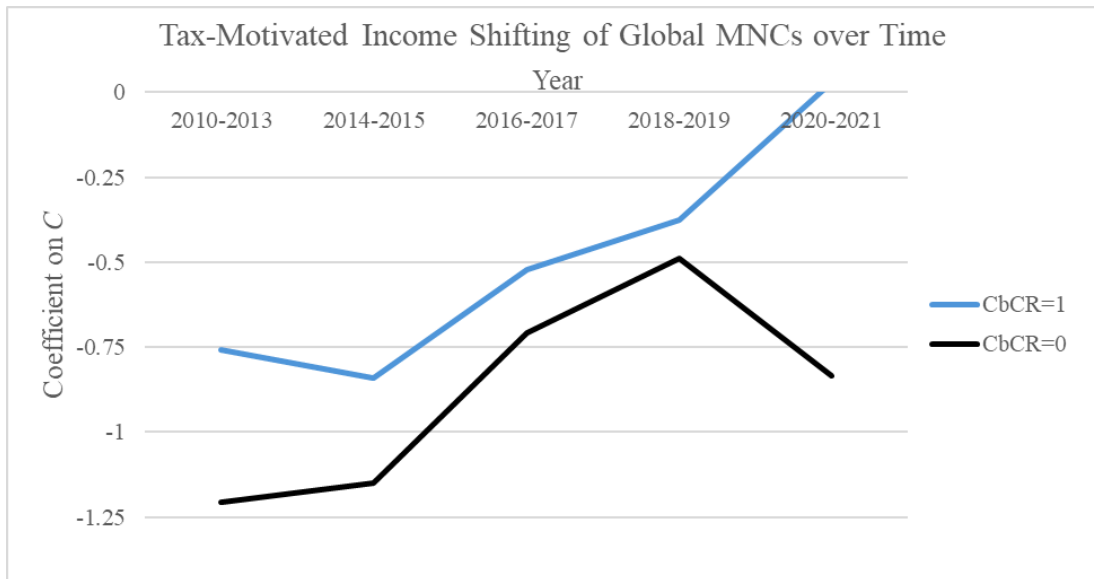
Panel B. Rotated factor loadings and unique variances

| Variable   | Regn   | IndvVoice | Uniqueness |
|------------|--------|-----------|------------|
| aastd      | 0.836  | 0.085     | 0.293      |
| rulelaw    | 0.847  | 0.477     | 0.055      |
| abscorrupt | 0.868  | 0.438     | 0.054      |
| legalsys   | 0.945  | 0.104     | 0.096      |
| regqual    | 0.908  | 0.269     | 0.103      |
| govteffect | 0.907  | 0.300     | 0.088      |
| individual | 0.238  | 0.680     | 0.481      |
| power      | -0.386 | -0.730    | 0.318      |
| voice      | 0.286  | 0.935     | 0.044      |
| freepress  | -0.188 | -0.916    | 0.125      |

Notes: There are 319 observations for the 10 variables used in this analysis. Panel A presents the eigenvalues and the proportion of total variation explained by each factor, including incremental eigenvalue and variations. Panel B shows the factor loadings after the orthogonal varimax rotation is applied.

**Figure 1**  
**Tax-Motivated Income Shifting of Multinational Corporations Over Time**

Panel A. By Year



Panel B. By Size

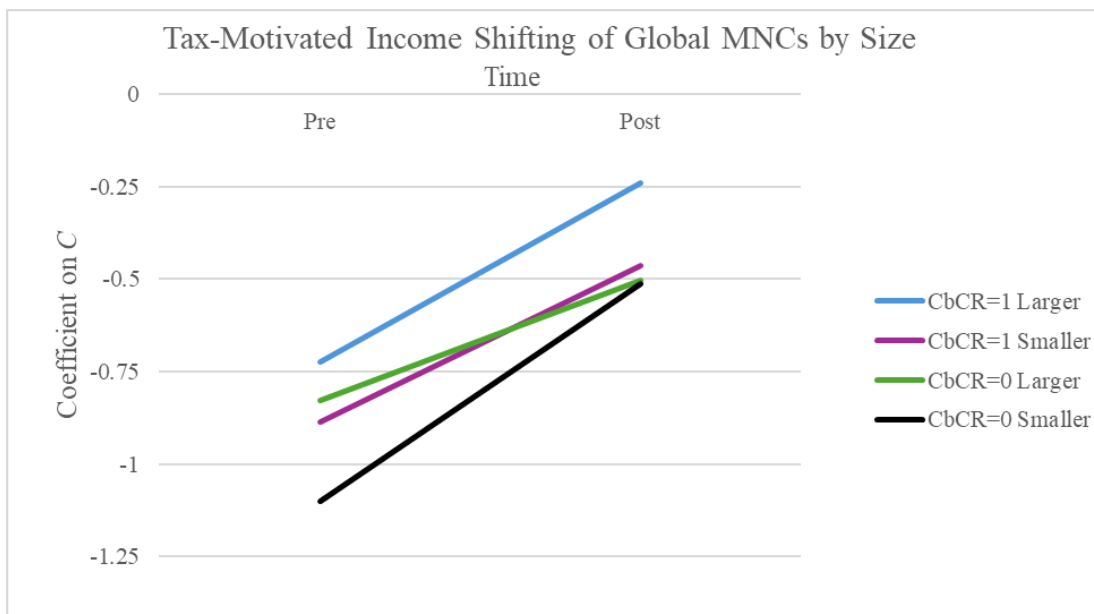
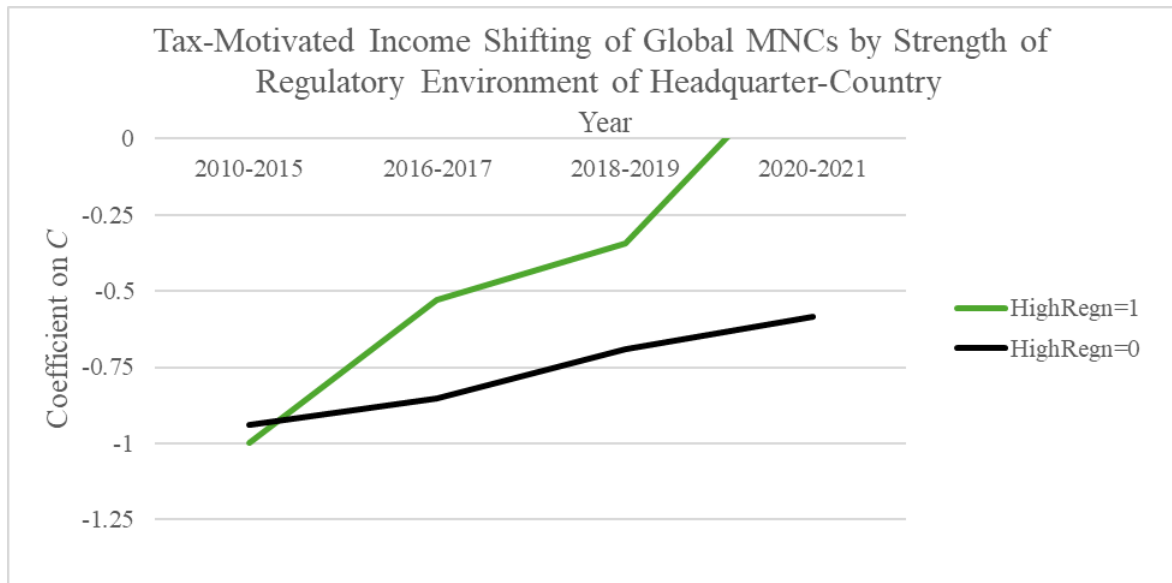
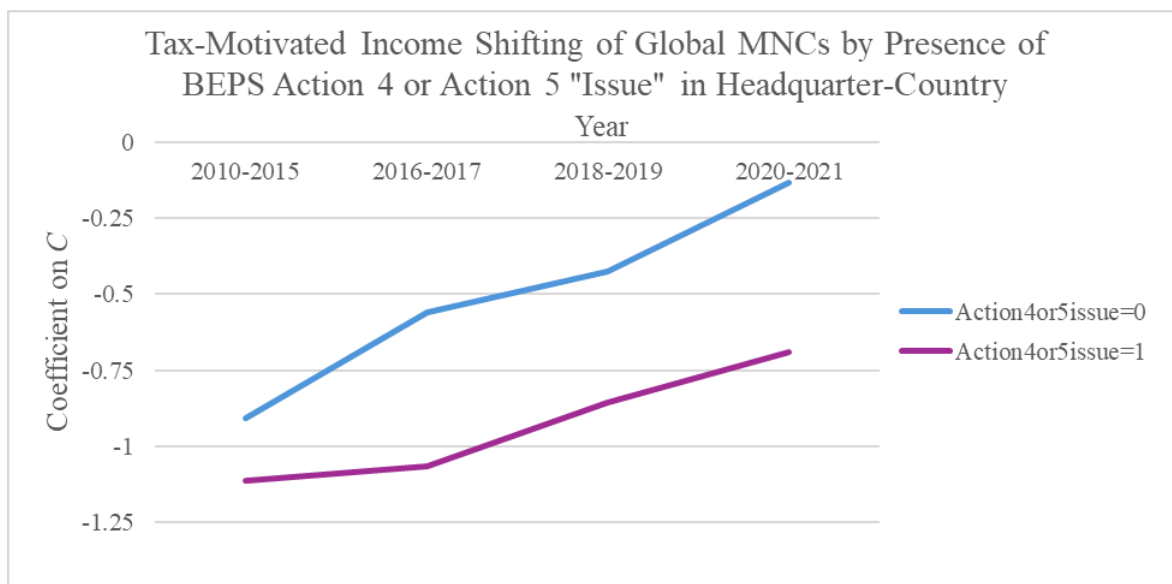


**Figure 2**  
**Cross-Sectional Differences in the Tax-Motivated Income Shifting**  
**of Multinational Corporations**

Panel A. High Regulation Countries



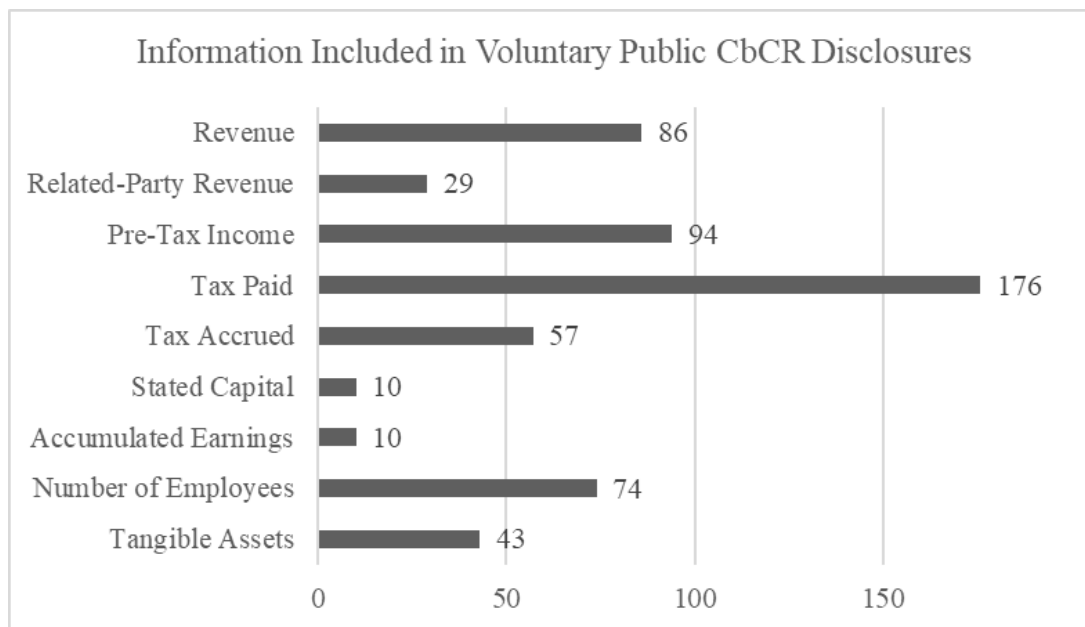
Panel B. Countries with BEPS Action 4 or Action 5 “Issues”



### Figure 3

## Characteristics of Voluntary Public Country-by-Country Reporting Disclosures

Panel A. Information Included in the 193 Voluntary Public CbCR Disclosures



Panel B. Other Characteristics of the 193 Voluntary Public CbCR Disclosures

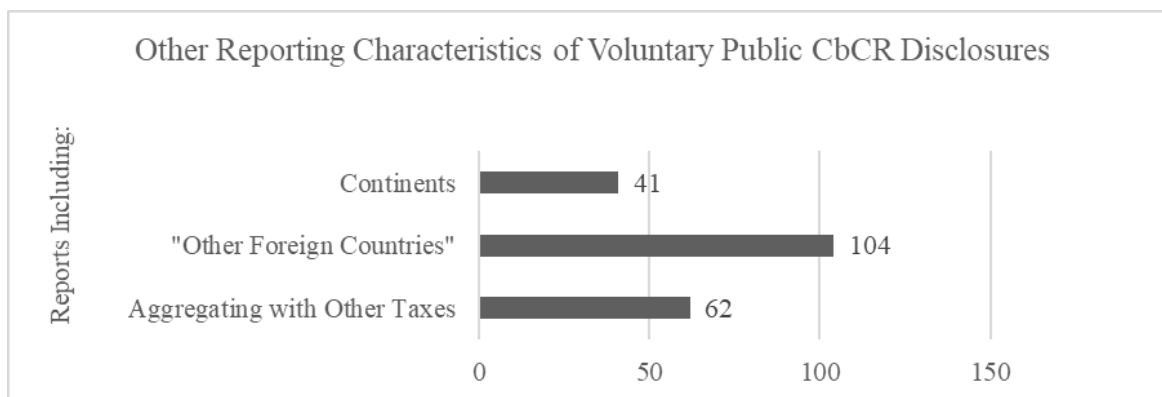


**Table 1**  
**Sample Selection and Composition for the Test of Hypothesis 1**

Panel A. Sample Selection

|                                                                                                                                | Unique MNCs |               |
|--------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|
|                                                                                                                                | EU Sample   | Global Sample |
| All GUO corporations in <i>Orbis</i> with at least one affiliate located in a country other than the GUO's headquarter-country | 295,824     | 295,824       |
| Less: GUOs with missing NACE codes                                                                                             | (214,657)   | (214,657)     |
| Less: GUOs in financial industries                                                                                             | (18,136)    | (18,136)      |
| Less: GUOs in extractive industries                                                                                            | (926)       | (926)         |
| Less: GUOs headquartered outside the EU                                                                                        | (32,354)    | -             |
| Less: GUOs headquartered in countries with no private CbCR regulation                                                          | -           | (3,775)       |
| Less: GUOs missing revenue or total assets                                                                                     | (22,181)    | (39,370)      |
| Sample of MNCs                                                                                                                 | 7,570       | 18,960        |

|                                                                                            | Affiliate-Years |               |
|--------------------------------------------------------------------------------------------|-----------------|---------------|
|                                                                                            | EU Sample       | Global Sample |
| All affiliate-years in <i>Orbis</i> belonging to the above MNCs from 2010-2021             | 1,064,995       | 2,252,506     |
| Less: affiliates with missing NACE codes                                                   | (74,539)        | (163,082)     |
| Less: affiliates missing required data (e.g., EBIT, revenue, assets, compensation expense) | (596,776)       | (1,407,487)   |
| Less: affiliates with EBIT < 0                                                             | (104,449)       | (171,613)     |
| Sample of affiliate-year observations                                                      | 289,231         | 510,324       |

