Transparency and Harmonization in International Corporate Taxation

Empirical and Analytical Evidence on the Effects of Country-by-Country Reporting and of a Common Corporate Tax Base

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List of Abbreviations

Adj.	Adjusted
AGI	Allowance for Growth and Investment
AR	Abnormal return
Art.	Article
AT	Austria
ATAD	Anti-Tax Avoidance Directive
B2B	Business-to-Business
B2C	Business-to-Consumer
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht
BE	Belgium
BEA	Bureau of Economic Analysis
BEPS	Base Erosion and Profit Shifting
BG	Bulgaria
BHR	Buy-and-hold return
bn.	billion
CAAR	Cumulative average abnormal return
CAR	Cumulative abnormal return
CbC	Country-by-Country
CbCR	Country-by-Country Reporting / Country-by-Country Report
C(C)CTB	Common (Consolidated) Corporate Tax Base
CCCTB	Common Consolidated Corporate Tax Base
CCTB	Common Corporate Tax Base
CD	Council Directive
Ch.	Chapter
CRD IV	Capital Requirements Directive IV
CRR	Capital Requirements Regulation
CSV	Comma-separated values

CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
e.g.	exempli gratia (for example)
EBA	European Banking Authority
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, depreciation and amortization
ECB	European Central Bank
ECOFIN	Economic and Financial Affairs Council
Ed.	Editor
Eds.	Editors
EE	Estonia
EEA	European Economic Area
EITI	Extractive Industries Transparency Initiative
EL	Greece
ES	Spain
et al.	et alii (and others)
ETR	Effective tax rate
EU	European Union
EUR	Euro
Euribor	Euro Interbank Offered Rate
EY	Ernst & Young
FE	Fixed effects
Feb.	February
FI	Finland
FiFo	First-in first-out
FR	France

GAAP	Generally Accepted Accounting Principles
GDP	Gross domestic product
GRI	Global Reporting Initiative
GSSB	Global Sustainability Standards Board
HQ	Headquarter(ed)
HR	Croatia
HU	Hungary
i.a.	inter alia (among others)
i.e.	id est (that is)
IBFD	International Bureau of Fiscal Documentation
IE	Ireland
IFRS	International Financial Reporting Standards
incl.	including
IP	Intellectual property
IT	Italy
Jun.	June
KPMG	Klynveld Peat Marwick Goerdeler
LiFo	Last-in first-out
lit.	littera (letter)
ln	logarithmus naturalis (natural logarithm)
LT	Lithuania
LU	Luxembourg
LV	Latvia
m.	million
Mar.	March
MFI	Monetary financial institutions

MNE	Multinational enterprise
MSCI	Morgan Stanley Capital International
MT	Malta
N	Number of observations
NGO	Non-governmental organization
NID	Notional interest deduction
NL	Netherlands
No. / n.	Number
Obs.	Observations
Oct.	October
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary least squares
p.	page
p1	1st percentile
p25	25th percentile
p50	50th percentile (= median)
p75	75th percentile
p99	99th percentile
PDF	Portable Document Format
PE	Permanent establishment
PL	Poland
pp.	pages
PT	Portugal
R&D	Research & Development
RO	Romania
S&P	Standard & Poor's
SE	Sweden

SEC	Securities and Exchange Commission
Sec.	Section
SI	Slovenia
SK	Slovak Republic
Std. Dev.	Standard deviation
th.	thousand
TIEA	Tax information exchange agreement
U.S.	United States
UK	United Kingdom
USD	United States Dollar
UTP	Uncertain tax position
Vol.	Volume
vs.	versus
VVA	Valdani Vicari & Associati SRL
XML	Extensible markup language
yr.	year
ZAR	South African Rand
ZEW	ZEW – Leibniz Centre for European Economic Research

1

Introduction

In light of an increasingly international, mobile and digital business environment, multinational enterprises and tax authorities have faced new challenges over the last decades. In particular, high administrative and compliance costs arise from the coexistence of different national tax systems (European Commission, 2015, p. 2). Besides, loopholes and mismatches between tax regimes offer opportunities to multinational companies to shift their profits in low-tax countries in order to minimize their overall tax burden (OECD, 2013a, pp. 5–6). An abundant body of empirical literature confirms that multinational firms regularly engage in income shifting, notably by mis-pricing intra-group transactions and setting up complex financing structures.[1] The Organization for Economic Co-operation and Development (OECD) and the European Commission play an active role in the fight against presumably aggressive tax planning and have developed various measures to improve the perceived fairness of international taxation and to prevent the erosion of the tax base. Examples are the OECD's Action Plan on Base Erosion and Profit Shifting (BEPS) (OECD, 2013b) and the European Commission's Action Plan for a Fair and Efficient Corporate Tax System in the European Union (EU) (European Commission, 2015). Amongst others, two central measures discussed therein are transparency and harmonization.

A prominent transparency measure is the so-called country-by-country reporting (CbCR) which requires companies to disclose tax-related information on a by-country basis. The data should support tax authorities in detecting abusive tax sheltering more efficiently (Evers et al., 2017, p. 12) and, if it is made publicly available, to exert public pressure on the firms to voluntarily refrain from tax avoidance and to pay taxes in line with real economic activity (Grotherr, 2016a, p. 856; Schreiber & Voget, 2017, p. 149). While policymakers in the EU are still debating the introduction of a public CbCR requirement for large multinational firms (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021),[2] several CbCR initiatives are already in place and allow to draw lessons concerning their effectiveness. In particular, the public CbCR obligation for EU financial institutions that applies to financial

[1] See for instance Dharmapala (2014); Heckemeyer and Overesch (2017); Riedel (2018); Dyreng and Hanlon (2019); Beer et al. (2020) for a review of the empirical literature on profit shifting and tax avoidance by multinational companies.

[2] At the time of writing this thesis, the debate is still open. See Dutt et al. (2020) for a detailed discussion of the compromise proposal presented by the Finnish Presidency of the Council of the EU on 15 November 2019 (Council of the EU, 2019), which failed to reach a qualified majority of Member States at a meeting of the Competitiveness Council on 28 November 2019. In January 2021, the Portuguese Presidency of the Council of the EU issued a slightly amended compromise proposal (Council of the EU, 2021). At a policy debate of the Competitiveness Council on 25 February 2021, a qualified majority of Member States voted in favor of the proposal. The legislative procedure is still ongoing, but the latest agreement in the Council has substantially increased the likelihood of public CbCR adoption.

years 2014 onwards (Article 89 of the Capital Requirements Directive IV (CRD IV))[3] offers a unique research setting due to the public accessibility of the data.

The introduction of the disclosure requirement is not supposed to alter the current system of separate entity accounting (OECD, 2015, pp. 16, 22) where profits of group members are determined separately by using transfer prices which follow the arm's length principle (Spengel & Zöllkau, 2012, p. 6). Still, the fundamental concept of CbCR is based on the idea of assessing the appropriateness of profits and tax payments in individual countries in view of indicators of economic activity, such as the number of employees or revenues (Dutt et al., 2020, p. 17). As such, CbCR can be seen as a step towards formula apportionment (Cockfield & MacArthur, 2015, p. 642; Reibel, 2015, p. 210; Hanlon, 2018, p. 215), which comprises the allocation of the consolidated tax base at group level to the individual group members based on a formula including distinct factors. Thus, CbCR also relates to the concept of a Common Consolidated Corporate Tax Base (CCCTB), which relies on the key elements of harmonization, consolidation and formula apportionment.

The proposal for a Common (Consolidated) Corporate Tax Base (C(C)CTB) was first launched by the European Commission in 2011 (European Commission, 2011a) and re-launched in 2016 as a two-step process. The first step entails the introduction of a harmonized set of tax accounting rules for the determination of each group member's taxable income (draft Council Directive on a Common Corporate Tax Base (CCTB), European Commission, 2016c), whereas the consolidation of the individual tax bases to a common tax base and the allocation of the consolidated tax base to the group members by formula apportionment should be implemented as a second step at a later stage (draft Council Directive on a CCCTB, European Commission, 2016b). The EU-wide harmonization of corporate taxation would increase transparency because companies would only face a single set of rules for computing their tax base. A C(C)CTB thus has the potential to reduce tax compliance costs and to close regulatory gaps that offer room for tax planning. However, in comparison to the transparency measure of CbCR which does not change existing tax systems, it is likely to have much more far reaching implications for Member States' tax revenues and companies' tax burdens and real investments.

This thesis provides empirical and analytical evidence on the effectiveness and consequences of the two instruments outlined above, namely CbCR and a CCTB. Although being supposed

[3] Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, *Official Journal of the European Union*, *56*(L 176), 338–436 (27 June 2013).

to work via different channels, they both reflect the current effort in the EU to overcome the obstacles that multinational companies and tax authorities face in today's economic environment. The thesis aims to answer the following main questions:

(1) How do investors evaluate the introduction of the public CbCR requirement for EU financial institutions?
(2) In how far does the published CbCR data increase transparency on EU banks' worldwide activities and the extent of their profit shifting compared to conventional datasets used in prior studies?
(3) How transparently is the CbCR data of EU banks presented and which open points diminish the added value of the reporting requirement?
(4) In how far does the introduction of a CCTB require amendments to current national tax provisions and what is its impact on effective corporate tax burdens in the EU Member States?

The insights provided in this thesis constitute a valuable contribution for both academics and policymakers. They are especially relevant in view of the proposals for a public CbCR for EU multinationals and for a CCTB. Since both proposals have not been adopted yet, the conclusions delivered in this thesis enrich the ongoing political discussion.

The thesis consists of four self-contained chapters that address the above raised questions. Chapters 2, 3 and 4 relate to the CbCR requirement for EU financial institutions, whereas Chapter 5 covers the implications of a CCTB. Chapter 6 summarizes the main findings of the thesis.

Chapter 2 focuses on the introduction of the public CbCR obligation for EU financial institutions. Prior studies provide evidence that the capital market reacted negatively to the adoption of other tax transparency measures. Their findings suggest that investors expect the disclosure of new information to be costly for firms, mainly due to an anticipated increase in scrutiny by the public and by tax authorities as well as potential reputational damages. Against this background, the aim of the chapter is to examine the capital market response around the day of the surprising political decision to include a CbCR obligation in the CRD IV proposal. The analysis of stock returns is based on an event study methodology. The results are suggestive of a zero response in the full sample of financial institutions headquartered in the EU. Sample splits, however, reveal that the investor reaction is slightly more negative for banks engaging in selected tax havens and for banks with an above-average B2C orientation, and slightly more

positive for banks with a below-average share of institutional investors. The chapter concludes that investors anticipated both a reduction in banks' tax avoidance opportunities and a decline in managers' expropriation activities due to reduced information asymmetries between managers and shareholders. These simultaneous expectations imply both negative and positive capital market reactions, which on average offset each other. Ultimately, investors' perception of increases in tax transparency crucially depends on the distinct objective and design of the initiative.

Chapter 3 contains the creation of a novel database of hand-collected information from the CbCRs of more than 100 multinational bank groups headquartered in the EU for 2014-2016. Essentially, this new dataset provides a complete picture of banks' worldwide activities, including the amount of profits booked and the number of workers employed in tax havens. It therefore allows to overcome an important blind spot, which so far has blurred many estimates of profit shifting. The chapter compares the CbCR data with financial statement information from conventional datasets, i.e. Orbis and Bank Focus, and aims to assess in how far the new disclosure regime increases transparency on the distribution of banks' profits and employees, thus contributing to the still unresolved question of the actual size of profit shifting. The comparison shows that CbCRs uncover a large fraction of the global profits and real activities in terms of employees of EU bank groups, especially in tax havens. The reports also reveal a striking disconnect between profits and employees, with considerable heterogeneity between different tax havens and bank groups from different headquarter countries. Estimates based on CbCR data suggest that the EU-headquartered bank groups in the underlying sample shift about 10% of their total global profit and 14% of their foreign profit to tax havens annually. Due to missing financial data, the extent of shifted profits is severely underestimated when relying on conventional micro-level datasets. The analyses further imply that the sample selection bias in prior regression estimates of the tax semi-elasticity of banks' reported profits amounts to approximately three percentage points.

Chapter 4 is based on the same dataset of CbCRs of EU-headquartered multinational bank groups underlying the analysis in Chapter 3. In contrast to Chapter 3, though, the focus is not on the numerical key CbCR data, but on the reporting behavior and the degree of transparency provided in the reports. Given that the CRD IV lacks clear and uniform guidelines on the calculation and the presentation of the reportable items, the aim of the chapter is to analyze the reporting heterogeneity that arises across different bank groups and implementing Member States. Based on the construction of variables that reflect the different ways of preparing the

reports, the chapter identifies open points that inhibit the interpretability, the readability and the comparability of the data as well as bank groups which are particularly (in-)transparent in their CbC reporting behavior. The chapter reveals a large heterogeneity with respect to the place of publication of the CbCR, its content – such as the underlying data source, applied definitions and the provision of additional qualitative and quantitative information –, the readability of the data tables as well as the list of entities that should be published together with the by-country data. Finally, recommendations are developed in order to avoid the detected inconsistencies in reporting and to improve the added value of CbCR.

Chapter 5 analyzes the consequences of the introduction of the CCTB draft Council Directive of 2016. The aim of the chapter is twofold. First, it identifies the need for adjustment that would arise when implementing the provisions of the CCTB into the national laws of the 28 EU Member States.[4] Second, it quantifies the changes in effective corporate tax burdens in the Member States induced by replacing current national tax accounting rules by the regulations of the CCTB. Effective corporate tax burdens are calculated based on the European Tax Analyzer model, which simulates the development of a model corporation over a ten-year period. The comparison of Member States' current tax practice and the CCTB provisions reveals that adjustment requirements in order to comply with the CCTB draft Council Directive are highest with regard to the Allowance for Growth and Investment (AGI), which is a type of notional interest deduction, tax incentives for research and development (R&D), loss relief, the applicable depreciation rates and the use of the pool depreciation method. The adoption of the CCTB would result in a substantial decrease in the effective corporate tax burden on average, which is mainly driven by the AGI. For R&D companies, the effect of the CCTB introduction largely depends on the generosity of existing R&D tax incentives and is therefore very heterogeneous across Member States. Ultimately, the considerable implications of certain elements of the CCTB, notably the AGI and the R&D tax incentive, on national tax laws and corporate tax burdens might hinder the agreement on a harmonized set of tax base provisions.

The chapters of this thesis have originally been written as papers for publication in academic journals or on behalf of the European Commission and are joint work with different co-authors. Table 1.1 provides an overview of the papers underlying each chapter, including the co-authors, the publication status and the author's own key contributions.

[4] At the time of writing this thesis, the withdrawal of the United Kingdom from the EU (so-called Brexit) has not been implemented yet in its entirety. Therefore, the United Kingdom is included in the list of EU Member States throughout this thesis.

Table 1.1: Co-authors, publication status and own contribution to the projects included in the thesis

Chapter	Project	Co-authors	Publication status	Own key contribution
2	Increasing Tax Transparency: Investor Reactions to the Country-by-Country Reporting Requirement for EU Financial Institutions	Christopher Ludwig Katharina Nicolay Heiko Vay Johannes Voget	Published in *International Tax and Public Finance* (2019)	– Introduction and positioning of the paper – Research and description of the institutional background – Review of the related literature and development of the hypotheses – Development of the conceptual design of the empirical analysis – Interpretation of the results and discussion in light of prior findings – Summary of the results and conclusion
3	Can European Banks' Country-by-Country Reports Reveal Profit Shifting? An Analysis of the Information Content of EU Banks' Disclosures	Katharina Nicolay Heiko Vay Johannes Voget	*ZEW Discussion Paper* No. 19-042; prepared for submission to *Contemporary Accounting Research*	– Introduction and positioning of the paper – Research and description of the institutional background – Review of the related literature – Development of the data collection concept – Data collection and preparation – Descriptive analysis based on CbCR data and Orbis data – Regression analysis based on CbCR data and Bank Focus data – Summary of the results and conclusion

Table 1.1: Co-authors, publication status and own contribution to the projects included in the thesis *(continued)*

Chapter	Project	Co-authors	Publication status	Own key contribution
4	Reporting Behavior and Transparency in European Banks' Country-by-Country Reports	Katharina Nicolay Christoph Spengel	*ZEW Discussion Paper* No. 21-019; prepared for submission to *Schmalenbach Journal of Business Research*	– Introduction and positioning of the paper – Research and description of the institutional background – Review of the related literature – Definition and manual coding of the variables reflecting the reporting behavior – Descriptive analysis of the reporting heterogeneity – Calculation of the transparency scores and correlation analysis – Development of a best practice approach on CbCR – Summary of the results and conclusion
5	Impact of the Introduction of the Common Corporate Tax Base (CCTB) on the Effective Tax Burden of Corporations in the EU Member States	Christoph Spengel Rainer Bräutigam Leonie Fischer Kathrin Stutzenberger	*European Commission Taxation Paper* No. 75-2019	– Conceptualization and implementation of the CCTB rules into the model framework of the European Tax Analyzer – Qualitative analysis: provisions for legal obligations (warranty provisions), provisions for pensions, notional interest deduction schemes, R&D tax incentives – Quantitative analysis: analysis of the isolated effect of the Allowance for Growth and Investment, including analysis of different scenarios – Sensitivity analysis – Comparison of the effects of the CCTB draft Council Directives as of 2011 and 2016 – Summary of the results, including preparation of the results tables and visualization of the effects

2

Increasing Tax Transparency: Investor Reactions to the Country-by-Country Reporting Requirement for EU Financial Institutions

This chapter is based on the following published journal article:

Dutt, V. K., Ludwig, C. A., Nicolay, K., Vay, H., & Voget, J. (2019). Increasing tax transparency: investor reactions to the country-by-country reporting requirement for EU financial institutions. *International Tax and Public Finance*, *26*(6), 1259–1290. https://doi.org/10.1007/s10797-019-09575-4

The original publication and the supplementary material provided in Appendix A are available at https://link.springer.com/article/10.1007/s10797-019-09575-4 (23 February 2021).

Apart from minor editorial changes, slight amendments to the published journal article have been made for the purpose of writing this thesis in order to account for recent developments as regards the institutional background. References to working papers have been updated in cases where the relevant inferences have remained unchanged.

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2.1 Introduction

A couple of recent studies suggest that investors perceive a mandatory increase in tax transparency as a potent tool in curbing tax avoidance. More precisely, Johannesen and Larsen (2016), Chen (2017) and Hoopes et al. (2018) document negative stock price reactions around key dates of two legislative procedures that introduced new public tax disclosure obligations for certain companies. They interpret their findings as evidence of investors expecting the disclosure of new information to be costly for firms, mainly due to an anticipated increase in scrutiny by the public and by tax authorities, resulting in a potential reduction of profit shifting opportunities under the new disclosure rules. To provide a more general understanding of how tax reporting requirements – and in particular country-by-country reporting (CbCR) – are perceived by investors, we analyze the introduction of the public CbCR obligation for EU financial institutions, enacted in 2013.

Since the tax planning strategies of large multinational firms have moved into the focus of public and political attention, several EU and OECD initiatives have discussed potential measures to limit extensive profit shifting activities. One of these measures aims at improving tax transparency, in particular by mandating companies to disclose a CbCR, which contains certain tax-related information on a per-country basis. The data is supposed to help tax authorities in detecting abusive tax sheltering and – if it is made public – to exert public pressure on the firms inducing them to pay their "fair share of taxes" in the countries where they operate. As one of the first CbCR initiatives, Article 89 of the Capital Requirements Directive IV (CRD IV)[5] requires EU financial institutions to publicly disclose reports for the financial year 2014 onwards.

In theory, several channels could drive investors' reaction to adopting this new rule. On the one hand, investors could appreciate the upcoming enhancement in tax transparency. The additional information may serve as a tool to better monitor the tax avoidance activities of managers and to limit their related possibilities to extract private benefits (Desai & Dharmapala, 2006; Desai et al., 2007; Bennedsen & Zeume, 2018). This potential decrease in information asymmetry could trigger a positive stock price response. On the other hand, investors might react negatively in anticipation of reduced future after-tax profits. As intended by the legislator, banks may cut

[5] Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, *Official Journal of the European Union*, *56*(L 176), 338–436 (27 June 2013).

back their tax planning to some extent due to increased scrutiny by the tax authorities and the general public (Graham et al., 2014; Dyreng et al., 2016). Besides, the new disclosure requirement might come along with substantial direct and implicit costs.

Empirical evidence from similar settings indicates a negative response of the capital market. Hoopes et al. (2018) investigate a new public tax disclosure rule in Australia and document a significant stock price decline for all firms affected by the new rule, which is especially pronounced for firms expected to be disclosed as paying zero taxes. Chen (2017) extends their analysis to additional event dates in the legislative procedure. When accounting for the dividend imputation system in Australia and focusing on a portfolio of firms with clear incentives to minimize their corporate tax burden, Chen (2017) finds a negative and significant investor reaction aggregated over all event dates. Finally, Johannesen and Larsen (2016) exploit the introduction of the CbCR requirement for EU companies in the extractive industries through the EU Accounting Directive[6] and observe remarkable stock price declines of about 5-10%.

All these prior findings suggest that the channels of increased scrutiny by the tax authority and by the public dominate investors' perception of the introduction of tax disclosure requirements. Consequently, we also expect a negative reaction in our setting. Early empirical evidence (Joshi et al., 2018; Overesch & Wolff, 2019)[7] indicating that banks changed their tax avoidance behavior to some extent after the implementation of the new CbCR requirement corroborates this expectation.

We employ an event study methodology to examine the capital market response around the day of the surprising political decision to include a CbCR obligation in the CRD IV proposal. We can reject a negative reaction larger than 2.1% and a positive reaction larger than 1.4% for the full sample of financial institutions headquartered in the EU. To investigate potential cross-sectional variation in the response to the new disclosure rule, we conduct several sample splits. As expected, we find that banks particularly exposed to the increase in tax transparency (proxied by tax haven usage) and banks more sensitive to reputational concerns (proxied by

[6] Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC, *Official Journal of the European Union*, *56*(L 182), 19–76 (29 June 2013).

[7] More recent versions of the cited working papers are Joshi et al. (2020) and Overesch and Wolff (2020). However, a reference to the updated papers would cause content-related deviations from the published journal article of Dutt, Ludwig et al. (2019), on which this chapter of the thesis is based. Therefore, I refer to the working paper versions as of the point in time of publication of the paper of Dutt, Ludwig et al. (2019) throughout this chapter. References to other working papers have been updated for the purpose of writing this chapter since the relevant inferences have remained unchanged.

B2C orientation) exhibit a more negative reaction, while banks characterized by higher information asymmetry (i.e. a low share of institutional investors) show a more positive reaction. However, the effects measured for all subsamples are small in economic terms and statistically insignificant. Our results remain unchanged when considering two additional event dates and throughout various robustness checks.

We conclude that our cross-sectional tests provide some evidence of different channels driving the response to the CbCR introduction for EU financial institutions. The capital market may have perceived the new disclosure rule to result in a simultaneous decline in tax avoidance possibilities and a reduction in information asymmetry, implying both positive and negative stock price effects. This interpretation can explain why we do not observe a pronounced capital market reaction on average, while concurrent studies on banks' reaction to the CbCR requirement (Joshi et al., 2018; Overesch & Wolff, 2019) document that banks adjusted their tax avoidance behavior after the implementation of the rule.

We also relate our results to the findings of extant event studies investigating the introduction of similar tax transparency measures. Differences in research question and research design impede a direct comparison with Hoopes et al. (2018). However, the negative stock price reaction of Australian firms featuring tax avoidance incentives which are similar to those in our setting, as documented by Chen (2017), is small in economic terms and lies within the range of our confidence interval. In contrast, we can exclude the occurrence of a reaction as strong as the one observed by Johannesen and Larsen (2016) at the 5% level. While their setting shares several common features with ours, one important difference might explain the results. The reporting obligation in the extractive industries aims at preventing corruption by publishing payments to governments. By contrast, the objective in the banking sector is to increase transparency against the backdrop of the financial crisis and to reveal where profits are generated compared to where real economic activity occurs. These diverging objectives have translated into differences in the selection of items to be disclosed according to both rules. Consequently, the strong negative stock price reaction observed for the extractive industries might not be due to an anticipated reduction in tax avoidance. It may rather be dominated by investors' belief that this particular kind of CbCR disclosure effectively fights corruption and that companies have to increase their (legitimate) compensation to their host countries for extracted resources. This specific channel is not present in our setting of EU financial institutions.

We make several contributions to the growing literature on tax transparency. First, our paper sheds light on the impact and effectiveness of a particular tax transparency measure, namely CbCR. Up to now, most contributions on possible costs and benefits of the disclosure requirement have been normative (e.g. Cockfield & MacArthur, 2015; Evers et al., 2017). Empirical evidence on the impact of the CbCR for EU financial institutions on corporate tax avoidance is scarce and inconclusive. While Overesch and Wolff (2019) document a relative increase in the effective tax burdens of affected banks, Joshi et al. (2018) find a substitution of profit shifting activities between different kinds of subsidiaries but no significant change at the corporate group level. We aim to complement this early research on the effectiveness of CbCR by investigating investors' perspective on this new transparency rule.

Second, our analysis provides evidence on the impact of tax transparency in general (not specifically CbCR) on the capital market. Several studies examine how investors value the publication of tax-related information about companies, focusing on the event of disclosure itself (Hanlon & Slemrod, 2009; Gallemore et al., 2014; Brooks et al., 2016; Chen, 2017; Hoopes et al., 2018; Huesecken et al., 2018; O'Donovan et al., 2019). However, little is known about how investors react to changes in rules that require the disclosure of additional information, i.e. an increase in tax transparency. Market responses to the actual disclosure of information reflect how specific publications of certain companies are perceived by the capital market. Focusing on legislative procedures on new disclosure requirements instead allows to assess how investors evaluate the new legislation as a whole and in particular its effectiveness.

While prior studies and our cross-sectional tests are generally in line with increased tax transparency curbing tax avoidance of multinational companies, our results also suggest that the very strong capital market reaction to the CbCR introduction for the EU extractive industries was rather due to its effectiveness in fighting corruption. This inference is of special importance in light of the ongoing discussion about whether to adopt a public CbCR requirement for all EU-based multinational firms with profits above a certain threshold (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021). Compared to the CbCR for EU financial institutions, the current proposal for a general public CbCR (European Parliament, 2019; Council of the EU, 2019, 2021) provides for a more salient way of disclosure and a more comprehensive list of items, which could further increase the effectiveness of the CbCR in preventing tax avoidance and thereby affect the perception of the disclosure requirement by investors.

The remainder of this paper is structured as follows: Section 2.2 provides information on the CbCR requirement for EU financial institutions, the legislation procedure and prior literature related to our study. Section 2.3 describes the data and the research design. Section 2.4 presents the results of our analysis, which are complemented by robustness checks and further analyses in Section 2.5. Section 2.6 concludes.

2.2 Background and hypotheses

2.2.1 The CbCR requirement for EU financial institutions

The political intention to oblige EU financial institutions to publicly disclose CbCR information emerged quite as a surprise on 27 February 2013, which marks the key event date of our study. In a trilogue between the Presidency of the Council of the EU, the European Parliament and the European Commission on this day, it was decided to incorporate this new reporting obligation in the CRD IV. The main purpose of the CRD IV and the accompanying Capital Requirements Regulation (CRR)[8] was to implement the Basel III standards into EU law, including i.a. capital, liquidity and leverage requirements and new provisions regarding corporate governance and remuneration. While the legislative procedure had already started in 2011 (European Commission, 2011b) and most key features had been publicly debated, the idea of a CbCR obligation did not appear in any of the proposals or public discussions before the trilogue. It was only a spontaneous initiative of some members of the European Parliament which triggered this mandatory increase in tax transparency. Parliamentarians argued that, given the central role of banks and the large amount of public subsidies they have received during the financial crisis, EU citizens should be able to assess whether they are paying their "fair share of taxes" in the countries where they operate. Due to the unpredicted nature of the decision in the trilogue on 27 February 2013, we expect to observe an investor reaction around this date.

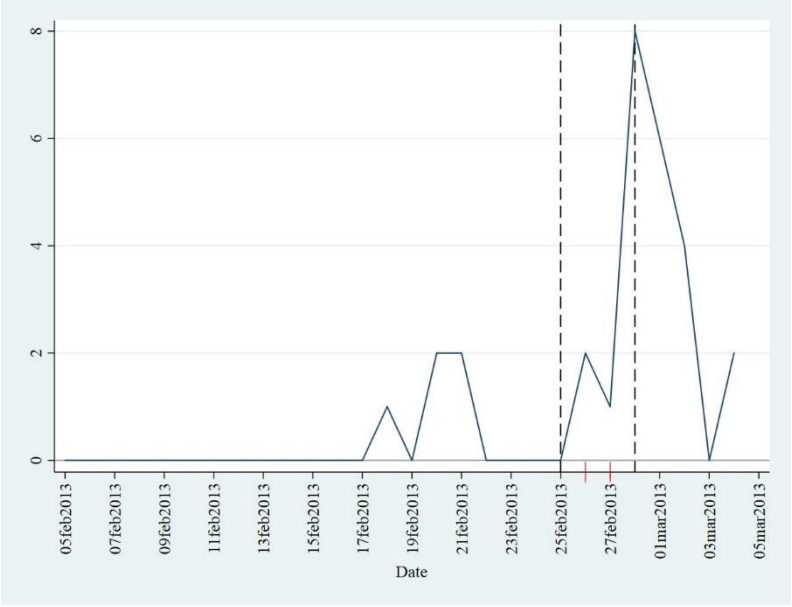
On 26 June 2013, the CRD IV was finally signed by the president of the European Parliament and the president of the Council of the EU. The CbCR rule contained in Article 89 requires EU credit institutions and investment firms to publicly disclose turnover, the number of employees, profit or loss before tax, tax on profit or loss and public subsidies received on a per-country basis as well as the name, location and nature of activities of their subsidiaries and branches.