Panel B. Affiliate-Year Observations by Year

| <b>Year</b> | <b>EU Sample</b>                                                                       |                                                                         |              | <b>Global Sample</b>                                                                   |                                                                         |              |
|-------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------|
|             | <b>Affiliates of<br/>MNCs Subject<br/>to Private<br/>CbCR in the<br/>Sample Period</b> | <b>Affiliates of<br/>MNCs Never<br/>Subject to<br/>Private<br/>CbCR</b> | <b>Total</b> | <b>Affiliates of<br/>MNCs Subject<br/>to Private<br/>CbCR in the<br/>Sample Period</b> | <b>Affiliates of<br/>MNCs Never<br/>Subject to<br/>Private<br/>CbCR</b> | <b>Total</b> |
| 2010        | 802                                                                                    | 104                                                                     | 906          | 1,676                                                                                  | 178                                                                     | 1,854        |
| 2011        | 2,355                                                                                  | 322                                                                     | 2,677        | 4,758                                                                                  | 527                                                                     | 5,285        |
| 2012        | 13,614                                                                                 | 6,209                                                                   | 19,823       | 24,773                                                                                 | 7,656                                                                   | 32,429       |
| 2013        | 15,720                                                                                 | 8,067                                                                   | 23,787       | 31,562                                                                                 | 10,345                                                                  | 41,907       |
| 2014        | 16,627                                                                                 | 9,025                                                                   | 25,652       | 33,884                                                                                 | 11,674                                                                  | 45,558       |
| 2015        | 17,753                                                                                 | 9,605                                                                   | 27,358       | 35,963                                                                                 | 12,521                                                                  | 48,484       |
| 2016        | 18,530                                                                                 | 10,366                                                                  | 28,896       | 37,949                                                                                 | 13,716                                                                  | 51,665       |
| 2017        | 19,502                                                                                 | 11,556                                                                  | 31,058       | 40,258                                                                                 | 15,256                                                                  | 55,514       |
| 2018        | 19,886                                                                                 | 12,552                                                                  | 32,438       | 41,287                                                                                 | 16,440                                                                  | 57,727       |
| 2019        | 20,175                                                                                 | 13,198                                                                  | 33,373       | 41,689                                                                                 | 17,359                                                                  | 59,048       |
| 2020        | 18,753                                                                                 | 12,732                                                                  | 31,485       | 38,782                                                                                 | 16,735                                                                  | 55,517       |
| 2021        | 18,807                                                                                 | 12,971                                                                  | 31,778       | 38,303                                                                                 | 17,033                                                                  | 55,336       |
| Total       | 182,524                                                                                | 106,707                                                                 | 289,231      | 370,884                                                                                | 139,440                                                                 | 510,324      |

Panel C. Affiliate-Year Observations by Country of Affiliate

| Country            | EU Sample                                                       |                                                  |        | Global Sample                                                   |                                                  |        |
|--------------------|-----------------------------------------------------------------|--------------------------------------------------|--------|-----------------------------------------------------------------|--------------------------------------------------|--------|
|                    | Affiliates of MNCs Subject to Private CbCR in the Sample Period | Affiliates of MNCs Never Subject to Private CbCR | Total  | Affiliates of MNCs Subject to Private CbCR in the Sample Period | Affiliates of MNCs Never Subject to Private CbCR | Total  |
| AL (Albania)       | 17                                                              | 7                                                | 24     | 18                                                              | 7                                                | 25     |
| AR (Argentina)     | 7                                                               | -                                                | 7      | 8                                                               | -                                                | 8      |
| AT (Austria)       | 4,492                                                           | 1,327                                            | 5,819  | 6,841                                                           | 1,389                                            | 8,230  |
| AU (Australia)     | 2,919                                                           | 205                                              | 3,124  | 10,150                                                          | 1,367                                            | 11,517 |
| BA (Bosnia)        | 266                                                             | 106                                              | 372    | 415                                                             | 127                                              | 542    |
| BD (Bangladesh)    | 1                                                               | -                                                | 1      | 1                                                               | -                                                | 1      |
| BE (Belgium)       | 10,125                                                          | 6,367                                            | 16,492 | 17,694                                                          | 6,913                                            | 24,607 |
| BG (Bulgaria)      | 1,882                                                           | 929                                              | 2,811  | 3,160                                                           | 1,076                                            | 4,236  |
| BM (Bermuda)       | -                                                               | -                                                | -      | 1                                                               | 6                                                | 7      |
| BR (Brazil)        | 50                                                              | 1                                                | 51     | 67                                                              | 1                                                | 68     |
| CH (Switzerland)   | 9                                                               | -                                                | 9      | 72                                                              | 25                                               | 97     |
| CI (Côte d'Ivoire) | -                                                               | -                                                | -      | 12                                                              | -                                                | 12     |
| CL (Chile)         | 19                                                              | 2                                                | 21     | 21                                                              | 3                                                | 24     |
| CO (Colombia)      | 2                                                               | -                                                | 2      | 2                                                               | -                                                | 2      |
| CZ (Czechia)       | 5,298                                                           | 2,286                                            | 7,584  | 9,674                                                           | 3,366                                            | 13,040 |
| DE (Germany)       | 14,675                                                          | 6,063                                            | 20,738 | 28,315                                                          | 7,448                                            | 35,763 |
| DK (Denmark)       | 2,081                                                           | 1,957                                            | 4,038  | 3,789                                                           | 2,438                                            | 6,227  |
| DZ (Algeria)       | 60                                                              | 7                                                | 67     | 83                                                              | 8                                                | 91     |
| EC (Ecuador)       | 3                                                               | -                                                | 3      | 6                                                               | -                                                | 6      |
| EE (Estonia)       | 871                                                             | 917                                              | 1,788  | 1,313                                                           | 1,053                                            | 2,366  |
| EG (Egypt)         | -                                                               | -                                                | -      | 1                                                               | -                                                | 1      |
| ES (Spain)         | 18,382                                                          | 12,524                                           | 30,906 | 28,201                                                          | 13,539                                           | 41,740 |
| FI (Finland)       | 4,316                                                           | 6,516                                            | 10,832 | 7,036                                                           | 6,900                                            | 13,936 |
| FR (France)        | 33,133                                                          | 9,688                                            | 42,821 | 49,838                                                          | 11,178                                           | 61,016 |
| GB (UK)            | 19,154                                                          | 10,085                                           | 29,239 | 42,808                                                          | 13,028                                           | 55,836 |
| GE (Georgia)       | 3                                                               | -                                                | 3      | 6                                                               | -                                                | 6      |
| GH (Ghana)         | 2                                                               | -                                                | 2      | 2                                                               | -                                                | 2      |
| GY (Guyana)        | 4                                                               | -                                                | 4      | 4                                                               | -                                                | 4      |
| HK (Hong Kong)     | 2                                                               | -                                                | 2      | 5                                                               | -                                                | 5      |
| HR (Croatia)       | 1,339                                                           | 705                                              | 2,044  | 2,178                                                           | 761                                              | 2,939  |
| HU (Hungary)       | 3,027                                                           | 1,169                                            | 4,196  | 5,583                                                           | 1,344                                            | 6,927  |
| IE (Ireland)       | 2,267                                                           | 790                                              | 3,057  | 5,770                                                           | 1,035                                            | 6,805  |
| IN (India)         | 2,878                                                           | 673                                              | 3,551  | 13,151                                                          | 4,492                                            | 17,643 |
| IS (Iceland)       | 57                                                              | 27                                               | 84     | 213                                                             | 197                                              | 410    |
| IT (Italy)         | 12,999                                                          | 14,001                                           | 27,000 | 23,864                                                          | 15,329                                           | 39,193 |
| JP (Japan)         | 282                                                             | 74                                               | 356    | 27,431                                                          | 4,526                                            | 31,957 |

|                   |         |         |         |         |         |         |
|-------------------|---------|---------|---------|---------|---------|---------|
| KR (Korea)        | 1,935   | 191     | 2,126   | 10,835  | 1,838   | 12,673  |
| LK (Sri Lanka)    | 18      | -       | 18      | 54      | 95      | 149     |
| LU (Luxembourg)   | 804     | 205     | 1,009   | 1,550   | 251     | 1,801   |
| LV (Latvia)       | 114     | 20      | 134     | 129     | 27      | 156     |
| MA (Morocco)      | 820     | 186     | 1,006   | 1,262   | 238     | 1,500   |
| ME (Montenegro)   | 62      | 26      | 88      | 126     | 42      | 168     |
| MK (N. Macedonia) | 81      | 47      | 128     | 115     | 47      | 162     |
| MT (Malta)        | 99      | 29      | 128     | 112     | 37      | 149     |
| MU (Mauritius)    | -       | -       | -       | 1       | -       | 1       |
| MY (Malaysia)     | 6       | -       | 6       | 76      | 17      | 93      |
| NL (Netherlands)  | 1,699   | 588     | 2,287   | 3,744   | 809     | 4,553   |
| NO (Norway)       | 4,543   | 3,892   | 8,435   | 10,830  | 9,808   | 20,638  |
| NZ (New Zealand)  | 660     | 38      | 698     | 2,163   | 281     | 2,444   |
| PA (Panama)       | 8       | -       | 8       | 8       | -       | 8       |
| PE (Peru)         | 1       | -       | 1       | 5       | -       | 5       |
| PK (Pakistan)     | 79      | -       | 79      | 176     | 40      | 216     |
| PL (Poland)       | 7,572   | 4,517   | 12,089  | 13,126  | 5,284   | 18,410  |
| PT (Portugal)     | 4,569   | 3,040   | 7,609   | 7,407   | 3,181   | 10,588  |
| PY (Paraguay)     | 1       | -       | 1       | 1       | -       | 1       |
| RO (Romania)      | 3,885   | 2,295   | 6,180   | 6,607   | 2,619   | 9,226   |
| RS (Serbia)       | 1,079   | 473     | 1,552   | 1,786   | 712     | 2,498   |
| RU (Russia)       | -       | -       | -       | 1       | -       | 1       |
| SE (Sweden)       | 9,166   | 12,696  | 21,862  | 14,623  | 14,161  | 28,784  |
| SG (Singapore)    | -       | -       | -       | 4       | -       | 4       |
| SI (Slovenia)     | 923     | 326     | 1,249   | 1,540   | 357     | 1,897   |
| SK (Slovakia)     | 2,927   | 1,423   | 4,350   | 4,913   | 1,687   | 6,600   |
| SV (El Salvador)  | -       | -       | -       | 7       | -       | 7       |
| TH (Thailand)     | 34      | -       | 34      | 431     | 43      | 474     |
| TN (Tunisia)      | -       | -       | -       | -       | 3       | 3       |
| TR (Türkiye)      | 7       | -       | 7       | 7       | -       | 7       |
| TZ (Tanzania)     | 2       | -       | 2       | 5       | -       | 5       |
| UA (Ukraine)      | 785     | 289     | 1,074   | 1,466   | 307     | 1,773   |
| US (USA)          | -       | -       | -       | 5       | -       | 5       |
| UY (Uruguay)      | 14      | -       | 14      | 22      | -       | 22      |
| ZA (South Africa) | 9       | -       | 9       | 9       | -       | 9       |
| ZM (Zambia)       | -       | -       | -       | 3       | -       | 3       |
| ZW (Zimbabwe)     | -       | -       | -       | 2       | -       | 2       |
| Total             | 182,524 | 106,707 | 289,231 | 370,884 | 139,440 | 510,324 |

Panel D. Affiliate-Year Observations by Industry of Affiliate

| Industry             | EU Sample                                                       |                                                  |         | Global Sample                                                   |                                                  |         |
|----------------------|-----------------------------------------------------------------|--------------------------------------------------|---------|-----------------------------------------------------------------|--------------------------------------------------|---------|
|                      | Affiliates of MNCs Subject to Private CbCR in the Sample Period | Affiliates of MNCs Never Subject to Private CbCR | Total   | Affiliates of MNCs Subject to Private CbCR in the Sample Period | Affiliates of MNCs Never Subject to Private CbCR | Total   |
| Agriculture,         |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Forestry, Fishing    | 908                                                             | 1,285                                            | 2,193   | 1,619                                                           | 1,481                                            | 3,100   |
| Mining, Quarrying    | 1,527                                                           | 304                                              | 1,831   | 2,425                                                           | 493                                              | 2,918   |
| Manufacturing        | 41,227                                                          | 30,159                                           | 71,386  | 93,925                                                          | 39,920                                           | 133,845 |
| Electricity, Gas,    |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Steam, Air           | 4,030                                                           | 776                                              | 4,806   | 5,221                                                           | 1,290                                            | 6,511   |
| Water, Sewerage,     |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Waste                | 4,242                                                           | 671                                              | 4,913   | 4,989                                                           | 815                                              | 5,804   |
| Construction         | 14,711                                                          | 4,107                                            | 18,818  | 21,993                                                          | 5,403                                            | 27,396  |
| Trade, Vehicle       |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Repair               | 47,705                                                          | 25,982                                           | 73,687  | 103,536                                                         | 33,747                                           | 137,283 |
| Transportation,      |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Storage              | 8,302                                                           | 5,060                                            | 13,362  | 14,234                                                          | 6,568                                            | 20,802  |
| Accommodation,       |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Food                 | 1,662                                                           | 1,752                                            | 3,414   | 4,169                                                           | 2,070                                            | 6,239   |
| Information,         |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Communication        | 15,169                                                          | 12,245                                           | 27,414  | 34,765                                                          | 17,076                                           | 51,841  |
| Financial, Insurance | 2,801                                                           | 1,168                                            | 3,969   | 6,057                                                           | 1,480                                            | 7,537   |
| Real Estate          | 2,892                                                           | 2,874                                            | 5,766   | 5,243                                                           | 3,532                                            | 8,775   |
| Professional,        |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Scientific, Tech     | 17,145                                                          | 10,302                                           | 27,447  | 35,445                                                          | 13,238                                           | 48,683  |
| Administrative,      |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Support              | 10,128                                                          | 5,943                                            | 16,071  | 21,709                                                          | 7,570                                            | 29,279  |
| Public Admin,        |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Defence              | 191                                                             | 22                                               | 213     | 324                                                             | 33                                               | 357     |
| Education            | 600                                                             | 603                                              | 1,203   | 1,259                                                           | 751                                              | 2,010   |
| Human Health,        |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Social Work          | 7,145                                                           | 2,359                                            | 9,504   | 9,628                                                           | 2,578                                            | 12,206  |
| Arts, Entertainment, |                                                                 |                                                  |         |                                                                 |                                                  |         |
| Recreation           | 877                                                             | 511                                              | 1,388   | 1,690                                                           | 683                                              | 2,373   |
| Other Service        | 1,235                                                           | 567                                              | 1,802   | 2,616                                                           | 692                                              | 3,308   |
| Other Activities     | 27                                                              | 17                                               | 44      | 37                                                              | 20                                               | 57      |
| Total                | 182,524                                                         | 106,707                                          | 289,231 | 370,884                                                         | 139,440                                          | 510,324 |

Notes: This table provides sample selection in Panel A, and sample composition, by year in Panel B, by country in Panel C, and by NACE industry in Panel D. Observations are categorized as affiliates of MNCs that are subject to private CbCR or not.

**Table 2**  
**Descriptive Statistics Relevant to the Test of Hypothesis 1**

Panel A. Summary Statistics

|                            |        |        |        |        |        | Affiliates of MNCs<br>Subject to Private<br>CbCR in the Sample<br>Period | Affiliates of<br>MNCs Never<br>Subject to<br>Private CbCR |            |
|----------------------------|--------|--------|--------|--------|--------|--------------------------------------------------------------------------|-----------------------------------------------------------|------------|
| Global Sample              |        |        |        |        |        |                                                                          |                                                           |            |
| Variable                   | mean   | sd     | p25    | p50    | p75    | mean                                                                     | mean                                                      | difference |
| MNC-level variables:       |        |        |        |        |        |                                                                          |                                                           |            |
| Revenue (billions)         | 14.647 | 30.113 | 0.517  | 3.049  | 15.274 | 20.056                                                                   | 0.258                                                     | 19.798***  |
| Size                       | 21.820 | 2.412  | 20.095 | 22.029 | 23.628 | 22.940                                                                   | 18.842                                                    | 4.097***   |
| # of affiliates            | 101    | 218    | 12     | 35     | 94     | 130                                                                      | 23                                                        | 107***     |
| CbCR                       | 0.727  | 0.446  | 0.000  | 1.000  | 1.000  | -                                                                        | -                                                         | -          |
| Affiliate-level variables: |        |        |        |        |        |                                                                          |                                                           |            |
| lnPTI                      | 13.865 | 2.176  | 12.550 | 13.904 | 15.228 | 14.153                                                                   | 13.097                                                    | 1.056***   |
| lnEBIT                     | 13.880 | 2.089  | 12.591 | 13.908 | 15.199 | 14.157                                                                   | 13.143                                                    | 1.014***   |
| C <sup>HL</sup>            | -0.006 | 0.074  | -0.046 | 0.000  | 0.029  | -0.007                                                                   | -0.003                                                    | -0.004***  |
| C <sup>DKS</sup>           | -0.005 | 0.057  | -0.032 | 0.000  | 0.024  | -0.006                                                                   | -0.003                                                    | -0.003***  |
| PrivatePost                | 0.649  | 0.477  | 0.000  | 1.000  | 1.000  | 0.635                                                                    | 0.687                                                     | -0.052***  |
| lnFixedAssets              | 13.865 | 3.986  | 12.195 | 14.400 | 16.317 | 14.147                                                                   | 13.116                                                    | 1.031***   |
| lnCompensation             | 14.826 | 1.886  | 13.697 | 14.856 | 16.022 | 15.078                                                                   | 14.154                                                    | 0.925***   |
| lnAge                      | 2.849  | 0.895  | 2.398  | 2.996  | 3.401  | 2.891                                                                    | 2.738                                                     | 0.153***   |

| <b>Country- and Industry-level variables:</b> |        |        |        |        |        |        |        |           |
|-----------------------------------------------|--------|--------|--------|--------|--------|--------|--------|-----------|
| <i>lnGDP</i>                                  | 27.636 | 1.203  | 26.810 | 28.011 | 28.620 | 27.700 | 27.467 | 0.233***  |
| <i>lnGDPperCapita</i>                         | 10.312 | 0.749  | 10.185 | 10.509 | 10.704 | 10.298 | 10.349 | -0.051*** |
| <i>ΔGDP</i>                                   | 0.017  | 0.037  | 0.008  | 0.019  | 0.030  | 0.017  | 0.016  | 0.001***  |
| <i>ΔMktSize</i>                               | 6.183  | 41.424 | -0.786 | 0.202  | 3.487  | 6.658  | 4.971  | 1.687***  |
| <i>IndustryROA</i>                            | 0.044  | 0.040  | 0.024  | 0.039  | 0.058  | 0.044  | 0.043  | 0.001***  |

Panel B. Pearson Correlation Coefficients

|                            | (1)          | (2)          | (3)          | (4)          | (5)          | (6)          | (7)          | (8)          | (9)          | (10)         | (11)         | (12)         | (13)   | (14) |
|----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|------|
| (1) <i>lnPTI</i>           | 1            |              |              |              |              |              |              |              |              |              |              |              |        |      |
| (2) <i>lnEBIT</i>          | <b>0.950</b> | 1            |              |              |              |              |              |              |              |              |              |              |        |      |
| (3) <i>C<sup>HL</sup></i>  | <b>0.039</b> | <b>0.034</b> | 1            |              |              |              |              |              |              |              |              |              |        |      |
| (4) <i>C<sup>DKS</sup></i> | <b>0.048</b> | <b>0.043</b> | <b>0.942</b> | 1            |              |              |              |              |              |              |              |              |        |      |
| (5) <i>CbCR</i>            | <b>0.216</b> | <b>0.216</b> | -0.025       | -0.022       | 1            |              |              |              |              |              |              |              |        |      |
| (6) <i>PrivatePost</i>     | <b>0.011</b> | <b>0.008</b> | <b>0.008</b> | -0.006       | -0.049       | 1            |              |              |              |              |              |              |        |      |
| (7) <i>lnFixedAssets</i>   | <b>0.591</b> | <b>0.597</b> | <b>0.068</b> | <b>0.080</b> | <b>0.115</b> | -0.015       | 1            |              |              |              |              |              |        |      |
| (8) <i>lnCompensation</i>  | <b>0.655</b> | <b>0.672</b> | <b>0.077</b> | <b>0.081</b> | <b>0.218</b> | -0.007       | <b>0.533</b> | 1            |              |              |              |              |        |      |
| (9) <i>lnAge</i>           | <b>0.297</b> | <b>0.286</b> | <b>0.074</b> | <b>0.082</b> | <b>0.076</b> | <b>0.054</b> | <b>0.282</b> | <b>0.306</b> | 1            |              |              |              |        |      |
| (10) <i>lnGDP</i>          | <b>0.188</b> | <b>0.182</b> | <b>0.376</b> | <b>0.372</b> | <b>0.086</b> | <b>0.009</b> | <b>0.165</b> | <b>0.205</b> | <b>0.201</b> | 1            |              |              |        |      |
| (11) <i>lnGDPperCapita</i> | <b>0.040</b> | <b>0.019</b> | <b>0.077</b> | <b>0.095</b> | -0.031       | <b>0.017</b> | -0.060       | <b>0.104</b> | <b>0.107</b> | <b>0.192</b> | 1            |              |        |      |
| (12) <i>ΔGDP</i>           | <b>0.016</b> | <b>0.019</b> | -0.098       | -0.112       | <b>0.010</b> | <b>0.018</b> | -0.004       | -0.023       | -0.044       | -0.105       | -0.142       | 1            |        |      |
| (13) <i>ΔMktSize</i>       | <b>0.008</b> | <b>0.009</b> | <b>0.035</b> | <b>0.041</b> | <b>0.018</b> | -0.102       | 0.003        | <b>0.007</b> | <b>0.008</b> | <b>0.064</b> | <b>0.009</b> | -0.028       | 1      |      |
| (14) <i>IndustryROA</i>    | <b>0.015</b> | <b>0.019</b> | -0.051       | -0.055       | <b>0.008</b> | <b>0.044</b> | -0.050       | <b>0.086</b> | <b>0.012</b> | <b>0.062</b> | <b>0.077</b> | <b>0.066</b> | -0.012 | 1    |

Notes: This table provides summary statistics in Panel A for variables to estimate the affiliate-level tax-motivated income shifting models. Panel A also compares mean values for observations categorized as affiliates of MNCs that are subject to private CbCR or not. Two-sided t-tests are used to test the difference in means. \*, \*\*, and \*\*\* indicate statistical significance at the ten, five, and one percent levels, respectively. Panel B provides Pearson correlations for variables to estimate the affiliate-level tax-motivated income shifting models. Values that are in bold are statistically significant at the five percent level or higher (two-tailed). Variables are defined in Appendix D.

**Table 3**  
**Income Shifting of EU MNCs from 2010 – 2018**

|                           | (1)<br>Joshi [2020]<br>Table 8 Panel<br>A column 2 | (2)<br>Replication<br>of Joshi<br>[2020] | (3)<br>Replication of<br>Joshi [2020] with<br>no ISIN restriction | (4)<br>Huizinga &<br>Laeven<br>[2008] model | (5)<br>De Simone<br>et al. [2017]<br>model |
|---------------------------|----------------------------------------------------|------------------------------------------|-------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|
| Variables                 | <i>lnPTI</i>                                       | <i>lnPTI</i>                             | <i>lnPTI</i>                                                      | <i>lnEBIT</i>                               | <i>lnEBIT</i>                              |
| <i>C</i>                  | -0.888**<br>(-2.099)                               | -1.731***<br>(-2.840)                    | -1.263***<br>(-4.208)                                             | -1.328***<br>(-5.767)                       | -1.164***<br>(-3.128)                      |
| <i>C×CbCR</i>             | <b>0.513</b><br><b>(1.145)</b>                     | <b>0.570</b><br><b>(0.943)</b>           | <b>0.072</b><br><b>(0.223)</b>                                    | <b>0.297</b><br><b>(1.043)</b>              | <b>0.477</b><br><b>(1.076)</b>             |
| <i>C×PrivatePost</i>      | <b>0.349</b><br><b>(0.709)</b>                     | <b>0.179</b><br><b>(0.439)</b>           | <b>0.752***</b><br><b>(3.308)</b>                                 | <b>0.717***</b><br><b>(3.632)</b>           | <b>0.946***</b><br><b>(3.000)</b>          |
| <i>C×CbCR×PrivatePost</i> | <b>-0.140</b><br><b>(-0.273)</b>                   | <b>-0.086</b><br><b>(-0.195)</b>         | <b>-0.553**</b><br><b>(-2.068)</b>                                | <b>-0.465**</b><br><b>(-2.001)</b>          | <b>-0.803**</b><br><b>(-2.155)</b>         |
| <i>lnFixedAssets</i>      | 0.186***<br>(37.200)                               | 0.218***<br>(29.522)                     | 0.188***<br>(32.170)                                              | 0.172***<br>(30.575)                        | 0.184***<br>(29.844)                       |
| <i>lnCompensation</i>     | 0.547***<br>(60.778)                               | 0.483***<br>(41.025)                     | 0.530***<br>(53.699)                                              | 0.533***<br>(48.718)                        | 0.507***<br>(45.641)                       |
| <i>lnGDP</i>              | 0.058***<br>(5.800)                                | 0.091***<br>(4.262)                      | 0.069***<br>(4.583)                                               |                                             |                                            |
| <i>lnGDPperCapita</i>     |                                                    |                                          |                                                                   | 0.058***<br>(2.940)                         |                                            |
| <i>ΔGDP</i>               |                                                    |                                          |                                                                   |                                             | 4.158***<br>(7.138)                        |
| <i>lnAge</i>              |                                                    |                                          |                                                                   |                                             | 0.118***<br>(9.658)                        |
| <i>ΔMktSize</i>           |                                                    |                                          |                                                                   |                                             | 0.000<br>(1.535)                           |
| <i>IndustryROA</i>        |                                                    |                                          |                                                                   |                                             | -0.340<br>(-0.971)                         |
| <i>CbCR</i>               | -0.024<br>(-1.143)                                 | 0.280***<br>(3.620)                      | 0.389***<br>(8.888)                                               | 0.309***<br>(9.618)                         | 0.349***<br>(8.472)                        |
| <i>CbCR×PrivatePost</i>   | -0.078***<br>(-4.588)                              | -0.028<br>(-0.837)                       | -0.041*<br>(-1.953)                                               | -0.005<br>(-0.253)                          | -0.017<br>(-0.823)                         |
| Fixed Effects             | Year                                               | Year                                     | Year                                                              | Year,<br>Industry                           | Year                                       |
| Observations              | 123,920                                            | 134,070                                  | 192,595                                                           | 192,595                                     | 183,860                                    |
| Adjusted R <sup>2</sup>   | 0.586                                              | 0.511                                    | 0.520                                                             | 0.558                                       | 0.522                                      |

Notes: This table provides regression results for EU MNCs' tax-motivated income shifting around the implementation of private CbCR, where the dependent variable is *lnPTI* in columns 1-3 and *lnEBIT* in columns 4-5. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the MNC level and the related *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix D.

**Table 4**  
**Impact of the ISIN Sample Restriction**

Panel A. Summary Statistics

|                                   | Affiliates of MNCs with<br>an ISIN listed in <i>Orbis</i> | Affiliates of MNCs without<br>an ISIN listed in <i>Orbis</i> |            |
|-----------------------------------|-----------------------------------------------------------|--------------------------------------------------------------|------------|
| Variable                          | mean                                                      | mean                                                         | difference |
| <b>MNC-level variables:</b>       |                                                           |                                                              |            |
| <i>Revenue</i> (billions)         | 19.129                                                    | 1.439                                                        | 17.691***  |
| <i>Size</i>                       | 22.365                                                    | 19.411                                                       | 2.954***   |
| <i># of affiliates</i>            | 193                                                       | 29                                                           | 164***     |
| <i>CbCR</i>                       | 0.828                                                     | 0.291                                                        | 0.537***   |
| <b>Affiliate-level variables:</b> |                                                           |                                                              |            |
| <i>lnPTI</i>                      | 13.912                                                    | 13.153                                                       | 0.759***   |
| <i>lnEBIT</i>                     | 13.930                                                    | 13.211                                                       | 0.719***   |
| <i>C<sup>HL</sup></i>             | -0.006                                                    | -0.006                                                       | 0.001      |
| <i>PrivatePost</i>                | 0.466                                                     | 0.506                                                        | -0.039***  |
| <i>lnFixedAssets</i>              | 13.823                                                    | 13.483                                                       | 0.340***   |
| <i>lnCompensation</i>             | 14.899                                                    | 14.318                                                       | 0.581***   |
| <b>Country-level variables:</b>   |                                                           |                                                              |            |
| <i>lnGDP</i>                      | 27.501                                                    | 27.458                                                       | 0.042***   |
| <i>lnGDPperCapita</i>             | 10.334                                                    | 10.321                                                       | 0.014***   |

Panel B. Sample Composition by MNC Headquarter-Country

| Country         | Replication of<br>Joshi [2020] | Replication of Joshi [2020]<br>with no ISIN restriction | Difference in<br>Sample Composition |
|-----------------|--------------------------------|---------------------------------------------------------|-------------------------------------|
| DE (Germany)    | 14.8%                          | 17.9%                                                   | -3.1%                               |
| ES (Spain)      | 4.0%                           | 6.8%                                                    | -2.8%                               |
| FR (France)     | 24.8%                          | 19.5%                                                   | 5.3%                                |
| GB (UK)         | 17.6%                          | 14.0%                                                   | 3.6%                                |
| IT (Italy)      | 2.4%                           | 7.3%                                                    | -4.9%                               |
| SE (Sweden)     | 13.7%                          | 12.4%                                                   | 1.3%                                |
| Other countries | 22.7%                          | 22.1%                                                   | 0.6%                                |

Panel C. Income Shifting of MNCs Headquartered in France or the UK versus all other EU Countries

|                           | MNCs Headquartered in<br>France or the UK   |                                            | MNCs Headquartered in all<br>other EU Countries |                                            |
|---------------------------|---------------------------------------------|--------------------------------------------|-------------------------------------------------|--------------------------------------------|
|                           | (1)<br>Huizinga &<br>Laeven [2008]<br>model | (2)<br>De Simone et<br>al. [2017]<br>model | (3)<br>Huizinga &<br>Laeven [2008]<br>model     | (4)<br>De Simone et<br>al. [2017]<br>model |
| Variables                 | <i>lnEBIT</i>                               | <i>lnEBIT</i>                              | <i>lnEBIT</i>                                   | <i>lnEBIT</i>                              |
| <i>C</i>                  | -1.363***<br>(-3.417)                       | -0.713<br>(-1.350)                         | -1.349***<br>(-4.817)                           | -1.340***<br>(-3.279)                      |
| <i>C×CbCR</i>             | <b>0.219</b><br><b>(0.466)</b>              | <b>0.089</b><br><b>(0.135)</b>             | <b>0.365</b><br><b>(1.047)</b>                  | <b>0.676</b><br><b>(1.326)</b>             |
| <i>C×PrivatePost</i>      | <b>0.376</b><br><b>(1.061)</b>              | <b>-0.244</b><br><b>(-0.411)</b>           | <b>0.694***</b><br><b>(2.651)</b>               | <b>0.855**</b><br><b>(2.330)</b>           |
| <i>C×CbCR×PrivatePost</i> | <b>-0.004</b><br><b>(-0.010)</b>            | <b>0.662</b><br><b>(1.008)</b>             | <b>-0.359</b><br><b>(-1.152)</b>                | <b>-0.706</b><br><b>(-1.619)</b>           |
| <i>lnFixedAssets</i>      | 0.150***<br>(15.606)                        | 0.166***<br>(16.676)                       | 0.177***<br>(29.638)                            | 0.180***<br>(26.330)                       |
| <i>lnCompensation</i>     | 0.529***<br>(24.707)                        | 0.501***<br>(25.181)                       | 0.523***<br>(47.236)                            | 0.506***<br>(41.313)                       |
| <i>lnGDPperCapita</i>     | 0.095***<br>(3.535)                         |                                            | 0.062***<br>(2.743)                             |                                            |
| <i>ΔGDP</i>               |                                             | 5.436***<br>(7.130)                        |                                                 | 2.163***<br>(5.666)                        |
| <i>lnAge</i>              |                                             | 0.147***<br>(6.755)                        |                                                 | 0.113***<br>(8.720)                        |
| <i>ΔMktSize</i>           |                                             | 0.000<br>(1.268)                           |                                                 | 0.000<br>(1.241)                           |
| <i>IndustryROA</i>        |                                             | -0.661<br>(-0.964)                         |                                                 | -0.787**<br>(-2.445)                       |
| <i>CbCR</i>               | 0.341***<br>(5.753)                         | 0.398***<br>(4.743)                        | 0.333***<br>(8.919)                             | 0.369***<br>(8.790)                        |
| <i>CbCR×PrivatePost</i>   | -0.060<br>(-1.394)                          | -0.149***<br>(-2.809)                      | -0.009<br>(-0.386)                              | -0.011<br>(-0.452)                         |
| Fixed Effects             | Year, Industry                              | Year                                       | Year, Industry                                  | Year                                       |
| Observations              | 93,954                                      | 81,035                                     | 195,277                                         | 186,417                                    |
| Adjusted R <sup>2</sup>   | 0.534                                       | 0.505                                      | 0.561                                           | 0.549                                      |

Panel D. 2x2 Matrix of France and UK MNCs'  $C$  Coefficients from Column 1

|        |        |                        |                        |                                                                                                        |
|--------|--------|------------------------|------------------------|--------------------------------------------------------------------------------------------------------|
|        |        |                        | +0.376                 |                                                                                                        |
|        |        | Post=0                 | Post=1                 |                                                                                                        |
|        | CbCR=0 | -1.363***              | -0.987** <sup>2</sup>  | <sup>1</sup> F-test $C + C \times CbCR = 0$ : F-stat 19.40                                             |
| +0.219 | CbCR=1 | -1.144*** <sup>1</sup> | -0.772*** <sup>2</sup> | <sup>2</sup> F-test $C + C \times Post = 0$ : F-stat 6.01                                              |
|        |        |                        | +0.376-0.004           | <sup>3</sup> F-test $C + C \times CbCR + C \times Post + C \times CbCR \times Post = 0$ : F-stat 10.47 |

Notes: This table provides summary statistics in Panel A and sample composition by headquarter country in Panel B for variables to estimate the affiliate-level tax-motivated income shifting models based on whether the MNC has an ISIN listed in *Orbis* or not. Panel A also compares mean values for observations categorized as affiliates of MNCs that have an ISIN listed in *Orbis* or not. Panel C provides regression results for tax-motivated income shifting around the implementation of private CbCR, where the dependent variable is  $\ln EBIT$ , using a sample of MNCs headquartered in France or the UK (all other EU countries) in columns 1 and 2 (3 and 4). The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the MNC level and the related  $t$ -statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Panel D provides a 2x2 matrix of the implied coefficients on  $C$  from Panel C column 1. Variables are defined in Appendix D.