[8] Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, *Official Journal of the European Union*, *56*(L 176), 1–337 (27 June 2013).

The disclosure obligation applies to financial years 2014 onwards. Groups headquartered in the EU have to provide a CbCR with respect to the whole group, whereas groups headquartered outside the EU only have to disclose information for their EU entities, including their subsidiaries and branches.

To further examine whether the trilogue decision to include a CbCR obligation was unexpected, we analyze the media coverage of the topic around our event date. Following Hillert et al. (2014) and Chen et al. (2019), we conduct searches in the Factiva and Lexis Nexis databases for news articles addressing the (potential) CbCR introduction for EU financial institutions. The number of relevant articles on each date is depicted in Figure 2.1. The figure exhibits a sharp increase directly after the event on 27 February 2013, reflecting that the inclusion of CbCR in the CRD IV appears to have come unexpected.

Figure 2.1: Trend analysis for news reports on CbCR around the event window



Notes: The figure depicts the number of relevant articles on CbCR for each date. We conduct our searches in the Factiva and the Lexis Nexis database for the period 5 February to 5 March 2013 using the following search terms: country-by-country reporting or country-by-country report or cbcr or capital requirements directive or crd iv. After eliminating duplicates (i.e. identical articles contained in both databases), we read through all search results in English language to identify articles that actually address the (potential) CbCR introduction for EU financial institutions by the CRD IV. The dashed lines frame the dates around the event date (25-28 February 2013). The red marks represent the consecutive days within this window.

In addition, on 26 February 2013, the non-governmental organization (NGO) "Avaaz" launched a petition requesting the inclusion of a CbCR requirement in the CRD IV. They managed to get more than 200,000 signatures until 27 February 2013, among them members of the European Parliament supporting CbCR (Treanor, 2013a). This event underlines the sudden increase in public interest in a CbCR requirement for the banking sector.

Other topics discussed in the trilogue concern additional capital buffer requirements for systemically important institutions, the flexibility for Member States to take country-specific prudential measures, the power of the European Banking Authority to mediate on its own initiative in the event of conflicts between national competent authorities, and details of and exemptions from the bonus cap for banks' managers. News articles around the trilogue, though, show that the CbCR requirement and the bonus cap for managers are the only two topics that received substantial public attention. While the 1:1 ratio of the bonus cap had already been agreed upon on 19 February 2013 and only been specified in the trilogue on 27 February 2013 in more detail, the inclusion of CbCR was completely open until then.

Furthermore, at the date of the trilogue, no other legal initiatives existed on a general CbCR or a CbCR for the financial sector. The confidential CbCR for large multinational firms proposed by the OECD (OECD, 2015) dates back to the OECD's initiative against Base Erosion and Profit Shifting (OECD, 2013b). Though, in February 2013, the concept of a CbCR had not yet been elaborated. In its report "Addressing Base Erosion and Profit Shifting" published on 12 February 2013, the OECD only expresses the "need for increased transparency on effective tax rates of MNEs" (OECD, 2013a, p. 6). Thus, we are confident that our event date is characterized by a strong increase in the likelihood of the introduction of a public CbCR for EU financial institutions.

2.2.2 Prior literature and hypotheses

The CbCR introduction for EU financial institutions constitutes an increase in the volume of publicly available tax-related information. To assess the consequences for the future profits of the companies affected, investors have to predict how managers, the tax authorities, consumers and the public sentiment will react to the new disclosure requirement. From a theoretical point of view, different channels could drive the response of the capital market.

On the one hand, investors might predict a reduction of the costs of capital for the affected banks. The capital market might appreciate the upcoming increase in transparency as the CbCRs could provide more certainty regarding banks' tax positions as well as additional information on the geographical distribution of activities and earnings. Ultimately, this data can help to increase the accuracy of analysts' forecasts. Prior evidence suggests that tax-related information can be useful in forecasting future earnings (Hanlon et al., 2005; Bratten et al., 2017; Demeré, 2018). Moreover, the CbCR information might serve as a tool for investors to better monitor managers' tax planning activities. Engaging in tax sheltering does not only allow firms to save

taxes, which is in the interest of all shareholders, but can also be exploited by managers and controlling shareholders to divert rents to their own advantage. As Desai and Dharmapala (2006) have found, tax avoidance and the extraction of private benefits by managers are complementary. In the same vein, Desai et al. (2007) have documented that an enhancement in tax enforcement reduces managers' possibilities of rent extraction. Bennedsen and Zeume (2018) provide evidence that an increase in transparency through the signing of tax information exchange agreements (TIEA) between home countries and tax havens increases the cost for managers to engage in expropriation of minority shareholders through the use of tax havens. This positive effect of TIEAs on firm value from reducing the self-serving activities of managers outweighs the negative effect from declining opportunities for pure tax saving via tax havens. In the same vein, the new CbCR requirement might decrease the information asymmetry between managers and shareholders. The information to be disclosed makes the tax avoidance activities of firms more transparent to shareholders, which might impede private rent extraction by managers. As a consequence, the capital market may react positively to the introduction of the new disclosure obligation.

On the other hand, investors could expect a decrease of banks' future profits. First, banks might reduce their extent of profit shifting since tax authorities have more information at hand to audit tax-aggressive banks more efficiently.[9] As Bozanic et al. (2017) have shown, tax authorities actually make use of tax-related disclosures in financial statements in case they contain incremental information to the tax return data. Second, increased public scrutiny might induce banks to voluntarily pay their "fair share of taxes". Several studies have documented that companies adjust their tax planning activities due to reputational concerns (Graham et al., 2014; Dyreng et al., 2016; Austin & Wilson, 2017; Hoopes et al., 2018). Finally, investors might also expect the new disclosure rule to impose additional costs on the companies. Apart from direct costs for an initial adjustment of the reporting system and for the annual compilation of the reports, companies may also face considerable indirect costs in the form of reputational damages from being potentially blamed for aggressive tax planning (Evers et al., 2017).

In summary, there are three potential channels which could drive the response of investors to the new disclosure rule: (1) reduction in information asymmetry, (2) tax authority scrutiny and (3) public scrutiny. While the first channel should result in a relative stock price increase of the affected firms, the latter two channels would lead to a relative decrease. Thus, it remains an

[9] Tax authority scrutiny should only matter if the tax authority's prior information set is inferior to the new set after the disclosure requirement is implemented.

empirical question how the capital market actually reacted to the introduction of the CbCR obligation.

Due to the recent nature of the rule, empirical evidence on whether EU financial institutions changed their behavior in response to the CbCR introduction is scarce and preliminary. Two early studies investigate potential behavioral responses with regard to the extent of tax planning activities. Overesch and Wolff (2019) find that European multinational banks reduced their tax avoidance after the implementation of the new disclosure obligation. They document an increase in the effective tax burdens of European-headquartered multinational banks relative to different control groups unaffected by the CbCR requirement. The reaction is especially pronounced for banks with activities in tax havens due to their higher exposure to the increased transparency. In contrast, Joshi et al. (2018) do not find a significant decline in the tax avoidance behavior at the corporate group level, measured by the effective tax rate. They claim that banks are able to substitute profit shifting activities between subsidiaries subject to different degrees of transparency, which leaves the overall level of tax avoidance unaffected. In particular, they document decreases in profit shifting through financial affiliates and increases in profit shifting through industrial affiliates, the latter of which they consider not to be included in the scope of the CRD IV.

While Overesch and Wolff (2019) and Joshi et al. (2018) shed some light on the tax avoidance behavior of banks affected by Article 89 of the CRD IV, their findings are – at least partly – contradictory. Moreover, as shown above, the capital market might not only reflect the implications of more tax transparency for tax avoidance, but might also incorporate additional channels in its reaction. Thus, it still remains an open question how investors have assessed the consequences of the upcoming increase in tax transparency.

Three recent event studies examine the stock price reaction in similar settings. Hoopes et al. (2018) and Chen (2017) both exploit a new rule in Australia, issued in 2013. It requires the Australian Taxation Office to publicly disclose certain items from corporate tax returns (i.a. taxable income and income tax payable) of large private and public companies. Hoopes et al. (2018) focus on a major date in the legislative procedure when the details of the intended rule, including the disclosure threshold and the tax return items to be reported, were announced for the first time. They find a negative capital market reaction for all firms affected by the new rule, whereby stock prices of firms expected to be disclosed as paying zero taxes experienced a significantly stronger decline.

Chen (2017) extends their analysis by three additional decisive dates in the legislative procedure that revealed new information and/or increased the probability of the passage of the law. While she also observes a significant (albeit considerably smaller) stock price decline on the event date shared with Hoopes et al. (2018), she documents an overall positive reaction across all four event dates. She concludes that investors adjusted their perception of the new rule in the course of the legislative procedure and that they ultimately anticipated a net benefit of disclosure. Nevertheless, Chen (2017) also takes note of the particularity of the dividend imputation system applicable in Australia. Individual shareholders resident in Australia who receive dividends from Australian corporations can generally credit the corporate tax payment of the corporation against their personal income tax liability. Thus, in contrast to the classical or shareholder relief systems prevailing in most developed countries, resident individual shareholders in Australia should not be as concerned about corporate tax minimization as foreign shareholders. Chen (2017) addresses this difference in corporate tax avoidance incentives in a cross-sectional test. She finds that corporations characterized by a relatively high fraction of foreign shareholders not benefitting from the imputation tax credit exhibit a small but significant negative stock price reaction overall. For this subgroup of firms facing tax avoidance incentives which should be more comparable to our European setting, the market apparently anticipates the costs of disclosure to outweigh the benefits.

Johannesen and Larsen (2016) analyze the capital market response around four key dates in the legislation process of the EU Accounting Directive, which introduced a CbCR requirement for EU companies in the extractive industries. They find significant decreases in firm value around two of their event dates, with a remarkable overall effect amounting to 5-10%. They interpret their result as evidence of tax planning creating additional profits for the firms considered and of financial transparency being a potentially powerful tool to restrict this behavior. Due to the common features of the settings, their study is closely related to ours. Both the Accounting Directive and the CRD IV are EU Directives which mandate companies of a specific industry to publicly disclose a CbCR. They mainly differ insofar as the CRD IV applies to the financial sector whereas Chapter 10 of the Accounting Directive targets companies active in the extractive industries. However, recent findings by Merz and Overesch (2016) and Langenmayr and Reiter (2017) confirm that banks also engage in tax avoidance and that they exhibit an even higher tax sensitivity compared to other industries.[10] Thus, it is reasonable to assume that

[10] These studies document a tax semi-elasticity of banks' overall reported profits of about 2.4 (Merz & Overesch, 2016) and of certain trading gains of about 3.4 to 4.0 (Merz & Overesch, 2016; Langenmayr & Reiter, 2017). This effect is quite large compared to the consensus estimate by Heckemeyer and Overesch (2017) of 0.8.

additional disclosures revealing tax planning activities are not less relevant for banks than for natural resource companies.

Taking together the findings of Hoopes et al. (2018), Chen (2017) and Johannesen and Larsen (2016), we expect to observe a negative capital market reaction also in the setting of the CbCR introduction for EU financial institutions.

2.3 Data and methodology

We employ an event study methodology as laid out by Kothari and Warner (2007) and applied by Johannesen and Larsen (2016) to estimate the impact of the CbCR introduction on the stock returns of the institutions affected. In particular, we investigate whether the capital market reacted to the proposed introduction of the new disclosure regulation around our key event date, 27 February 2013. As commonly used in the literature, our event window covers three trading days centered on the event day, i.e. the period 26-28 February 2013 (Austin, 1993; Eckbo et al., 2007). Due to the generally quick dissemination of information, we expect to observe a market reaction on the next trading day after the news at the latest. Furthermore, the inclusion of 28 February 2013 accounts for the peak in news articles on CbCR following the trilogue meeting (see Section 2.2.1). The inclusion of one day prior to the event allows to capture any potential effect of information available to the market before the event. It also enables us to take into consideration the starting date of the Avaaz petition for a CbCR requirement.

For our main specification, we use ownership information provided by the Orbis Bank Focus database to construct a sample of listed entities of bank groups whose global ultimate owner is located in the EU, i.e. the listed entity can either be a subsidiary of such a bank group or the global ultimate owner itself. For these banks, the CbCR requirement should be of highest relevance since the report must be provided by the global ultimate owner for the whole group, hence revealing all profit shifting opportunities of the group. We limit our sample to banks where at least one shareholder, subsidiary or branch is located in a different country than the bank itself. The underlying reason is that a purely domestic group has no possibility and incentive to shift profits cross-border and therefore, the CbCR does not provide any incremental information on the appropriateness of taxes paid in light of the economic activity.

Table 2.1: Descriptive statistics of daily stock returns for different groups of banks

Realized return	*N*	Mean	Std. Dev.	p1	p99
Treated banks	155	0.070	0.706	-1.755	1.929
Control group	537	0.072	0.437	-1.172	1.134

Notes: Treated banks are entities of bank groups whose global ultimate owner is located in the EU. Banks in the control group are entities of bank groups whose global ultimate owner is located outside the EU. The descriptive statistics are calculated for the period from 1 January 2012 to 31 December 2014. All values, except for the number of banks *N*, are stated in percent.

Table 2.2: Dispersion of treated banks over countries

Country	Banks		Percent	Country	Banks		Percent
	Number	Thereof parents			Number	Thereof parents	
Argentina	2	0	1.29	Kenya	2	0	1.29
Austria	5	5	3.23	Luxembourg	1	1	0.65
Belgium	3	2	1.94	Malta	2	1	1.29
Brazil	1	0	0.65	Mexico	1	1	0.65
Bulgaria	1	1	0.65	Morocco	1	0	0.65
Canada	1	0	0.65	Netherlands	6	5	3.87
Chile	1	0	0.65	Pakistan	2	0	1.29
Croatia	2	0	1.29	Poland	9	2	5.81
Czech Republic	1	0	0.65	Portugal	2	1	1.29
Côte d'Ivoire	1	0	0.65	Romania	2	1	1.29
Denmark	9	9	5.81	Russian Federation	2	1	1.29
Finland	5	4	3.23	Slovakia	1	0	0.65
France	14	9	9.03	South Africa	3	1	1.94
Germany	14	10	9.03	Spain	9	8	5.81
Ghana	1	0	0.65	Sweden	6	6	3.87
Greece	6	6	3.87	Switzerland	2	0	1.29
Hong Kong	1	0	0.65	Tunisia	2	0	1.29
Hungary	2	2	1.29	United Kingdom	30	27	19.35
Ireland	1	1	0.65	Venezuela	1	0	0.65
				Total	**155**	**104**	**100.00**

Notes: Treated banks are stock-listed entities of bank groups whose global ultimate owner is located in the EU. These groups are obliged to issue a CbCR for the whole group, revealing all tax haven subsidiaries and branches. Consequently, all affiliates of these groups are fully affected by the CbCR introduction. As some bank groups whose global ultimate owner is located in the EU also have stock-listed subsidiaries in non-EU countries, the sample of treated banks also contains a few bank entities located in non-EU countries. In total, we have 155 treated banks in our main sample. The depicted countries reflect the residence of the listed bank entities, which corresponds to the place of stock issuance. In general, the shares of listed banks are traded in the local currency of their home country, except for the shares of the one bank located in Luxembourg (traded in USD), one bank in Malta (traded in ZAR) and one bank in Sweden (traded in EUR). The column "Banks – Thereof parents" depicts the number of banks in a country that are global ultimate owners (*N*=104).

We merge the ownership information with daily stock prices from Datastream/Eikon for the period from January 2012 to December 2014. Banks with insufficient price information and banks with constant zero returns over time are dropped.[11] To avoid possible distortions by confounding events, we also exclude banks located in countries where a major election took place as well as banks explicitly targeted by major announcements of the European Central Bank (ECB) within one week before or after the event date.[12] Our final main sample includes 155 listed banks. Table 2.1 shows descriptive statistics for the treatment group and the control group. The sample mean of the stock returns is 0.070% with a standard deviation of 0.706. Table 2.2 shows the distribution of the treated banks over countries and Table A.1 in the Appendix provides the corresponding information for the control group.

For each treated bank i, we calculate the daily abnormal return $AR_{i,t}$ as the difference between the actual realized return $R_{i,t}^{act}$ and the expected return $R_{i,t}^{exp}$ on trading day t.

$$AR_{i,t} = R_{i,t}^{act} - R_{i,t}^{exp} \tag{1}$$

We use different approaches for calculating the expected return. First, we estimate the market model for a time horizon of one year, ending six days before the event, where $R_{i,t}^{act}$ denotes the actual firm return, $R_{m,t}$ denotes the market return, and $\varepsilon_{i,t}$ is a zero mean disturbance term (MacKinlay, 1997).

$$R_{i,t}^{act} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \tag{2}$$

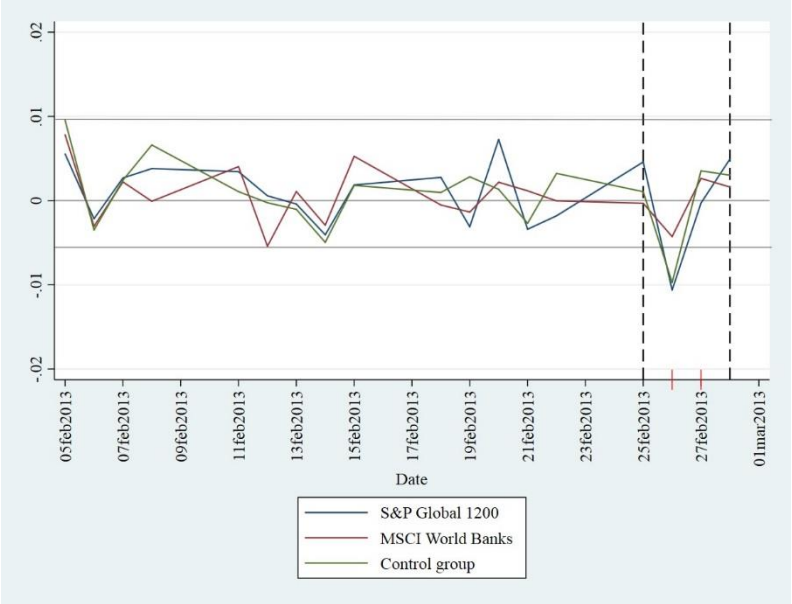
We consider two different market indices, namely S&P Global 1200 (following Johannesen & Larsen, 2016) and MSCI World Banks. While S&P Global 1200 proxies the market portfolio, MSCI World Banks is better tailored to the banking sector, hence absorbing industry specific shocks. The estimated coefficients are then applied to the market return on each day of the event period to compute the expected returns for each firm and day. One caveat of the market model event study method is that treated firms may be constituents of the index used for calculating expected returns, which tends to attenuate the estimates of abnormal returns. The treated firms in our sample represent up to 3.86% of the S&P Global 1200 index and up to 32.01% of the

[11] In particular, we require the price information to be available for at least 80% of the trading days in the event and pre-event period to estimate the expected returns. We keep only banks with a non-zero return in more than 30% of the estimation and event period to capture those firms that are actively traded and thus do not have constant zero returns over time. The sample is very insensitive to any variation of these thresholds.

[12] Due to this restriction, we have to drop one bank located in Cyprus and 21 banks located in Italy.

MSCI World Banks index.[13] As an alternative, we construct a control group of banks not directly affected by the CbCR requirement, i.e. entities of bank groups whose global ultimate owner is located in a non-EU country.[14] The daily expected returns – which under this alternative are identical across the treatment firms – equal the average realized returns of the control group firms on the respective days. Figure 2.2 illustrates the average abnormal returns for a period of three weeks prior to our event window, using the different control indices and the control group. The small variation around zero indicates comparable pre-trends for all our specifications.

Figure 2.2: Average abnormal returns three weeks prior to and within the event window



Notes: The colored lines indicate the average abnormal returns (in decimal) for all three specifications ($\frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$), where *N* is the number of banks in the treatment group. The dashed lines frame the dates around the event date (25-28 February 2013). The red marks represent the consecutive days within this window. The light gray horizontal lines frame the maximal and minimal average abnormal returns for the period three weeks prior to the event window. The small variation around zero indicates comparable pre-trends for all three specifications.

For each abnormal return specification and firm, we then compute the cumulative abnormal return CAR_i over the three-day event window.

$$CAR_i = \sum_{t=1}^{T} AR_{i,t} \qquad (3)$$

[13] Alternatively, we also computed expected returns based on the Stoxx Europe 600 Ex Financials index, which excludes financial firms. The untabulated estimates are very similar to the case when using the S&P Global 1200 index as the benchmark.

[14] Strictly speaking, the control group banks may also fall under the scope of Article 89 of the CRD IV if they have subsidiaries or branches in EU countries. Still, in this case, the report covers only the EU entities and their subsidiaries and branches, thus revealing only part of the group structure. This allows groups to structure their operations in such a way that tax haven operations are not evident from the CbCRs of their EU entities. We therefore assume no (or at least a considerably smaller) investor reaction for our control group banks. Besides, we address the issue of the (perceived) scope of the CbCR regulation in the robustness tests in Section 2.5.2.

Finally, we calculate the cumulative average abnormal return $CAAR$ by taking the average of the cumulative abnormal returns across all firms.

$$CAAR = \frac{1}{N}\sum_{i=1}^{N} CAR_i \quad (4)$$

In order to test the statistical significance of the $CAARs$, we employ a t-test which is constructed as the ratio of the event $CAAR$ and the standard deviation of the pre-event $CAARs$. The latter are defined as the $CAARs$ for each three-day window in the pre-event period (similar to Johannesen & Larsen, 2016). In the absence of abnormal returns, the test statistic is typically assumed to follow a unit normal distribution (Kothari & Warner, 2007).

2.4 Results

2.4.1 Baseline results

Table 2.3 presents the results of our baseline model. Around the key event date, 27 February 2013, all specifications yield negative cumulative average abnormal returns for the treatment group of banks headquartered in the EU. However, the returns are small in size (between 0.0% and 0.6%) and insignificant throughout all three specifications.[15] This outcome does not provide any statistical evidence of an investor reaction to the proposed disclosure obligation that is different from zero. Instead, the confidence intervals of our three main specifications indicate that the stock market did neither show a negative reaction larger than 2.1% nor a positive reaction larger than 1.4%.

Table 2.3: Cumulative average abnormal returns – three-day window centered on event date

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
26-28 Feb. 2013	-0.006 (-0.777) [-0.021, 0.009]	-0.000 (-0.005) [-0.012, 0.012]	-0.003 (-0.354) [-0.021, 0.014]

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The 155 treated banks are entities of bank groups whose global ultimate owner is located in the EU.
t-test statistic in parenthesis and 95% confidence interval in square brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

[15] The results based on the Stoxx Europe 600 Ex Financials index yield a negative cumulative average abnormal return of 0.5% with a t-statistic of -0.613. The results are in general similar to the ones when using the S&P Global 1200 index throughout all further specifications.

As described above, the trilogue on 27 February 2013 marks the date of the first political agreement requiring EU financial institutions to publish CbC reports. Since the previous drafts of the CRD IV and CRR did not contain such a rule, it is reasonable to assume that the decision of the co-legislators during the trilogue contains a surprise component for investors. However, the lack of a significant reaction could possibly be due to information being disseminated to the market shortly before the event window. On 25 February 2013, three members of the European Parliament (so-called "shadow rapporteurs") collectively signed an open letter to all ECOFIN ministers calling for support for their initiative to implement a CbCR obligation in the CRD IV (European Parliament, 2013). It is possible that this incident already raised investors' expectations of the new disclosure rule and that, consequently, stock prices reacted immediately. To address this concern, the daily abnormal returns from 25 to 28 February 2013 are depicted in Table 2.4 and graphically illustrated in Figure 2.2. We do not find any evidence of a stock price reaction on the day of the open letter, 25 February 2013. What we do observe is a relative stock price decline on 26 February 2013 ranging from 0.4% to 1.1%, which is significant (marginally significant) in the specification based on the S&P Global 1200 index (based on the control group). However, since 26 February 2013 is already included in our event window, the decline is neither strong enough nor persistent enough to appear as significant in a three-day window. Thus, the publication of the open letter does not invalidate our choice of the event window.

Table 2.4: Daily average abnormal returns – around event date

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
25 Feb. 2013	0.005	-0.000	0.001
	(0.961)	(-0.083)	(0.195)
26 Feb. 2013	-0.011**	-0.004	-0.010*
	(-2.226)	(-1.127)	(-1.788)
27 Feb. 2013	-0.000	0.003	0.004
	(-0.059)	(0.695)	(0.651)
28 Feb. 2013	0.005	0.002	0.003
	(1.035)	(0.425)	(0.556)

Notes: The table displays daily average abnormal returns. The 155 treated banks are entities of bank groups whose global ultimate owner is located in the EU.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

In addition, we also take account of the concern that the inconclusive result of the Italian general election on 26 February 2013 might influence our results as such an outcome was perceived to be a "turn for the worse" (Rodrigues, 2013). Italian banks are already excluded due to our sample selection criteria (see Section 2.3). However, it is still possible that the stock prices of other European banks were also negatively affected due to relatively more exposure to the Italian market, which would introduce a downward bias. To address this issue, we rerun our analysis separately with two modified samples. First, we relax our sample restrictions and do not drop observations due to the occurrence of elections or ECB announcements. This relaxation is largely equivalent to extending the sample by banks located in Italy, which should be affected the most by the election outcome. Second, we use a more restrictive sample and exclude banks located in countries in which the financial sector is reported to have a substantial exposure to Italian sovereign debt.[16]

The daily stock returns and the returns for the three-day event window for both modified samples are depicted in Table 2.5. When we include Italian banks, the negative return on 26 February 2013 becomes larger in size and stronger in terms of significance, indicating that stock prices of Italian banks were indeed negatively affected by the election. However, the reaction is still insignificant in the conventional three-day event window. Conversely, excluding also non-Italian banks with a high exposure to the Italian market leads to results which are very similar to the ones obtained in our main sample. These findings mitigate the concern regarding the impact of the Italian election. In any case, a potentially remaining negative bias despite the exclusion of Italian banks from the benchmark sample would change the interpretation of our estimates to a lower bound for the actual effect, i.e. firm values reacted more positively to the disclosure requirement than implied by our estimates.[17]

In summary, contrary to the expectations derived from the findings by Johannesen and Larsen (2016), Chen (2017) and Hoopes et al. (2018), our results suggest a zero capital market response to the proposed increase in tax transparency for EU financial institutions. More precisely, we can reject that the negative effect of the public CbCR introduction on the stock prices of affected banks was larger than 2.1%.

[16] In response to the financial crisis 2008, the European Banking Authority has analyzed the exposure of banks to sovereign debt. We use this data, provided by The Guardian Data Blog (2013), to examine the country-specific average exposure of banks to Italian sovereign debt and exclude all jurisdictions in which the exposure to Italy exceeds 10% of the gross exposure to government debt. The results are robust to lowering this threshold.

[17] Alternatively, if the effects of the two events are concentrated on the day at which they take place, then they are separable by analyzing the daily average abnormal returns in Table 2.4 and Panels A and B of Table 2.5.

Table 2.5: Average abnormal returns – alternative sample specifications

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Panel A: Daily average abnormal returns relaxing the sample restrictions – around event date			
25 Feb. 2013	0.006	0.000	0.001
	(1.047)	(0.035)	(0.213)
26 Feb. 2013	-0.015***	-0.008**	-0.015**
	(-2.858)	(-1.972)	(-2.361)
27 Feb. 2013	-0.001	0.002	0.004
	(-0.135)	(0.605)	(0.615)
28 Feb. 2013	0.003	-0.001	0.001
	(0.599)	(-0.143)	(0.233)
Panel B: Daily average abnormal returns with additional sample restrictions – around event date			
25 Feb. 2013	0.004	-0.001	0.001
	(0.865)	(-0.155)	(0.142)
26 Feb. 2013	-0.010**	-0.004	-0.009
	(-2.039)	(-0.934)	(-1.634)
27 Feb. 2013	0.000	0.003	0.004
	(0.027)	(0.761)	(0.700)
28 Feb. 2013	0.006	0.002	0.004
	(1.164)	(0.606)	(0.677)
Panel C: Cumulative average abnormal returns relaxing the sample restrictions – three-day window centered on event date			
26-28 Feb. 2013	-0.013	-0.006	-0.010
	(-1.448)	(-0.903)	(-0.907)
Panel D: Cumulative average abnormal returns with additional sample restrictions – three-day window centered on event date			
26-28 Feb. 2013	-0.004	0.002	-0.001
	(-0.529)	(0.260)	(-0.157)

Notes: Panel A displays the daily average abnormal returns around the event date after relaxing the sample restrictions as described in Section 2.3. The resulting sample without these adjustments still includes Italian and Cypriot banks in the treatment group (*N*=177). Panel B displays the daily average abnormal returns around the event date with additional sample restrictions: Countries with banks that have on average above 10% exposure to Italian sovereign debt (in relation to banks' gross exposure to government debt) are excluded from the treatment group (*N*=139). The exposure of banks to Italian sovereign debt is based on data by the European Banking Authority that depicts the share of exposure to government debt (the data is provided by The Guardian Data Blog, 2013). For completeness and comparability to our main specification, we additionally provide estimates for a three-day window centered on the event date for both alternative samples. Panel C displays the cumulative average abnormal returns for a three-day window centered on the event date after relaxing the sample restrictions (*N*=177). Panel D displays the cumulative average abnormal returns for a three-day window centered on the event date for treated banks with a low exposure to Italian sovereign debt (*N*=139).
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

2.4.2 Cross-sectional analysis of different channels at work

As theory provides arguments for both positive and negative investor reactions to additional tax disclosure requirements, the absence of an economically meaningful effect on average in the whole sample might be due to the concurrence of both reactions for different kinds of banks canceling each other out. For example, investors may predict a stronger decrease in after-tax earnings due to reduced profit shifting opportunities and additional costs for certain banks, while for other banks, they may place more weight on the expected benefits from reduced information asymmetry. In this vein, Chen (2017) and Hoopes et al. (2018) provide some evidence on heterogeneity in the capital market response in the Australian setting.

To examine potential cross-sectional variation in the sample of EU financial institutions, we conduct four sample splits. First, consistent with Hoopes et al. (2018),[18] banks that are perceived to engage strongly in tax planning would need to reduce their tax planning activities to a higher extent or should suffer more reputational costs due to enhanced transparency than banks that are assumed to pay their "fair share of taxes". We calculate the effective tax rate (ETR) for each bank based on the consolidated financial statements and use the median ETR to partition our sample into banks with a high vs. a low level of (assumed) tax avoidance. Table 2.6 shows the cumulative average abnormal returns for the three-day window, separately for high and low ETR banks. Surprisingly, the abnormal returns are even slightly positive for the subsample of low ETR banks and negative for the subsample of high ETR banks, albeit none of the coefficients are significant.

However, it has to be noted that annual ETRs can be quite volatile and that a low ETR can result from several reasons other than tax planning. For instance, a low ETR might also follow from the existence of high tax loss carry-forwards that are offset against future profits. In this case, the ETR does not adequately reflect the level of tax avoidance. In order to proxy for the extent of tax avoidance via cross-border profit shifting more explicitly, we conduct a sample split that accounts for banks' presence in tax havens. Banks' activities in tax havens are directly revealed in the CbCRs. Hence, banks with subsidiaries and/or branches in tax havens should be more in the focus of the public and of tax authorities after the introduction of the CbCR requirement than banks without any presence in these locations. Therefore, following Overesch and Wolff (2019), we consider bank groups engaging in at least one of five selected European

[18] For her sample split based on tax avoidance incentives, Chen (2017) exploits particularities of the Australian imputation system under which domestic shareholders receive credits for the corporate tax paid by the firm. This identification approach is not suitable in the European Union setting because the countries in our sample generally do not discriminate between domestic and foreign shareholders due to EU regulation.

tax havens (namely Cyprus, Ireland, Liechtenstein, Luxembourg and Malta) to be particularly exposed to the increase in tax transparency[19] and split our sample of treated banks accordingly. Information on the banks' activities in the selected tax havens is taken from the banks' CbCRs.

Table 2.6: ETR sample split

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with ETR below median ETR in the EU			
26-28 Feb. 2013	0.005	0.010	0.004
	(0.428)	(0.863)	(0.296)
Banks with ETR above median ETR in the EU			
26-28 Feb. 2013	-0.012	-0.005	-0.007
	(-1.175)	(-0.607)	(-0.549)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. We use the 2011 financial statements to calculate the ETR for our event as investors have to rely on the information available on the event date to estimate banks' tax aggressiveness. This approach is consistent with Abernathy et al. (2013). We split all listed banks according to the median ETR and then perform the data cleaning procedure described in Section 2.3. This can lead to slight numerical inequalities between the two ETR groups. The sample adjustment leaves us with 48 (56) treated banks with an ETR below (above) the median ETR. For the specification in column (3), the control group is split accordingly at the median ETR. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.106, 0.131 and 0.230, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table 2.7 shows the cumulative average abnormal returns for the subsample of banks with a presence vs. without a presence in the selected tax havens. The abnormal returns are in general negative and, in concordance with our expectations and the findings of Chen (2017) and Hoopes et al. (2018) in Australia, this negative effect is more pronounced for banks with a higher exposure to the CbCR obligation. However, the coefficients still lack statistical significance in conventional terms.

[19] Following Overesch and Wolff (2019), the five selected tax havens are characterized by a low population size and a comparably low gross domestic product (GDP). In Table A.6 in the Appendix, we have included an alternative sample split according to the engagement in tax havens based on the broader tax haven classification of Hines (2010).

Table 2.7: Engagement in selected tax havens sample split

Expected return	(1)	(2)
	S&P Global 1200	MSCI World Banks
Banks not engaging in selected tax havens		
26-28 Feb. 2013	-0.003 (-0.412)	0.003 (0.374)
Banks engaging in selected tax havens		
26-28 Feb. 2013	-0.009 (-1.016)	-0.002 (-0.329)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. Following Overesch and Wolff (2019), banks that have an entity located in either Cyprus, Ireland, Liechtenstein, Luxembourg or Malta are considered to engage in tax havens. We gather the relevant information from hand-collected CbCRs. If we cannot obtain information from the public CbCR, we check annual reports. We employ CbCR and annual report data for the financial year 2014 since this is the first year for which the full CbCR information has to be published. Despite a small time lag between financial year 2014 and our event date, we are confident that the tax haven activity at the time of the CbCR introduction is well reflected in the first wave of published CbCRs since it presumably takes time to react to the increase in tax transparency by withdrawing from tax havens. We reduce the sample to the treated banks for which we could find the relevant information. 66 (78) banks are part of a group without (with) an engagement in the selected tax havens. This test excludes the specification where the expected return is based on a control group of banks because comprehensive CbCRs are generally not available for banks with a global ultimate owner located outside the EU. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.229 and 0.253, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Next, we aim to split our sample according to banks' sensitivity to reputational concerns. Graham et al. (2014) and Austin and Wilson (2017) have recently documented the influence of reputational costs on companies' tax planning activities. With regard to financial institutions, a study of IBM (2009) has revealed that bank employees expect their clients to attach a very high value to reputation and integrity. Accordingly, Fiordelisi et al. (2014) describe reputation as a "key asset" for banks. An event study by Hanlon and Slemrod (2009) and survey evidence by Graham et al. (2014) have revealed that firms with more consumer orientation (proxied by firms in the retail industry) are more sensitive to reputational concerns. Consequently, we hypothesize that banks with a higher fraction of their total earnings depending on transactions with private customers should suffer more from a potential consumer backlash than banks that are largely focused on business customers. Thus, we try to distinguish between wholesale (i.e. B2B) and retail banks (i.e. B2C).

We use the "specialization" variable of Orbis Bank Focus as the basis for our sample split since it is sufficiently covered and specified consistently across different institutions. After inspecting several examples of banks allocated to the different categories of this variable, we uniquely

assign each category to either B2C or B2B (see the notes to Table 2.8). This information is stored in a dummy variable taking the value of 1 if classified as B2C and 0 if classified as B2B. As the specialization variable and, consequently, the dummy variable are available at the entity level, we match all entities that belong to the same group according to their global ultimate owner. For each bank group, we then calculate the fraction of B2C orientation as the simple average of the dummy variable of all entities in the same group. This B2C fraction is attributed to each publicly listed entity that belongs to this group. Finally, we partition our sample according to the mean value of the B2C fraction.

Table 2.8: B2B/B2C sample split

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-average B2C orientation			
26-28 Feb. 2013	-0.003	0.001	0.001
	(-0.359)	(0.159)	(0.092)
Banks with an above-average B2C orientation			
26-28 Feb. 2013	-0.009	-0.003	-0.008
	(-0.933)	(-0.305)	(-0.625)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. Banks are classified according to the specialization code in Bank Focus: Commercial banks, Investment & Trust corporations, Investment banks, Private banking/ Asset management companies and Securities firms are assumed to be mainly B2B-oriented. Cooperative banks, Finance companies, Real Estate & Mortgage banks, Savings banks and Specialized governmental credit institutions are regarded to be mainly B2C-oriented. Central banks, Clearing & Custody institutions, Group finance companies, Islamic banks, Micro-financing institutions, Multi-lateral government banks and Other non-banking credit institutions are not considered. Consequently, 178 of 940 entities in the complete sample of banks listed on a stock market are categorized as B2C-oriented. At the group level, bank groups are classified to have a high or low B2C orientation depending on the fraction of affiliates with B2C orientation. We split all bank groups at the mean of the B2C fraction (about 20%). Hence, the treatment and control group are split in accordance. In the complete sample, about 30% of the bank groups are classified to have an above-average B2C orientation. Roughly in line with the ratio in the raw data, we have categorized 78 (43) treated banks as part of a group with a low (high) B2C orientation. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.295, 0.358 and 0.249, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table 2.8 documents the results of our sample split. While the stock price reaction in the three-day event window is more negative for the group of banks classified as having a higher B2C orientation, it is still small in size and insignificant. Thus, we find only weak evidence of a more negative investor reaction to the proposed increase in tax transparency for banks that are assumed to face higher reputational risks. However, we note several caveats to our approach. First, the Bank Focus financials database only contains information (including the

specialization variable) for those subsidiaries of bank groups which have a bank license (see Merz & Overesch, 2016). As this covers only a small fraction of subsidiaries, the actual B2C orientation of a bank group might differ from what we calculate based on the information available. Second, the different categories of the specialization variable do not always allow a clear distinction between B2C and B2B. Thus, several entities might be allocated imprecisely which can add noise to our results.

Finally, we split the sample according to the level of institutional ownership to analyze the channel of a reduction in information asymmetry separately. As Desai and Dharmapala (2006), Desai et al. (2007) and Bennedsen and Zeume (2018) have shown, tax avoidance strategies are regularly used by managers and controlling owners to extract private benefits. CbCRs can reduce information asymmetries between managers and shareholders by making the magnitude of tax avoidance more transparent. It might therefore become more difficult for managers and controlling shareholders to hide expropriation activities from minority shareholders. Hence, the negative capital market reaction to an anticipated reduction in tax avoidance might come along with a positive reaction to the expectation of reduced information asymmetries and limited rent extraction. As stock owners holding a larger percentage of the shares of a company (such as institutional investors) usually have access to private information already, the benefits resulting from increased transparency should be more pronounced for firms with a high fraction of dispersed ownership (see also Bennedsen & Zeume, 2018). To examine this effect, we conduct our event study separately for banks with a low and a high share of institutional ownership.

Table 2.9 displays the results of our additional cross-sectional analysis. In line with our expectations, the overall reaction is less negative/ more positive for the subsample of banks with a below-median share of institutional investors, i.e. for banks whose investors potentially benefit more from the additional disclosure. This finding might indicate that public CbCR can serve to reduce information asymmetries between managers and non-institutional investors. However, the overall results are still relatively small in size and we cannot conclude that the effect is significantly different from zero in conventional terms.

Table 2.9: Ownership concentration sample split

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-median share of institutional investors			
26-28 Feb. 2013	-0.003 (-0.324)	0.003 (0.469)	-0.001 (-0.075)
Banks with an above-median share of institutional investors			
26-28 Feb. 2013	-0.009 (-1.251)	-0.003 (-0.532)	-0.006 (-0.679)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. Banks are classified according to the proportion of institutional investors based on the shareholder data obtained from Bureau van Dijk's Orbis database, similar to Chen (2017). We use ownership data from the financial year 2013, which is our best proxy for the group structure at the event date. Based on this information on the investors, we calculate the share of institutional investors and split the sample at the median, which is at about 48%. We classify 71 (80) treated banks to have a below- (above-) median share of institutional investors. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.190, 0.162 and 0.268, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

In conclusion, all four approaches to examine potential cross-sectional variation in the investor reaction provide some evidence on how different channels drive the response of the capital market. We conclude that the simultaneous impact of a reduction in tax avoidance possibilities and of a decline in information asymmetry, which might affect heterogeneous groups of banks differently, may explain why our main finding suggests a zero reaction. Due to a relatively small sample size in our study, we might lack the power to obtain statistically significant results in sample splits. We thus leave it to future research to examine these channels in more detail.

2.4.3 Discussion of results in view of prior evidence

The different channels described and analyzed in detail should also prevail with respect to the new disclosure rule in Australia and the CbCR requirement for EU companies in the extractive industries. Thus, it is surprising that recent findings document significant investor reactions in these settings, whereas we do not observe a significant capital market response in our setting. Besides, the extant literature on Article 89 of the CRD IV provides some evidence that EU financial institutions actually changed their tax avoidance behavior after the introduction of the CbCR obligation. We therefore try to relate our finding to these prior results.

Both Overesch and Wolff (2019) and Joshi et al. (2018) find that EU financial institutions reacted to the new CbCR requirement to some extent by adapting their tax planning behavior.

On the one hand, Overesch and Wolff (2019) document a decline in the extent of tax avoidance at bank group level. On the other hand, Joshi et al. (2018) observe that banks substitute profit shifting activities between subsidiaries that they consider to be within and outside the scope of the CRD IV, leaving the overall level of tax avoidance unaffected. In light of their findings and of our cross-sectional tests, our overall result should presumably not be interpreted as evidence for investors expecting the CbCR obligation to be ineffective in curbing tax avoidance. Instead, as shown above, the increased transparency due to the CbCR disclosure may simultaneously limit the tax planning behavior of banks and reduce the possibilities of bank managers to extract private benefits. While Overesch and Wolff (2019) and Joshi et al. (2018) focus their analysis on tax avoidance and profit shifting and can therefore clearly separate the first channel, the capital market might incorporate both channels in its reaction.

Next, we try to understand possible reasons for the differing results between our study and prior analyses on the capital market reaction to increases in tax transparency. In the Australian setting, Hoopes et al. (2018) find a significant stock price decline around a decisive date in the legislative procedure. However, their research design differs fundamentally from ours as they are mainly interested in the incremental effect for companies expected to be disclosed as paying zero tax in Australia (compared to other firms also subject to the disclosure). Owing to this research question, they apply a difference-in-differences design as opposed to the event study methodology laid out by Kothari and Warner (2007). Moreover, they do not account for the distinct incentives created by the dividend imputation system. Due to these reasons, it is not feasible to directly compare the stock price effects documented by both studies. Nevertheless, we implement the design of Hoopes et al. (2018) in our setting as an additional robustness test (Table A.5 in the Appendix).

When considering a portfolio of Australian firms which should – even within the framework of the dividend imputation system – have pronounced incentives to minimize their corporate tax burden, Chen (2017) finds a negative and significant investor reaction aggregated over four event dates. However, the overall effect size of -0.01% observable in this specification is small in economic terms and lies within the range of our confidence intervals, i.e. we cannot exclude a comparably small stock market reaction in our setting. We also apply the design of Chen (2017) in our setting as an additional robustness test (Table A.4 in the Appendix).

In contrast, Johannesen and Larsen (2016) observe sizeable cumulative average abnormal returns of -2.3% to -6.0% around each of their two major event dates. These results clearly fall outside of our confidence intervals throughout all specifications, i.e. we can reject such a

substantial negative stock price reaction for EU financial institutions at the 5% level. To identify the potential drivers of the conflicting findings, it is essential to compare the different settings exploited in our analysis and by Johannesen and Larsen (2016). Both event studies share important common features: The event dates are milestones within an EU legislative procedure which introduced a public CbCR obligation for EU companies in a specific industry. With respect to the geographic coverage, both rules require a full disclosure for all countries worldwide in which the corporate group is active. Moreover, both kinds of reports are published by the companies themselves, allowing for some discretion about the exact timing and design of the disclosure. These similarities ensure a sufficient degree of comparability between both settings.

A very obvious difference arises from the scope of the rules: While Article 89 of the CRD IV applies to EU financial institutions, Chapter 10 of the Accounting Directive targets companies active in the extractive industries or the logging of primary forests. It is possible that the introduction of public CbCR does not have the same effects across both industries. Since banks have traditionally been in a heavily regulated industry and were already subject to comprehensive disclosure obligations before the implementation of CbCR, investors might have expected that the new CbCR rule for the extractive industry reveals more material incremental information than in the financial industry.

However, despite the disclosure regulations existing before the CbCR enactment, financial companies scored among the worst in studies on transparency in corporate reporting conducted by Transparency International (2012, 2014). The results were extremely poor – and considerably worse than for extractive industry firms – in the category of country-by-country disclosures.[20] Moreover, the extant empirical evidence of banks engaging in tax avoidance (Merz & Overesch, 2016; Langenmayr & Reiter, 2017; Joshi et al., 2018) is complemented by anecdotal evidence that the media and the general public are actually interested in information on this behavior: The Avaaz petition to enact a CbCR requirement achieved more than 200,000 signatures within less than two days. Several NGO studies analyzed small samples of published CbCRs and criticized the extensive tax haven usage of certain banks (Murphy, 2015; Aubry et

[20] The reports by Transparency International are based on very large companies and the evidence therefrom may not extrapolate to smaller firms. Kahl and Belkaoui (1981), Lang and Lundholm (1993) and Linsley et al. (2006) provide evidence of a positive relationship between firm size and disclosure adequacy (for banks and non-banks). We hence conclude that smaller banks are no more transparent in their public reporting than larger banks.

al., 2016; Aubry & Dauphin, 2017).[21] Furthermore, there are examples of financial institutions which increased the quality of their tax-related disclosures after being publicly accused of tax avoidance or evasion.[22] Finally, we know from recent literature (Joshi et al., 2018; Overesch & Wolff, 2019) that banks adjusted their tax planning behavior in response to the CbCR requirement. Taken together, these considerations do not suggest that the incremental information content of CbCRs or the public attention to tax planning behavior is per se weaker for banks than for companies in the extractive industries.

Instead, the discrepancy between our results and Johannesen and Larsen (2016) can arise from the different objectives of the respective CbCR rules. The idea of requiring natural resource companies to publish certain information on a by-country basis dates back to the Extractive Industries Transparency Initiative (EITI) launched in 2003. Its primary goal is to fight corruption, which has been identified as a major problem in the extractive industries and as a key driver of the so-called "resource curse". As a consequence, the main focus of these disclosure obligations is on payments between companies and governments (including tax payments).[23] By contrast, the CbCR requirement for EU financial institutions follows the goal of rebuilding trust in these institutions, which received enormous public subsidies in the course of the financial crisis (European Parliament, 2013). By imposing a CbCR obligation on banks, the public should be given the opportunity to assess whether they are paying their "fair share of taxes" in the countries where they operate. In this vein, the items to be reported by banks (as described in Section 2.2.1) contain additional indicators of economic activity in each country.

The distinct objectives and resulting designs of both CbCR rules adopted in the EU provide a plausible explanation for the differences in the empirical findings. The sizeable negative stock price reaction for the extractive industries observed by Johannesen and Larsen (2016) could primarily result from investors' belief that the mandatory disclosure of payments between firms and governments effectively fights corruption and that companies have to increase their (legitimate) compensation to their host countries for extracted resources. This conjecture is also consistent with Rauter (2020) who documents corresponding real effects on payments of EU

[21] Especially the analysis of Aubry and Dauphin (2017) for Oxfam received considerable media attention, causing headlines such as "European Banks Stashing Billions in Tax Havens" (Nielsen, 2017).

[22] E.g., Barclays was publicly denounced for maintaining a special "tax avoidance division" (Lawrence, 2013; Treanor, 2013b). As a reaction, the bank voluntarily published a complete CbCR (called "Country Snapshot") already for financial year 2013. This report (and all following ones) contains several additional tax items and explanations, trying to present Barclays as a responsible taxpayer.

[23] The payment items to be disclosed by natural resource companies are production entitlements; taxes; royalties; dividends; signature, discovery and production bonuses; license fees, rental fees, entry fees and other considerations for licenses and/or concessions; and payments for infrastructure improvements.

firms in the extractive industries after the CbCR introduction. This channel is not present in our setting, though, which can explain why the capital market reaction to the enactment of CbCR is more pronounced in the extractive industries than in the financial sector.

2.5 Further analyses

2.5.1 Additional event dates

Prior studies have demonstrated the importance of considering multiple event dates, especially when investigating a legislative procedure (Donohoe & McGill, 2011; Abernathy et al., 2013; Chen, 2017). For this reason, we extend our analysis by two additional events, although noting some caveats regarding these dates.[24]

Our first additional event is the publication of the CRD IV and the CRR in the Official Journal of the EU on 27 June 2013. This marks the final passage of the legislative package, removing any potential doubts whether the proposed CbCR rule would actually be incorporated into EU law. Table A.2 in the Appendix shows the cumulative average abnormal returns for the three-day window centered on this alternative event date. Again, we do not find a significant stock price reaction for the banks affected by the new disclosure rule. However, as the CRD IV and the CRR contain a multitude of novel regulations for EU financial institutions (i.a. capital, liquidity and leverage requirements), different investor reactions to different kinds of rules might cancel each other out on average. Moreover, the final act of signing and publishing the law was probably not perceived as a surprise by investors as all relevant items had already been agreed upon in the months before.

Second, we exploit the fact that the CbCR obligation in Article 89 of the CRD IV was placed under the proviso that the European Commission conducts an impact assessment regarding potential negative economic consequences of the public disclosure of such information. Global systemically important institutions were required to confidentially report the CbCR items for the financial year 2013 to the Commission, providing a basis for their evaluation. The impact assessment study was prepared in September 2014 by PricewaterhouseCoopers on behalf of the European Commission (PricewaterhouseCoopers, 2014b). On 30 October 2014, the European

[24] Another potential extension of our study would be to exploit the actual disclosure of banks' CbCRs as event date(s). However, they are usually published as part of the banks' annual reports or at least at the same point in time. This makes it difficult to disentangle investor reactions to the CbCR disclosure and to other information published in the annual reports. Hence, we concentrate on different dates in the legislative procedure.

Commission reported to the Council of the EU and to the European Parliament that the public CbCR obligation was not expected to have a negative economic impact and could thus be implemented as foreseen in the Directive (European Commission, 2014). This represents our second additional event. As also depicted in Table A.2 in the Appendix, we do not observe a significant investor reaction in the three-day window centered on 30 October 2014. It seems questionable whether the result of the impact assessment was really perceived as a surprise by investors. Investors might have expected that the CbCR rule would actually come into effect once it was included in the CRD IV, irrespective of the proviso.

2.5.2 Robustness tests

We conduct a series of robustness tests to increase the confidence in our results. First, we modify the event window. We shift the three-day event window to 25-27 February 2013 to capture potential anticipatory effects, but the results remain similar to our main specification. We also extend the event window and use a four-day window starting at the event date as well as a five-day window centered on the event date (Panel A of Table A.3 in the Appendix).

Second, we vary the abnormal return calculation. We replace the cumulative average abnormal returns by buy-and-hold abnormal returns, calculated as the average returns of a buy and hold strategy with geometric growth of returns. As buy-and-hold returns tend to be right-skewed (Kothari & Warner, 2007), we apply the skewness-adjusted t-test developed by Johnson (1978) as our relevant test statistic for this approach (Panel B of Table A.3 in the Appendix).

Third, we rerun our analysis with an alternative sample (Panel C of Table A.3 in the Appendix). Our baseline sample of treated firms described in Section 2.3 contains only entities of bank groups whose global ultimate owner is located in the EU. Only these institutions are obliged to issue a CbCR for the whole group, revealing all tax haven subsidiaries and branches. In contrast, financial institutions headquartered in third countries only have to publish a report for their EU establishments, which makes it impossible to judge their worldwide tax planning activities. Nevertheless, investors might not have completely comprehended this difference in the scope of the new rule and might just have associated a bank's EU nexus with an upcoming CbCR requirement. We take account of this concern and adjust our sample so that the treatment group contains all banks listed in the EU (irrespective of the location of the global ultimate owner). The control group used to calculate abnormal returns is adapted accordingly.

Furthermore, we replace the event study design as laid out by Kothari and Warner (2007) by alternative event study methods. First, we implement a multivariate regression model similar

to Frischmann et al. (2008) and Abernathy et al. (2013). More precisely, we add a dummy variable taking the value one for each day of the event window to the market model. The coefficient estimates on the dummy variable reflect the abnormal returns (Table A.4 in the Appendix). Second, we replicate the event study conducted by Hoopes et al. (2018) for our event date. In line with our prior setting, we use banks with a global ultimate owner located in the EU as the treatment group and banks whose global ultimate owner is located in a non-EU country as the control group. The results are depicted in Table A.5 in the Appendix.

Finally, we conduct a series of robustness tests for our main event specification and the heterogeneity analysis in Appendix A.2 to A.4, where we apply more restrictive samples of treated banks. First, we limit the initial treatment group to entities which both belong to an EU-headquartered bank group and are themselves located in an EU country as these entities should have the strongest exposure to the CbCR introduction (Appendix A.2). Second, to exclude potential noise resulting from banks located in countries with only few observations, we restrict the treatment group further to entities located in EU countries with at least ten listed banks (Appendix A.3). The control groups are adjusted accordingly in both sets of tests. Third, to account for potentially differing profit shifting incentives of listed subsidiaries due to the existence of minority shareholders, we only consider treated banks which are the global ultimate owner of a bank group (Appendix A.4).

Throughout all these robustness tests, the results remain qualitatively similar and our main inferences do not change. We do not find a statistically significant overall stock price reaction around the event day that we can trace back to the CbCR introduction.

2.6 Conclusion

In recent years, several initiatives have proposed and implemented CbCR requirements for multinational firms. These new disclosure obligations are supposed to curb extensive tax avoidance by providing additional information to tax authorities and – if reports are made publicly available – by public pressure being exerted on companies. Due to the recent nature of all CbCR rules, empirical evidence on the effectiveness of this kind of tax transparency measure is still scarce and inconclusive. In our study, we examine how investors evaluate the enactment of a CbCR requirement for EU financial institutions (Article 89 of the CRD IV). On the one hand, investors might appreciate the upcoming enhancement in tax transparency, providing them with incremental information about the firms and reducing information asymmetries

between shareholders and managers. On the other hand, investors could expect that the affected companies will subsequently reduce the extent of their tax avoidance activities (as intended by the legislator) and/or will face substantial reputational costs.

Prior event studies by Chen (2017), Hoopes et al. (2018) and Johannesen and Larsen (2016) document negative capital market responses to the introduction of similar tax disclosure rules for large Australian firms and for EU firms in the extractive industries, respectively. Their findings suggest that the channels of increased tax authority and public scrutiny dominate investors' perception of new tax disclosure requirements. Consequently, we also expect a negative reaction in our setting. This expectation is corroborated by early empirical evidence indicating that banks changed their tax avoidance behavior after the implementation of the CbCR obligation (Joshi et al., 2018; Overesch & Wolff, 2019).

We employ an event study methodology to analyze the stock price reaction around the day of the surprising political decision to introduce a CbCR obligation for EU financial institutions. Our results are suggestive of a zero response in our full sample of financial institutions headquartered in the EU. We conduct several sample splits and find that the reaction is slightly more negative for banks engaging in selected tax havens and for banks with an above-average B2C orientation, and slightly more positive for banks with a below-average share of institutional investors, albeit still insignificant. Our inferences remain unchanged when considering two additional event dates and throughout various robustness checks.

We link our finding to previous studies on tax transparency. Recent evidence suggests that financial institutions reacted to the new CbCR requirement by adjusting their tax planning behavior (Joshi et al., 2018; Overesch & Wolff, 2019). Prior literature has shown that tax avoidance and the extraction of private benefits by managers and controlling owners are complementary (Desai & Dharmapala, 2006; Desai et al., 2007; Bennedsen & Zeume, 2018). Taking together these findings and our result, we conclude that investors anticipated both a reduction in the tax avoidance opportunities and a decline in managers' expropriation activities due to reduced information asymmetries between managers and shareholders. These expectations might trigger both negative and positive capital market reactions, offsetting each other on average.

While the modest negative stock market reactions documented by Chen (2017) and Hoopes et al. (2018) in response to a new disclosure requirement in Australia still lie within our confidence intervals and/or can potentially be traced back to the different research design, we can exclude

the occurrence of a reaction as strong as observed by Johannesen and Larsen (2016) for the EU extractive industries at the 5% level. Comparing the settings analyzed by Johannesen and Larsen (2016) and in our study, we conjecture that differences in the list of disclosure items due to the distinct objectives of both transparency rules explain the different perceptions by the capital market. Investors expected the CbCR of EU extractive industries to effectively fight corruption, while this channel is not at work in our setting.

Overall, we provide more insights into the expectations that go along with the CbCR requirement for EU financial institutions. Our findings are especially relevant for policymakers deciding upon the implementation of additional tax disclosure rules. For instance, the European Commission, the European Parliament and the Presidency of the Council of the EU have recently drafted proposals to adopt a public CbCR requirement for all multinational firms with profits above a certain threshold (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021). So far, no final decision has been made.