**Table 5**  
**Test of Hypothesis 1**

Panel A. Regression Results

|                           | EU Sample from 2010-2021          |                                  | Global Sample from 2010-2021      |                                  |
|---------------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|
|                           | (1)                               | (2)                              | (3)                               | (4)                              |
|                           | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model |
| Variables                 | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    |
| <i>C</i>                  | -1.344***<br>(-5.731)             | -1.207***<br>(-3.286)            | -1.155***<br>(-6.042)             | -1.328***<br>(-4.395)            |
| <i>C×CbCR</i>             | <b>0.308</b><br><b>(1.071)</b>    | <b>0.503</b><br><b>(1.137)</b>   | <b>0.369*</b><br><b>(1.710)</b>   | <b>0.712**</b><br><b>(2.091)</b> |
| <i>C×PrivatePost</i>      | <b>0.661***</b><br><b>(3.073)</b> | <b>0.678**</b><br><b>(1.988)</b> | <b>0.484***</b><br><b>(2.675)</b> | <b>0.645**</b><br><b>(2.267)</b> |
| <i>C×CbCR×PrivatePost</i> | <b>-0.313</b><br><b>(-1.259)</b>  | <b>-0.398</b><br><b>(-1.021)</b> | <b>-0.033</b><br><b>(-0.164)</b>  | <b>-0.061</b><br><b>(-0.197)</b> |
| <i>lnFixedAssets</i>      | 0.168***<br>(32.034)              | 0.173***<br>(30.388)             | 0.168***<br>(45.204)              | 0.174***<br>(43.617)             |
| <i>lnCompensation</i>     | 0.525***<br>(49.848)              | 0.503***<br>(47.122)             | 0.537***<br>(72.624)              | 0.511***<br>(67.027)             |
| <i>lnGDPperCapita</i>     | 0.071***<br>(3.824)               |                                  | -0.001<br>(-0.108)                |                                  |
| <i>ΔGDP</i>               |                                   | 2.979***<br>(7.691)              |                                   | 4.070***<br>(15.266)             |
| <i>lnAge</i>              |                                   | 0.135***<br>(11.962)             |                                   | 0.126***<br>(16.077)             |
| <i>ΔMktSize</i>           |                                   | 0.000**<br>(1.989)               |                                   | 0.000<br>(1.188)                 |
| <i>IndustryROA</i>        |                                   | -0.562*<br>(-1.796)              |                                   | -0.476**<br>(-2.076)             |
| <i>CbCR</i>               | 0.324***<br>(10.276)              | 0.361***<br>(8.691)              | 0.301***<br>(13.023)              | 0.363***<br>(13.125)             |
| <i>CbCR×PrivatePost</i>   | -0.027<br>(-1.347)                | -0.036*<br>(-1.658)              | -0.017<br>(-1.070)                | -0.027<br>(-1.443)               |
| Fixed Effects             | Year, Industry                    | Year                             | Year, Industry                    | Year                             |
| Observations              | 289,231                           | 278,438                          | 510,324                           | 481,279                          |
| Adjusted R <sup>2</sup>   | 0.549                             | 0.512                            | 0.548                             | 0.519                            |

Panel B. 2x2 Matrix of Global MNCs'  $C$  Coefficients from Column 3

|         |        |                                |                        |                                                                                                        |
|---------|--------|--------------------------------|------------------------|--------------------------------------------------------------------------------------------------------|
|         |        |                                | +0.484***              |                                                                                                        |
|         |        | Post=0                         | Post=1                 |                                                                                                        |
| +0.369* | CbCR=0 | -1.155***                      | -0.671*** <sup>2</sup> | <sup>1</sup> F-test $C + C \times CbCR = 0$ : F-stat 66.57                                             |
|         | CbCR=1 | -0.786*** <sup>1</sup>         | -0.335*** <sup>3</sup> | <sup>2</sup> F-test $C + C \times Post = 0$ : F-stat 15.55                                             |
|         |        | (+0.484-0.033)*** <sup>4</sup> |                        | <sup>3</sup> F-test $C + C \times CbCR + C \times Post + C \times CbCR \times Post = 0$ : F-stat 10.97 |
|         |        |                                |                        | <sup>4</sup> F-test $C \times Post + C \times CbCR \times Post = 0$ : F-stat 29.93                     |

Panel C. Regression Results Using an Entropy-Balanced Sample

| Variables                 | EU Sample from 2010-2021          |                                   | Global Sample from 2010-2021      |                                   |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|                           | (1)                               | (2)                               | (3)                               | (4)                               |
|                           | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model  | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model  |
|                           | <i>lnEBIT</i>                     | <i>lnEBIT</i>                     | <i>lnEBIT</i>                     | <i>lnEBIT</i>                     |
| <i>C</i>                  | -1.309***<br>(-6.073)             | -1.344***<br>(-4.268)             | -1.062***<br>(-6.074)             | -1.372***<br>(-5.268)             |
| <i>C×CbCR</i>             | <b>0.227</b><br><b>(0.844)</b>    | <b>0.520</b><br><b>(1.312)</b>    | <b>0.270</b><br><b>(1.349)</b>    | <b>0.687**</b><br><b>(2.280)</b>  |
| <i>C×PrivatePost</i>      | <b>0.688***</b><br><b>(3.287)</b> | <b>0.785***</b><br><b>(2.578)</b> | <b>0.610***</b><br><b>(3.494)</b> | <b>0.816***</b><br><b>(3.137)</b> |
| <i>C×CbCR×PrivatePost</i> | <b>-0.387</b><br><b>(-1.582)</b>  | <b>-0.549</b><br><b>(-1.529)</b>  | <b>-0.225</b><br><b>(-1.162)</b>  | <b>-0.284</b><br><b>(-0.982)</b>  |
| <i>lnFixedAssets</i>      | 0.149***<br>(26.933)              | 0.160***<br>(26.131)              | 0.156***<br>(38.981)              | 0.168***<br>(38.193)              |
| <i>lnCompensation</i>     | 0.592***<br>(53.038)              | 0.566***<br>(50.166)              | 0.592***<br>(75.332)              | 0.561***<br>(69.353)              |
| <i>lnGDPperCapita</i>     | 0.040**<br>(2.009)                |                                   | -0.056***<br>(-5.721)             |                                   |
| <i>ΔGDP</i>               |                                   | 2.575***<br>(7.149)               |                                   | 4.522***<br>(17.145)              |
| <i>lnAge</i>              |                                   | 0.103***<br>(9.171)               |                                   | 0.103***<br>(12.096)              |
| <i>ΔMktSize</i>           |                                   | 0.000**<br>(2.434)                |                                   | 0.000<br>(1.531)                  |
| <i>IndustryROA</i>        |                                   | -0.726***<br>(-2.681)             |                                   | -0.658***<br>(-3.214)             |
| <i>CbCR</i>               | 0.267***<br>(9.249)               | 0.313***<br>(7.578)               | 0.240***<br>(11.537)              | 0.307***<br>(11.301)              |
| <i>CbCR×PrivatePost</i>   | -0.013<br>(-0.665)                | -0.016<br>(-0.777)                | -0.000<br>(-0.008)                | -0.005<br>(-0.293)                |
| Fixed Effects             | Year, Industry                    | Year                              | Year, Industry                    | Year                              |
| Observations              | 289,231                           | 278,438                           | 510,324                           | 481,279                           |
| Adjusted R <sup>2</sup>   | 0.544                             | 0.535                             | 0.545                             | 0.540                             |

Panel D. Regression Results without Affiliates Operating in Extractive and Financial Industries

| Variables                 | EU Sample from 2010-2021          |                                  | Global Sample from 2010-2021      |                                  |
|---------------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|
|                           | (1)                               | (2)                              | (3)                               | (4)                              |
|                           | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model |
|                           | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    |
| <i>C</i>                  | -1.331***<br>(-5.710)             | -1.205***<br>(-3.256)            | -1.141***<br>(-6.011)             | -1.327***<br>(-4.364)            |
| <i>C×CbCR</i>             | <b>0.351</b><br><b>(1.228)</b>    | <b>0.530</b><br><b>(1.197)</b>   | <b>0.420**</b><br><b>(1.964)</b>  | <b>0.784**</b><br><b>(2.297)</b> |
| <i>C×PrivatePost</i>      | <b>0.677***</b><br><b>(3.145)</b> | <b>0.698**</b><br><b>(2.027)</b> | <b>0.491***</b><br><b>(2.714)</b> | <b>0.669**</b><br><b>(2.332)</b> |
| <i>C×CbCR×PrivatePost</i> | <b>-0.279</b><br><b>(-1.133)</b>  | <b>-0.336</b><br><b>(-0.861)</b> | <b>-0.021</b><br><b>(-0.108)</b>  | <b>-0.039</b><br><b>(-0.126)</b> |
| <i>lnFixedAssets</i>      | 0.164***<br>(30.843)              | 0.170***<br>(29.347)             | 0.165***<br>(43.549)              | 0.173***<br>(42.204)             |
| <i>lnCompensation</i>     | 0.536***<br>(48.927)              | 0.509***<br>(45.508)             | 0.548***<br>(71.010)              | 0.516***<br>(64.827)             |
| <i>lnGDPperCapita</i>     | 0.059***<br>(3.154)               |                                  | -0.014<br>(-1.396)                |                                  |
| <i>ΔGDP</i>               |                                   | 2.962***<br>(7.687)              |                                   | 4.037***<br>(15.161)             |
| <i>lnAge</i>              |                                   | 0.136***<br>(11.996)             |                                   | 0.128***<br>(16.205)             |
| <i>ΔMktSize</i>           |                                   | 0.000**<br>(2.106)               |                                   | 0.000<br>(1.374)                 |
| <i>IndustryROA</i>        |                                   | -0.502<br>(-1.579)               |                                   | -0.379<br>(-1.636)               |
| <i>CbCR</i>               | 0.314***<br>(9.914)               | 0.352***<br>(8.500)              | 0.288***<br>(12.430)              | 0.355***<br>(12.864)             |
| <i>CbCR×PrivatePost</i>   | -0.029<br>(-1.426)                | -0.036<br>(-1.593)               | -0.023<br>(-1.377)                | -0.029<br>(-1.573)               |
| Fixed Effects             | Year, Industry                    | Year                             | Year, Industry                    | Year                             |
| Observations              | 283,431                           | 272,696                          | 499,869                           | 471,403                          |
| Adjusted R <sup>2</sup>   | 0.555                             | 0.518                            | 0.555                             | 0.526                            |

Panel E. Regression Results with MNC Fixed Effects

| Variables                 | EU Sample from 2010-2021          |                                   | Global Sample from 2010-2021      |                                   |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|                           | (1)                               | (2)                               | (3)                               | (4)                               |
|                           | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model  | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model  |
|                           | <i>lnEBIT</i>                     | <i>lnEBIT</i>                     | <i>lnEBIT</i>                     | <i>lnEBIT</i>                     |
| <i>C</i>                  | -1.598***<br>(-8.064)             | -1.511***<br>(-5.309)             | -1.346***<br>(-8.262)             | -1.414***<br>(-5.908)             |
| <i>C×CbCR</i>             | <b>0.519**</b><br><b>(2.050)</b>  | <b>0.600*</b><br><b>(1.713)</b>   | <b>0.458**</b><br><b>(2.423)</b>  | <b>0.615**</b><br><b>(2.251)</b>  |
| <i>C×PrivatePost</i>      | <b>0.564***</b><br><b>(3.052)</b> | <b>0.785***</b><br><b>(2.945)</b> | <b>0.528***</b><br><b>(3.359)</b> | <b>0.756***</b><br><b>(3.305)</b> |
| <i>C×CbCR×PrivatePost</i> | <b>-0.188</b><br><b>(-0.860)</b>  | <b>-0.217</b><br><b>(-0.704)</b>  | <b>-0.011</b><br><b>(-0.062)</b>  | <b>0.030</b><br><b>(0.120)</b>    |
| <i>lnFixedAssets</i>      | 0.161***<br>(29.898)              | 0.159***<br>(28.328)              | 0.157***<br>(40.591)              | 0.153***<br>(37.603)              |
| <i>lnCompensation</i>     | 0.524***<br>(46.963)              | 0.505***<br>(45.827)              | 0.543***<br>(68.145)              | 0.525***<br>(63.831)              |
| <i>lnGDPperCapita</i>     | 0.086***<br>(5.841)               |                                   | 0.050***<br>(5.912)               |                                   |
| <i>ΔGDP</i>               |                                   | 1.938***<br>(8.349)               |                                   | 2.266***<br>(13.565)              |
| <i>lnAge</i>              |                                   | 0.166***<br>(17.407)              |                                   | 0.156***<br>(22.218)              |
| <i>ΔMktSize</i>           |                                   | 0.000<br>(0.649)                  |                                   | -0.000<br>(-0.871)                |
| <i>IndustryROA</i>        |                                   | 0.337*<br>(1.673)                 |                                   | 0.386**<br>(2.562)                |
| <i>CbCR×PrivatePost</i>   | -0.015<br>(-0.891)                | -0.005<br>(-0.270)                | 0.005<br>(0.394)                  | 0.011<br>(0.809)                  |
| Fixed Effects             | Year, Industry,<br>MNC            | Year, MNC                         | Year, Industry,<br>MNC            | Year, MNC                         |
| Observations              | 289,231                           | 278,438                           | 510,324                           | 481,279                           |
| Adjusted R <sup>2</sup>   | 0.549                             | 0.512                             | 0.548                             | 0.519                             |

Panel F. Regression Results with MNCs with an ISIN listed in *Orbis*

| Variables                 | EU Sample from 2010-2021          |                                  | Global Sample from 2010-2021      |                                  |
|---------------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|
|                           | (1)                               | (2)                              | (3)                               | (4)                              |
|                           | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model |
|                           | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    |
| <i>C</i>                  | -1.816***<br>(-3.826)             | -2.056**<br>(-2.531)             | -1.378***<br>(-4.522)             | -1.893***<br>(-3.700)            |
| <i>C×CbCR</i>             | <b>0.725</b><br><b>(1.408)</b>    | <b>1.274</b><br><b>(1.495)</b>   | <b>0.558*</b><br><b>(1.723)</b>   | <b>1.212**</b><br><b>(2.260)</b> |
| <i>C×PrivatePost</i>      | <b>0.344</b><br><b>(0.880)</b>    | <b>0.249</b><br><b>(0.360)</b>   | <b>0.179</b><br><b>(0.666)</b>    | <b>0.281</b><br><b>(0.629)</b>   |
| <i>C×CbCR×PrivatePost</i> | <b>0.007</b><br><b>(0.018)</b>    | <b>0.004</b><br><b>(0.006)</b>   | <b>0.286</b><br><b>(1.005)</b>    | <b>0.316</b><br><b>(0.680)</b>   |
| <i>lnFixedAssets</i>      | 0.172***<br>(23.855)              | 0.181***<br>(23.706)             | 0.167***<br>(36.843)              | 0.175***<br>(35.883)             |
| <i>lnCompensation</i>     | 0.521***<br>(35.424)              | 0.494***<br>(34.536)             | 0.544***<br>(58.743)              | 0.515***<br>(54.259)             |
| <i>lnGDPperCapita</i>     | 0.081***<br>(3.650)               |                                  | 0.011<br>(1.021)                  |                                  |
| <i>ΔGDP</i>               |                                   | 3.121***<br>(5.721)              |                                   | 4.038***<br>(12.561)             |
| <i>lnAge</i>              |                                   | 0.156***<br>(9.603)              |                                   | 0.137***<br>(14.376)             |
| <i>ΔMktSize</i>           |                                   | 0.000**<br>(2.184)               |                                   | 0.000<br>(0.915)                 |
| <i>IndustryROA</i>        |                                   | -0.768*<br>(-1.882)              |                                   | -0.514*<br>(-1.902)              |
| <i>CbCR</i>               | 0.278***<br>(5.313)               | 0.282***<br>(4.262)              | 0.237***<br>(6.876)               | 0.278***<br>(6.701)              |
| <i>CbCR×PrivatePost</i>   | -0.054*<br>(-1.712)               | -0.081**<br>(-2.208)             | -0.023<br>(-0.983)                | -0.036<br>(-1.268)               |
| Fixed Effects             | Year, Industry                    | Year                             | Year, Industry                    | Year                             |
| Observations              | 190,138                           | 179,590                          | 396,083                           | 366,823                          |
| Adjusted R <sup>2</sup>   | 0.552                             | 0.510                            | 0.545                             | 0.515                            |