3

Can European Banks' Country-by-Country Reports Reveal Profit Shifting? An Analysis of the Information Content of EU Banks' Disclosures

This chapter constitutes an updated version of the following ZEW Discussion Paper:

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3.1 Introduction

Following the strong public focus on the tax planning strategies of large multinational enterprises, several EU and OECD initiatives have developed measures aimed at curbing extensive profit shifting activities by increasing tax transparency. The so-called country-by-country reporting (CbCR) requires multinational firms to disclose certain tax-related data for every country where they operate. The reports are supposed to help tax authorities in effectively detecting presumably aggressive tax planning. More importantly, proponents argue that if the reports are made publicly available, public pressure would induce firms to pay their "fair share of taxes" (Evers et al., 2017). The Capital Requirements Directive IV (CRD IV)[25] introduced a public CbCR requirement for EU financial institutions for financial years 2014 onwards. The reporting obligation offers a unique research setting due to the public availability of the data and the completeness of the reports with respect to financial information on tax havens.[26] Consequently, the newly published data allows tax authorities, the general public and researchers to gain new insights into banks' worldwide operations, which were partly not documented in other sources of publicly available information used so far.

We create a novel database by collecting data from the CbCRs of multinational bank groups headquartered in the EU for financial years 2014-2016. Based on this data, we aim to answer the following two research questions: (1) How much information on banks' global activities, notably in tax havens, do public CbCRs reveal which remain opaque in conventional datasets (e.g. Orbis and Bank Focus)? In other words, how large is the blind spot in terms of missing financial information when relying on conventional data sources? (2) What inferences can we

[25] Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, *Official Journal of the European Union*, *56*(L 176), 338–436 (27 June 2013).

[26] The other existing initiatives and proposals on CbCR are not suitable to answer our research questions. Section 1504 of the Dodd-Frank Wall Street Reform and Consumer Protection Act 2010 and Chapter 10 of the EU Accounting Directive (Directive 2013/34/EU) introduced a public disclosure requirement for firms in the extractive industries. However, these regulations follow a different motive – preventing corruption in the extractive industries rather than limiting profit shifting – and lack hence important variables. Besides, the reporting obligation according to Section 1504 of the Dodd-Frank Act has not come into effect yet due to ongoing disagreement regarding the final rules to be issued by the Securities and Exchange Commission (SEC) (SEC, 2019). The OECD established a CbCR for all multinational firms with consolidated revenues of at least EUR 750 million in the preceding year (OECD, 2015), whereby the data shall only be submitted confidentially to the tax authorities. The European Commission has developed a draft directive which resembles the OECD proposal but provides for a public disclosure of the reports (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021). However, this proposal is still under discussion, without CbCR data being publicly available yet. The CbCR standard of the Global Reporting Initiative (GRI) with which firms can voluntarily comply only applies as of 1 January 2021 (Global Sustainability Standards Board (GSSB), 2019).

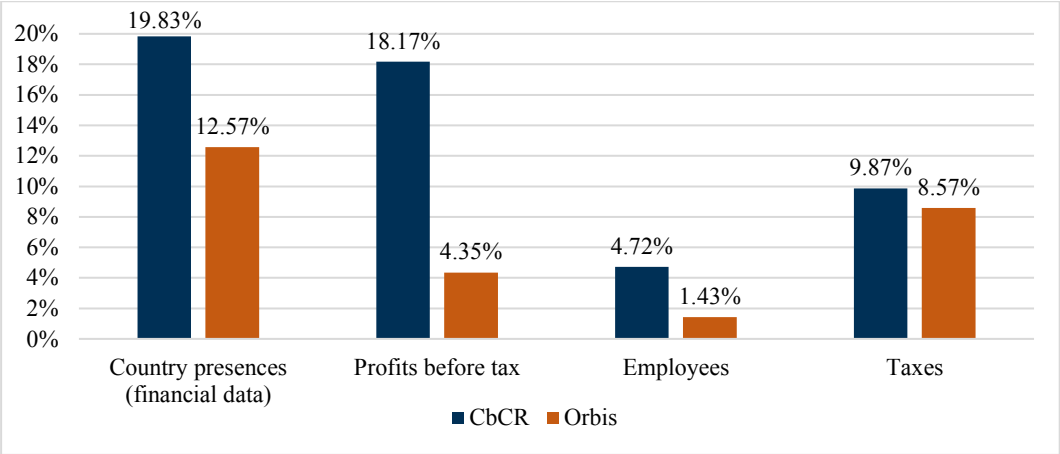
draw from the CbCR data on the tax haven usage and the profit shifting activities of EU-headquartered banks, which were partly obscure before? To answer these questions, we compare the coverage of banks' worldwide country presences as well as the distribution of their pre-tax profits and real activities in terms of employees in our CbCR dataset and a commercial database, with a special focus on tax havens. We also try to estimate the amount of excess profits booked in tax havens and to gauge the scope for sample selection bias in prior regression estimates of profit shifting, which are based on datasets with incomplete financial information. To the best of our knowledge, we are the first to quantify the missing data problem inherent in conventional datasets and its consequences for profit shifting estimates.

To assess the transparency gain by CbCR, we examine the coverage of banks' country presences and real activities in terms of employees in our CbCR dataset and in Bureau van Dijk's Orbis database, which we consider to be the maximum of information available prior to the CbCR introduction. We show that CbCRs uncover a substantial part of banks' worldwide activities that rests opaque when relying on conventional datasets. The coverage of key financial information in Orbis is especially poor for subsidiaries in tax havens (see Figure 3.1) and in the largest non-EU economies (i.e. the U.S., Japan and China). More specifically, Orbis contains financial data for only 42.1% of all country presences included in the CbCR dataset and for only 26.7% of presences in tax havens. Only 55.1% of the worldwide workforce of the bank groups in our sample is visible at subsidiary level in Orbis.

We shed light on the profit shifting behavior of EU-headquartered bank groups by investigating the worldwide distribution of reported profits before tax and real activity in terms of employees, using both CbCR data and Orbis data. CbCRs reveal a striking disconnect between profits and employees: While tax havens account on average for about 18% of EU banks' worldwide pre-tax profits, they only employ 5% of their global workforce (see Figure 3.1). The misalignment between tax haven profits and employees is especially strong for banks headquartered in Germany, the United Kingdom and Italy. In line with the observed disconnect, tax havens exhibit a median profit per employee that is 2.5 times as high as in other countries. However, there is considerable heterogeneity within the group of tax havens, suggesting that only some of them are preferably used for profit shifting. Relying solely on financial information available in Orbis leads to a severe mis-estimation of the worldwide allocation of profits and employees. For instance, the tax haven share of global profits in Orbis is substantially underestimated and amounts to only a quarter of the share of profits booked in tax havens when considering CbCR

data. Overall, we show that CbCRs reveal banks' most profitable presences, especially those located in tax havens.

Figure 3.1: Share of tax havens in banks' global country presences, profits before tax, employees and taxes



Notes: The graph shows the share of tax havens in banks' global country presences, profits before tax, number of employees and taxes. Tax havens are defined according to Hines (2010). Tax haven shares are based on aggregated values across tax havens and all countries. Country presences are defined based on the availability of financial information. More precisely, we record a country presence in the CbCR dataset if a bank group states in its CbCR both profit before tax and the number of employees in a certain country. We record a country presence in the Orbis dataset if information on both profit before tax and the number of employees is available from the single financial statements in Orbis of at least one subsidiary of a bank group in a certain country. We consider the pooled country presences across the years 2014-2016.

We try to put forward an estimate of the size of profit shifting that overcomes the identified blind spot in commercial data sources. To this end, we quantify the amount of excess and missing profits by comparing actually reported profits to the amounts of profit we would expect if a bank group's global profit was allocated to the country presences according to the worldwide distribution of employees. Based on CbCR data, we estimate that the EU-headquartered bank groups in our sample shift about EUR 11.4 billion of profits to tax havens annually, which corresponds to 9.7% of their total global profit and 13.9% of their foreign profit. The results based on Orbis are considerably smaller, suggesting that the magnitude of profit shifting is severely underestimated when relying on conventional micro-level datasets.

Regression analysis controlling for additional important determinants of reported profits would allow to draw more refined conclusions on the extent of profit shifting. Prior literature quantifies the magnitude of profit shifting in terms of tax semi-elasticities typically by modelling reported pre-tax profits as the sum of "true" profit (explained by economic input factors) and shifted profit (induced by tax incentives) (see e.g. Hines & Rice, 1994; Huizinga & Laeven, 2008). Due to the lack of financial information on many subsidiaries, particularly in low-tax countries, the size of the tax sensitivity obtained by analyses of conventional datasets

such as Bank Focus is likely to be biased downwards. The comprehensive geographical coverage of CbCRs can surmount this missing data problem. However, important control variables like the stock of capital (i.e. total assets) and staff cost are not included in the CbCRs. The limited set of reportable variables implies that a regression analysis of profit shifting based on CbCR data cannot recover undistorted coefficient estimates either. Still, by comparing estimates based on the full sample of CbCRs (i.e. exhibiting complete geographical coverage) and on a more restricted sample used in prior studies (i.e. lacking financial data on several subsidiaries, notably in tax havens), we can try to gauge the scope for sample selection bias in prior regression estimates of profit shifting. The comparison of the tax sensitivity of reported profits based on our CbCR dataset and on single financial statement data from Bank Focus for the same bank group-years suggests that the bias in prior regression estimates due to the incomplete coverage of banks' worldwide activities amounts to approximately three percentage points.

We contribute to the literature on firms' profit shifting, which still disagrees on the exact magnitude of the phenomenon. Studies using micro-level financial data of multinational firms (e.g. Huizinga & Laeven, 2008; Dharmapala & Riedel, 2013; Merz & Overesch, 2016) find rather small tax semi-elasticities of reported profits due to the incomplete coverage of the underlying databases. In particular, financial information of tax haven subsidiaries is regularly missing. Studies based on macro-level datasets (e.g. Clausing, 2016, 2020b; Tørsløv et al., 2020) try to overcome this shortcoming and document comparatively large effect sizes. Recently however, criticism has been raised that blames macro-level data for including a double counting and/or misallocation of foreign profits, inflating profit shifting estimates (Blouin & Robinson, 2020). In view of the still unresolved question of the actual size of profit shifting and the drawbacks of different datasets used in prior literature, we analyze a new source of data, i.e. CbCRs published by EU financial institutions. These reports have the potential to overcome the missing data problem inherent in micro-level databases without encountering a double counting of major income components. Essentially, CbCRs reveal profits and employees in all countries where the bank group maintains subsidiaries or branches. By comparing CbCR data and financial information from conventional datasets, we are able to assess the transparency gain by CbCR and to quantify the blind spot that blurred previous estimates of profit shifting.

We also contribute to the recent literature on the efficiency of CbCR (e.g. De Simone & Olbert, 2020; Eberhartinger et al., 2020; Hugger, 2020; Joshi, 2020; Joshi et al., 2020; Overesch & Wolff, 2020) and other tax transparency measures (e.g. Hope et al., 2013; Dyreng et al.,

2016; Dyreng et al., 2020). First evidence suggests that EU-headquartered bank groups changed their tax planning behavior in response to the introduction of the public CbCR requirement (Joshi et al., 2020; Overesch & Wolff, 2020). An analysis of the data reported in the CbCRs further allows to evaluate whether these reactions are only motivated by the expectation of increased scrutiny or whether the reports actually provide valuable insights into banks' profit shifting. A few studies analyze EU banks' CbCR data in isolation (Bouvatier et al., 2018; Brown et al., 2019; Fatica & Gregori, 2020; Janský, 2020). We make an important contribution by investigating a larger sample of CbCRs and by comparing the data to other sources of information, thus being able to assess the incremental informativeness of CbCR.

The remainder of this paper is structured as follows: Section 3.2 provides information on the institutional background and prior literature related to our research question. Section 3.3 describes the data collection process. In Section 3.4, we examine the coverage of EU banks' worldwide activities as well as the distribution of their pre-tax profits and employees in our CbCR dataset and a conventional database, focusing especially on the usage of tax havens. We also try to quantify the amount of shifted profits. Section 3.5 estimates the scope for sample selection bias in prior regression estimates of profit shifting. Finally, Section 3.6 concludes.

3.2 Background and prior literature

3.2.1 The CbCR requirement for EU financial institutions

The CbCR requirement for EU financial institutions aims at rebuilding trust in the financial sector in the aftermath of the financial crisis by making the location of banks' activities, profits, employees and taxes more transparent. As several banks had received large public subsidies, the public should be enabled to assess whether they are paying their "fair share of taxes" in the countries where they operate. The disclosure obligation is regulated in Article 89 of the CRD IV and transposed into the national laws of the EU Member States. The CRD IV, which was published in the Official Journal of the EU on 27 June 2013 and accompanied by the Capital Requirements Regulation (CRR),[27] implements the Basel III standards, in particular stricter requirements on capital, liquidity and leverage and new provisions on corporate governance and remuneration, into EU law.

[27] Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, *Official Journal of the European Union*, *56*(L 176), 1–337 (27 June 2013).

Article 89 of the CRD IV obliges EU credit institutions and investment firms to publicly disclose turnover, the number of employees, profit or loss before tax, tax on profit or loss and public subsidies received separately for every country in which they maintain subsidiaries and/or branches (referred to as "section of key financials" in the following). In addition, the affected firms have to list the name, geographical location and nature of activities of their subsidiaries and branches (referred to as "list of subsidiaries and branches" in the following). The disclosures are required on a "consolidated basis", which could either refer to the consolidation scope of the applicable accounting standards or to the – narrower – prudential scope of consolidation as defined by the CRR. While the wording of Article 89 of the CRD IV remains open, the national transpositions in the three largest headquarter countries France, Germany and the United Kingdom refer to the accounting scope (Art. L511-45 Code monétaire et financier; Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin), 2015; Statutory Instrument 2013 No. 3118). Moreover, the results of our analysis also suggest that CbCRs comprise the same group structure as consolidated financial statements.[28]

The reporting obligation is effective from 1 January 2015 with the first wave of disclosed CbCRs relating to the financial year 2014.[29] While bank groups headquartered in the EU have to include all entities of the whole group in their CbCR, bank groups headquartered in a third country only have to report on their EU entities, including their subsidiaries and branches. The reports must be audited and shall be published together with the financial statements – either as part of the annual report or as separate document. The public availability of the CbCRs for financial years 2014 onwards offers a unique research setting.

[28] See the comparison of the number of employees between CbCRs and consolidated financial statements described in Section 3.4.1. Moreover, about 88% of the CbCRs which explicitly give information on the consolidation scope state that the accounting scope was applied.

[29] From 1 July 2014 to 1 January 2015, the information to be disclosed was transitionally limited to the name, geographical location and nature of activities of the institutions' entities as well as to the amount of turnover and the number of employees. Only global systemically important institutions had to submit the complete information to the European Commission on a confidential basis. The European Commission, in cooperation with PricewaterhouseCoopers, used this data to assess the impact of the public disclosure of such tax-related information, in particular regarding potential negative economic consequences (PricewaterhouseCoopers, 2014b). The final decision on the inclusion of the CbCR requirement in the CRD IV as originally foreseen was made on 30 October 2014 (European Commission, 2014).

3.2.2 Related literature and advantages of CbCR data over previously used data sources

After almost three decades of scientific research on profit shifting, there is still huge disagreement about the magnitude of the phenomenon. Studies using micro-level financial information of multinational firms (from commercial databases such as Orbis or Amadeus) identify the occurrence of profit shifting but typically document rather modest effect sizes, with tax semi-elasticities of reported profits ranging between -0.5 and -1.3 (e.g. Huizinga & Laeven, 2008; Dharmapala & Riedel, 2013). For banks, Merz and Overesch (2016) examine micro-level data from Bankscope and find a semi-elasticity of about -2.4. This higher tax sensitivity compared to non-financial firms presumably reflects that banks can exploit additional shifting channels, such as loan loss provisioning and the allocation of trading gains (Andries et al., 2017; Langenmayr & Reiter, 2017).

A major criticism virtually all micro-level studies face is that the underlying databases are usually characterized by a very limited and selective geographical coverage. In particular, financial information of affiliates in tax havens is largely missing (Dyreng & Hanlon, 2019). In this vein, Tørsløv et al. (2020) provide striking examples of the insufficient coverage of the Orbis database. Dowd et al. (2017) show how neglecting tax haven observations can lead to a severe underestimation of the tax responsiveness of profits. In addition, the entity-based structure of micro-level datasets misallocates the activities and profits of foreign permanent establishments, which are particularly important in the banking industry (Merz & Overesch, 2016; Langenmayr & Reiter, 2017). Finally, the banking sector-specific databases Bankscope and Bank Focus only contain financial data on subsidiaries with a bank license (Merz & Overesch, 2016).

In light of these shortcomings, another strand of research on profit shifting relies on macro-level databases, such as aggregate information on foreign operations of U.S. firms compiled by the Bureau of Economic Analysis (BEA) (Hines & Rice, 1994) or new datasets of international foreign affiliates statistics (Tørsløv et al., 2020). These studies observe comparatively large effect sizes, e.g. shifted profits amounting to 40% of multinational enterprises' (MNE) foreign profits (Tørsløv et al., 2020) or causing a loss of 30-45% of total U.S. corporate tax revenues (Clausing, 2016, 2020b). Translated into elasticities, these results are an order of magnitude stronger than the ones based on micro-level data (Clausing, 2016). Correspondingly, meta regression analyses also reveal that aggregate datasets exhibit larger tax sensitivities (Heckemeyer & Overesch, 2017; Beer et al., 2020).

Very recently, however, macro-level datasets have been heavily criticized of systematically overestimating the extent of profit shifting due to a double counting and/or misallocation of foreign profits. Blouin and Robinson (2020) claim that, in particular, the profit figures in certain BEA data series are inflated and distorted due to the application of the equity method.[30] After correcting for this problem, they find U.S. corporate tax revenue losses due to profit shifting of only about 4-8%. This conflicting new evidence has fueled the discussion about the true size of profit shifting and about the drawbacks of conventional databases used by extant literature.

Against this background, we analyze the potential of CbCR data to provide new and useful information on the actual size of profit shifting (as suggested by Dyreng & Hanlon, 2019). We also aim to explicitly quantify the missing data problem inherent in conventional micro-level databases by a comparison with our dataset of CbCRs. Unlike other studies, we do not try to overcome the missing data problem by relying on aggregate information. Instead, we exploit the publicly available CbCRs of EU financial institutions as a new micro-level data source.

Our dataset features several important advantages. First and foremost, the CbCR legislation ensures a complete geographical coverage of the reports, including all countries where a bank group maintains any subsidiary or permanent establishment. Second, as the CbCRs are not prepared on legal-entity basis, the activities of foreign permanent establishments are allocated to the appropriate location. Third, the audit requirement for the reports warrants a certain reliability of the disclosed information. Finally, CbCR data should not suffer from severe double counting issues which would bias the profit shifting estimates. The equity method, which is the main source of criticism against certain BEA data series, is not applicable for the preparation of CbCRs. Besides, the position of "stateless income", which has been identified as a potential source of double counting within the confidential CbCRs of U.S. MNEs (Clausing, 2020b), does not exist in the public reports of EU financial institutions. We cannot completely exclude a certain double counting of intra-group dividends (see also Blouin & Robinson, 2020) as the definitions of Article 89 of the CRD IV do not specify whether the reportable profit figure is supposed to include this item. While an inclusion would tend to exaggerate profits allocated to locations of holding companies, it is not obvious that this necessarily results in an overestimation of profit shifting since our dataset also reflects all profits reported in a group's

[30] According to the equity method applied in the BEA data, the profit of an indirectly-owned foreign subsidiary of a U.S. MNE is also included as "equity income" in the profit of the direct owner of this subsidiary. As a result, this profit is counted twice: once in the residence country of the indirectly-owned subsidiary and once in the residence country of the direct owner. Blouin and Robinson (2020) also discuss other potential double counting and misallocation problems inherent in several macro- as well as micro-level datasets, including the U.S. tax return data used by Dowd et al. (2017).

headquarter country. More importantly, it has to be noted that banks as the preparer of the reports are well aware that their CbCRs will be scrutinized by the media and the public. Consequently, it seems implausible to expect that banks exercise any discretion with regard to dividends in such a way that it artificially inflates the profits reported in tax havens (Clausing, 2020b).

Our analysis of the incremental informativeness of CbCR data also contributes to the contemporary literature evaluating the efficiency of CbCR and other tax transparency tools targeted at reducing tax avoidance. Several recent studies examine the relationship between the level of tax disclosures and firms' tax planning. Results suggest that public disclosure requirements regarding a firm's group structure and geographic distribution influence the scope for international tax avoidance. In this vein, Hope et al. (2013) find that the possibility to abstain from the disclosure of geographic earnings in public segment reporting (introduced by Statement of Financial Accounting Standards No. 131) helps managers to mask tax avoidance, but this effect diminishes after the implementation of additional private disclosures to tax authorities by Schedule M-3.[31] Dyreng et al. (2016) and Dyreng et al. (2020) analyze MNEs' compliance with subsidiary disclosure requirements in the United Kingdom and the U.S. They document that firms strategically omit tax haven subsidiaries, that public pressure induced firms to become compliant and that the effective tax rate (ETR) of initially non-compliant firms subsequently increased.

A few concurrent studies suggest that EU financial institutions adjusted their tax planning behavior to some extent after the introduction of public CbCR. Joshi et al. (2020) observe that affected banks reduce profit shifting by financial affiliates but at the same time keep their ETR constant, which they interpret as a substitution between different forms of tax avoidance. In contrast, Overesch and Wolff (2020) find that the ETR of banks particularly exposed to the new disclosure requirement (due to their tax haven activities) increased after the reform. Eberhartinger et al. (2020) document that affected EU financial institutions reduced their share of tax haven entities, mainly by closing presences in so-called Dot Havens and in tax havens with high financial secrecy.[32]

[31] Bozanic et al. (2017) also provide evidence on the interaction between private and public disclosure requirements. They find that, after the introduction of the private reporting requirement of Schedule UTP, firms subsequently increase the quantity of their public tax-related disclosures in financial statements.

[32] Other contemporary studies of De Simone and Olbert (2020), Hugger (2020) and Joshi (2020) analyze the effects of the introduction of the OECD's confidential CbCR on the affected MNEs.

In summary, first evidence indicates that the introduction of public CbCR had an effect on the tax planning of European banks in the short run. To rule out that this effect is only temporary (i.e. due to the salience of the new regulation), we aim to analyze in how far the reports actually convey useful information on banks' profit shifting behavior. A couple of other studies investigate banks' CbCRs in isolation without comparison to the previously available information set.[33] However, their sample size covers only 20-60% of the bank groups contained in our sample, which may reflect that for some banks the (existence of the) CbC report is not very salient. More importantly, our analysis includes a direct comparison of the data disclosed in the CbCRs with information available from conventional datasets so that we can evaluate the *incremental* informativeness of the new reports.

3.3 Data collection process

3.3.1 CbCR data

As there is no central database or registry for banks' CbCRs, the reports and the data contained therein have to be hand-collected. Banks publish the CbCRs on their websites, either as part of the annual report or (albeit less often) as a separate document. The reports are usually in PDF format, whereby the structure and presentation of the data are not prescribed by the Directive and hence up to the banks' discretion. The resulting reporting heterogeneity across banks and countries makes the process of collecting the reports and extracting the relevant information challenging. We proceed as follows.

First, we create a list of banks for which we expect to find usable CbCRs. We use ownership data from Bank Focus to identify bank groups whose global ultimate owner is located in the EU. Focusing on EU-headquartered banks ensures that the report contains worldwide financial information on the whole group of firms (see Section 3.2.1). Moreover, we are only interested in multinational banks since purely domestic groups have no possibilities for cross-border profit shifting and their reports would only contain one country anyway. We thus keep only bank groups which have at least one foreign subsidiary or branch. We also note that the global ultimate owner information is sometimes missing in the Bank Focus ownership database. Furthermore, Bank Focus sometimes records non-banks (such as individuals, states or federal states) as global ultimate owners of bank groups. In these cases, the CbCRs are obviously not

[33] Bouvatier et al. (2018); Brown et al. (2019); Fatica and Gregori (2020); Janský (2020).

prepared by the global ultimate owner but rather by a holding company of the bank group. In order to avoid dropping banks from our list solely due to these data limitations, we also include bank entities located in EU countries with missing global ultimate owner information or with non-bank global ultimate owners. Consequently, our final search list of 597 banks sometimes contains multiple entities belonging to the same bank group. Therefore, we expect the actual number of annual CbCRs for EU-headquartered bank groups to be considerably lower.

Second, we also develop a list of typical expressions used to refer to CbCRs or within CbCRs. The terms are derived from the inspection of several exemplary hand-collected reports in different languages, namely English, German, French, Spanish, Italian and Portuguese. Table B.1 in the Appendix contains an overview of our different search terms.

We then use the list of banks and the list of search terms as input in a Google search programmed with Python. More precisely, the automatic search combines each name from the bank list with each search term and saves the first ten PDFs found by Google for each combination. Subsequently, the downloaded PDFs are filtered according to the search terms. As most documents are no separate CbCRs but rather comprehensive annual reports, we conduct a textual analysis using regular expressions to identify the section of the document that is most likely to contain the CbCR information. This section is then inspected manually to decide whether the document actually contains a CbCR.

The automatized CbCR collection with Python is complemented by a manual search for the CbCRs of the largest EU banks, defined by total assets, and for banks where CbCRs could not be found for all years. The initial data collection was conducted in 2017. As the disclosure obligation according to Article 89 of the CRD IV started on 1 January 2015, complete CbCRs were available for financial years 2014-2016. To account for delayed publication of some reports, we manually updated our search in 2019 for banks for which we had found at least one report in first place.

Finally, we manually extract the data from the section of key financials (i.e. the items profit or loss before tax, number of employees, turnover and taxes, reported for each country) and relevant additional core data (e.g. currency, unit, additional explanations) to build our database. After excluding CbCRs from financial year 2013 where the reporting requirement was not yet fully implemented, we arrive at a final sample of 114 bank groups for which we have (unbalanced) CbCR data for the period 2014-2016, amounting to a total of 316 CbCRs. We drop positions where several countries are combined to a single entry, such as “Others” or “Rest

of the world", thereby arriving at 4,091 observations at the bank group-year-country level. Table 3.1 provides an overview of the distribution of CbCRs (bank group-years) and observations (bank group-year-countries) over the years 2014-2016. About 20% of observations are tax havens. Table 3.2 shows the composition of the sample by headquarter country. Bank groups headquartered in France, Germany and the United Kingdom account for the majority of observations.

Table 3.1: CbCR sample composition – tax havens vs. other countries

		2014	2015	2016	Total
CbCRs (bank group-years)		100	112	104	316
Observations	All host countries	1,269	1,411	1,411	4,091
	Tax havens	258	279	278	815
	Non-tax havens	1,011	1,132	1,133	3,276

Notes: The table shows the number of CbCRs (bank group-years) and of observations (bank group-year-countries) in the CbCR dataset underlying the analysis in Section 3.4. Tax havens are defined according to Hines (2010).

Table 3.2: CbCR sample composition – headquarter countries

Headquarter country	2014	2015	2016	Total
Austria	42	43	43	128
Belgium	41	32	29	102
Cyprus	8	9	9	26
Denmark	24	24	23	71
France	361	357	347	1,065
Germany	240	233	221	694
Greece	21	23	24	68
Ireland	2	2	2	6
Italy	117	134	119	370
Luxembourg	13	22	22	57
Netherlands	100	138	140	378
Poland	0	0	4	4
Portugal	23	23	23	69
Slovenia	4	4	4	12
Spain	88	92	106	286
Sweden	58	64	63	185
United Kingdom	127	211	232	570
Total	1,269	1,411	1,411	4,091

Notes: The table shows the composition of the CbCR sample underlying the analysis in Section 3.4 by headquarter country.

3.3.2 Orbis and Bank Focus data

One of our main contributions lies in the comparison of CbCR data to conventional datasets used in prior studies on banks' profit shifting, namely Orbis and Bank Focus. In order to construct a sample which is comparable to our sample of CbCRs, we proceed as follows.

Our starting point are the bank groups contained in our CbCR dataset. For the parent banks that published the reports, we extract all subsidiaries (with direct or indirect participation of more than 50%) from the Orbis ownership database. We then download information from unconsolidated financial statements (of the parent and of each subsidiary belonging to the group) and consolidated financial statements (only of the parent) from the financial databases of both Orbis and Bank Focus. To ensure comparability with our CbCR dataset, we only include financial information for the exact bank group-year combinations included in our CbCR sample. While Bank Focus provides more banking sector-specific variables, it only comprises entities that have a bank license, resulting in a lower coverage than Orbis. For our different analyses, we separately choose the most appropriate database. Table B.2 and Table B.3 in the Appendix provide an overview of the composition of the Orbis and Bank Focus samples.

3.3.3 Tax rates and additional country data

We gather countries' statutory corporate tax rates from the International Bureau of Fiscal Documentation (IBFD)[34] database and, complementarily, from tax handbooks prepared by EY (2014, 2015, 2016), KPMG (2015, 2017) and PricewaterhouseCoopers (2014c, 2015, 2016). If available, we also consider specific tax rates for firms in the banking sector when calculating the overall statutory tax rate. To distinguish between tax havens and other countries, we apply the tax haven list developed by Hines (2010). Additional country-level information (gross domestic product (GDP) per capita, inflation rates) is taken from the World Bank's databases.[35]

[34] https://research.ibfd.org/#/ (12 July 2017).

[35] https://data.worldbank.org/indicator/NY.GDP.PCAP.CD (6 December 2018); https://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG (22 November 2018).

3.4 Transparency gains by CbCR data and inferences on banks' tax haven activities

How much information on banks' global activities do public CbCRs reveal which remain opaque in conventional datasets and what can we infer from the data on the tax haven usage of EU-headquartered banks? To answer these questions, we start by examining the coverage of banks' country presences and real activities in terms of employees in our CbCR dataset and in Bureau van Dijk's Orbis database. We then shed light on the worldwide distribution of recorded profits and real activities and estimate the amount of shifted profits based on both datasets. We use the Orbis ownership and financials datasets (as opposed to Bank Focus) as a benchmark to assess the increase in transparency by CbCR due to their superior coverage of subsidiaries. As Orbis contains data from both public business registries and additional sources,[36] its content can be interpreted as the maximum of information available to the public before CbCR was introduced.[37] Table B.2 in the Appendix provides an overview of the distribution of subsidiaries in the Orbis financials sample over tax havens and non-tax havens for the years 2014-2016.

3.4.1 Coverage of banks' worldwide activities in CbCR data and Orbis

We compare the coverage of banks' worldwide activities in our CbCR dataset and Orbis along two dimensions, i.e. the observable country presences and the aggregated number of employees. For the definition of "country presence", we apply two alternative approaches. First, we define a "country presence" according to Orbis solely based on ownership data. More precisely, we record a country presence if a bank group controls at least one subsidiary in a certain country, irrespective of whether financials are obtainable in Orbis for this subsidiary or not. Referring to the CbCR sample, we count a "country presence" if a bank group includes a certain country in the section of key financials in its CbCR.[38] We extract this information from the 2015 reports since this is the financial year with the most comprehensive CbCR coverage. Figure B.1 in the Appendix depicts the average number of total country presences and of tax haven presences per bank group, observable from both datasets. An overview of the total number of presences for a

[36] For more details, see Tørsløv et al. (2020) and De Simone and Olbert (2020).

[37] We note that an incomplete coverage in Orbis can result from several different reasons (e.g. lack of disclosure obligations in certain countries, low transparency of certain bank groups or poor quality of the dataset).

[38] As described in Section 3.2.1, this inclusion signals that the bank group maintains at least one subsidiary or permanent establishment in the respective country.

selection of countries[39] is shown in Figure B.2 in the Appendix. Both figures suggest a good coverage of corporate group structures and tax haven subsidiaries in the Orbis ownership database, which presumably results from the requirement of European bank groups to disclose a list of all consolidated entities in their annual reports. The comparison reveals that according to the 2015 CbCRs (Orbis ownership data), the average bank group is active in about 12.6 (13.9) different countries worldwide, of which about 2.5 (3.2) countries are tax havens. The share of tax havens amounts to 19.8% in the CbCR dataset and to 23.1% in the Orbis ownership dataset.[40]

Considering that an assessment of profit shifting activities cannot solely be based on information about group structures, our second approach defines the term "country presence" based on the availability of key financial variables. With regard to Orbis, we now additionally require that information on both profit before tax and the number of employees is available from the single financial statements of at least one subsidiary of a bank group in a certain country. Referring to the CbCR sample, we equally require that a bank group states in its CbCR both profit before tax and the number of employees in the respective country.[41] As the financial variables are reported annually and their availability can differ from year to year, we pool all the country presences observed in the three years of our sample period (2014-2016).

Figure 3.2 depicts the average number of total country presences and of tax haven presences per bank group and year. As expected, the numbers for the CbCR dataset are nearly unchanged compared to our first approach. In contrast, the observable presences in Orbis drop sharply to 5.4 in total and 0.7 in tax havens. Tax havens now account for only about 12.6% of all country presences covered in Orbis financials. Ultimately, Orbis contains financial information for only 42.1% of all affiliate countries included in the CbCR dataset and for only 26.7% of affiliate tax havens. Thus, a substantial part of banks' activities, notably in tax havens, rests opaque when relying on conventional datasets.

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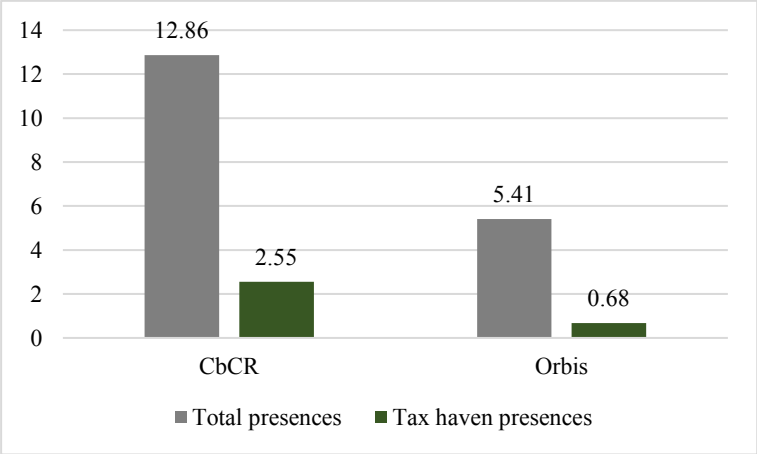
[39] The selection contains the ten countries accounting for the most observations in the CbCR dataset, all remaining tax havens with more than 20 observations in the CbCR dataset and additionally China and Japan due to their economic importance.

[40] A few country presences might be missing in the 2015 CbCRs due to the following reasons: (1) the use of combined country positions (e.g. "Others") in the CbCRs; (2) the application of the narrower prudential scope of consolidation instead of the accounting consolidation scope by some bank groups; and (3) differences between the accounting consolidation scope and the definition of beneficial ownership used in Orbis. As a result, the total number of country presences according to Orbis ownership information is slightly higher than according to the 2015 CbCRs.

[41] Since Article 89 of the CRD IV prescribes a disclosure of both variables for financial years 2014 onwards, the impact of this restriction compared to our initial definition of country presence is negligible. We only have to drop eight CbCRs which do not comply with the obligation and lack profit before tax.

Figure 3.2: Number of total country presences and of tax haven presences – average per parent-year (financial data, 2014-2016)

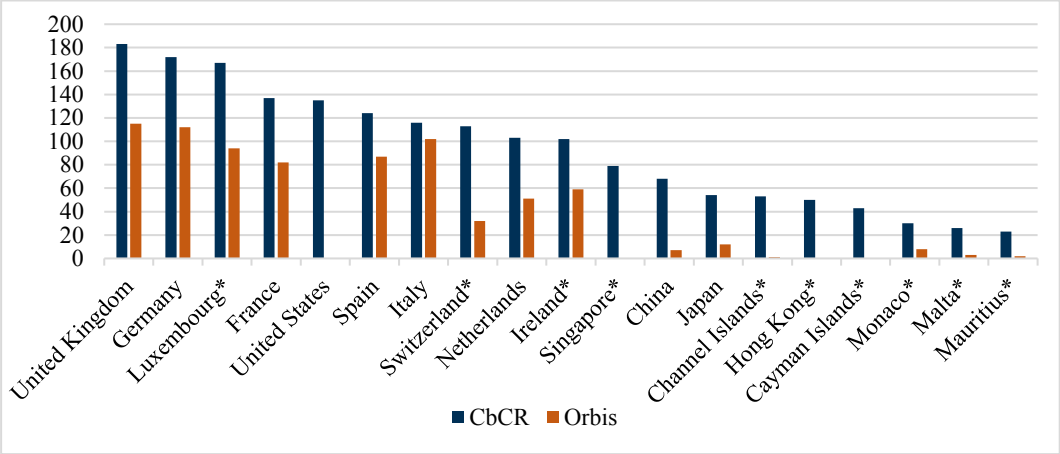


Notes: The graph shows the average number of total country presences and of tax haven presences. The averages are calculated per parent-year across the years 2014-2016. Country presences are defined based on the availability of financial information. More precisely, we record a country presence in the CbCR dataset if a bank group states in its CbCR both profit before tax and the number of employees in a certain country. We record a country presence in the Orbis dataset if information on both profit before tax and the number of employees is available from the single financial statements in Orbis of at least one subsidiary of a bank group in a certain country. Tax havens are defined according to Hines (2010).

Figure 3.3 investigates the differences in the total number of country presences in more detail across our selection of countries and allows for the following inferences. First, and unsurprisingly, the coverage of single financial statement information in Orbis is best for subsidiaries in the EU Member States. According to EU law, limited liability companies have to prepare single financial statements and file them with the relevant national business register.[42] As an example, Tørsløv et al. (2020) describe the comprehensive public business registry of France. Second, despite the requirements under EU law, the subsidiary coverage in the Member States is still far from complete if we require information on profit before tax and the number of employees, two crucial variables to assess companies' profit shifting activities. Third, transparency is especially poor for the non-European tax havens, e.g. with Singapore, Hong Kong and the Cayman Islands completely lacking any observations with sufficient financial information in Orbis. The CbCR obligation successfully sheds light on profits allocated to and the workforce employed in these locations. Fourth, CbCR also considerably increases transparency on the activities of EU-headquartered banks conducted in the world's largest economies, i.e. the U.S., China and Japan.

[42] For an overview, see https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/financial-reporting_en (27 January 2021).

Figure 3.3: Total number of presences in selected countries (financial data, 2014-2016)



Notes: The graph shows the total number of presences reported in selected countries. Country presences are defined based on the availability of financial information. More precisely, we record a country presence in the CbCR dataset if a bank group states in its CbCR both profit before tax and the number of employees in a certain country. We record a country presence in the Orbis dataset if information on both profit before tax and the number of employees is available from the single financial statements in Orbis of at least one subsidiary of a bank group in a certain country. We consider the pooled country presences across the years 2014-2016. * denotes tax havens according to Hines (2010).

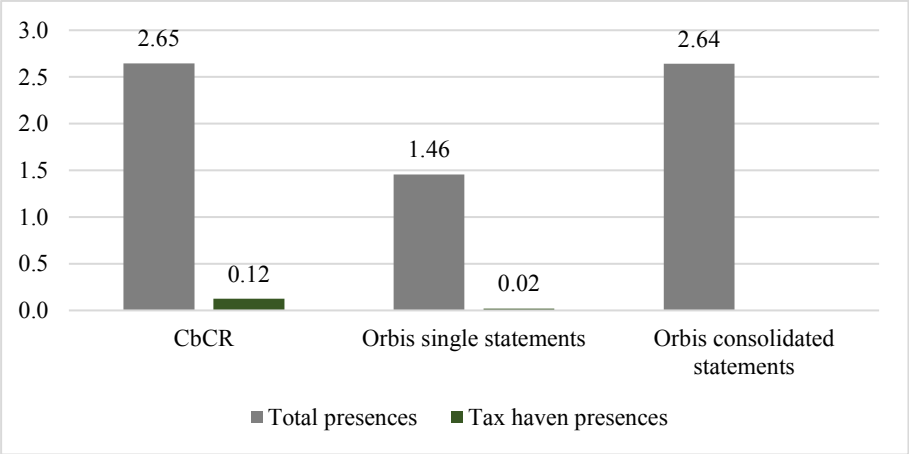
All these insights should be interpreted as a lower bound of the transparency gains by CbCR since our method tends to overestimate the coverage of Orbis. We count a country presence in the Orbis dataset if we observe data for at least one controlled subsidiary of a bank group in a certain country. However, this does not necessarily imply that Orbis records *all* subsidiaries controlled by the respective bank group in this country. The CbCR disclosures, on the other hand, provide financial information aggregated at country level and should generally comprise the data of all controlled subsidiaries and permanent establishments in the reported country presences (see Section 3.2.1).

To examine the quality and completeness of our different datasets further, we compare the aggregated number of employees across our CbCR dataset and consolidated and single financial statement information from Orbis.[43] As depicted in Figure 3.4, the worldwide workforce of the 114 bank groups in our CbCR dataset amounts to 2.65 million employees. The numbers derived from the consolidated financial statements are nearly identical, confirming that CbCRs usually cover the full group structure. Consequently, the large majority of bank groups seem to apply

[43] We choose the employee variable over profit before tax for this comparison because it is not subject to consolidation adjustments. We note that the availability of the employee variable in Orbis financials is worse than e.g. of profit before tax. However, assuming that countries with low transparency are largely characterized by high profits and a small number of employees, we conclude that a comparison based on employees should not severely understate the coverage of single financial statements of our bank groups in Orbis.

the accounting consolidation scope in their CbCRs.[44] In contrast, the single financial statements available in Orbis contain only 55.1% (1.46 million) of all employees. The coverage is especially poor for tax havens, with only about 21,000 of the actually 124,000 tax haven employees visible in Orbis.[45] Thus, the distribution of real activities remains largely incomplete without the information gathered from banks' CbCRs.

Figure 3.4: Aggregated number of global employees and of tax haven employees (average 2014-2016, in m.)



Notes: The graph shows the aggregated number of global employees and of tax haven employees, based on the CbCR dataset, Orbis single financial statement information and Orbis consolidated financial statement information. We calculate the average number of employees over the years 2014-2016 (all countries and tax havens) for each bank group and add up the averages across all bank groups. Tax havens are defined according to Hines (2010).

3.4.2 Location of banks' reported profits

To shed more light on the activities of EU-headquartered banks in particular countries, we now investigate the worldwide distribution of profits. Again, we use both CbCR data and Orbis data and contrast our inferences from both datasets. To this end, we aggregate all profits reported in the CbCR dataset and in the Orbis dataset over the sample period 2014-2016 and compare the share of different locations.[46] As displayed in Figure 3.5, the Orbis data suggests that EU-headquartered banks record only 4.4% of their total global profits in tax haven countries. In

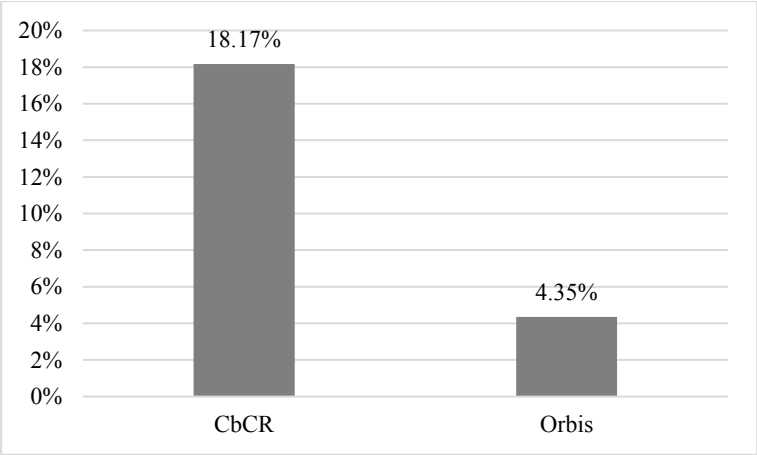
[44] Some minor deviations between the datasets may also result from differences in the exact definition of the employee variable (e.g. full-time equivalents vs. head count, treatment of sub-contractors).

[45] In addition, Figure B.3 in the Appendix shows the share of employees in the CbCRs which are observable from single financial statement data for bank groups headquartered in different countries. Most notably, bank groups based in the United Kingdom are by far the least transparent, with only 15.9% of their worldwide employees visible at country level without the CbCR data. Belgian, German and Italian bank groups exhibit the best coverage ratios.

[46] Due to differences in the treatment of intra-group transactions (especially intra-group dividends) in the single financial statements and in the CbCRs, it is difficult to compare absolute profit figures between the CbCR and the Orbis database. Therefore, we focus our analysis on the shares of worldwide profits recorded in the respective countries.

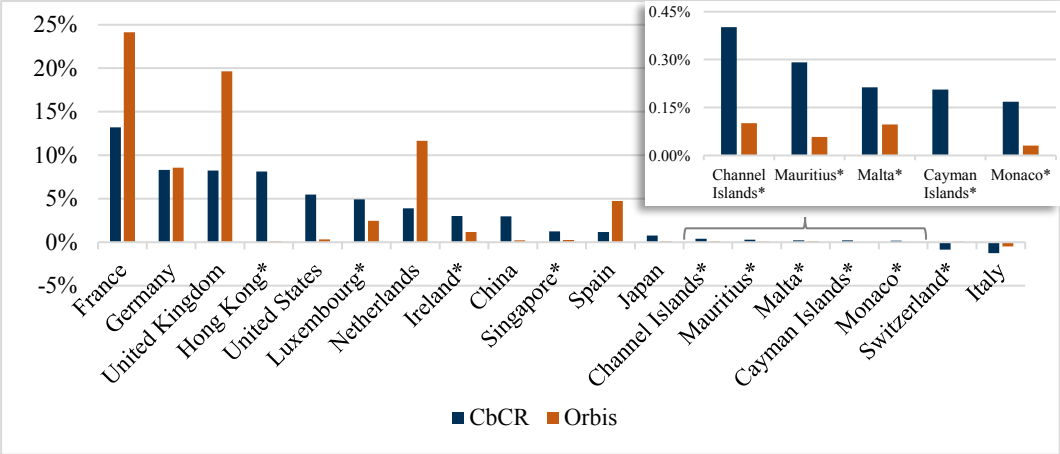
contrast, banks' CbCRs reveal that the share of tax havens is actually more than four times higher (about 18.2%). This increase in the tax haven share of profits documents a substantial transparency gain by CbCR on the location of banks' reported profits.

Figure 3.5: Share of total tax haven profit in total global profit



Notes: The graph shows the share of total tax haven profit in total global profit. Tax havens are defined according to Hines (2010). Tax haven shares are based on aggregated profits before tax across tax havens and all countries.

Figure 3.6: Share of total profit in selected countries in total global profit

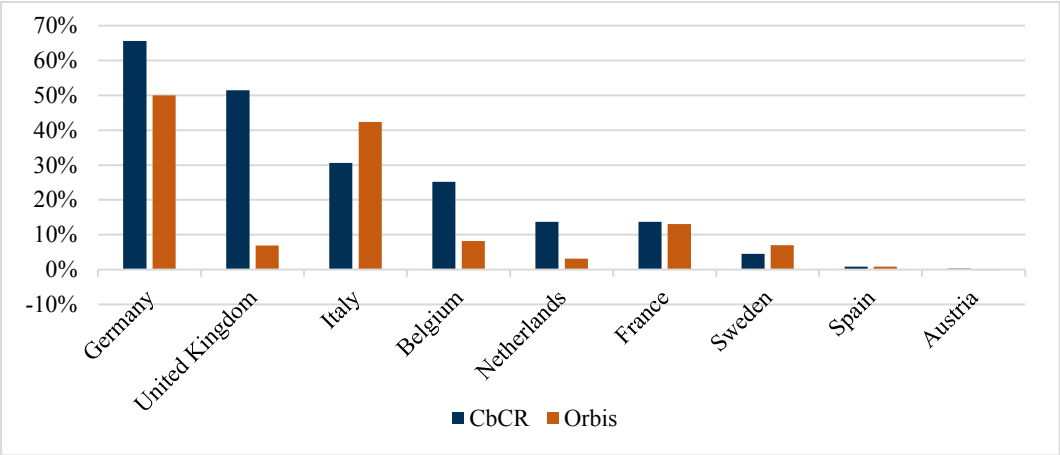


Notes: The graph shows the share of total profit recorded in selected countries in total global profit. Country shares are based on aggregated profits before tax across selected countries and all countries. * denotes tax havens according to Hines (2010).

Figure 3.6 provides information at a more disaggregate level and compares the profit shares for selected countries. It becomes evident that, when relying on the Orbis database, one severely overestimates the proportion of profits allocated to EU high-tax countries (e.g. France, United Kingdom, Spain) and underestimates the amounts booked in all tax haven countries displayed. Interestingly, Hong Kong, a country characterized as both a tax haven and an important financial center, ranks fourth and accounts for about 8.1% of the worldwide profits of EU-headquartered banks. As a caveat, we note that the occurrence of larger losses of bank groups

in certain countries can make it difficult to interpret the results (e.g. the aggregate losses in Switzerland and Italy).

Figure 3.7: Share of total tax haven profit in total foreign profit – by headquarter country



Notes: The graph shows the share of total tax haven profit in total foreign profit recorded by banks headquartered in selected countries. Tax havens are defined according to Hines (2010). The tax haven share by headquarter country is defined as the ratio of aggregated profits before tax in tax havens and aggregated profits before tax in all countries, both calculated at the level of the headquarter country. We exclude observations from the headquarter country itself, i.e. we only consider foreign country presences.

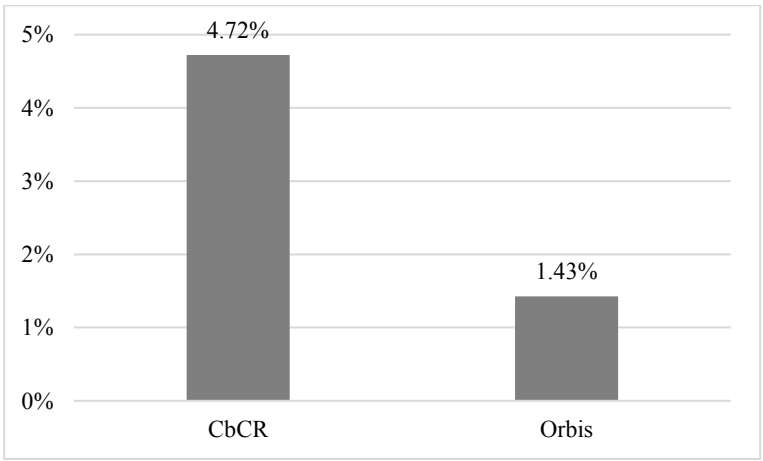
Finally, Figure 3.7 reveals considerable heterogeneity in the fraction of tax haven profits between banks from different headquarter countries.[47] According to the CbCR dataset, German bank groups record nearly two thirds and UK groups more than half of their total foreign profits in locations classified as tax havens. In contrast, French banks appear to make less use of tax havens, which account for only about 13.7% of their foreign profits. Interestingly, tax havens do not seem to play a major role for the profit allocation of Spanish and Austrian bank groups. When relying on single financial statement information from Orbis, the underestimation of tax haven profits is most severe for banks from the United Kingdom and the Netherlands. All in all, the conventional datasets provide a systematically incomplete and distorted picture of the allocation of banks' worldwide income.

[47] We display all countries where at least five different bank groups disclosing a CbCR are headquartered.

3.4.3 Location of banks' real activities in terms of employees

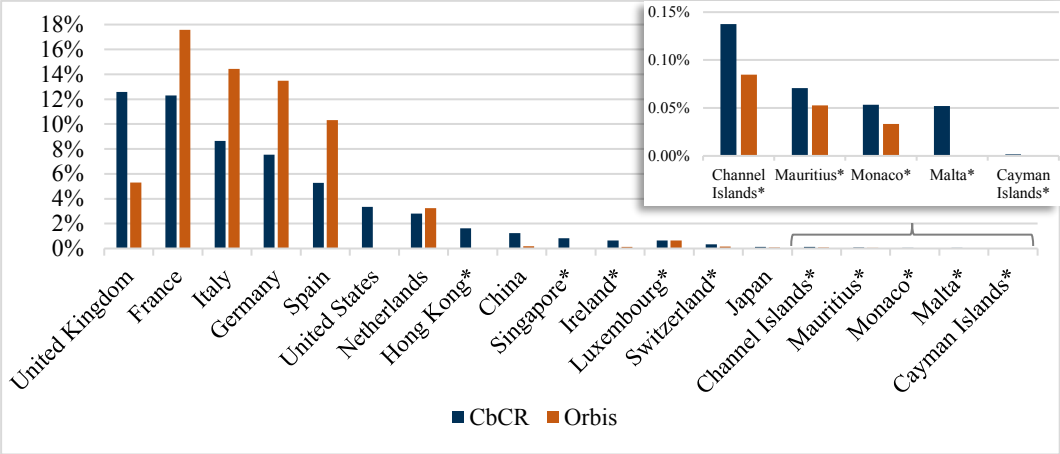
To distinguish whether the profits reported in different locations result from real economic activities or rather reflect a paper shifting of profits, we next focus on the distribution of employees and conduct the same analyses as for profits in Section 3.4.2. Figure 3.8, Figure 3.9 and Figure 3.10 provide the following insights. First, while CbCR data revealed that more than 18% of EU banks' global profits are booked in tax havens, less than 5% of their worldwide workforce is located there, indicating a misalignment between profits and economic activities (Figure 3.8). Second, Orbis understates the fraction of employees in tax havens, but the discrepancy to the CbCR data is not as large as for the profit figure. Third, Hong Kong, Singapore, Ireland and Luxembourg together account for the vast majority of the workforce employed in tax havens (Figure 3.9). The numbers in small offshore tax havens are virtually negligible. Most strikingly, the CbCRs record a total of only 45 employees in the Cayman Islands, which contrasts sharply with the considerable amount of profits booked there and the country's extraordinary role as a location for financial services providers (documented by Miethe, 2020). Fourth, we again observe heterogeneity between different headquarter countries. For instance, bank groups based in the United Kingdom employ a substantial fraction of 16.6% of their foreign workforce in tax havens, compared to a share of only 0.4% for Spanish groups (Figure 3.10). While a disconnect between profits and labor is visible for banks across all headquarter countries, it is most pronounced for Italian banks, with tax havens accounting for 1.6% of their foreign employees but 30.6% of their foreign profits.

Figure 3.8: Share of total number of tax haven employees in total number of global employees (average 2014-2016)



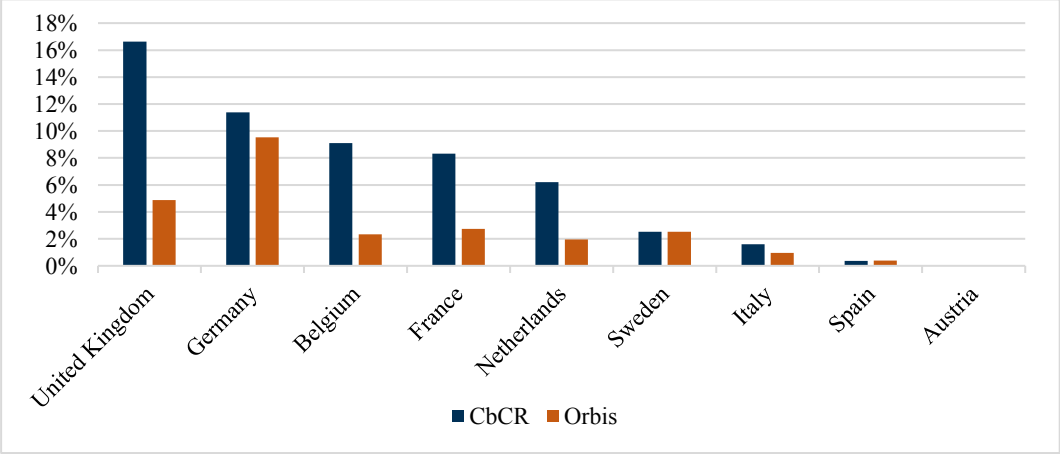
Notes: The graph shows the share of total tax haven employees in total global employees. Tax havens are defined according to Hines (2010). We calculate the average number of employees over the years 2014-2016 for each combination of bank group and reported country. Tax haven shares are based on the aggregated average number of employees across tax havens and all countries.

Figure 3.9: Share of total number of employees in selected countries in total number of global employees (average 2014-2016)



Notes: The graph shows the share of total employees recorded in selected countries in total global employees. We calculate the average number of employees over the years 2014-2016 for each combination of bank group and reported country. Country shares are based on the aggregated average number of employees across selected countries and all countries. * denotes tax havens according to Hines (2010).

Figure 3.10: Share of total number of tax haven employees in total number of foreign employees (average 2014-2016) – by headquarter country



Notes: The graph shows the share of total tax haven employees in total foreign employees recorded by banks headquartered in selected countries. Tax havens are defined according to Hines (2010). We calculate the average number of employees over the years 2014-2016 for each combination of bank group and reported country. The tax haven share by headquarter country is defined as the ratio of the aggregated average number of employees in tax havens and the aggregated average number of employees in all countries, both calculated at the level of the headquarter country. We exclude observations from the headquarter country itself, i.e. we only consider foreign country presences.

3.4.4 Relation between banks' reported profits and their real activities in terms of employees

Having investigated the distribution of profits and employees separately, we now combine both variables to get a more direct indication of a potential misalignment between economic activities and reported output in different locations. Figure 3.11 and Figure 3.12 show the median profit-per-employee ratio for tax havens vs. non-tax havens and for our selection of countries, respectively. Confirming our previous findings, labor productivity in terms of profit per employee reported in tax havens is almost 2.5 times as high as in other locations. Malta and the Cayman Islands clearly stand out with a median profit per employee of EUR 5.7 million and EUR 17.2 million, respectively, compared to the non-tax haven median of about EUR 85,000. In line with Tørsløv et al. (2020), Ireland and Luxemburg also exhibit remarkably high ratios, while the EU high-tax countries Germany, Italy and France appear at the bottom of the ranking.