Panel G. Regression Results Using a Stacked Difference-in-Differences Design

| Variables                 | EU Sample from 2010-2021          |                                  | Global Sample from 2010-2021      |                                  |
|---------------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|
|                           | (1)                               | (2)                              | (3)                               | (4)                              |
|                           | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model | Huizinga & Laeven<br>[2008] model | De Simone et al.<br>[2017] model |
|                           | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    |
| <i>C</i>                  | -1.287***<br>(-7.620)             | -1.205***<br>(-5.424)            | -1.008***<br>(-7.089)             | -1.123***<br>(-5.838)            |
| <i>C×CbCR</i>             | <b>0.390*</b><br>(1.658)          | <b>0.467</b><br>(1.533)          | <b>0.405**</b><br>(2.309)         | <b>0.595**</b><br>(2.521)        |
| <i>C×PrivatePost</i>      | <b>0.093***</b><br>(3.198)        | <b>0.122***</b><br>(3.420)       | <b>0.125***</b><br>(6.450)        | <b>0.159***</b><br>(6.316)       |
| <i>C×CbCR×PrivatePost</i> | <b>-0.120</b><br>(-0.879)         | <b>-0.095</b><br>(-0.513)        | <b>-0.152</b><br>(-1.638)         | <b>-0.087</b><br>(-0.673)        |
| <i>lnFixedAssets</i>      | 0.145***<br>(30.345)              | 0.143***<br>(28.197)             | 0.149***<br>(39.995)              | 0.147***<br>(36.520)             |
| <i>lnCompensation</i>     | 0.539***<br>(51.838)              | 0.516***<br>(47.758)             | 0.543***<br>(67.772)              | 0.522***<br>(61.275)             |
| <i>lnGDPperCapita</i>     | 0.105***<br>(6.890)               |                                  | 0.054***<br>(5.596)               |                                  |
| <i>ΔGDP</i>               |                                   | 0.620***<br>(6.119)              |                                   | 0.859***<br>(9.872)              |
| <i>lnAge</i>              |                                   | 0.167***<br>(17.002)             |                                   | 0.157***<br>(19.018)             |
| <i>ΔMktSize</i>           |                                   | -0.000<br>(-0.222)               |                                   | -0.000<br>(-0.287)               |
| <i>IndustryROA</i>        |                                   | 0.316<br>(1.542)                 |                                   | 0.313*<br>(1.909)                |
| Fixed Effects             | Time, Industry,<br>Cohort         | Time, Cohort                     | Time, Industry,<br>Cohort         | Time, Cohort                     |
| Observations              | 822,766                           | 768,825                          | 1,207,432                         | 1,112,213                        |
| Adjusted R <sup>2</sup>   | 0.616                             | 0.618                            | 0.627                             | 0.629                            |

Notes: Panel A provides regression results for EU and global MNCs' tax-motivated income shifting around the implementation of private CbCR, where the dependent variable is *lnEBIT*. Panels C to G provide regression results for various sample and research design changes. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the MNC level and the related *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Panel B provides a 2x2 matrix of the implied coefficients on *C* from Panel A column 3. Variables are defined in Appendix D.

**Table 6**  
**Finer Gradations on Time and Size**

Panel A. Time

|                         | (1)                            | (2)                           |
|-------------------------|--------------------------------|-------------------------------|
|                         | Huizinga & Laeven [2008] model | De Simone et al. [2017] model |
| Variables               | <i>lnEBIT</i>                  | <i>lnEBIT</i>                 |
| <i>C</i>                | -1.206***<br>(-5.351)          | -1.588***<br>(-4.494)         |
| <i>C×CbCR</i>           | <b>0.448*</b><br>(1.754)       | <b>0.917**</b><br>(2.307)     |
| <i>C×2014-2015</i>      | <b>0.055</b><br>(0.310)        | <b>0.447*</b><br>(1.749)      |
| <i>C×2016-2017</i>      | <b>0.498**</b><br>(2.291)      | <b>1.095***</b><br>(3.252)    |
| <i>C×2018-2019</i>      | <b>0.718***</b><br>(2.864)     | <b>1.037***</b><br>(2.719)    |
| <i>C×2020-2021</i>      | <b>0.373</b><br>(1.300)        | <b>0.513</b><br>(1.167)       |
| <i>C×CbCR×2014-2015</i> | -0.137<br>(-0.699)             | -0.374<br>(-1.293)            |
| <i>C×CbCR×2016-2017</i> | -0.263<br>(-1.090)             | -0.748**<br>(-1.983)          |
| <i>C×CbCR×2018-2019</i> | -0.336<br>(-1.215)             | -0.424<br>(-1.016)            |
| <i>C×CbCR×2020-2021</i> | <b>0.413</b><br>(1.301)        | <b>0.534</b><br>(1.090)       |
| <i>lnFixedAssets</i>    | 0.168***<br>(45.205)           | 0.174***<br>(43.610)          |
| <i>lnCompensation</i>   | 0.537***<br>(72.614)           | 0.511***<br>(67.022)          |
| <i>lnGDPperCapita</i>   | -0.001<br>(-0.114)             |                               |
| <i>ΔGDP</i>             |                                | 4.084***<br>(15.304)          |
| <i>lnAge</i>            |                                | 0.127***<br>(16.074)          |
| <i>ΔMktSize</i>         |                                | 0.000<br>(1.321)              |
| <i>IndustryROA</i>      |                                | -0.473**<br>(-2.062)          |
| <i>CbCR</i>             | 0.302***<br>(13.041)           | 0.364***<br>(13.132)          |

|                                  |                    |                    |
|----------------------------------|--------------------|--------------------|
| <i>CbCR</i> × <i>PrivatePost</i> | -0.017<br>(-1.066) | -0.026<br>(-1.421) |
| Fixed Effects                    | Year, Industry     | Year               |
| Observations                     | 510,324            | 481,279            |
| Adjusted R <sup>2</sup>          | 0.548              | 0.519              |

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Panel B. MNC Size

|                               | (1)                              | (2)                            | (3)                               | (4)                               | (5)                            | (6)                             | (7)                               | (8)                              |
|-------------------------------|----------------------------------|--------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|-----------------------------------|----------------------------------|
|                               | Huizinga and Laeven [2008] model |                                |                                   |                                   | De Simone et al. [2017] model  |                                 |                                   |                                  |
|                               | <i>CbCR</i> =0                   |                                | <i>CbCR</i> =1                    |                                   | <i>CbCR</i> =0                 |                                 | <i>CbCR</i> =1                    |                                  |
|                               | Smaller                          | Larger                         | Smaller                           | Larger                            | Smaller                        | Larger                          | Smaller                           | Larger                           |
| Variables                     | <i>lnEBIT</i>                    | <i>lnEBIT</i>                  | <i>lnEBIT</i>                     | <i>lnEBIT</i>                     | <i>lnEBIT</i>                  | <i>lnEBIT</i>                   | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    |
| <i>C</i>                      | -1.101***<br>(-3.648)            | -0.827***<br>(-3.799)          | -0.886***<br>(-7.563)             | -0.724***<br>(-4.989)             | -1.437***<br>(-3.131)          | -1.030***<br>(-3.369)           | -0.747***<br>(-4.039)             | -0.484*<br>(-1.782)              |
| <i>C</i> × <i>PrivatePost</i> | <b>0.587*</b><br><b>(1.914)</b>  | <b>0.322</b><br><b>(1.542)</b> | <b>0.422***</b><br><b>(3.867)</b> | <b>0.484***</b><br><b>(4.032)</b> | <b>0.734</b><br><b>(1.627)</b> | <b>0.599*</b><br><b>(1.932)</b> | <b>0.521***</b><br><b>(3.142)</b> | <b>0.452**</b><br><b>(2.058)</b> |
| <i>lnFixedAssets</i>          | 0.156***<br>(29.366)             | 0.157***<br>(21.120)           | 0.165***<br>(31.355)              | 0.180***<br>(23.657)              | 0.158***<br>(28.080)           | 0.164***<br>(19.292)            | 0.175***<br>(29.942)              | 0.190***<br>(23.278)             |
| <i>lnCompensation</i>         | 0.500***<br>(45.736)             | 0.542***<br>(38.144)           | 0.553***<br>(53.003)              | 0.520***<br>(37.356)              | 0.467***<br>(40.681)           | 0.503***<br>(32.082)            | 0.520***<br>(43.087)              | 0.507***<br>(37.744)             |
| <i>lnGDPperCapita</i>         | -0.040**<br>(-2.062)             | -0.068***<br>(-3.252)          | -0.012<br>(-0.719)                | 0.049***<br>(3.465)               |                                |                                 |                                   |                                  |
| <i>ΔGDP</i>                   |                                  |                                |                                   |                                   | 0.137***<br>(8.970)            | 0.107***<br>(6.390)             | 0.118***<br>(10.429)              | 0.113***<br>(7.600)              |
| <i>lnAge</i>                  |                                  |                                |                                   |                                   | 4.402***<br>(9.082)            | 3.691***<br>(6.927)             | 4.433***<br>(9.762)               | 3.432***<br>(6.825)              |
| <i>ΔMktSize</i>               |                                  |                                |                                   |                                   | 0.000**<br>(2.133)             | -0.000*<br>(-1.943)             | -0.000<br>(-0.674)                | 0.000<br>(0.670)                 |
| <i>IndustryROA</i>            |                                  |                                |                                   |                                   | -1.196***<br>(-3.533)          | 0.308<br>(0.868)                | -1.002***<br>(-2.796)             | -0.219<br>(-0.518)               |
| Fixed Effects                 | Year, Industry                   | Year, Industry                 | Year, Industry                    | Year, Industry                    | Year                           | Year                            | Year                              | Year                             |
| Observations                  | 69,693                           | 69,746                         | 185,448                           | 185,436                           | 65,175                         | 64,740                          | 166,117                           | 166,716                          |
| Adjusted R <sup>2</sup>       | 0.461                            | 0.506                          | 0.524                             | 0.546                             | 0.456                          | 0.498                           | 0.515                             | 0.535                            |

Notes: This table provides regression results for global MNCs' tax-motivated income shifting around the implementation of private *CbCR*, where the dependent variable is *lnEBIT*. In Panel A (B), the *PrivatePost* (*CbCR*) indicator variable is split into finer gradations. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the MNC level and the related *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix D.

**Table 7**  
**Additional Analyses**

Panel A. High Regulation Countries

|                             | (1)                               | (2)                              |
|-----------------------------|-----------------------------------|----------------------------------|
|                             | Huizinga & Laeven [2008] model    | De Simone et al. [2017] model    |
| Variables                   | <i>lnEBIT</i>                     | <i>lnEBIT</i>                    |
| <i>C</i>                    | -0.939***<br>(-8.474)             | -0.731***<br>(-4.248)            |
| <i>C×HighRegn</i>           | <b>-0.061</b><br><b>(-0.387)</b>  | <b>-0.198</b><br><b>(-0.797)</b> |
| <i>C×2016-2017</i>          | <b>0.087</b><br><b>(0.655)</b>    | <b>0.128</b><br><b>(0.587)</b>   |
| <i>C×2018-2019</i>          | <b>0.250*</b><br><b>(1.794)</b>   | <b>0.348*</b><br><b>(1.681)</b>  |
| <i>C×2020-2021</i>          | <b>0.356**</b><br><b>(2.465)</b>  | <b>0.436*</b><br><b>(1.922)</b>  |
| <i>C×HighRegn×2016-2017</i> | <b>0.384**</b><br><b>(2.286)</b>  | <b>0.539**</b><br><b>(2.045)</b> |
| <i>C×HighRegn×2018-2019</i> | <b>0.408*</b><br><b>(1.876)</b>   | <b>0.376</b><br><b>(1.109)</b>   |
| <i>C×HighRegn×2020-2021</i> | <b>0.942***</b><br><b>(2.964)</b> | <b>0.729*</b><br><b>(1.646)</b>  |
| <i>lnFixedAssets</i>        | 0.166***<br>(41.223)              | 0.174***<br>(39.775)             |
| <i>lnCompensation</i>       | 0.555***<br>(68.935)              | 0.539***<br>(63.326)             |
| <i>lnGDPperCapita</i>       | 0.028***<br>(2.762)               |                                  |
| <i>ΔGDP</i>                 |                                   | 3.818***<br>(14.564)             |
| <i>lnAge</i>                |                                   | 0.116***<br>(14.014)             |
| <i>ΔMktSize</i>             |                                   | 0.000<br>(0.253)                 |
| <i>IndustryROA</i>          |                                   | -0.475*<br>(-1.871)              |
| <i>HighRegn</i>             | 0.060***<br>(3.511)               | 0.060**<br>(2.282)               |
| Fixed Effects               | Year, Industry                    | Year                             |
| Observations                | 429,636                           | 388,345                          |
| Adjusted R <sup>2</sup>     | 0.545                             | 0.535                            |

Panel B. Countries with BEPS Action 4 or Action 5 “Issues”

|                                    | (1)<br>Huizinga & Laeven [2008] model | (2)<br>De Simone et al. [2017] model |
|------------------------------------|---------------------------------------|--------------------------------------|
| Variables                          | <i>lnEBIT</i>                         | <i>lnEBIT</i>                        |
| <i>C</i>                           | -0.907***<br>(-9.880)                 | -0.815***<br>(-5.421)                |
| <i>C×Action4or5issue</i>           | -0.206<br>(-0.832)                    | -0.290<br>(-0.893)                   |
| <i>C×2016-2017</i>                 | 0.346***<br>(4.417)                   | 0.494***<br>(4.111)                  |
| <i>C×2018-2019</i>                 | 0.483***<br>(4.896)                   | 0.553***<br>(3.719)                  |
| <i>C×2020-2021</i>                 | 0.772***<br>(6.279)                   | 0.802***<br>(4.315)                  |
| <i>C×Action4or5issue×2016-2017</i> | -0.299*<br>(-1.540)                   | -0.464*<br>(-1.500)                  |
| <i>C×Action4or5issue×2018-2019</i> | -0.227<br>(-1.116)                    | -0.287<br>(-1.000)                   |
| <i>C×Action4or5issue×2020-2021</i> | -0.350*<br>(-1.312)                   | -0.246<br>(-0.625)                   |
| <i>lnFixedAssets</i>               | 0.168***<br>(44.812)                  | 0.177***<br>(43.667)                 |
| <i>lnCompensation</i>              | 0.552***<br>(74.316)                  | 0.531***<br>(68.042)                 |
| <i>lnGDPperCapita</i>              | -0.007<br>(-0.710)                    |                                      |
| <i>ΔGDP</i>                        |                                       | 3.706***<br>(16.027)                 |
| <i>lnAge</i>                       |                                       | 0.119***<br>(15.353)                 |
| <i>ΔMktSize</i>                    |                                       | 0.000<br>(0.652)                     |
| <i>IndustryROA</i>                 |                                       | -0.606***<br>(-2.693)                |
| <i>Action4or5issue</i>             | -0.198***<br>(-6.740)                 | -0.195***<br>(-4.757)                |
| Fixed Effects                      | Year, Industry                        | Year                                 |
| Observations                       | 510,324                               | 463,648                              |
| Adjusted R <sup>2</sup>            | 0.546                                 | 0.538                                |

Notes: This table provides regression results for global MNCs' tax-motivated income shifting around the implementation of private CbCR, where the dependent variable is *lnEBIT*. In Panel A (B), an indicator variable is included representing the regulatory strength of the headquarter-countries (whether the headquarter-country has an "issue" with BEPS *Action 4* or *Action 5*). The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the MNC level and the related *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively, except for Panel B which uses one-tailed statistical significance. Variables are defined in Appendix D.

**Table 8**  
**Sample Selection and Composition for the Test of Hypothesis 2**

Panel A. Sample Selection

|                                                                                                                                                        | <b>Unique MNCs</b>         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| All global ultimate owner (GUO) corporations in <i>Orbis</i> with at least one affiliate located in a country other than the GUO's headquarter-country | 295,824                    |
| Less: GUOs with missing NACE codes                                                                                                                     | (214,657)                  |
| Less: GUOs in financial industries                                                                                                                     | (18,136)                   |
| Less: GUOs in extractive industries                                                                                                                    | (926)                      |
| Less: GUOs missing revenue or total assets                                                                                                             | (42,009)                   |
| Less: GUOs headquartered in countries that are not OECD members or advanced economies per the IMF                                                      | (4,900)                    |
| Less: GUOs headquartered in countries where no GUO headquartered in that country voluntarily discloses CbCR                                            | (3,032)                    |
| Less: GUOs not subject to mandatory private CbCR beginning in 2016                                                                                     | (8,179)                    |
| Sample of MNCs                                                                                                                                         | <hr/> 3,985                |
|                                                                                                                                                        | <br><b>Affiliate-Years</b> |
| All affiliate-years in <i>Orbis</i> belonging to the above MNCs from 2010-2021                                                                         | 715,090                    |
| Less: affiliates with missing NACE codes                                                                                                               | (18,436)                   |
| Less: affiliates missing required data (e.g., EBIT, revenue, assets, compensation expense)                                                             | (201,000)                  |
| Less: affiliates with EBIT < 0                                                                                                                         | (197,861)                  |
| Sample of affiliate-year observations (representing 2,520 unique MNCs)                                                                                 | <hr/> 297,793              |

Panel B. Affiliate-Year Observations by Year

| <b>Year</b> | <b>Affiliates of MNCs<br/>that Voluntarily<br/>Disclose CbCR<br/>Publicly in the Year</b> | <b>Affiliates of MNCs that<br/>Do Not Voluntarily<br/>Disclose CbCR<br/>Publicly in the Year</b> | <b>Total</b> | <b>% Voluntarily<br/>Disclosing<br/>CbCR Publicly</b> |
|-------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------|
| 2010        | -                                                                                         | 1,444                                                                                            | 1,444        | 0.000%                                                |
| 2011        | -                                                                                         | 4,040                                                                                            | 4,040        | 0.000%                                                |
| 2012        | 13                                                                                        | 20,248                                                                                           | 20,261       | 0.064%                                                |
| 2013        | 80                                                                                        | 25,162                                                                                           | 25,242       | 0.317%                                                |
| 2014        | 173                                                                                       | 26,170                                                                                           | 26,343       | 0.657%                                                |
| 2015        | 191                                                                                       | 27,748                                                                                           | 27,939       | 0.684%                                                |
| 2016        | 344                                                                                       | 29,511                                                                                           | 29,855       | 1.152%                                                |
| 2017        | 596                                                                                       | 31,495                                                                                           | 32,091       | 1.857%                                                |
| 2018        | 746                                                                                       | 32,697                                                                                           | 33,443       | 2.231%                                                |
| 2019        | 1,062                                                                                     | 33,038                                                                                           | 34,100       | 3.114%                                                |
| 2020        | 1,350                                                                                     | 30,630                                                                                           | 31,980       | 4.221%                                                |
| 2021        | 1,341                                                                                     | 29,714                                                                                           | 31,055       | 4.318%                                                |
| Total       | 5,896                                                                                     | 291,897                                                                                          | 297,793      | 1.980%                                                |

Panel C. Affiliate-Year Observations by Country of Affiliate

| <b>Country</b>     | <b>Affiliates of MNCs<br/>that Voluntarily<br/>Disclose CbCR<br/>Publicly</b> | <b>Affiliates of MNCs<br/>that Do Not<br/>Voluntarily Disclose<br/>CbCR Publicly</b> | <b>Total</b> | <b>% Voluntarily<br/>Disclosing<br/>CbCR Publicly</b> |
|--------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------|-------------------------------------------------------|
| AL (Albania)       | 1                                                                             | 12                                                                                   | 13           | 7.692%                                                |
| AR (Argentina)     | 0                                                                             | 11                                                                                   | 11           | 0.000%                                                |
| AT (Austria)       | 104                                                                           | 5,187                                                                                | 5,291        | 1.966%                                                |
| AU (Australia)     | 0                                                                             | 845                                                                                  | 845          | 0.000%                                                |
| BA (Bosnia)        | 3                                                                             | 190                                                                                  | 193          | 1.554%                                                |
| BE (Belgium)       | 245                                                                           | 13,982                                                                               | 14,227       | 1.722%                                                |
| BG (Bulgaria)      | 25                                                                            | 2,284                                                                                | 2,309        | 1.083%                                                |
| BR (Brazil)        | 0                                                                             | 47                                                                                   | 47           | 0.000%                                                |
| CH (Switzerland)   | 0                                                                             | 16                                                                                   | 16           | 0.000%                                                |
| CI (Côte d'Ivoire) | 0                                                                             | 12                                                                                   | 12           | 0.000%                                                |
| CL (Chile)         | 0                                                                             | 22                                                                                   | 22           | 0.000%                                                |
| CZ (Czechia)       | 143                                                                           | 8,189                                                                                | 8,332        | 1.716%                                                |
| DE (Germany)       | 267                                                                           | 25,542                                                                               | 25,809       | 1.035%                                                |
| DK (Denmark)       | 124                                                                           | 3,433                                                                                | 3,557        | 3.486%                                                |
| DZ (Algeria)       | 0                                                                             | 69                                                                                   | 69           | 0.000%                                                |
| EC (Ecuador)       | 3                                                                             | 0                                                                                    | 3            | 100.000%                                              |
| EE (Estonia)       | 46                                                                            | 1,148                                                                                | 1,194        | 3.853%                                                |
| ES (Spain)         | 1,689                                                                         | 24,239                                                                               | 25,928       | 6.514%                                                |
| FI (Finland)       | 178                                                                           | 6,327                                                                                | 6,505        | 2.736%                                                |
| FR (France)        | 373                                                                           | 46,499                                                                               | 46,872       | 0.796%                                                |
| GB (UK)            | 257                                                                           | 17,661                                                                               | 17,918       | 1.434%                                                |
| GE (Georgia)       | 0                                                                             | 5                                                                                    | 5            | 0.000%                                                |
| GH (Ghana)         | 0                                                                             | 1                                                                                    | 1            | 0.000%                                                |
| GY (Guyana)        | 0                                                                             | 4                                                                                    | 4            | 0.000%                                                |
| HK (Hong Kong)     | 0                                                                             | 2                                                                                    | 2            | 0.000%                                                |
| HR (Croatia)       | 26                                                                            | 1,675                                                                                | 1,701        | 1.529%                                                |
| HU (Hungary)       | 103                                                                           | 4,645                                                                                | 4,748        | 2.169%                                                |
| IE (Ireland)       | 11                                                                            | 382                                                                                  | 393          | 2.799%                                                |
| IN (India)         | 194                                                                           | 8,928                                                                                | 9,122        | 2.127%                                                |
| IS (Iceland)       | 30                                                                            | 163                                                                                  | 193          | 15.544%                                               |
| IT (Italy)         | 464                                                                           | 20,983                                                                               | 21,447       | 2.163%                                                |
| JP (Japan)         | 138                                                                           | 27,235                                                                               | 27,373       | 0.504%                                                |
| KR (Korea)         | 160                                                                           | 10,642                                                                               | 10,802       | 1.481%                                                |
| LK (Sri Lanka)     | 0                                                                             | 25                                                                                   | 25           | 0.000%                                                |
| LU (Luxembourg)    | 50                                                                            | 1,202                                                                                | 1,252        | 3.994%                                                |
| LV (Latvia)        | 7                                                                             | 87                                                                                   | 94           | 7.447%                                                |
| MA (Morocco)       | 16                                                                            | 1,076                                                                                | 1,092        | 1.465%                                                |

|                   |       |         |         |         |
|-------------------|-------|---------|---------|---------|
| ME (Montenegro)   | 3     | 76      | 79      | 3.797%  |
| MK (N. Macedonia) | 7     | 63      | 70      | 10.000% |
| MT (Malta)        | 2     | 37      | 39      | 5.128%  |
| MY (Malaysia)     | 0     | 51      | 51      | 0.000%  |
| NL (Netherlands)  | 29    | 3,339   | 3,368   | 0.861%  |
| NO (Norway)       | 194   | 10,253  | 10,447  | 1.857%  |
| NZ (New Zealand)  | 24    | 1,921   | 1,945   | 1.234%  |
| PA (Panama)       | 0     | 8       | 8       | 0.000%  |
| PK (Pakistan)     | 0     | 149     | 149     | 0.000%  |
| PL (Poland)       | 192   | 10,862  | 11,054  | 1.737%  |
| PT (Portugal)     | 228   | 5,651   | 5,879   | 3.878%  |
| RO (Romania)      | 170   | 5,347   | 5,517   | 3.081%  |
| RS (Serbia)       | 9     | 1,337   | 1,346   | 0.669%  |
| RU (Russia)       | 0     | 1       | 1       | 0.000%  |
| SE (Sweden)       | 264   | 13,628  | 13,892  | 1.900%  |
| SG (Singapore)    | 0     | 3       | 3       | 0.000%  |
| SI (Slovenia)     | 13    | 1,269   | 1,282   | 1.014%  |
| SK (Slovakia)     | 91    | 3,986   | 4,077   | 2.232%  |
| SV (El Salvador)  | 0     | 7       | 7       | 0.000%  |
| TH (Thailand)     | 0     | 174     | 174     | 0.000%  |
| TZ (Tanzania)     | 0     | 3       | 3       | 0.000%  |
| UA (Ukraine)      | 13    | 945     | 958     | 1.357%  |
| US (USA)          | 0     | 7       | 7       | 0.000%  |
| UY (Uruguay)      | 0     | 2       | 2       | 0.000%  |
| ZA (South Africa) | 0     | 8       | 8       | 0.000%  |
| Total             | 5,896 | 291,897 | 297,793 | 1.980%  |

Panel D. Affiliate-Year Observations by Industry of Affiliate

| <b>Industry</b>                     | <b>Affiliates of MNCs<br/>that Voluntarily<br/>Disclose CbCR<br/>Publicly</b> | <b>Affiliates of MNCs<br/>that Do Not<br/>Voluntarily Disclose<br/>CbCR Publicly</b> | <b>Total</b>   | <b>% Voluntarily<br/>Disclosing<br/>CbCR<br/>Publicly</b> |
|-------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------|
| Agriculture, Forestry,<br>Fishing   | 36                                                                            | 1,122                                                                                | 1,158          | 3.109%                                                    |
| Mining, Quarrying                   | 7                                                                             | 1,493                                                                                | 1,500          | 0.467%                                                    |
| Manufacturing                       | 1,010                                                                         | 68,863                                                                               | 69,873         | 1.445%                                                    |
| Electricity, Gas, Steam,<br>Air     | 318                                                                           | 3,981                                                                                | 4,299          | 7.397%                                                    |
| Water, Sewerage, Waste              | 127                                                                           | 4,080                                                                                | 4,207          | 3.019%                                                    |
| Construction                        | 226                                                                           | 19,228                                                                               | 19,454         | 1.162%                                                    |
| Trade, Vehicle Repair               | 1,129                                                                         | 85,753                                                                               | 86,882         | 1.299%                                                    |
| Transportation, Storage             | 222                                                                           | 11,396                                                                               | 11,618         | 1.911%                                                    |
| Accommodation, Food<br>Information, | 85                                                                            | 3,464                                                                                | 3,549          | 2.395%                                                    |
| Communication                       | 1,200                                                                         | 27,643                                                                               | 28,843         | 4.160%                                                    |
| Financial, Insurance                | 90                                                                            | 4,870                                                                                | 5,060          | 3.755%                                                    |
| Real Estate                         | 41                                                                            | 4,526                                                                                | 4,567          | 0.898%                                                    |
| Professional, Scientific,<br>Tech   | 548                                                                           | 27,212                                                                               | 27,760         | 1.974%                                                    |
| Administrative, Support             | 643                                                                           | 15,814                                                                               | 16,457         | 3.907%                                                    |
| Public Admin, Defence               | -                                                                             | 44                                                                                   | 44             | 0.000%                                                    |
| Education                           | 40                                                                            | 1,007                                                                                | 1,047          | 3.820%                                                    |
| Human Health, Social<br>Work        | 48                                                                            | 8,735                                                                                | 8,783          | 0.547%                                                    |
| Arts, Entertainment,<br>Rec         | 1                                                                             | 1,091                                                                                | 1,092          | 0.092%                                                    |
| Other Service                       | 25                                                                            | 1,566                                                                                | 1,591          | 1.571%                                                    |
| Other Activities                    | -                                                                             | 9                                                                                    | 9              | 0.000%                                                    |
| <b>Total</b>                        | <b>5,896</b>                                                                  | <b>291,897</b>                                                                       | <b>297,793</b> | <b>1.980%</b>                                             |

Notes: This table provides sample selection in Panel A, and sample composition, by year in Panel B, by country in Panel C, and by NACE industry in Panel D. Observations are categorized as affiliates of MNCs that voluntarily disclose CbCR publicly or not.

**Table 9**  
**Descriptive Statistics Relevant to the Test of Hypothesis 2**

Panel A. Summary Statistics

|                            |             |        |        |        |        | Affiliates of MNCs that<br>Voluntarily Disclose<br>CbCR Publicly | Affiliates of MNCs that<br>Do Not Voluntarily<br>Disclose CbCR Publicly |            |
|----------------------------|-------------|--------|--------|--------|--------|------------------------------------------------------------------|-------------------------------------------------------------------------|------------|
| Variable                   | Full Sample |        |        |        |        |                                                                  |                                                                         |            |
|                            | mean        | sd     | p25    | p50    | p75    | mean                                                             | mean                                                                    | difference |
| MNC-level variables:       |             |        |        |        |        |                                                                  |                                                                         |            |
| Revenue (billions)         | 21.337      | 35.386 | 2.432  | 7.803  | 25.416 | 39.712                                                           | 20.483                                                                  | 19.229***  |
| Size                       | 23.004      | 1.653  | 21.734 | 22.974 | 24.362 | 23.844                                                           | 22.965                                                                  | 0.880***   |
| # of affiliates            | 145         | 269    | 26     | 58     | 130    | 100                                                              | 147                                                                     | -47***     |
| PublicTreat                | 0.044       | 0.206  | 0.000  | 0.000  | 0.000  | -                                                                | -                                                                       | -          |
| PublicTreat                | 0.080       | 0.157  | 0.003  | 0.021  | 0.072  | -                                                                | -                                                                       | -          |
| PublicTreat                | 0.080       | 0.162  | 0.000  | 0.019  | 0.071  | -                                                                | -                                                                       | -          |
| PublicTreat×PublicPost     | 0.020       | 0.139  | 0.000  | 0.000  | 0.000  | -                                                                | -                                                                       | -          |
| Affiliate-level variables: |             |        |        |        |        |                                                                  |                                                                         |            |
| lnEBIT                     | 14.028      | 2.073  | 12.776 | 14.057 | 15.325 | 14.473                                                           | 14.007                                                                  | 0.466***   |
| C <sup>HL</sup>            | -0.002      | 0.078  | -0.048 | 0.001  | 0.041  | -0.009                                                           | -0.002                                                                  | -0.007***  |
| C <sup>DKS</sup>           | -0.002      | 0.060  | -0.033 | 0.001  | 0.032  | -0.005                                                           | -0.002                                                                  | -0.003***  |
| PrivatePost                | 0.647       | 0.478  | 0.000  | 1.000  | 1.000  | 0.630                                                            | 0.647                                                                   | -0.018***  |
| lnFixedAssets              | 14.143      | 3.833  | 12.497 | 14.556 | 16.478 | 14.826                                                           | 14.111                                                                  | 0.714***   |
| lnCompensation             | 15.027      | 1.835  | 13.921 | 15.033 | 16.191 | 15.139                                                           | 15.021                                                                  | 0.118***   |
| lnAge                      | 2.888       | 0.883  | 2.485  | 2.996  | 3.466  | 2.759                                                            | 2.894                                                                   | -0.135***  |

| <b>Country- and Industry-level variables:</b> |        |        |        |        |        |        |        |           |
|-----------------------------------------------|--------|--------|--------|--------|--------|--------|--------|-----------|
| <i>lnGDPperCapita</i>                         | 10.285 | 0.709  | 10.181 | 10.495 | 10.654 | 10.192 | 10.289 | -0.097*** |
| <i>ΔGDP</i>                                   | 0.015  | 0.035  | 0.006  | 0.018  | 0.029  | 0.014  | 0.015  | -0.001*   |
| <i>ΔMktSize</i>                               | 6.825  | 44.118 | -0.958 | 0.200  | 3.993  | 5.449  | 6.889  | -1.439*** |
| <i>IndustryROA</i>                            | 0.042  | 0.038  | 0.023  | 0.039  | 0.057  | 0.037  | 0.043  | -0.006*** |