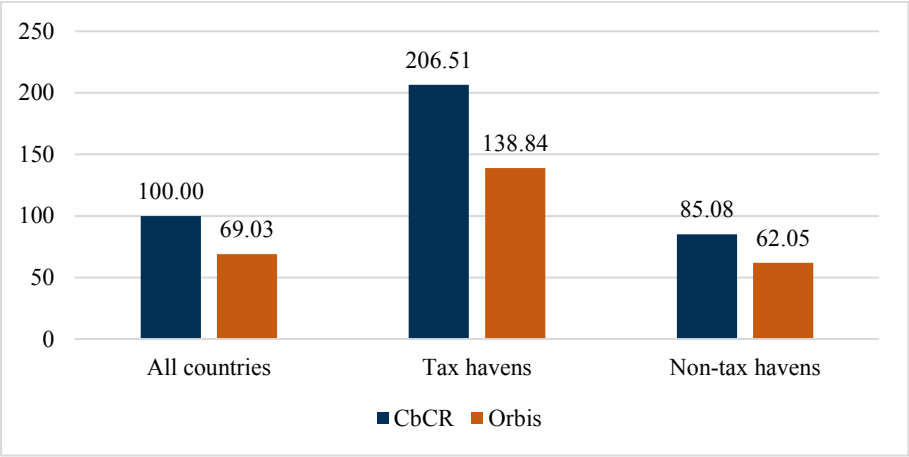
However, several countries do not seem to fit into this pattern. The bank groups in our sample report a rather high profit per employee in the high-tax countries U.S. and Japan. Conversely, the labor productivities disclosed for Hong Kong, Singapore and Switzerland – three countries characterized both as tax havens and as important financial centers – are lower as one might expect. Thus, we conjecture that EU-headquartered bank groups use only certain tax havens preferably for tax-induced profit shifting activities, while other tax haven locations primarily serve different purposes.[48]

Moreover, the analyses reveal that the productivity figures are generally smaller (for both tax havens and non-tax havens) when calculated based on the information available in Orbis. For some countries, we do not even have a single observation with sufficient data to compute the ratio. Overall, the results suggest a relationship between opaqueness regarding a country

[48] We corroborate our inference that banks' choice of tax havens is not only driven by the purpose of minimizing tax payments by assessing the tax attractiveness of different locations in terms of the effective tax rate (see Figure B.4 and Figure B.5 in the Appendix). The ETR does not only reflect a location's statutory tax rate but also the scope of the tax base (e.g. tax-free income) and other incentives (e.g. tax credits). Generally, the ETR recorded in tax havens (10.8%) is less than half of the burden that bank groups face in non-tax haven countries (22.0%). Nevertheless, we observe considerable variation within the group of tax havens. With a median ETR of zero, the Cayman Islands appear as the most favorable location from a taxpayer perspective. This incentive may explain why banks record such an extraordinarily high profit per employee there. In contrast, presences in Luxembourg – the tax haven most frequently used in our sample – face a median ETR of 19.3%, which is close to the rate observed for the United Kingdom (20.2%). Thus, tax considerations alone do not explain the attractiveness of the country as location for profits. Again, ETRs based on Orbis provide a distorted picture of banks' worldwide tax burdens.

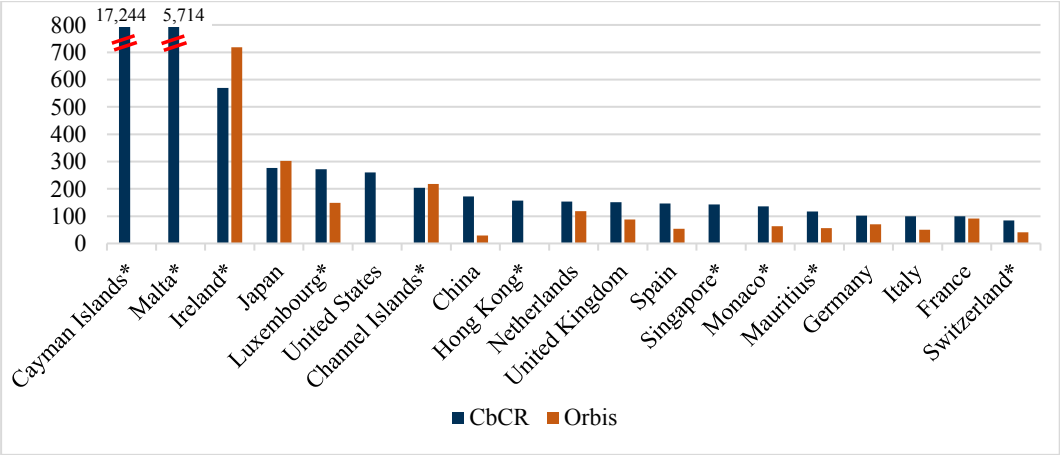
presence and its profit per employee. CbCR data provides added value in this regard by revealing banks' most profitable presences, especially those located in tax havens.

Figure 3.11: Profit per employee in tax havens vs. other countries (in th. EUR)



Notes: The graph shows the profit per employee of bank presences in tax havens vs. other countries. We calculate the ratio of profit before tax and the number of employees at bank group-year-country level and take the median across all countries, tax havens and non-tax havens, respectively. Tax havens are defined according to Hines (2010). We replace values of zero employees in a reported country by a value of 0.5 employees in order not to lose these observations which principally have an infinitely large profit-per-employee ratio. The value of 0.5 is based on the assumption that banks report all employee figures (in full-time equivalents) below 0.5 as zero due to rounding. We do not consider observations with zero or negative profit before tax.

Figure 3.12: Profit per employee in selected countries (in th. EUR)



Notes: The graph shows the profit per employee of bank presences in selected countries. We calculate the ratio of profit before tax and the number of employees at bank group-year-country level and take the median across selected countries. We replace values of zero employees in a reported country by a value of 0.5 employees in order not to lose these observations which principally have an infinitely large profit-per-employee ratio. The value of 0.5 is based on the assumption that banks report all employee figures (in full-time equivalents) below 0.5 as zero due to rounding. We do not consider observations with zero or negative profit before tax. * denotes tax havens according to Hines (2010).

3.4.5 Estimation of shifted profits

Studies trying to quantify the size of profit shifting face an important problem: All numbers reported in financial statements and included in aggregate statistics already reflect the outcome of firms' profit shifting activities. The challenge is to create an appropriate counterfactual of the "true" economic profits before any shifting activities. Based on the variables available in banks' CbCRs and considering the remarkable disconnect between profits and real activities in terms of employment (see Figure 3.11 and Figure 3.12), one simplified approach is to estimate the expected profits of a bank's country presence in relation to the workforce employed in this location.

To this end, we aggregate the profits achieved by all presences of a bank group in a certain year and then allocate this aggregate profit to the different locations in such a way that it is proportional to the geographic distribution of the total number of employees of the respective bank group. However, to account for the considerable variation in employee productivity across different countries, we weight the number of employees reported in each country by the average value added per worker in the service sector in this country (retrieved from the World Bank's database[49]). Finally, the amount of shifted profits is calculated as the difference between profits actually reported in a certain location and our estimate of the expected profits in this location.[50] A positive sign indicates excess profits (i.e. inward shifting), a negative sign shows missing profits (i.e. outward shifting). We apply this approach to both the CbCR and the Orbis dataset and directly compare the results.

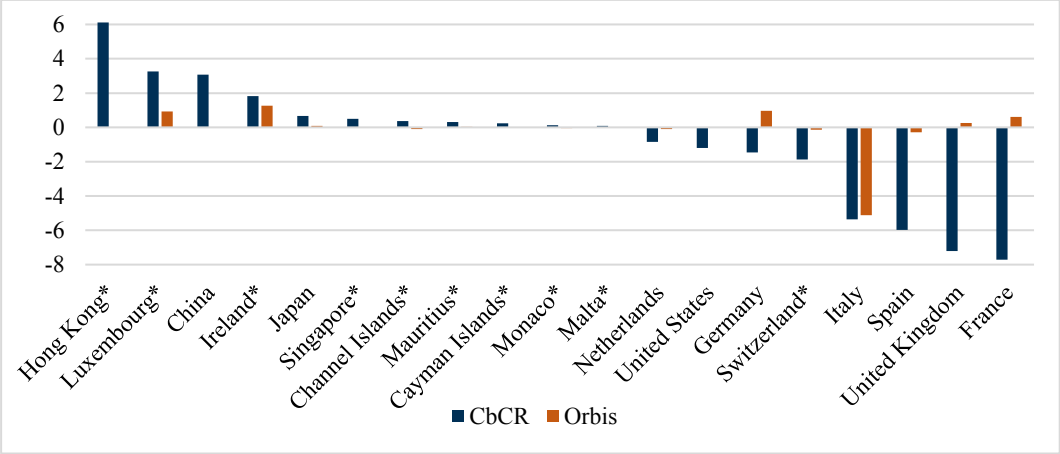
According to the CbCR data, the EU-headquartered banks in our sample shift about EUR 11.4 billion to tax havens annually, which corresponds to 9.7% of their total global profits or 13.9% of their foreign profits (i.e. all profits recorded outside the headquarter country). The estimate based on Orbis financial information is considerably smaller, with shifted profits amounting to only EUR 1.9 billion (2.4% of total global profits or 8.4% of all foreign profits). As expected, our findings confirm that the extent of profit shifting is widely underestimated when relying on conventional micro-level databases such as Orbis. At the same time, our CbCR-based estimates are still clearly below the results of macro-level studies such as Tørsløv et al. (2020), who document that MNEs shift about 40% of their foreign profits to tax havens. While this

[49] https://data.worldbank.org/indicator/NV.SRV.EMPL.KD (7 February 2020).
[50] See the notes to Figure 3.13 for a more detailed description of our approach to quantify shifted profits.

discrepancy might reflect a tendency of macro-level datasets to produce rather high estimates, major differences in the sample composition impede a comparison of the outcome.

Figure 3.13 additionally displays the absolute amounts of annual inward/ outward shifting for our selection of countries. Unsurprisingly, tax havens appear to be the winners and high-tax EU countries the main losers of profit shifting. Hong Kong and Luxembourg, which are also important financial centers, together account for a large fraction of the excess profits in tax havens. Interestingly, small offshore tax havens like the Cayman Islands, which exhibit a strikingly high profit per employee (see Figure 3.12), do not play a significant role in terms of absolute amounts. Calculations based on Orbis financials provide an incomplete and distorted picture. For some (tax haven) countries, we do not have any observation to quantify shifted profits; and for other countries, we even observe an opposite sign (e.g. Germany, France).

Figure 3.13: Estimation of shifted profits for selected countries (in bn. EUR per year)



Notes: The graph shows an estimation of the annual amount of profits shifted into/out of selected countries by the EU-headquartered bank groups included in our sample. Our estimation is based on the following approach. First, we aggregate the profits achieved by all presences of a bank group in a certain year and then allocate this aggregate group profit to the different locations in such a way that it is proportional to the geographic distribution of the total number of employees of the respective bank group. To account for the considerable variation in employee productivity across different countries, we weight the number of employees reported in each country by the average value added per worker in the service sector in this country (retrieved from the World Bank's database). Subsequently, the amount of shifted profits is calculated as the difference between profits actually reported by a bank group in a certain country and our estimate of the expected profits in this country. A positive sign indicates excess profits (i.e. inward shifting), a negative sign shows missing profits (i.e. outward shifting). Finally, we aggregate the amount of profits shifted by all the bank groups contained in our sample and calculate the annual average over the sample period (2014-2016). All calculations only include observations of country presences (CbCR data) / subsidiaries (Orbis data) for which both the profit before tax and the number of employees are available in the respective dataset. * denotes tax havens according to Hines (2010).

3.5 Scope for bias in regression estimates of profit shifting

The identification of profit shifting in Section 3.4 relies on simple indicators, i.e. the distribution of profits and employees. This approach warrants caution as potentially confounding factors cannot be fully ruled out. A regression analysis controlling for additional important determinants of reported profits would provide a more comprehensive picture of the extent of banks' profit shifting. Prior literature quantifies the size of profit shifting in terms of tax semi-elasticities typically by modelling reported pre-tax profits as the sum of "true" profit (explained by economic input factors) and shifted profit (induced by tax incentives) (see e.g. Hines & Rice, 1994; Huizinga & Laeven, 2008). Important control variables like the stock of capital, however, are missing in the CbCRs. This restriction implies that a regression analysis of the effect of tax incentives on the magnitude of profit shifting based on CbCR data cannot recover undistorted coefficient estimates. Still, by comparing estimates based on the full sample of CbCRs (i.e. exhibiting complete geographical coverage) and on a more restricted sample used in prior studies (i.e. lacking financial data on several subsidiaries, notably in tax havens), we can try to gauge the scope for sample selection bias in prior regression estimates of profit shifting.

Previous literature suggests that banks are considerably more tax sensitive than non-financial MNEs.[51] Specifically, Merz and Overesch (2016) estimate that banks exhibit a tax semi-elasticity of -2.378 (in the period 2001-2012). This finding implies that a one percentage point increase in the host country tax rate is associated with a decrease in reported subsidiary profits of about 2.4%. The authors rely on Bureau van Dijk's Bankscope database (the predecessor of Bank Focus), which presumably lacks financial information for a considerable fraction of subsidiaries located in tax havens. Moreover, Bankscope only contains financial data on subsidiaries with a bank license. Finally, information on foreign branches is regularly missing. This incomplete coverage of banks' worldwide activities is likely to bias the tax rate coefficient upwards (Merz & Overesch, 2016).

As some studies indicate a behavioral response of EU banks to the CbCR introduction (Joshi et al., 2020; Overesch & Wolff, 2020), we start our analysis by quantifying the extent of profit shifting for the bank group-years contained in our CbCR dataset, using the same approach as employed in previous literature and a comparable data source. This exercise provides us with a

[51] In a meta-analysis on general profit shifting studies, Heckemeyer and Overesch (2017) document a consensus estimate for the tax semi-elasticity of non-financial firms of about -0.8.

benchmark for the subsequent estimation of the sample selection bias in prior regression estimates. To this end, we replicate the design of Merz and Overesch (2016) in a first step and estimate the following regression at the level of subsidiary i in year t:

$$lnPLBT_{it} = \beta_0 + \beta_1 STR_{it} + \beta_2 lnTOAS_{it} + \beta_3 lnSTAFF_{it} + \beta_4 X_{it} + \beta_5 lnINF_{it} + \rho_k + \mu_l + \vartheta_t + \varepsilon_{it} \quad (1)$$

The dependent variable ($PLBT$) is profit before tax reported by subsidiary i in year t. $TOAS$ and $STAFF$ denote total assets and staff cost, respectively. Several subsidiary-level variables (X), namely off-balance sheet items, subsidiary growth and the share of total earning assets in total assets, are included as further explanatory variables. INF is a country-specific control variable which accounts for the host country's inflation rate.[52,53] The regression also contains parent fixed effects (ρ_k) and year fixed effects (ϑ_t). In addition, bank-type fixed effects (μ_l) control for differences in banks' business models. ε_{it} denotes the error term. Our key variable of interest is the measure of the tax incentive to shift profits, STR. We define this variable as the difference between the statutory corporate tax rate of the host country and the simple average tax rate of the bank group. The coefficient of the tax incentive measure, β_1, reflects the tax semi-elasticity of reported profits.

We estimate the tax sensitivity for the same sample of bank group-years contained in our CbCR dataset with unconsolidated financial statement data from Bank Focus (see Section 3.3.2 for a description of the sample selection process).[54] Table B.3 in the Appendix provides an overview of the distribution of subsidiaries over tax havens and non-tax havens for the years 2014-2016. Table B.4 shows summary statistics of the variables discussed above.

Column (1) of Table 3.3 displays the results for the estimation of equation (1) with subsidiary-level data for the years 2014-2016. We observe a coefficient on the tax incentive variable of -2.017, which is significant at the 1% level. Although slightly smaller, this semi-elasticity is still in the same range as the estimate of -2.378 by Merz and Overesch (2016) for the period 2001-2012. Thus, while EU banks may have reduced their profit shifting activities to some extent in response to the public CbCR requirement, evidence suggests that profit shifting is still

[52] The host country's inflation rate is measured as the annual growth rate of the ratio of GDP in current local currency to GDP in constant local currency.

[53] $PLBT$, $TOAS$, $STAFF$, off-balance sheet items and INF are used in natural logs (ln).

[54] As opposed to Section 3.4, we now choose Bank Focus over Orbis as Bank Focus includes additional banking sector-specific variables and to ensure comparability with the results of extant studies on banks' profit shifting, which are mainly based on Bankscope (i.e. the predecessor of Bank Focus).

prevalent and economically meaningful in our sample of EU-headquartered banks for the years 2014-2016. This conclusion is also in line with the results of our descriptive analysis.

Table 3.3: Regression results – Bank Focus data and CbCR data

	Dependent variable: *PLBT* (ln)		
	Bank Focus		CbCR
	(1)	(2)	(3)
STR	-2.017***	4.945***	1.884**
	(0.561)	(0.929)	(0.805)
TOAS (ln)	0.649***		
	(0.043)		
STAFF (ln)	0.238***		
	(0.048)		
EMPL (ln)		0.783***	0.718***
		(0.046)	(0.021)
INF (ln)	-0.012	-0.125	-0.061
	(0.034)	(0.079)	(0.060)
Intercept	-0.829	12.162***	11.278***
	(0.868)	(0.513)	(0.381)
Other subsidiary-level controls	Yes	No	No
Bank-type FE	Yes	No	No
Parent & Year FE	Yes	Yes	Yes
Level	Subsidiary	Country	Country
Obs.	1,000	486	2,251
Adj. R^2	0.754	0.662	0.761

Notes: The table shows the results of OLS regressions with profit or loss before tax (ln) as the dependent variable. See Section 3.5 for a description of the explanatory variables.
We use heteroscedasticity-robust standard errors clustered at country-year level, shown in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Due to the incomplete geographical coverage of Bank Focus (see above), our estimated tax rate coefficient is presumably biased upwards. In a next step, we try to quantify this bias. To this end, we estimate both a regression based on a restricted sample (Bank Focus data) and a regression based on a full sample (CbCR data), i.e. including information on tax havens and foreign branches, and compare the resulting coefficients. Since the CbCRs are confined to the set of variables which the affected banks have to report, most control variables included in equation (1) are missing in the CbCR database. In addition, the data is at country level, not at subsidiary level. Therefore, we adapt the design of equation (1) to the structure and available

variables in our CbCR dataset. The regression equation at the level of country j in year t is as follows:

$$lnPLBT_{jt} = \beta_0 + \beta_1 STR_{jt} + \beta_2 lnEMPL_{jt} + \beta_3 lnINF_{jt} + \rho_k + \vartheta_t + \varepsilon_{jt} \quad (2)$$

$EMPL$ denotes the number of employees and is used as a proxy for labor input. The other variables are defined as above.

The Bank Focus regression sample is constructed by aggregating the subsidiary-level Bank Focus data described above at country level, such that the unit of observation is the same as in the CbCR dataset. The CbCR regression sample is derived from the CbCR dataset explained in Section 3.3.1. We exclude observations with missing values on the regression variables or where we cannot calculate the logarithms due to negative or zero values. We provide an overview of the composition of the CbCR regression sample in Table B.5 in the Appendix and summary statistics of the variables used in the CbCR regression in Table B.6. The number of observations in the CbCR dataset is more than four times higher than in the comparable Bank Focus dataset, which demonstrates again the improved geographical coverage of CbCRs relative to financial information from commercial databases.

Columns (2) and (3) of Table 3.3 show the regression results with Bank Focus data and CbCR data. The tax rate coefficients are positive[55] and significant at the 5% level in both regressions (i.e. +4.945 in the Bank Focus sample and +1.884 in the CbCR sample). Comparing the coefficients on the tax incentive variable across both samples results in a difference of 3.061 percentage points (= 4.945 – 1.884). This difference reflects the sample selection bias in the Bank Focus regression due to the incomplete coverage of the underlying data. If one assumes that the bias in a comprehensive regression model as employed in prior literature (i.e. equation (1) and column (1) of Table 3.3) has the same size, we would observe an actual tax semi-elasticity of banks' reported profits of -5.078 (= -2.017 – 3.061). This estimate implies that a one percentage point increase in the tax rate difference between the host country and the simple average of the bank group is associated with about 5.1% lower reported subsidiary profits.[56]

[55] We note that the omission of total assets and the replacement of staff cost by the number employees result in an omitted variable bias and a measurement error, respectively, biasing the tax rate coefficients upwards. However, as we do not quantify the extent of profit shifting based on the simplified regression model, but only compare the size of the tax rate coefficients, this bias should not distort our inferences. For a stepwise transformation of the Bank Focus subsidiary-level regression to the reduced regression model, see Table B.7 in the Appendix.

[56] However, this conclusion should be treated with caution due to the differences in the underlying regression models.

In summary, CbCR data of EU-headquartered multinational bank groups cannot produce undistorted estimates of the tax semi-elasticity of reported profits due to the absence of important control variables, notably total assets and staff cost. Regression analysis using Bank Focus subsidiary-level data confirms prior evidence and suggests that even after the introduction of CbCR, multinational banks engage in profit shifting. The tax incentive coefficient obtained by analyses of conventional datasets such as Bank Focus is likely to be biased upwards since financial data on low-tax subsidiaries is regularly missing in these databases. The comparison of estimates based on the full sample of CbCRs and on the more restricted Bank Focus sample suggests that the bias in regression estimates due to the incomplete coverage of banks' worldwide activities amounts to approximately three percentage points.

3.6 Conclusion

We create a novel database by collecting data from the CbCRs of more than 100 multinational bank groups headquartered in the EU for financial years 2014-2016. The comprehensive coverage of CbCRs with regard to the location of banks' worldwide profits and employees allows us to analyze and quantify an important blind spot in terms of missing financial data, which so far has blurred many estimates of profit shifting. We compare the new CbCR dataset with Bureau van Dijk's Orbis and Bank Focus databases to assess in how far transparency on banks' global activities has increased by the introduction of the new reporting requirement. We provide new estimates on the amount of banks' excess profits booked in tax havens and thus contribute to the still unresolved question of how large the size of profit shifting really is.

We show that CbCRs uncover a substantial fraction of worldwide profits and real activities in terms of employees of EU bank groups, which remain opaque when relying on other sources of publicly available information (e.g. Orbis). The transparency gains resulting from the CbCR implementation are especially strong for tax havens and for the largest non-EU economies. We document a striking disconnect between reported profits before tax and real activity, with banks headquartered in Germany, the United Kingdom and Italy exhibiting the most pronounced misalignments. We also note considerable heterogeneity within the group of tax havens, suggesting that only some of them are preferably used for profit shifting. Based on CbCR data, we estimate that the EU-headquartered bank groups in our sample shift about EUR 11.4 billion of profits to tax havens annually, which corresponds to 9.7% of their total global profit and

13.9% of their foreign profit. The magnitude of profit shifting is severely underestimated when relying on conventional micro-level datasets. We compare regression estimates based on our comprehensive sample of CbCRs and on single financial statement data from Bank Focus, which lacks financial information on many (low-tax) subsidiaries. This comparison suggests that the sample selection bias in prior regression estimates of the tax semi-elasticity of banks' reported profits amounts to approximately three percentage points.

The increase in transparency on the distribution of banks' profits and employees, notably in tax havens, is an important value added of the newly compiled CbCR data. The inclusion of additional variables reflecting economic input factors, i.e. total assets and staff cost, would strengthen the informative value of the reporting requirement further. These insights are especially relevant in the context of the ongoing political discussions whether to introduce a public CbCR for all multinational firms in the EU with revenues exceeding EUR 750 million (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021).

4

Reporting Behavior and Transparency in European Banks' Country-by-Country Reports

This chapter is based on the following ZEW Discussion Paper:

Dutt, V. K., Nicolay, K., & Spengel, C. (2021). *Reporting Behavior and Transparency in European Banks' Country-by-Country Reports* (ZEW Discussion Paper No. 21-019). Retrieved from http://ftp.zew.de/pub/zew-docs/dp/dp21019.pdf (23 February 2021).

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4.1 Introduction

During the debate on base erosion and profit shifting by large multinational enterprises, the claim for the disclosure of certain tax-related data on a by-country basis, the so-called country-by-country reporting (CbCR), has intensified. While the proposal for a public CbCR for all large multinational firms in the EU is still under discussion (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021), several CbCR initiatives are already in place, allowing to draw lessons concerning their effectiveness. In particular, Article 89 of the Capital Requirements Directive IV (CRD IV)[57] introduced a public CbCR requirement for EU financial institutions for financial years 2014 onwards. The public availability of the reports is supposed to allow both the tax authorities and the general public to better assess whether banks are paying their "fair share of taxes" in the countries where they operate. However, the lack of clear and uniform guidelines on the definition and the presentation of the reportable items arises in reporting heterogeneity across Member States and bank groups, which impedes the interpretability and the comparability of the reports. Given that the CbCR obligation imposes additional direct and indirect costs (Dutt et al., 2020), it seems worthwhile to ensure that the different ways of calculating and presenting the information do not diminish the added value of CbCR.

We analyze the reporting heterogeneity across CbCRs published by EU-headquartered multinational bank groups for financial years 2014-2016, considering in particular both the content of the reports, such as explanations on the underlying way of calculation or the provision of additional information, and the readability of the data. We shed more light on the degree of transparency of the CbCRs, i.e. how transparently and comprehensively the data is presented and how accessible the information is for the addressees. Our analyses allow us to identify which open points inhibit the readability and the interpretability of the reports. We also determine relationships between the reporting behavior and bank characteristics, such as the headquarter country, the bank group size or the intensity of tax haven usage. Ultimately, we suggest a best practice approach on CbCR in order to improve the information content and the comparability of the reports. Our insights are particularly important in light of the ongoing political discussion on the introduction of a public CbCR for all multinational firms in the EU

[57] Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, *Official Journal of the European Union*, *56*(L 176), 338–436 (27 June 2013).

with revenues exceeding EUR 750 million (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021).

We rely on a dataset of CbCRs collected by Dutt, Nicolay et al. (2019)[58] which contains CbCR data for multinational bank groups headquartered in the EU for the years 2014-2016. For each CbCR included in their dataset, we define and manually code variables that reflect the reporting behavior. They refer to the place of publication of the CbCR, the CbCR content, the readability of the tables containing the CbCR data and the list of entities that should be published together with the reportable items. A higher value of the variables implies more transparency or a better readability. Our analysis is threefold: First, we descriptively analyze the reporting heterogeneity across our sample of CbCRs, also considering differences between bank groups headquartered in different countries. Second, we aggregate single variables to transparency scores in order to identify bank groups and headquarter countries that are particularly (in-)transparent in certain dimensions. Third, we develop guidelines to avoid the inconsistencies in reporting identified above and to improve the effectiveness of CbCR.

Our main findings are as follows: We observe that most bank groups prefer including the CbCR in their annual report over the publication as a separate document on their website. The majority of the reports contain measures that facilitate finding the data, such as the use of the expression "CbCR" or a reference to the legal basis of the reporting requirement. Article 89 of the CRD IV does not specify the reportable items further. The following open points result in different ways of calculating the data.

(1) Most CbCRs provide no information on their way of defining the "consolidated basis" on which the disclosure should be made. German bank groups exhibit the highest transparency with almost two third relying on the accounting consolidation scope, which is regularly broader than the prudential scope of consolidation and allows for a better comparison to the consolidated financial statements.

(2) Information on the underlying data source and on the treatment of intra-group transactions is mostly missing in the CbCRs, which impedes the interpretability of the data both within the report (i.e. comparability of profits and taxes as well as across reported countries) and between different reports. From those bank groups that provide additional information, the majority claim to prepare the CbCR on the same basis as the consolidated financial statements. However, intra-group transactions are in most cases

[58] See Chapter 3.

not eliminated. Only a fifth of the CbCRs in our sample contain a quantification of the differences between the CbCR data and the consolidated financial statements data.

(3) Since "turnover" is not naturally part of the financial statements of financial institutions, we observe a wide variety of different expressions for reporting the "turnover" item. Some bank groups, in particular in Austria and France, report two turnover variables, which is in line with national provisions. More than half of the reports provide additional explanations on the composition of the reported turnover item(s).

(4) As regards the number of employees on a full-time equivalent basis, differences among CbCRs arise with respect to the point in time to which the reported number refers (i.e. yearly average vs. at year-end or at the reporting date) and to the inclusion or exclusion of particular worker groups. Depending on the personnel structure, different ways of calculating the number of employees can result in substantially different reported figures.

(5) Article 89 of the CRD IV does not specify how "tax on profit or loss" should be defined. The different possible understandings of the tax variable influence the conclusions that can be drawn from the variable itself as well as regarding the link between reported taxes and profits. Almost half of the CbCRs in our sample report at least one tax item of which the exact meaning is unclear. As some Member States prescribe the reporting of a specific tax variable, we observe systematic differences between headquarter countries. Bank groups headquartered in the United Kingdom consistently report tax paid, whereas French bank groups predominantly disclose both current and deferred tax expense. Bank groups from Sweden and Germany have a clear preference for the accounting tax expense. A fifth of the CbCRs report more than one tax item.

Although the by-country data should be published separately for each jurisdiction where the institution has an establishment, some bank groups pool several countries into a single entry, which comes at the cost of transparency. However, the relative importance of these collective countries in terms of the number of employees and profit before tax is in most cases negligible. We also observe that some CbCRs contain information that goes beyond the requirements of the CRD IV, thus being particularly transparent. Examples are the provision of explanations that help to interpret the data, the reporting of additional variables and the inclusion of item totals and previous-year data. The readability of the tables containing the CbCR data is in most cases satisfactory, i.e. most bank groups align numbers to the decimal point, use monospaced

numbers, separate thousands by comma or dot and arrange countries in rows and items in columns. We regularly detect room for improvement as regards the table design and an additional visualization of the data. The list of subsidiaries and branches which should be published together with the CbCR data is often not included in the CbCR and frequently lacks information on branches.