Panel B. Pearson Correlation Coefficients

|                                            | (1)          | (2)           | (3)           | (4)           | (5)           | (6)           | (7)           | (8)           | (9)           | (10)          | (11)          | (12)          |
|--------------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| (1) <i>lnEBIT</i>                          | 1            |               |               |               |               |               |               |               |               |               |               |               |
| (2) <i>C<sup>HL</sup></i>                  | <b>0.065</b> | 1             |               |               |               |               |               |               |               |               |               |               |
| (3) <i>C<sup>DKS</sup></i>                 | <b>0.078</b> | <b>0.947</b>  | 1             |               |               |               |               |               |               |               |               |               |
| (4) <i>PrivatePost</i>                     | <b>0.026</b> | <b>-0.013</b> | <b>-0.023</b> | 1             |               |               |               |               |               |               |               |               |
| (5) <i>PublicTreat</i>                     | <b>0.046</b> | <b>-0.019</b> | <b>-0.011</b> | <b>-0.008</b> | 1             |               |               |               |               |               |               |               |
| (6) <i>PublicTreat</i> × <i>PublicPost</i> | <b>0.034</b> | <b>-0.014</b> | <b>-0.012</b> | <b>0.082</b>  | <b>0.659</b>  | 1             |               |               |               |               |               |               |
| (7) <i>lnFixedAssets</i>                   | <b>0.586</b> | <b>0.080</b>  | <b>0.092</b>  | <b>-0.015</b> | <b>0.038</b>  | <b>0.023</b>  | 1             |               |               |               |               |               |
| (8) <i>lnCompensation</i>                  | <b>0.653</b> | <b>0.116</b>  | <b>0.121</b>  | <b>0.018</b>  | <b>0.013</b>  | <b>0.016</b>  | <b>0.541</b>  | 1             |               |               |               |               |
| (9) <i>lnAge</i>                           | <b>0.262</b> | <b>0.104</b>  | <b>0.111</b>  | <b>0.070</b>  | <b>-0.032</b> | <b>-0.011</b> | <b>0.256</b>  | <b>0.277</b>  | 1             |               |               |               |
| (10) <i>lnGDPperCapita</i>                 | <b>0.023</b> | <b>0.126</b>  | <b>0.151</b>  | <b>0.017</b>  | <b>-0.028</b> | <b>-0.011</b> | <b>-0.032</b> | <b>0.087</b>  | <b>0.142</b>  | 1             |               |               |
| (11) <i>ΔGDP</i>                           | <b>0.005</b> | <b>-0.070</b> | <b>-0.082</b> | <b>0.030</b>  | <b>-0.003</b> | <b>-0.013</b> | <b>-0.010</b> | <b>-0.028</b> | <b>-0.058</b> | <b>-0.182</b> | 1             |               |
| (12) <i>ΔMktSize</i>                       | <b>0.009</b> | <b>0.034</b>  | <b>0.041</b>  | <b>-0.108</b> | <b>-0.007</b> | <b>-0.019</b> | <b>0.005</b>  | <b>0.006</b>  | <b>0.009</b>  | <b>0.011</b>  | <b>-0.030</b> | 1             |
| (13) <i>IndustryROA</i>                    | <b>0.012</b> | <b>-0.041</b> | <b>-0.047</b> | <b>0.084</b>  | <b>-0.031</b> | <b>-0.008</b> | <b>-0.047</b> | <b>0.067</b>  | <b>0.012</b>  | <b>0.071</b>  | <b>0.093</b>  | <b>-0.013</b> |

Notes: This table provides descriptive statistics in Panel A for variables to estimate the affiliate-level tax-motivated income shifting models. Panel A also compares mean values for observations categorized as affiliates of MNCs that voluntarily disclose CbCR publicly or not. Two-sided t-tests are used to test the difference in means. \*, \*\*, and \*\*\* indicate statistical significance at the ten, five, and one percent levels, respectively. Panel B provides Pearson correlations for variables to estimate the affiliate-level tax-motivated income shifting models. Values that are in bold are statistically significant at the five percent level or higher (two-tailed). Variables are defined in Appendix D.

**Table 10**  
**Test of Hypothesis 2 without Xu's Two-Step Instrumental Variables**  
**Method**

Panel A. Staggered Difference-in-Differences Design

|                                        | (1)<br>Huizinga & Laeven [2008]<br>model | (2)<br>De Simone et al. [2017]<br>model |
|----------------------------------------|------------------------------------------|-----------------------------------------|
| Variables                              | <i>lnEBIT</i>                            | <i>lnEBIT</i>                           |
| <i>C</i>                               | -0.591***<br>(-5.481)                    | -0.709***<br>(-4.054)                   |
| <i>C×PrivatePost</i>                   | 0.443***<br>(4.590)                      | 0.647***<br>(4.299)                     |
| <i>C×PublicTreat</i>                   | 1.049*<br>(1.737)                        | 1.120<br>(1.230)                        |
| <b><i>C×PublicTreat×PublicPost</i></b> | <b>-0.157</b><br><b>(-0.220)</b>         | <b>-0.127</b><br><b>(-0.142)</b>        |
| <i>lnFixedAssets</i>                   | 0.170***<br>(29.950)                     | 0.173***<br>(30.633)                    |
| <i>lnCompensation</i>                  | 0.541***<br>(46.139)                     | 0.527***<br>(47.649)                    |
| <i>lnGDPperCapita</i>                  | 0.008<br>(0.743)                         |                                         |
| <i>ΔGDP</i>                            |                                          | 3.336***<br>(10.282)                    |
| <i>lnAge</i>                           |                                          | 0.128***<br>(12.682)                    |
| <i>ΔMktSize</i>                        |                                          | -0.429<br>(-1.339)                      |
| <i>IndustryROA</i>                     |                                          | 0.000<br>(0.609)                        |
| <i>PublicTreat</i>                     | 0.291***<br>(3.629)                      | 0.319***<br>(2.812)                     |
| <i>PublicTreat×PublicPost</i>          | 0.021<br>(0.237)                         | -0.035<br>(-0.358)                      |
| Fixed Effects                          | Year, Industry                           | Year                                    |
| Observations                           | 297,793                                  | 297,793                                 |
| Adjusted R <sup>2</sup>                | 0.518                                    | 0.508                                   |

Panel B. Stacked Difference-in-Differences Design

|                                        | (1)<br>Huizinga & Laeven [2008]<br>model | (2)<br>De Simone et al. [2017]<br>model |
|----------------------------------------|------------------------------------------|-----------------------------------------|
| Variables                              | <i>lnEBIT</i>                            | <i>lnEBIT</i>                           |
| <i>C</i>                               | -0.588***<br>(-5.438)                    | -0.794***<br>(-4.564)                   |
| <i>C×PrivatePost</i>                   | 0.435***<br>(4.512)                      | 0.611***<br>(3.997)                     |
| <i>C×PublicTreat</i>                   | 1.017<br>(1.514)                         | 1.109<br>(1.166)                        |
| <b><i>C×PublicTreat×PublicPost</i></b> | <b>-0.373</b><br><b>(-0.512)</b>         | <b>-0.278</b><br><b>(-0.310)</b>        |
| <i>lnFixedAssets</i>                   | 0.165***<br>(28.710)                     | 0.167***<br>(29.475)                    |
| <i>lnCompensation</i>                  | 0.548***<br>(45.315)                     | 0.535***<br>(46.896)                    |
| <i>lnGDPperCapita</i>                  | 0.008<br>(0.718)                         |                                         |
| <i>ΔGDP</i>                            |                                          | 1.455***<br>(12.778)                    |
| <i>lnAge</i>                           |                                          | 0.127***<br>(12.553)                    |
| <i>ΔMktSize</i>                        |                                          | 0.000<br>(1.339)                        |
| <i>IndustryROA</i>                     |                                          | -0.353<br>(-1.079)                      |
| <i>PrivatePost</i>                     | 0.100***<br>(9.309)                      | 0.083***<br>(7.459)                     |
| Fixed Effects                          | Time, Industry, Cohort                   | Time, Cohort                            |
| Observations                           | 2,574,345                                | 2,574,345                               |
| Adjusted R <sup>2</sup>                | 0.516                                    | 0.505                                   |

Notes: This table provides regression results for MNCs' tax-motivated income shifting after voluntary public CbCR disclosure initiation, where the dependent variable is *lnEBIT*. Panel A (B) uses a staggered (stacked) difference-in-differences design. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the MNC level and the related *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix D.

**Table 11**  
**Test of Hypothesis 2 with Xu's Two-Step Instrumental Variables**  
**Method**

Panel A. Huizinga and Laeven [2008] model

|                                                                                | (1)<br>1 <sup>st</sup> Stage | (2)<br>Modified 1 <sup>st</sup> Stage | (3)<br>Huizinga & Laeven [2008]<br>model |
|--------------------------------------------------------------------------------|------------------------------|---------------------------------------|------------------------------------------|
| Variables                                                                      | $\widehat{PublicTreat}$      | $\widehat{\widehat{PublicTreat}}$     | $\ln EBIT$                               |
| <i>C</i>                                                                       | 0.115<br>(0.173)             | 0.016<br>(0.441)                      | -0.775***<br>(-4.645)                    |
| <i>C</i> × <i>PrivatePost</i>                                                  |                              |                                       | 0.451***<br>(3.598)                      |
| <i>C</i> × $\widehat{PublicTreat}$                                             |                              |                                       | -0.337<br>(-0.391)                       |
| <b><i>C</i>×<math>\widehat{\widehat{PublicTreat}}</math>×<i>PublicPost</i></b> |                              |                                       | <b>2.508*</b><br><b>(1.661)</b>          |
| <i>lnFixedAssets</i>                                                           | 0.027<br>(1.480)             | -0.001<br>(-0.697)                    | 0.164***<br>(22.250)                     |
| <i>lnCompensation</i>                                                          | -0.018<br>(-0.438)           | 0.001<br>(0.525)                      | 0.535***<br>(33.102)                     |
| <i>lnGDPperCapita</i>                                                          | -0.017<br>(-0.349)           | 0.001<br>(0.316)                      | 0.047***<br>(3.650)                      |
| $\widehat{PublicTreat}$                                                        |                              | 1.021***<br>(9.458)                   |                                          |
| $\widehat{\widehat{PublicTreat}}$                                              |                              |                                       | 0.520***<br>(3.417)                      |
| $\widehat{\widehat{PublicTreat}}$ × <i>PublicPost</i>                          |                              |                                       | 0.506***<br>(2.600)                      |
| <i>TaxAggress</i>                                                              | 0.056<br>(0.075)             |                                       |                                          |
| <i>MandESG</i>                                                                 | -1.091***<br>(-2.682)        |                                       |                                          |
| <i>MandTax</i>                                                                 | 1.588**<br>(2.326)           |                                       |                                          |
| <i>AvgESGscore</i>                                                             | -1.497<br>(-0.442)           |                                       |                                          |
| <i>CodeLaw</i>                                                                 | 0.177<br>(0.226)             |                                       |                                          |
| <i>Regn</i>                                                                    | -1.608***<br>(-4.233)        |                                       |                                          |

|                             |                |                |                |
|-----------------------------|----------------|----------------|----------------|
| <i>IndvVoice</i>            | 1.237**        |                |                |
|                             | (1.990)        |                |                |
| <i>EnvScore</i>             | 0.300          |                |                |
|                             | (0.185)        |                |                |
| <i>SocScore</i>             | 4.966***       |                |                |
|                             | (3.838)        |                |                |
| <i>GovScore</i>             | -1.362         |                |                |
|                             | (-1.348)       |                |                |
| <i>GRI</i>                  | 2.833***       |                |                |
|                             | (5.659)        |                |                |
| <i>Competition</i>          | 1.813**        |                |                |
|                             | (2.207)        |                |                |
| <i>PrivatePost</i>          | -0.279         |                |                |
|                             | (-0.457)       |                |                |
| <i>Haven</i>                | 3.101          |                |                |
|                             | (1.542)        |                |                |
| <i>Loss</i>                 | -0.182         |                |                |
|                             | (-0.478)       |                |                |
| <i>Size</i>                 | -0.038         |                |                |
|                             | (-0.144)       |                |                |
| <i>RD</i>                   | 0.175          |                |                |
|                             | (0.026)        |                |                |
| <i>ROA</i>                  | 3.979          |                |                |
|                             | (1.235)        |                |                |
| <i>Leverage</i>             | 0.499          |                |                |
|                             | (0.264)        |                |                |
| <i>lnAnalysts</i>           | 0.007          |                |                |
|                             | (0.012)        |                |                |
| <i>InstOwnPRI</i>           | -5.747         |                |                |
|                             | (-1.331)       |                |                |
| <i>InstOwnNonPRI</i>        | -4.845***      |                |                |
|                             | (-3.148)       |                |                |
| <i>StdRet</i>               | -1.131         |                |                |
|                             | (-0.799)       |                |                |
| Fixed Effects               | Year, Industry | Year, Industry | Year, Industry |
| Observations                | 139,304        | 139,304        | 139,304        |
| Pseudo R <sup>2</sup>       | 0.411          | -              | -              |
| R <sup>2</sup>              | -              | -              | 0.510          |
| <i>p</i> -value of $\chi^2$ | -              | -              | 0.000          |

Panel B. De Simone et al. [2017] model

|                                                                                | (1)<br>1 <sup>st</sup> Stage | (2)<br>Modified 1 <sup>st</sup> Stage | (3)<br>De Simone et al. [2017]<br>model |
|--------------------------------------------------------------------------------|------------------------------|---------------------------------------|-----------------------------------------|
| Variables                                                                      | $\widehat{PublicTreat}$      | $\widehat{\widehat{PublicTreat}}$     | $\ln EBIT$                              |
| <i>C</i>                                                                       | 0.186<br>(0.210)             | 0.060<br>(1.133)                      | -0.429*<br>(-1.951)                     |
| <i>C</i> × <i>PrivatePost</i>                                                  |                              |                                       | 0.515***<br>(2.932)                     |
| <i>C</i> × $\widehat{PublicTreat}$                                             |                              |                                       | -1.313<br>(-1.033)                      |
| <b><i>C</i>×<math>\widehat{\widehat{PublicTreat}}</math>×<i>PublicPost</i></b> |                              |                                       | <b>5.094***<br/>(2.926)</b>             |
| <i>lnFixedAssets</i>                                                           | 0.034**<br>(2.491)           | -0.001<br>(-0.834)                    | 0.164***<br>(20.940)                    |
| <i>lnCompensation</i>                                                          | -0.043<br>(-1.578)           | 0.002<br>(1.003)                      | 0.518***<br>(31.229)                    |
| $\Delta GDP$                                                                   | 1.074<br>(0.688)             | 0.131<br>(1.272)                      | 2.727***<br>(7.664)                     |
| <i>lnAge</i>                                                                   | -0.062<br>(-1.364)           | -0.004<br>(-1.295)                    | 0.138***<br>(9.819)                     |
| $\Delta MktSize$                                                               |                              |                                       | -0.000<br>(-0.280)                      |
| <i>IndustryROA</i>                                                             |                              |                                       | 0.031<br>(0.090)                        |
| $\widehat{PublicTreat}$                                                        |                              | 1.026***<br>(10.828)                  |                                         |
| $\widehat{\widehat{PublicTreat}}$                                              |                              |                                       | 0.666***<br>(4.372)                     |
| $\widehat{\widehat{PublicTreat}}$ × <i>PublicPost</i>                          |                              |                                       | 0.454**<br>(2.479)                      |
| <i>TaxAggress</i>                                                              | -0.258<br>(-0.430)           |                                       |                                         |
| <i>MandESG</i>                                                                 | -0.498<br>(-1.474)           |                                       |                                         |
| <i>MandTax</i>                                                                 | 1.517**<br>(2.432)           |                                       |                                         |
| <i>AvgESGscore</i>                                                             | -0.656<br>(-0.218)           |                                       |                                         |
| <i>CodeLaw</i>                                                                 | 0.070<br>(0.094)             |                                       |                                         |
| <i>Regn</i>                                                                    | -1.491***<br>(-4.619)        |                                       |                                         |

|                             |                |                |         |
|-----------------------------|----------------|----------------|---------|
| <i>IndvVoice</i>            | 0.880*         |                |         |
|                             | (1.765)        |                |         |
| <i>EnvScore</i>             | 0.324          |                |         |
|                             | (0.232)        |                |         |
| <i>SocScore</i>             | 4.219***       |                |         |
|                             | (3.257)        |                |         |
| <i>GovScore</i>             | -1.072         |                |         |
|                             | (-1.245)       |                |         |
| <i>GRI</i>                  | 2.626***       |                |         |
|                             | (5.830)        |                |         |
| <i>Competition</i>          | -0.076         |                |         |
|                             | (-0.110)       |                |         |
| <i>PrivatePost</i>          | -0.544         |                |         |
|                             | (-0.506)       |                |         |
| <i>Haven</i>                | 2.235*         |                |         |
|                             | (1.666)        |                |         |
| <i>Loss</i>                 | 0.269          |                |         |
|                             | (0.758)        |                |         |
| <i>Size</i>                 | 0.229          |                |         |
|                             | (0.993)        |                |         |
| <i>RD</i>                   | 0.277          |                |         |
|                             | (0.041)        |                |         |
| <i>ROA</i>                  | 4.990*         |                |         |
|                             | (1.792)        |                |         |
| <i>Leverage</i>             | 0.280          |                |         |
|                             | (0.170)        |                |         |
| <i>lnAnalysts</i>           | -0.516         |                |         |
|                             | (-1.146)       |                |         |
| <i>InstOwnPRI</i>           | -5.624         |                |         |
|                             | (-1.557)       |                |         |
| <i>InstOwnNonPRI</i>        | -4.484***      |                |         |
|                             | (-3.026)       |                |         |
| <i>StdRet</i>               | -0.686         |                |         |
|                             | (-0.487)       |                |         |
| Fixed Effects               | Year, Industry | Year, Industry | Year    |
| Observations                | 123,666        | 123,666        | 123,666 |
| Pseudo R <sup>2</sup>       | 0.427          | -              | -       |
| R <sup>2</sup>              | -              | -              | 0.512   |
| <i>p</i> -value of $\chi^2$ | -              | -              | 0.000   |

Panel C. Stacked Difference-in-Differences Design

|                                                                                | (1)                             | (2)                              |
|--------------------------------------------------------------------------------|---------------------------------|----------------------------------|
|                                                                                | Huizinga & Laeven [2008] model  | De Simone et al. [2017] model    |
| Variables                                                                      | <i>lnEBIT</i>                   | <i>lnEBIT</i>                    |
| <i>C</i>                                                                       | -0.485***<br>(-2.877)           | -0.749**<br>(-2.293)             |
| <i>C</i> × <i>PrivatePost</i>                                                  | 0.318**<br>(2.420)              | 0.503**<br>(2.101)               |
| <i>C</i> × $\widehat{\widehat{PublicTreat}}$                                   | -0.635<br>(-0.535)              | -1.963<br>(-1.012)               |
| <b><i>C</i>×<math>\widehat{\widehat{PublicTreat}}</math>×<i>PublicPost</i></b> | <b>2.962*</b><br><b>(1.857)</b> | <b>5.307**</b><br><b>(2.343)</b> |
| <i>lnFixedAssets</i>                                                           | 0.159***<br>(19.550)            | 0.161***<br>(21.128)             |
| <i>lnCompensation</i>                                                          | 0.544***<br>(27.957)            | 0.534***<br>(33.636)             |
| <i>lnGDPperCapita</i>                                                          | -0.009<br>(-0.651)              |                                  |
| $\Delta GDP$                                                                   |                                 | 1.432***<br>(7.712)              |
| <i>lnAge</i>                                                                   |                                 | 0.139***<br>(9.003)              |
| $\Delta MktSize$                                                               |                                 | 0.000*<br>(1.797)                |
| <i>IndustryROA</i>                                                             |                                 | -0.493<br>(-0.910)               |
| $\widehat{\widehat{PublicTreat}}$                                              | 0.121<br>(0.875)                | 0.047<br>(0.293)                 |
| $\widehat{\widehat{PublicTreat}}$ × <i>PublicPost</i>                          | 1.109***<br>(4.621)             | 1.222***<br>(4.756)              |
| <i>PrivatePost</i>                                                             | 0.071***<br>(3.651)             | 0.096***<br>(4.296)              |
| Fixed Effects                                                                  | Time, Industry, Cohort          | Time, Cohort                     |
| Observations                                                                   | 1,038,114                       | 1,038,114                        |
| R <sup>2</sup>                                                                 | 0.523                           | 0.509                            |
| <i>p</i> -value of $\chi^2$                                                    | 0.000                           | 0.000                            |

Notes: This table provides regression results for MNCs' tax-motivated income shifting after voluntary public CbCR disclosure initiation using Xu's [2021] two-step instrumental variables method. The regression in column 1 is estimated using logit regression and the dependent variable is *PublicTreat*. The regressions in columns 2 and 3, and 2 and 4, are estimated using maximum likelihood. Column 2 represents the endogenous disclosure decision where the dependent variable is *PublicTreat*, and columns 3 and 4 represent the income shifting outcome where the dependent variable is *lnEBIT*. Panel A uses the Huizinga and Laeven [2008] income shifting model, Panel B uses the De Simone et al. [2017] income shifting model, and Panel C uses a stacked difference-in-differences design. Standard errors have been adjusted for clustering at the MNC level and the related z-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix D.

**Table 12**  
**Impact of the Reduced Sample Size**

Panel A. Summary Statistics

| <b>Variable</b>                        | <b>mean</b> | <b>sd</b> | <b>p25</b> | <b>p50</b> | <b>p75</b> |
|----------------------------------------|-------------|-----------|------------|------------|------------|
| <b>MNC-level variables:</b>            |             |           |            |            |            |
| <i>Revenue</i> (billions)              | 28.388      | 37.404    | 6.269      | 17.060     | 37.780     |
| <i># of affiliates</i>                 | 210         | 347       | 42         | 87         | 179        |
| <i>PublicTreat</i>                     | 0.075       | 0.263     | 0.000      | 0.000      | 0.000      |
| <i>PublicTreat</i> × <i>PublicPost</i> | 0.035       | 0.184     | 0.000      | 0.000      | 0.000      |
| <i>TaxAggress</i>                      | 0.045       | 0.166     | -0.015     | 0.043      | 0.129      |
| <i>EnvScore</i>                        | 0.680       | 0.201     | 0.561      | 0.716      | 0.834      |
| <i>SocScore</i>                        | 0.689       | 0.179     | 0.573      | 0.722      | 0.832      |
| <i>GovScore</i>                        | 0.631       | 0.199     | 0.487      | 0.663      | 0.796      |
| <i>GRI</i>                             | 0.718       | 0.450     | 0.000      | 1.000      | 1.000      |
| <i>Competition</i>                     | 0.727       | 0.231     | 0.655      | 0.814      | 0.868      |
| <i>Haven</i>                           | 0.977       | 0.149     | 1.000      | 1.000      | 1.000      |
| <i>Loss</i>                            | 0.064       | 0.244     | 0.000      | 0.000      | 0.000      |
| <i>Size</i>                            | 23.742      | 1.324     | 22.769     | 23.892     | 24.664     |
| <i>RD</i>                              | 0.021       | 0.033     | 0.000      | 0.007      | 0.029      |
| <i>ROA</i>                             | 0.074       | 0.057     | 0.042      | 0.065      | 0.096      |
| <i>Leverage</i>                        | 0.228       | 0.126     | 0.144      | 0.219      | 0.297      |
| <i>lnAnalysts</i>                      | 2.838       | 0.457     | 2.639      | 2.944      | 3.135      |
| <i>InstOwnPRI</i>                      | 0.085       | 0.067     | 0.037      | 0.063      | 0.114      |
| <i>InstOwnNonPRI</i>                   | 0.370       | 0.213     | 0.202      | 0.299      | 0.542      |
| <i>StdRet</i>                          | 0.079       | 0.071     | 0.050      | 0.066      | 0.090      |
| <b>Affiliate-level variables:</b>      |             |           |            |            |            |
| <i>lnEBIT</i>                          | 14.267      | 2.116     | 12.977     | 14.284     | 15.594     |
| <i>C<sup>HL</sup></i>                  | -0.007      | 0.084     | -0.066     | 0.001      | 0.047      |
| <i>C<sup>DKS</sup></i>                 | -0.006      | 0.065     | -0.047     | 0.001      | 0.035      |
| <i>PrivatePost</i>                     | 0.665       | 0.472     | 0.000      | 1.000      | 1.000      |
| <i>lnFixedAssets</i>                   | 14.325      | 3.957     | 12.665     | 14.775     | 16.725     |
| <i>lnCompensation</i>                  | 15.257      | 1.900     | 14.122     | 15.284     | 16.471     |
| <i>lnAge</i>                           | 2.932       | 0.870     | 2.485      | 3.045      | 3.466      |

**Country- and Industry-level variables:**

|                       |        |        |        |        |        |
|-----------------------|--------|--------|--------|--------|--------|
| <i>MandESG</i>        | 0.478  | 0.500  | 0.000  | 0.000  | 1.000  |
| <i>MandTax</i>        | 0.141  | 0.349  | 0.000  | 0.000  | 0.000  |
| <i>AvgESGscore</i>    | 0.489  | 0.094  | 0.411  | 0.484  | 0.585  |
| <i>CodeLaw</i>        | 0.596  | 0.491  | 0.000  | 1.000  | 1.000  |
| <i>Regn</i>           | 0.198  | 0.454  | -0.058 | 0.273  | 0.523  |
| <i>IndvVoice</i>      | -0.007 | 0.415  | -0.369 | -0.020 | 0.221  |
| <i>lnGDPperCapita</i> | 10.311 | 0.717  | 10.212 | 10.509 | 10.675 |
| <i>ΔGDP</i>           | 0.009  | 0.037  | 0.006  | 0.017  | 0.025  |
| <i>ΔMktSize</i>       | 5.720  | 39.088 | -0.941 | 0.153  | 3.244  |
| <i>IndustryROA</i>    | 0.043  | 0.041  | 0.024  | 0.039  | 0.057  |

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Panel B. Equation 1

|                                                      | (1)<br>Huizinga & Laeven [2008] model | (2)<br>De Simone et al. [2017] model |
|------------------------------------------------------|---------------------------------------|--------------------------------------|
| Variables                                            | <i>lnEBIT</i>                         | <i>lnEBIT</i>                        |
| <i>C</i>                                             | -0.846***<br>(-5.452)                 | -0.795***<br>(-2.628)                |
| <i>C</i> × <i>PrivatePost</i>                        | 0.480***<br>(3.787)                   | 0.579**<br>(2.452)                   |
| <i>C</i> × <i>PublicTreat</i>                        | 0.766<br>(1.004)                      | 0.545<br>(0.437)                     |
| <b><i>C</i>×<i>PublicTreat</i>×<i>PublicPost</i></b> | <b>-0.188</b><br><b>(-0.233)</b>      | <b>0.178</b><br><b>(0.150)</b>       |
| <i>lnFixedAssets</i>                                 | 0.166***<br>(22.018)                  | 0.174***<br>(22.678)                 |
| <i>lnCompensation</i>                                | 0.533***<br>(32.578)                  | 0.517***<br>(34.671)                 |
| <i>lnGDPperCapita</i>                                | 0.044***<br>(3.407)                   |                                      |
| <i>ΔGDP</i>                                          |                                       | 3.275***<br>(6.015)                  |
| <i>lnAge</i>                                         |                                       | 0.134***<br>(8.917)                  |
| <i>ΔMktSize</i>                                      |                                       | 0.000<br>(1.452)                     |
| <i>IndustryROA</i>                                   |                                       | -0.621<br>(-1.177)                   |
| <i>PublicTreat</i>                                   | 0.352***<br>(3.478)                   | 0.391**<br>(2.537)                   |
| <i>PublicTreat</i> × <i>PublicPost</i>               | 0.005<br>(0.040)                      | -0.129<br>(-0.955)                   |
| Fixed Effects                                        | Year, Industry                        | Year                                 |
| Observations                                         | 139,304                               | 123,666                              |
| Adjusted R <sup>2</sup>                              | 0.523                                 | 0.512                                |

Notes: This table provides summary statistics in Panel A for variables to estimate Xu's [2021] two-step instrumental variables method. Panel B provides regression results for MNCs' tax-motivated income shifting after voluntary public CbCR disclosure initiation using equation 1 on the reduced sample, where the dependent variable is *lnEBIT*. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the MNC level and the related *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix D.

**Table 13**  
**Additional Analysis**

Panel A. Regression Results

|                                                                                  | (1)<br>Huizinga & Laeven [2008]<br>model | (2)<br>De Simone et al. [2017]<br>model |
|----------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------|
| Variables                                                                        | <i>lnEBIT</i>                            | <i>lnEBIT</i>                           |
| <i>C</i>                                                                         | -0.493***<br>(-2.934)                    | -0.681**<br>(-2.082)                    |
| <i>C</i> × <i>PrivatePost</i>                                                    | 0.309**<br>(2.299)                       | 0.530**<br>(2.219)                      |
| <i>C</i> × $\widehat{PublicTreat}$                                               | 0.258<br>(0.210)                         | 0.297<br>(0.146)                        |
| <i>C</i> × $\widehat{PublicTreat}$ × <i>More</i>                                 | -2.070<br>(-1.303)                       | -3.605<br>(-1.430)                      |
| <b><i>C</i>×<math>\widehat{PublicTreat}</math>×<i>PublicPost</i></b>             | <b>1.273</b><br><b>(0.608)</b>           | <b>3.888</b><br><b>(1.462)</b>          |
| <b><i>C</i>×<math>\widehat{PublicTreat}</math>×<i>PublicPost</i>×<i>More</i></b> | <b>5.184*</b><br><b>(1.859)</b>          | <b>4.373</b><br><b>(1.300)</b>          |
| <i>lnFixedAssets</i>                                                             | 0.168***<br>(21.441)                     | 0.171***<br>(23.135)                    |
| <i>lnCompensation</i>                                                            | 0.531***<br>(30.038)                     | 0.520***<br>(35.564)                    |
| <i>lnGDPperCapita</i>                                                            | -0.004<br>(-0.307)                       |                                         |
| $\Delta GDP$                                                                     |                                          | 3.505***<br>(6.572)                     |
| <i>lnAge</i>                                                                     |                                          | 0.140***<br>(9.228)                     |
| $\Delta MktSize$                                                                 |                                          | 0.000*<br>(1.707)                       |
| <i>IndustryROA</i>                                                               |                                          | -0.581<br>(-1.094)                      |
| $\widehat{PublicTreat}$                                                          | 0.622***<br>(4.174)                      | 0.623***<br>(3.119)                     |
| $\widehat{PublicTreat}$ × <i>PublicPost</i>                                      | 0.402**<br>(2.235)                       | 0.307<br>(1.630)                        |
| <i>More</i>                                                                      | 0.222*<br>(1.670)                        | 0.507***<br>(3.075)                     |

| Fixed Effects       | Year, Industry | Year    |
|---------------------|----------------|---------|
| Observations        | 139,304        | 123,666 |
| R <sup>2</sup>      | 0.527          | 0.513   |
| p-value of $\chi^2$ | 0.000          | 0.000   |

Panel B. 2x2 Matrix of MNCs'  $C \times \widehat{PublicTreat}$  Coefficients from Column 1

|        |        |                                                                                                                                                                                                    |                       |
|--------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
|        |        | +1.273                                                                                                                                                                                             |                       |
|        |        | PublicPost=0                                                                                                                                                                                       | PublicPost=1          |
|        | More=0 | -0.235 <sup>1</sup>                                                                                                                                                                                | 1.038 <sup>3</sup>    |
| -2.070 | More=1 | -2.305* <sup>2</sup>                                                                                                                                                                               | 4.152*** <sup>5</sup> |
|        |        | (+1.273+5.184)*** <sup>4</sup>                                                                                                                                                                     |                       |
|        |        | <sup>1</sup> F-test $C + C \times PublicTreat = 0$ : F-stat 0.04                                                                                                                                   |                       |
|        |        | <sup>2</sup> F-test $C + C \times PublicTreat + C \times PublicTreat \times More = 0$ : F-stat 3.82                                                                                                |                       |
|        |        | <sup>3</sup> F-test $C + C \times PublicTreat + C \times PublicTreat \times PublicPost = 0$ : F-stat 0.35                                                                                          |                       |
|        |        | <sup>4</sup> F-test $C \times PublicTreat \times PublicPost + C \times PublicTreat \times PublicPost \times More = 0$ : F-stat 12.18                                                               |                       |
|        |        | <sup>5</sup> F-test $C + C \times PublicTreat + C \times PublicTreat \times More + C \times PublicTreat \times PublicPost + C \times PublicTreat \times PublicPost \times More = 0$ : F-stat 10.32 |                       |

Notes: This table provides regression results for MNCs' tax-motivated income shifting after voluntary public CbCR disclosure initiation, using Xu's [2021] two-step instrumental variables method. The regression is estimated using maximum likelihood. Panel A represents the income shifting outcome where the dependent variable is  $lnEBIT$  and includes an interaction for more detailed disclosures. Standard errors have been adjusted for clustering at the MNC level and the related z-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Panel B provides a 2x2 matrix of the implied coefficients on  $C \times \widehat{PublicTreat}$  from Panel A column 1. Variables are defined in Appendix D.