Since our variables are defined in such a way that a higher value implies more transparency or a better readability, we can add up the values of different variables in order to achieve an overall figure which reflects the degree of transparency across several variables. We construct three different transparency scores: The *content score* reflects the degree of transparency across the variables that relate to the CbCR content, i.e. the way of calculation of the reportable items and the provision of additional information. The *readability score* relates to the structure and presentation of the CbCR data tables. The *overall score* is composed of the content score and of the readability score and also takes into consideration the place of publication of both the CbCR and the list of entities. The scores are normalized to 100, whereby a score of 100 (0) indicates the highest (lowest) possible degree of transparency. We find that CbCRs published by bank groups headquartered in the United Kingdom and Germany achieve on average the highest overall scores, whereas Austrian bank groups perform worst on average. This effect is mainly driven by differences with respect to the CbCR content, while the variation of the readability of the data tables is low among the headquarter countries. Still, even for those bank groups that perform best in our analyses, the reporting behavior leaves room for improvements. We also observe that large bank groups and bank groups with a high share of tax havens disclose their activities in a comparatively transparent CbCR.

We suggest guidelines on CbCR that aim to close the regulatory loopholes identified above in order to ensure a consistent interpretation of the reports across different bank groups and countries, thus increasing the information content of CbCR. Above all, the specification of the underlying data source and of the applicable consolidation scope as well as the establishment of uniform definitions of the reportable items are indispensable. A standardized template, similar to the model template of the OECD (OECD, 2015, pp. 29–30), could further support the reader in processing the information and would facilitate comparisons across bank groups.

Our study sheds more light on CbCR, notably on the informative value of the public CbCR requirement in the banking sector. A few recent studies analyze the effectiveness of Article 89 of the CRD IV. They document that EU banks adapted their tax avoidance behavior to some extent (Joshi et al., 2020; Overesch & Wolff, 2020) and reduced their presence in tax havens

(Eberhartinger et al., 2020) in response to CbCR. However, the findings of Dutt, Ludwig et al. (2019)[59] suggest an overall zero response of the capital market to the introduction of the disclosure obligation. Empirical evidence on the information content of the published data itself is growing (Bouvatier et al., 2018; Brown et al., 2019; Dutt, Nicolay et al., 2019; Fatica & Gregori, 2020; Janský, 2020). The authors agree that the publicly available CbCR data of EU financial institutions reveals the extent of banks' presence in tax havens and a misalignment between profits and employees. We complement prior literature investigating the CbCR key data itself by analyzing how transparently and comprehensively the information is presented. The way of preparing the reports is essential for a consistent interpretation of the data by the public and by tax authorities. Ultimately, we make an important contribution by identifying open points that diminish the added value and effectiveness of CbCR.

Our findings are, at least partly, also generalizable to other CbCR initiatives, such as the confidential CbCR of the OECD that applies to large multinational firms (OECD, 2015). Although the OECD provides a model template (OECD, 2015, pp. 29–30), detailed instructions (e.g. OECD, 2015, pp. 31–35, 2019a, 2019b) and more specific items (e.g. differentiation between income tax paid and income tax accrued instead of "tax on profit or loss"), it also offers leeway to the reporting firms. For instance, the underlying data source and the calculation of the number of employees are specified neither by the OECD nor by most of the implementing countries (Spengel, Vay et al., 2019). Still, the risk of misinterpretations due to the lack of standardized rules is attenuated by the fact that firms are encouraged to describe which calculation methods they use (OECD, 2015, p. 32). In addition, the data is only reported confidentially to the tax authorities, such that potentially wrong conclusions by the general public cannot occur. The current CbCR proposal for large EU multinationals (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021), though, also foresees a publication of the data. Clear guidelines for preparing the reports are essential in order to make sure that the data can be considered appropriately by all addressees.

The remainder of this paper is structured as follows: Section 4.2 provides information on the CbCR requirement for EU financial institutions and reviews prior literature related to our study. Section 4.3 describes the construction of our dataset. In Section 4.4, we analyze the CbC reporting behavior of European bank groups headquartered in different countries. Based on our findings, we develop a best practice approach on CbCR in Section 4.5. Section 4.6 concludes.

[59] See Chapter 2.

4.2 Background and prior literature

4.2.1 The CbCR requirement for EU financial institutions

After the financial crisis, the need for more transparency and stricter regulations for financial institutions increased. In that regard, the CRD IV, accompanied by the Capital Requirements Regulation (CRR),[60] was adopted in June 2013. The package implements the Basel III standards, including for instance stricter requirements on capital, liquidity and leverage and new provisions on corporate governance and remuneration, into EU law. Article 89 of the CRD IV provides for a public CbCR for EU credit institutions and investment firms.[61] In light of the large public subsidies for the banking sector during the financial crisis, more transparency on banks' worldwide activities should enable the public to assess whether the taxes paid in the different jurisdictions reflect real economic activity appropriately (European Commission, 2014, p. 3). The reporting obligation comprises the public disclosure of turnover, the number of employees, profit or loss before tax, tax on profit or loss and public subsidies received for every country in which the group operates. In addition, the institutions are required to list the name, geographical location and nature of activities of their subsidiaries and branches (referred to as "list of entities" in the following). EU-headquartered bank groups have to prepare a CbCR for the whole group, whereas groups headquartered in third countries only have to disclose data on their EU entities, including their subsidiaries and branches. After having been audited, the reports shall be published as an annex to the financial statements. The CbCR requirement is effective from 1 January 2015, i.e. the first disclosure should relate to financial years beginning on or after 1 January 2014.[62]

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[60] Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, *Official Journal of the European Union*, *56*(L 176), 1–337 (27 June 2013).

[61] The CbCR requirement for EU financial institutions is one of the first CbCR initiatives. Section 1504 of the Dodd-Frank Wall Street Reform and Consumer Protection Act 2010 foresees a public disclosure requirement for firms in the extractive industries, but has not yet come into effect due to ongoing disagreement on the final rules to be issued by the Securities and Exchange Commission (SEC) (SEC, 2019). Similarly, under Chapter 10 of the EU Accounting Directive (Directive 2013/34/EU), large EU undertakings in the extractive industry are required to publicly disclose certain payments made to governments. For financial years starting on or after 1 January 2016, the OECD introduced a confidential CbCR vis-à-vis the tax authorities for multinational firms with consolidated revenues of at least EUR 750 million in the preceding year (OECD, 2015). The European Commission has developed a draft directive which resembles the OECD CbCR but provides for a public reporting (European Commission, 2016a). The European Parliament and the Presidency of the Council of the EU have brought forward several amendments and compromise proposals (e.g. European Parliament, 2019; Council of the EU, 2019, 2021), but a final agreement has not yet been reached. Finally, with effect from 1 January 2021, the Global Reporting Initiative (GRI) has established a CbCR standard to which firms can voluntarily adhere (Global Sustainability Standards Board (GSSB), 2019).

[62] From 1 July 2014 to 1 January 2015, the information to be disclosed was limited to the name, geographical location and nature of activities of the institutions' entities as well as to the amount of turnover and the number

Being secondary law, the CRD IV must be transposed into the national laws of the EU Member States. Article 89 of the CRD IV lacks clear guidelines on the definition and the presentation of the reportable items. Aiming at a consistent interpretation of European legislation, the European Banking Authority (EBA) provides answers to questions submitted by interested and affected parties as regards the application or implementation of certain provisions. Though, these answers are not binding (EBA, 2019). Ultimately, the exact interpretation of the provisions set out in Article 89 of the CRD IV is up to the discretion of the Member States (PricewaterhouseCoopers, 2014a, p. 2), and – in case they do not provide further guidance either – up to the reporting banks' discretion. Table 4.1 gives an overview of the transposition of different aspects that remain open in Article 89 of the CRD IV into the national laws of selected Member States,[63] including clarifications provided by the EBA during the Question & Answer process. The most important similarities and differences across the Member States are highlighted in the following.[64]

(1) While Article 89 of the CRD IV only states that the report shall be published as an annex to the financial statements, several countries offer more concrete options to the banks as to where to make their CbCR publicly available, e.g. as part of the annual report or as a separate document on the bank's website (see also EBA, 2014b).

(2) The CbCR should be prepared on a "consolidated basis", whereby the wording of Article 89 of the CRD IV leaves open what consolidation scope should be used. The EBA recommends to use the prudential scope of consolidation as defined by the CRR, but provides that Member States can also require a broader consolidation scope (EBA, 2014d). The latter alternative is followed by France (Art. L511-45 Code monétaire et financier), Germany (Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin), 2015) and the United Kingdom (HM Treasury, 2013b), which refer to the consolidation scope of the applicable accounting standards.

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of employees. Global systemically important institutions, though, had to submit the complete information to the European Commission on a confidential basis. Based on this data, the European Commission, in cooperation with PricewaterhouseCoopers, conducted an assessment as regards potential negative economic consequences of a public disclosure (PricewaterhouseCoopers, 2014b). On 30 October 2014, the European Commission informed the European Parliament and the Council of the EU on the outcome of its study and decided that the CbCR requirement should apply in full as originally foreseen (European Commission, 2014).

63 The selection is based on countries for which at least 15 CbCRs are included in our sample and where national laws and guidelines could be interpreted reliably. For other countries where we could only find single provisions (Austria, Luxembourg, the Netherlands, Sweden), these are shortly described in the following sections.

64 See Section 4.4 for a detailed discussion of the advantages and disadvantages of different ways of defining and presenting the required information.

Table 4.1: Transposition of Article 89 of the CRD IV into the national laws of selected EU Member States and recommendations by the European Banking Authority

Item / Topic	European Banking Authority	France	Germany	Italy	United Kingdom
Publication	Annex or notes to financial statements or separate report	Annual report, annex to financial statements or separate document on website; list of entities and table containing key financials shall be presented one after the other in the document where they are published	-	Annex to financial statements or website in combination with link in financial statements	Annual report or website in combination with link in annual report
Scope of consolidation	Prudential consolidation scope	Accounting consolidation scope	Accounting consolidation scope	-	Accounting consolidation scope, but only for firms within scope of CRD IV
Treatment of intra-group transactions	Before adjustments for intra-group cross-border transactions and other consolidated adjustments	-	Gross basis; institutions can decide whether they want to consolidate intra-group transactions within countries	-	-
Turnover	Consistent with the institution's financial statements, e.g. total net banking income (i.e. total net income before impairment and operating expenses, but including net interest income, net fees and commissions income, net trading income and other operating income)	"Produit net bancaire" (net banking income); "chiffre d'affaires" (turnover)	Total net income before impairment and operating expenses, but including net interest income, net fees and commissions income, net trading income and other operating income	Net interest and other banking income as per item 120 of the income statement and the consolidated income statement	Consistent with the institution's financial statements; e.g. total income before impairment and operating expenses, but after net interest, net commissions/fees income, investment and trading income and net insurance premiums

Table 4.1: Transposition of Article 89 of the CRD IV into the national laws of selected EU Member States and recommendations by the European Banking Authority *(continued)*

Item / Topic	European Banking Authority	France	Germany	Italy	United Kingdom
Number of employees on a full-time equivalent basis	-	-	In line with § 267 Sec. 5 German Trade Tax Code: average, without employees in training	Ratio between the total number of hours worked by all employees, excluding overtime, and the contractually agreed annual total for a full-time employee	Average; no requirement to report on workers who are not employees
Profit or loss before tax	-	-	-	Sum of items 250 and 280 (the latter before tax) of the income statement	Consistent with the institution's financial statements
Tax on profit or loss	Separately on a cash basis (taxes paid) and on an accrued basis (only current tax expense, no deferred taxes or provisions for uncertain tax liabilities)	Current and deferred tax expense	Accounting tax expense	Sum of the taxes referred to in item 260 of the income statement and income taxes relating to groups of assets held for sale	Corporation tax paid
Other	Institutions shall reconcile the published information with the consolidated annual financial statements where applicable	-	-	-	Institutions are encouraged to provide additional explanations and information that might be considered helpful to readers
Source	EBA (2014a, 2014b, 2014c, 2014d, 2014e)	Art. L511-45 Code monétaire et financier; Décret n° 2014-1657 du 29 décembre 2014 pris pour l'application de l'article L511-45 du code monétaire et financier	BaFin (2015)	Circolare n. 285 del 17 dicembre 2013, Parte Prima, Titolo III, Capitolo 2	Statutory Instrument 2013 No. 3118; HM Treasury (2013a, 2013b)

Notes: The table shows how different aspects of Article 89 of the CRD IV are transposed into the national laws of selected Member States, including clarifications provided by the European Banking Authority. The selection of Member States is based on countries for which at least 15 CbCRs are included in our sample and where national laws and guidelines could be interpreted reliably. We focus only on aspects that go beyond the wording of Article 89 of the CRD IV.

(3) Article 89 of the CRD IV does not prescribe which data source should be used for the calculation of profit or loss before tax. In Italy (Circolare n. 285 del 17 dicembre 2013, Parte Prima, Titolo III, Capitolo 2) and the United Kingdom (HM Treasury, 2013a), this item shall be consistent with that in the institution's income/ financial statements. According to the EBA, the CbCR data shall be presented "before adjustments for intra-group cross-border transactions and other consolidated adjustments" (EBA, 2014c). Germany is the only country that provides further guidance in this regard, according to which the CbCR shall be prepared on a gross basis, whereby institutions can decide whether they consolidate intra-group transactions within countries (BaFin, 2015).

(4) Turnover is not naturally part of banks' financial statements and thus leaves room for interpretation. The EBA recommends that this item shall be in line with the institution's financial statements and interpreted for instance as total net banking income, defined as "total net income before impairment and operating expenses, but including net interest income, net fees and commissions income, net trading income and other operating income" (EBA, 2014e). Germany (BaFin, 2015), the United Kingdom (HM Treasury, 2013a) and Italy (Circolare n. 285 del 17 dicembre 2013, Parte Prima, Titolo III, Capitolo 2) follow this definition. Austria (§ 64 Sec. 1 No. 18 lit. b Bankwesengesetz) and France (Art. L511-45 Code monétaire et financier) both explicitly demand two turnover variables ("Nettozinsertrag" and "Betriebserträge"; "produit net bancaire" and "chiffre d'affaires"), whereas Sweden only specifies that a net size shall be reported (FFFS 2008:25, Ch. 7, Sec. 4).

(5) As regards the number of employees on a full-time equivalent basis, Germany (BaFin, 2015), the Netherlands (Art. 3 Besluit uitvoering publicatieverplichtingen richtlijn kapitaalvereisten), Sweden (FFFS 2008:25, Ch. 7, Sec. 4) and the United Kingdom (Statutory Instrument 2013 No. 3118) further specify that an average number should be reported.

(6) The exact meaning of "tax on profit or loss" is not revealed in Article 89 of the CRD IV. The EBA recommends to report taxes both on a cash basis, i.e. taxes paid, and on an accrued basis, i.e. current tax expense without deferred taxes or provisions for uncertain tax liabilities (EBA, 2014a). Luxembourg (Art. 38-3 Loi du 5 avril 1993 relative au secteur financier) and the United Kingdom (Statutory Instrument 2013 No. 3118) prescribe the disclosure of (corporation) tax paid, while the accounting tax expense shall be disclosed in Germany (BaFin, 2015) and France (Art. L511-45 Code monétaire et

financier), whereby the latter further distinguishes between current and deferred tax expense. Italy refers again to the taxes as reported in the income statement, i.e. the sum of current and deferred tax expense (Circolare n. 285 del 17 dicembre 2013, Parte Prima, Titolo III, Capitolo 2).

(7) Beyond the explicit requirements of Article 89 of the CRD IV, the EBA recommends that the published data shall be reconciled with the consolidated financial statements if possible (EBA, 2014d). In the United Kingdom, institutions are encouraged to provide additional explanations and information that might help readers to understand the report (HM Treasury, 2013a).

For the public CbCR requirement for EU financial institutions to be effective, it is essential that the reports can be considered appropriately by all addressees. The disclosure obligation is supposed to work via two main channels: First, the data shall direct tax authorities' attention to issues that require further investigation such that abusive tax planning behavior can be detected more efficiently. Second, public pressure should induce firms to refrain voluntarily from presumably aggressive tax sheltering and to pay taxes in proportion to real economic activity. The different ways of implementing the CbCR obligation, though, can result in reporting heterogeneity across Member States and bank groups, which can in turn impede the interpretability and the comparability of the reports. Ultimately, and notably in light of the additional direct and indirect costs that go along with the CbCR requirement (Dutt et al., 2020), the heterogeneous reporting behavior is likely to weaken the added value of CbCR. The public availability of the reports offers a unique research setting and allows to identify regulatory gaps that require further clarifications, such that the overall objective of CbCR, the increase in transparency, can be reliably achieved.

4.2.2 Related literature

We contribute to the literature on CbCR which is continuously growing due to the novelty of this transparency measure and the emergence of an increasing number of different CbCR concepts (see footnote 61). We differentiate between three strands of empirical literature on CbCR that can further be classified according to the different existing initiatives.[65]

[65] In additional, several normative studies discuss the pros and cons of CbCR, e.g. Cockfield and MacArthur (2015); Evers et al. (2017); Hanlon (2018); Dutt et al. (2020); Lagarden et al. (2020).

First, several studies analyze in how far affected firms reacted to CbCR and adapted their tax avoidance behavior and their real economic activities. With regard to Article 89 of the CRD IV, empirical evidence on its impact on banks' overall level of tax avoidance is mixed. Overesch and Wolff (2020) find that EU-headquartered multinational banks with activities in European tax havens are particularly exposed to the new transparency measure and increase their effective tax rates after the introduction of CbCR compared to banks without tax haven operations and to different control groups not affected by the disclosure obligation. Joshi et al. (2020) document a decline in income shifting by financial affiliates, but find that the magnitude of corporate tax avoidance at bank group level did not change materially. Concerning real effects, Eberhartinger et al. (2020) observe a reduction in European banks' presence in tax havens, especially in so-called Dot Havens and tax havens where financial secrecy is high. With regard to the confidential CbCR for large multinational firms established by the OECD for financial years starting on or after 1 January 2016 (OECD, 2015), Hugger (2020) and Joshi (2020) document that the effective tax rates of firms subject to the disclosure requirement increase in response to the CbCR introduction and that the extent of profit shifting declines.[66] Hugger (2020) also observes that companies try to avoid the CbCR obligation by adjusting their revenues below the reporting threshold of EUR 750 million. De Simone and Olbert (2020) provide evidence that affected firms increase investments in tangible assets and employees in European countries with preferential tax regimes and reduce the number of subsidiaries and organizational complexity.

Second, two event studies examine the reaction of the capital market to the increase in tax transparency by CbCR. Empirical results are inconclusive and depend on the underlying CbCR initiative. Johannesen and Larsen (2016) observe a significant decrease in firm value around two key dates in the legislative process that included a CbCR requirement for large EU undertakings in the extractive industry in the EU Accounting Directive. In contrast, the findings of Dutt, Ludwig et al. (2019) suggest a zero investor response to the decision to introduce a CbCR obligation for EU financial institutions. They find some evidence that negative reactions from the anticipation of reduced tax avoidance opportunities and positive reactions from an expected decline in information asymmetries between managers and shareholders offset each other on average.

Third, and most closely related to our study, several authors analyze the information content of CbCR. Descriptive analyses of the publicly available CbCR data of EU financial institutions

[66] Joshi (2020) only finds a decline in profit shifting from 2018 onwards.

reveal the extent of banks' presence in tax havens as well as a misalignment between profits and employees in particular tax havens (Bouvatier et al., 2018; Brown et al., 2019; Dutt, Nicolay et al., 2019; Fatica & Gregori, 2020; Janský, 2020).[67] Dutt, Nicolay et al. (2019) also show that CbCRs uncover a large amount of bank's worldwide profits and employees compared to conventional databases. In the context of the confidential CbCR of the OECD, a few papers examine aggregated CbCR data of U.S. multinational companies.[68] Garcia-Bernardo et al. (2019) find that the disconnect between profits and real economic activity is higher in countries with low effective tax rates and that the country coverage of CbCR data is superior to that of other available data sources. Clausing (2020a, 2020b) estimates a large scale of profit shifting based on U.S. CbCR data. Finally, Blouin and Robinson (2020) and Horst and Curatolo (2020) discuss in how far U.S. CbCR data contains a double counting of profits which might inflate profit shifting estimates.

We complement prior literature analyzing the numerical CbCR information itself by focusing on how transparently and comprehensively the information is presented. For this purpose, we build on the dataset of CbCRs collected by Dutt, Nicolay et al. (2019) and add new variables to the key data contained therein which measure the reporting behavior of the bank groups. The way of calculating and presenting the data is essential for a consistent interpretation of the reports by its addressees. We make an important contribution by investigating which open points diminish the informative value of CbCR and impede its effectiveness and therefore require further clarifications.

4.3 Data

Our starting point is the dataset of CbCRs collected by Dutt, Nicolay et al. (2019). The authors conduct a Python programmed Google search based on both a list of multinational, EU-headquartered bank groups derived from Bank Focus ownership data and typical expressions contained in CbCRs in several languages. They use textual analysis techniques to identify the relevant section in the downloaded PDFs that comprises the CbCR information.[69] For each CbCR, they manually extract the key CbCR data (profit or loss before tax, number of employees, turnover and taxes) for each reported country as well as additionally relevant

[67] Apart from academic studies, there are also studies prepared by non-governmental organizations or political groups, for instance Murphy (2015); Aubry et al. (2016); Aubry and Dauphin (2017).

[68] Recently, the OECD also published a first descriptive analysis of aggregated CbCR data from 26 jurisdictions (OECD, 2020).

[69] See Dutt, Nicolay et al. (2019, pp. 14–16) for a detailed description of the data collection process.

information (e.g. unit, currency). Their final sample includes (unbalanced) CbCR data for 114 multinational bank groups headquartered in the EU for the years 2014-2016.[70] This dataset forms the starting point for our analyses. We aggregate the dataset at bank group-year level, since we are interested in the CbCRs as a whole, not in the distribution of the data across the different reported countries. Table 4.2 shows the composition of the sample of CbCRs underlying our analyses by headquarter country and year. Overall, we consider 304 reports.[71] CbCRs of bank groups headquartered in Germany, the United Kingdom, France, Italy and Spain constitute the largest part of the sample.

Table 4.2: CbCR sample composition – headquarter countries

Headquarter country	2014	2015	2016	Total
Austria	5	6	6	17
Belgium	3	3	4	10
Cyprus	1	2	2	5
Denmark	3	3	3	9
France	12	14	13	39
Germany	19	19	18	56
Greece	2	2	2	6
Ireland	1	1	1	3
Italy	12	15	12	39
Luxembourg	0	2	3	5
Netherlands	6	7	7	20
Poland	0	0	1	1
Portugal	0	1	1	2
Slovenia	1	1	1	3
Spain	11	12	11	34
Sweden	5	5	5	15
United Kingdom	10	16	14	40
Total	91	109	104	304

Notes: The table shows the number of CbCRs (bank group-years) by headquarter country and year.

[70] The CbCR requirement is effective from 1 January 2015. Dutt, Nicolay et al. (2019) conducted the data collection process in 2017. Hence, their sample covers the financial years 2014-2016. We believe that a longer time horizon would not significantly change our inferences, since exemplary inspections reveal that, over the three years considered, banks' adjustments in presenting the CbCR data are overall only minor.

[71] The total number of CbCRs (304) is slightly smaller than the number of bank group-years (316) indicated in Dutt, Nicolay et al. (2019). The small discrepancy stems from the different underlying research questions. Dutt, Nicolay et al. (2019) focus on the information content of the CbCR data. In case a CbCR is not available for a distinct year, but the data is contained in the CbCR of the following year, the CbCR of the following year is used to collect data for both years, such that two bank group-years are recorded. In this study, though, we are interested in the CbCR as a whole instead of the CbCR data. In the case illustrated above, we would therefore only count one CbCR.

In a next step, we define variables that reflect the reporting behavior in the CbCRs. They refer to the place of publication of the CbCR, the CbCR content, the readability of the tables containing the CbCR data and the list of entities that should be published together with the reportable items. Columns 3 to 5 of Table C.1 in the Appendix provide an overview of the variables included in our analyses. We differentiate between a maximum of four values per variable (i.e. 0 – 1 – 2 – 3). Most variables, though, can take two values (e.g. 0 = "no", 1 = "yes"). The variables are constructed in such a way that a higher value implies more transparency or a better readability. This ordering is essential for the score analysis conducted in Section 4.4.2 since it ensures that the values of different variables can be added up. The different values that a variable can take are also indicated in the legend of each figure in Section 4.4.1. The order of the bars in the figures reflects an increase in transparency.[72]

For each CbCR, we manually code the variables along our definition. Some of the variables shown in Table C.1 are derived from additional variables that are not numeric, but where we enter free text, which is subsequently converted into categories (e.g. *turn_count*, *tax_count*, *item_add_count*, *other_ctry_count_desc*).

In Section 4.4.2, we also consider the relation between the reporting behavior and both the share of tax havens in the total number of reported countries and the total number of employees reported in the CbCR. These variables are calculated based on the original CbCR dataset at bank group-year-country level of Dutt, Nicolay et al. (2019).

4.4 Analysis of European banks' country-by-country reporting behavior

4.4.1 Reporting heterogeneity

In this section, we examine the reporting heterogeneity across our sample of CbCRs by conducting descriptive analyses. We focus on the place of publication of the CbCR, the CbCR content, the readability of the tables containing the CbCR data and the list of subsidiaries and branches. We also consider differences between bank groups headquartered in different countries and try to link our findings to country-specific particularities with regard to the

[72] In Figure 4.1, Figure 4.9, Figure 4.11, Figure 4.14, Figure 4.16, Figure 4.18, Figure 4.19 and Figure 4.21, the order of the bars does not imply an increase in transparency. Instead, each bar reflects a "no" vs. "yes" decision (0 vs. 1).

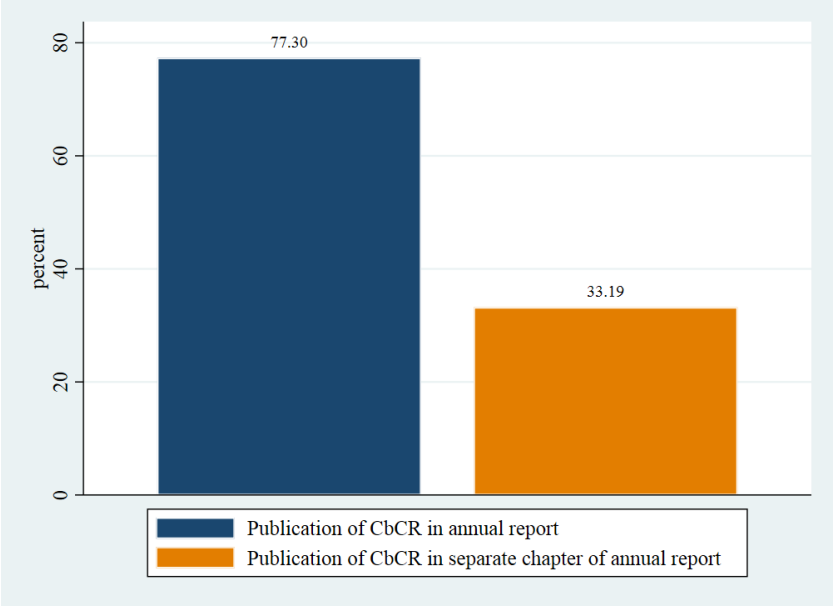
transposition of Article 89 of the CRD IV into Member States' national laws, as described in Section 4.2.1.[73]

4.4.1.1 Place of publication

According to Article 89 of the CRD IV, CbCRs shall be published as an annex to the financial statements. They are regularly made available to the public either by disclosure in the annual report or as a separate document on the bank's website. Figure 4.1 reveals that most bank groups (77.30%) publish the CbCR as part of the annual report. Among those CbCRs that are published in the annual report, about one third (33.19%) are included in a separate chapter, i.e. the section containing the CbCR is listed in the table of contents of the annual report. However, there is a wide variety among the headquarter countries in our sample, with Italian bank groups exhibiting the highest share of CbCRs contained in a separate chapter (82.61%). Given the often extensive length of the annual report, information as to where to find the CbCR among the other financial and non-financial information provided in the annual report facilitates finding the data. For three quarter (75.66%) of the CbCRs, the annual report constitutes the only place of publication (see Figure 4.2). A quarter (24.34%) of the reports, in contrast, are published in a separate document, whereby rarely, both publication places are used in parallel. Bank groups from the United Kingdom have a slight preference for the publication of the CbCR in a separate document (62.50%); a few CbCRs are published as part of a larger tax report which includes additional information on the overall tax strategy of the group. A separate document is also common in Italy (41.03%) and Germany (35.71%). Article 89 of the CRD IV prescribes that the CbCR data shall be audited. In case the CbCR is published in an own document, only some of these include a separate statement of the auditor.

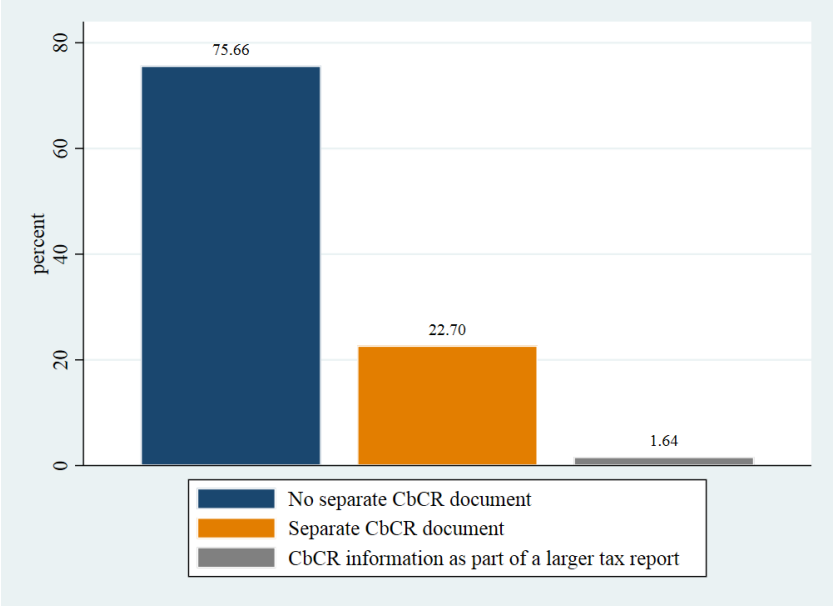
[73] We only draw inferences on headquarter countries for which at least 15 CbCRs are included in our sample.

Figure 4.1: Publication of CbCR in (separate chapter of) annual report



Notes: The graph shows the share of CbCRs that are published in the annual report ("Publication of CbCR in annual report") and, for those CbCRs that are published in the annual report, the share of CbCRs that are contained in a separate chapter of the annual report, i.e. the CbCR is included in the table of contents of the annual report ("Publication of CbCR in separate chapter of annual report").

Figure 4.2: Form of publication used for CbCR apart from annual report



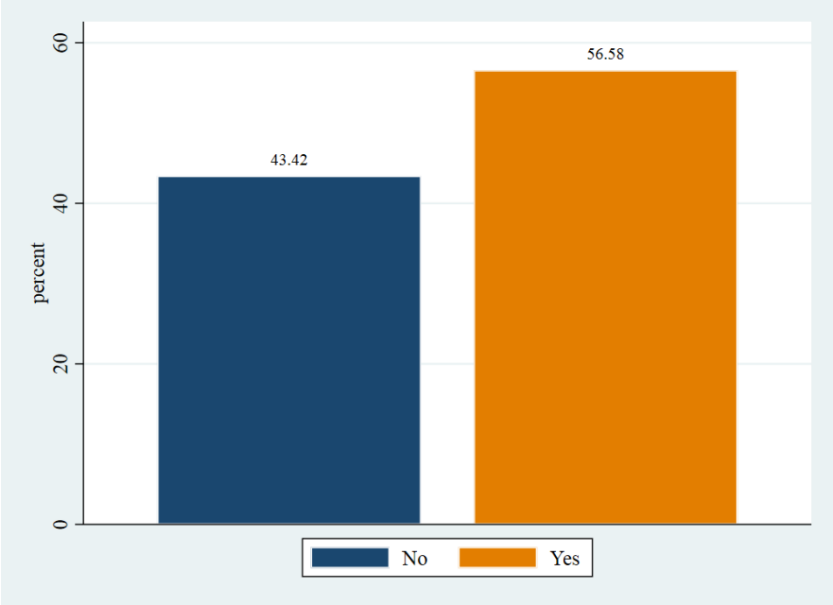
Notes: The graph shows the relative frequencies of the forms of publication used for the CbCR apart from the annual report. "No separate CbCR document" indicates that the CbCR is only published in the annual report, without any separate publication being detectable. "Separate CbCR document" indicates that the CbCR is published in a separate document which contains no other information – regardless of a parallel publication in the annual report. "CbCR information as part of a larger tax report" represents a specific scenario where the CbCR information is published as part of a larger tax report which includes additional information.

4.4.1.2 CbCR content

In this section, we consider what information is provided in the report beyond the mere numbers. We take both qualitative and quantitative information into account, such as additional explanations on the calculation of the data or the inclusion of supplementary items that go beyond the requirements of the CRD IV.

As displayed in Figure 4.3, more than half of the CbCRs (56.58%) include the literal expression of "CbCR" or equivalent terms, which helps to find the report. In Spain, Article 87 of Law 10/2014 specifies that the CbCR shall be called "informe bancario anual" (annual banking report), which is consistent with our observations.[74] While 23.36% of the reports provide no explanation on the legal basis of the CbCR, 28.62% (9.21%) refer to the national legal rules (the CRD IV) (see Figure 4.4). In 38.82% of the cases, a reference to both national law and the CRD IV is provided, which is particularly common in Spain and Germany. Again, such a reference supports the reader of the document in identifying the CbCR data.

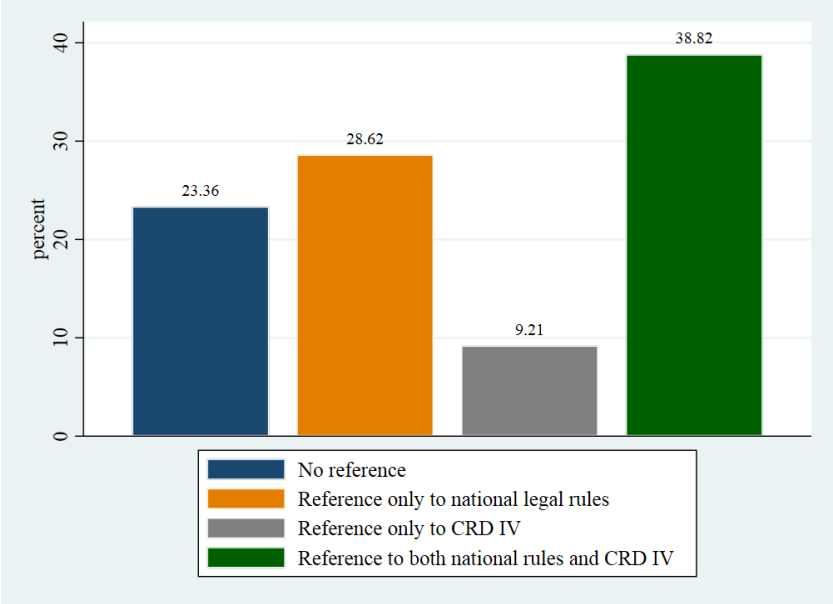
Figure 4.3: Use of literal expression of "CbCR" or equivalent terms



Notes: The graph shows the share of CbCRs that include the literal expression of "CbCR" or equivalent terms (accounting for different languages). "No" indicates that the literal expression or an equivalent term for CbCR is not used in the report. "Yes" indicates that the literal expression or an equivalent term for CbCR is used in the report.

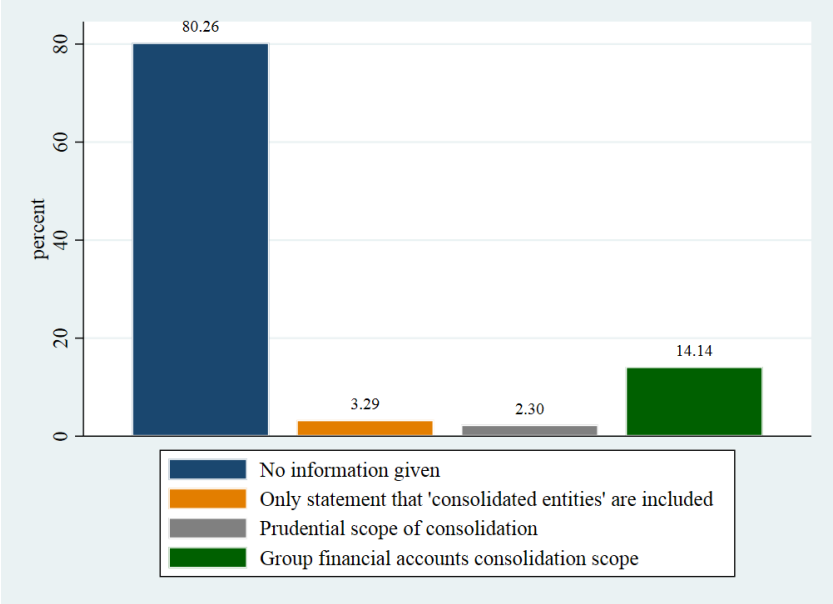
[74] However, we do not consider the expression "informe bancario anual" as synonym for "CbCR" since it is not specific enough to find the CbCR data without knowledge of the Spanish regulation. A term which we treat equivalently to "CbCR" is for instance the German term "länderspezifische Berichterstattung" (country-specific reporting).

Figure 4.4: Explanation on legal basis of CbCR



Notes: The graph shows the relative frequencies of the different explanations given on the legal basis of the CbCR. "No reference" indicates that no explanation is given on the legal basis. The other possible cases include a "Reference only to national legal rules", "Reference only to CRD IV" and "Reference to both national rules and CRD IV".

Figure 4.5: Underlying consolidation scope



Notes: The graph shows the relative frequencies of the underlying consolidation scopes used. "No information given" indicates that no information on the underlying consolidation scope is provided in the CbCR. "Only statement that 'consolidated entities' are included" denotes the statement in the CbCR that only consolidated entities are included. "Prudential scope of consolidation" and "Group financial accounts consolidation scope" indicate that the CbCR states that the prudential consolidation scope and the group financial accounts consolidation scope are used, respectively.

The CbCR should be prepared on a "consolidated basis", which could relate to either the accounting or the (usually narrower) prudential consolidation scope (EBA, 2014d). Figure 4.5 shows that the vast majority of the CbCRs (80.26%) contain no information on the underlying scope of consolidation. 3.29% (only CbCRs from France) state that "consolidated entities" are included, without providing further details. Since the CbCR is regularly part of the annual report (see above), this statement presumably refers to the consolidation scope of the applicable accounting standards. This understanding is also consistent with the provisions of Article L511-45 of the "Code monétaire et financier" in France. 2.30% of the CbCRs (only from Germany) state to use the prudential consolidation scope, whereas an explicit reference to the accounting consolidation scope is made in 14.14% of the cases. Germany exhibits by far the highest transparency (only 25% of the reports provide no information). With almost two third (64.29%) relying on the accounting consolidation scope, the majority of the German bank groups are in line with the guidelines of the BaFin (BaFin, 2015).

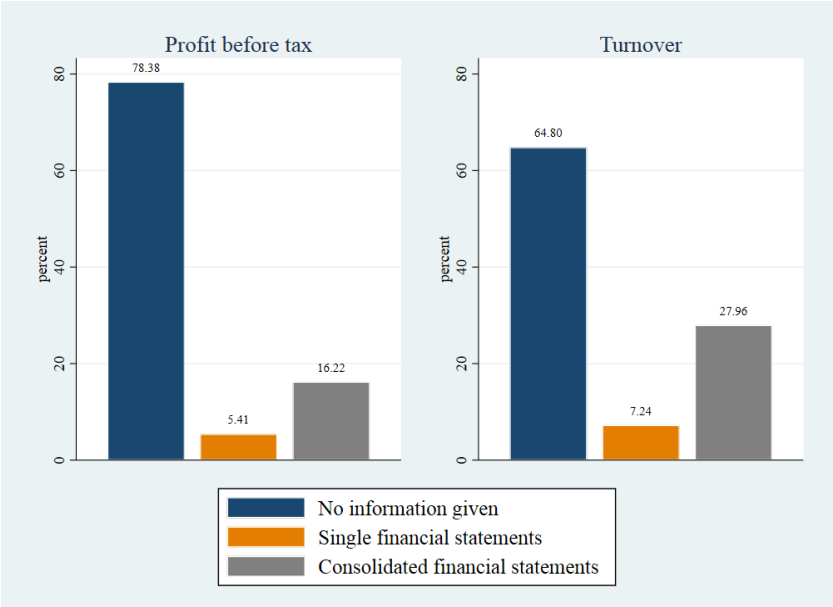
Article 89 of the CRD IV does not specify which data source should be used for the calculation of the reportable items and in how far profits from intra-group transactions should be eliminated. Both single and consolidated financial statements are conceivable data sources. These alternatives contain important differences. If consolidated financial statements are used, consolidated profits/ losses and turnover must be allocated to different countries. The sum of the country profits reported in the CbCR should thus correspond to the total profit at group level reported in the consolidated financial statements (Evers & Hundsdoerfer, 2014, p. 12). Such an apportionment, though, is arbitrary since total profits are affected by synergy effects as well as by non-feasible internal and external factors and therefore cannot be allocated to distinct locations based on simple key figures (Evers & Hundsdoerfer, 2014, pp. 12–13, 23). If, in contrast, single financial statements are considered, the profits/ losses and turnover of the group's entities would just have to be added up by country. In consolidated financial statements, income and expenses from intra-group transactions are netted out, such that the overall profit remains unaffected (Evers et al., 2017, p. 7). However, taxes are regularly determined on the basis of single financial statements including profits from intra-groups transactions. Thus, the link between reported profits and taxes per country is likely to be distorted and offers room for misinterpretations (Evers & Hundsdoerfer, 2014, p. 12; Grotherr, 2016b, p. 711). In addition, profit shifting by means of transfer pricing or intra-group financing is not visible (Evers et al., 2017, p. 7). By contrast, single financial statements contain profits from intra-group transactions. Still, they would at best provide rough indications for profit shifting because the

by-country data does not provide details on the intercompany transactions, such as on their source or direction (Evers et al., 2017, p. 7). Although reported profits and taxes per country match better than on the basis of consolidated financial statements (Grotherr, 2016b, p. 711), discrepancies between financial and tax accounting can also result in a misleading picture (Evers et al., 2017, p. 7). Lastly, single financial statements are regularly based on local Generally Accepted Accounting Principles (GAAP) which might differ between jurisdictions, thus impeding the cross-country comparability of the data (Grotherr, 2016b, p. 712; Evers et al., 2017, p. 7). For consolidated financial statements, International Financial Reporting Standards (IFRS) are becoming more and more common, but discrepancies between CbCRs prepared by different groups might arise as well unless all countries oblige firms to rely exclusively on IFRS (Spengel, Vay et al., 2019, p. 579). Still, at least within the same CbCR, the data is better comparable across reported countries.

Figure 4.6 shows that information on the underlying data source is mostly missing in the CbCRs. The data source used for the by-country calculation of turnover is more often revealed (35.20% of the CbCRs) than for the determination of profit or loss before tax (21.62% of the cases). A potential reason is that the notion of turnover itself requires further explanations as it is not naturally part of the financial statements of financial institutions (see section below). German and Spanish bank groups exhibit the highest transparency. From those bank groups that provide additional information on the underlying data source, the majority claim to prepare the CbCR on the same basis as the consolidated financial statements. Most bank groups also remain intransparent on how they treat intra-group transactions (see Figure 4.7). German bank groups are the most transparent, with a clear preference for no elimination of intra-group transactions (49.09% for profit before tax, 69.64% for turnover), thereby following the recommendation of the BaFin to report the data on a gross basis (BaFin, 2015). We rarely observe the elimination of all intra-group transactions in Italy, the United Kingdom and Germany. An elimination of transactions between entities in the same country while preserving cross-border intra-group transactions (EBA, 2014c) is explicitly made by a small portion of bank groups headquartered in the United Kingdom and Germany. A direct comparison of Figure 4.6 and Figure 4.7 reveals that caution should be warranted when taking the statements in the reports literally: While consolidated financial statements are the preferred source of data, no elimination is the most favored treatment of intra-group transactions, which constitutes a contradiction (see description above). Hence, statements such as “the data is prepared on the same basis as the consolidated financial statements” do not imply an exact equaling of the data

from the CbCR and the consolidated financial statements because additional adjustments might have been made when splitting the overall result to individual countries. The EBA recommends that the CbCR data shall be reconciled with the consolidated financial statements (EBA, 2014d). Only few CbCRs state that the CbCR data and the consolidated financial statements data are compatible (3.04%) respectively not compatible (2.03%) (see Figure 4.8). A fifth (22.30%) of the CbCRs in our sample contain a quantification of the differences between the two types of information disclosed. Especially bank groups headquartered in Sweden, the United Kingdom and Italy prepare such a reconciliation. Some bank groups provide additional explanations on the origin of the difference between the sum of the country profits in the CbCR and the overall profit in the consolidated financial statements. Common reasons are adjustments with respect to intra-group transactions and dividend payments.[75]

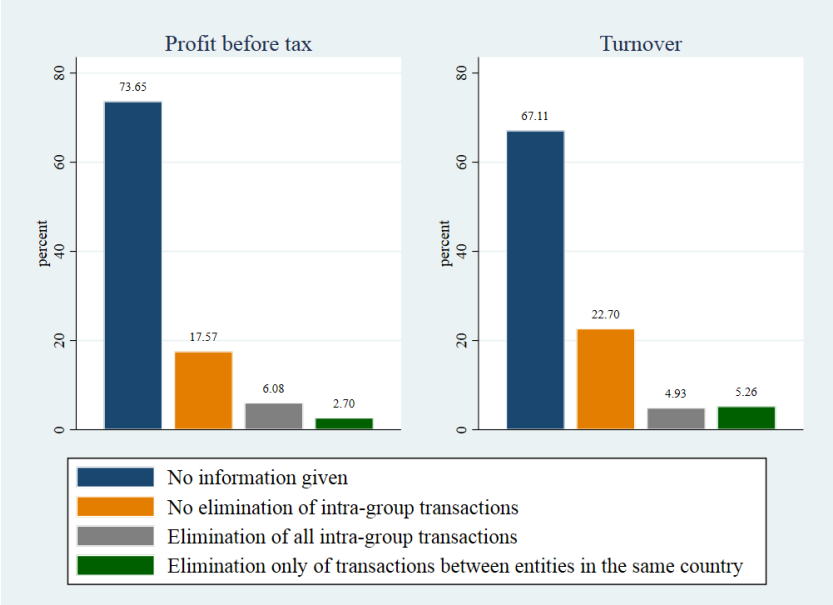
Figure 4.6: Underlying data source for profit before tax and turnover



Notes: The graph shows the relative frequencies of the underlying data sources used for the by-country calculation of profit before tax and turnover. "No information given" indicates that no information on the underlying data source is provided in the CbCR. "Single financial statements" and "Consolidated financial statements" indicate that the CbCR states that single financial statements and consolidated financial statements, respectively, are used as basis for the by-country calculation of profit before tax or turnover.

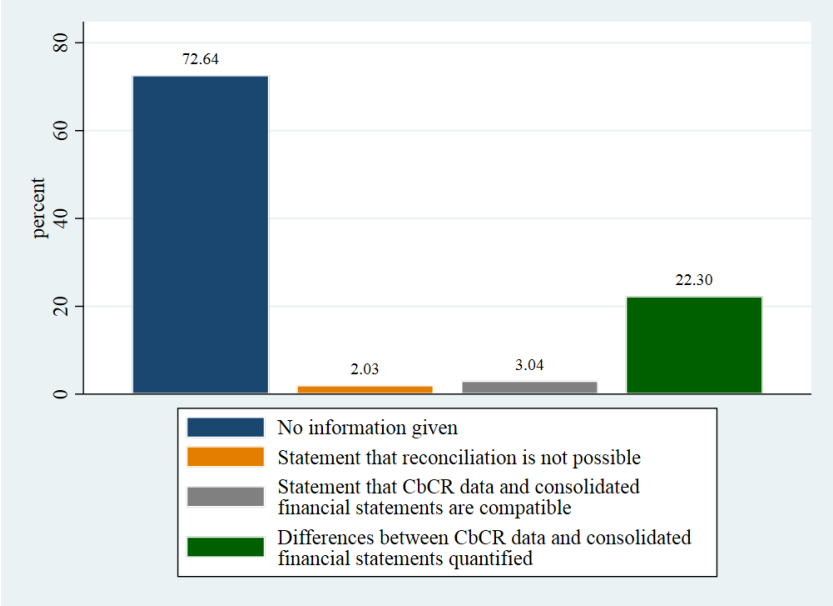
[75] Since dividend distributions are not deductible from income, the inclusion of received intra-group dividends in the reported profit before tax results in a double counting of the dividend income. In particular with respect to jurisdictions where holding companies are located, a distorted picture on the amount of profits before tax might thus arise (Spengel, Vay et al., 2019, p. 580). See also Horst and Curatolo (2020) and Blouin and Robinson (2020) for a discussion of this double counting problem with respect to aggregate CbCR data of U.S. multinationals. As regards the CbCR requirement set out in Action 13 of the OECD's Action Plan on Base Erosion and Profit Shifting (BEPS) (OECD, 2015), the OECD has recently clarified that dividend payments received from other group members should be excluded from profit or loss before tax (OECD, 2019b, p. 13). Article 89 of the CRD IV, though, does not prescribe how intra-group dividends should be treated.

Figure 4.7: Underlying treatment of intra-group transactions with regard to the calculation of profit before tax and turnover



Notes: The graph shows the relative frequencies of the ways intra-group transactions are treated with regard to the calculation of profit before tax and turnover. "No information given" indicates that no information on the underlying treatment of intra-group transactions is provided in the CbCR. "No elimination of intra-group transactions", "Elimination of all intra-group transactions" and "Elimination only of transactions between entities in the same country" indicate that the CbCR states that intra-group transactions are not eliminated, that all intra-group transactions are eliminated and that only transactions between different entities in the same country are eliminated while preserving cross-border transactions, respectively.

Figure 4.8: Degree of compatibility between CbCR and consolidated financial statements

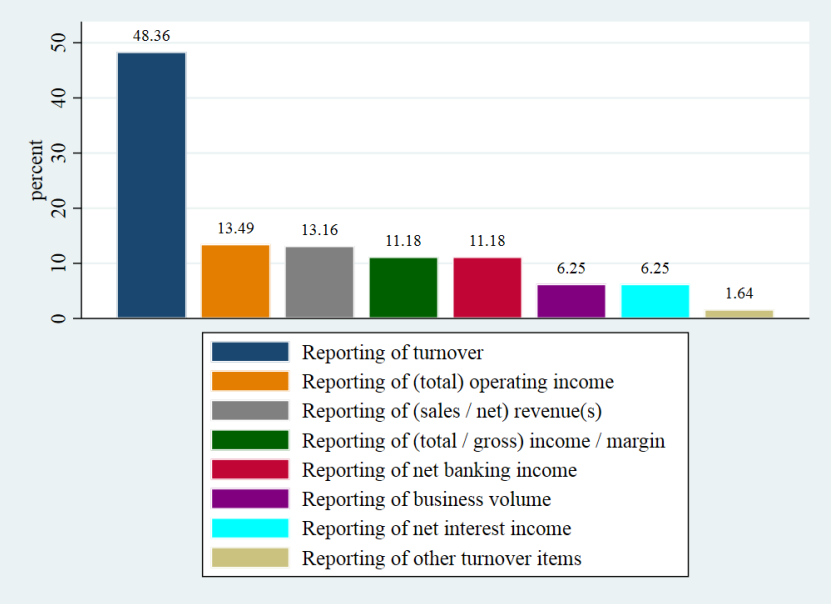


Notes: The graph shows the relative frequencies of the different degrees to which the CbCR and the consolidated financial statements are compatible. "No information given" indicates that no information on the compatibility between the CbCR and the consolidated financial statements is provided in the CbCR. "Statement that reconciliation is not possible", "Statement that CbCR data and consolidated financial statements are compatible" and "Differences between CbCR data and consolidated financial statements quantified" indicate that the CbCR states that reconciliation between the CbCR data and the consolidated financial statements is not possible, that compatibility between the CbCR data and the consolidated financial statements is given and that differences between the CbCR data and the consolidated financial statements are quantified, respectively.

The notion of "turnover" is not naturally part of the financial statements of financial institutions. The EBA clarifies that this item shall be in line with the institution's financial statements and interpreted for instance as total net banking income, defined as "total net income before impairment and operating expenses, but including net interest income, net fees and commissions income, net trading income and other operating income" (EBA, 2014e). We observe a wide variety of different expressions for reporting the "turnover" item, which are displayed in Figure 4.9. Almost half of the bank groups (48.36%) employ literally the notion of "turnover" (notwithstanding differences in language and spelling). Other expressions that regularly appear (between 6.25% and 13.49% of the cases) are "(total) operating income", "(sales/ net) revenue(s)", "(total/ gross) income/ margin", "net banking income", "business volume" and "net interest income" (see the notes to Figure 4.9 for variants in different languages and spelling). In Austria, § 64 Sec. 1 No. 18 lit. b Bankwesengesetz goes beyond the requirements of the CRD IV and prescribes the reporting of two different turnover items, namely "Nettozinsertrag" (net interest income) and "Betriebserträge" (operating income). In France, Article L511-45 of the "Code monétaire et financier" demands two turnover variables as well, i.e. "produit net bancaire" (net banking income) and "chiffre d'affaires" (turnover).

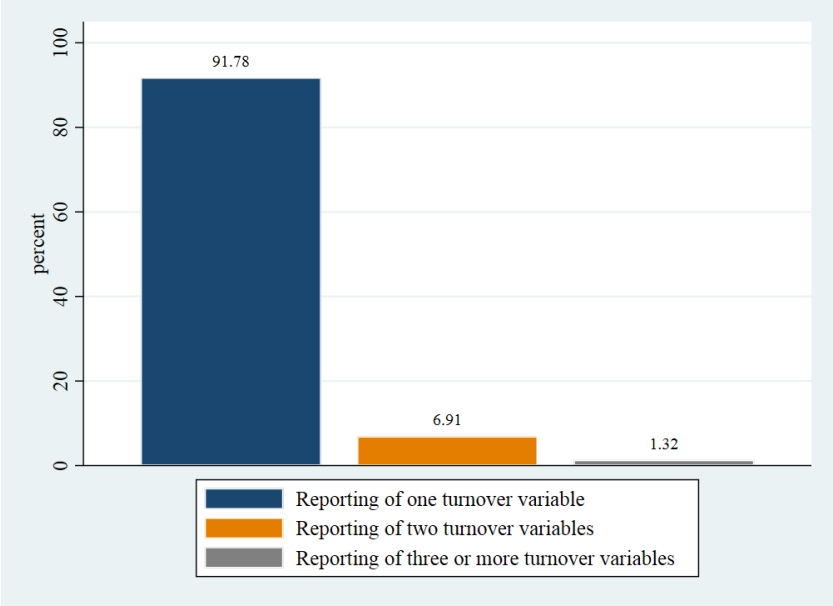
Indeed, we observe that 82.35% of the Austrian and 17.95% of the French bank groups in our sample report two different turnover variables (see Figure 4.10). A few bank groups in Sweden even disclose three or more turnover items. The expression used for turnover is often not concrete enough to gain a thorough understanding of what is actually measured by this variable, in particular if the notion "turnover" itself is employed. More than half of the CbCRs (57.57%) provide therefore additional explanations on the composition of the reported turnover item(s), for instance which sub-items are included in the variable (see Figure 4.11). Transparency is highest in Germany and Spain and lowest in the Netherlands, France and Austria. Still, additional definitions are dispensable if the turnover expression is sufficiently precise, as it is regularly the case in Austria and France, for instance.

Figure 4.9: Expressions used for turnover



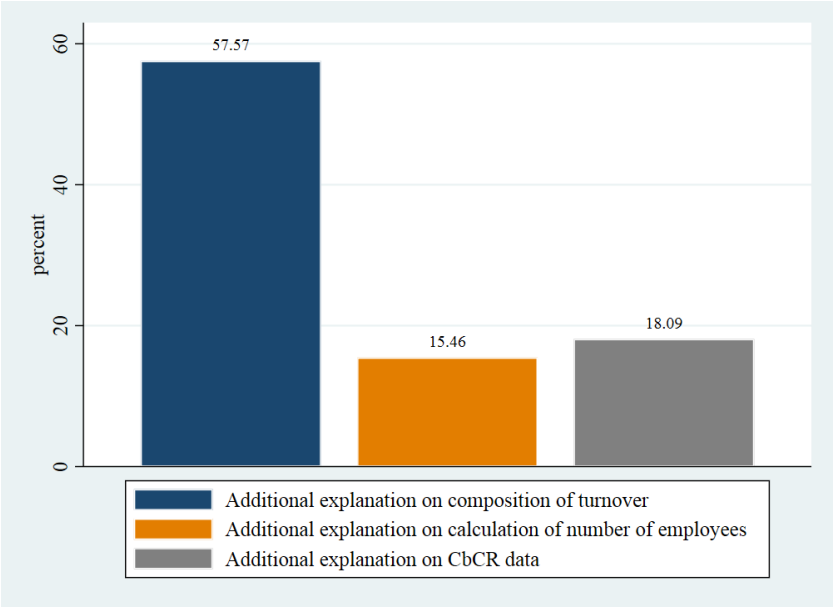
Notes: The graph shows the relative frequencies of different expressions used for the reporting of turnover in the CbCR (notwithstanding differences in language and spelling). "Reporting of turnover" refers to the cases where turnover is literally reported as "turnover", i.e. turnover, fatturato, Umsatz, chiffre d'affaires. "Reporting of (total) operating income" refers to the reporting of (total/ statutory/ other) operating income, total income from operating activities, Betriebserträge. "Reporting of (sales/ net) revenue(s)" refers to the reporting of (sales/ net) revenue(s). "Reporting of (total/ gross) income/ margin" refers to the reporting of (total/ gross) income/ margin, margen bruto, income from continued/ continuing operations. "Reporting of net banking income" refers to the reporting of net banking income/ revenue, produit net bancaire, net interest and other banking income. "Reporting of business volume" refers to the reporting of business volume, volume of business, volumen de negocio. "Reporting of net interest income" refers to the reporting of net interest income, Zinsüberschuss, Nettozinsertrag, both interest income and interest expense. "Reporting of other turnover items" refers to the reporting of other variables in the context of turnover, e.g. (net) fees and commissions income, net premium income, net insurance income, other income.

Figure 4.10: Number of turnover variables reported



Notes: The graph shows the relative frequencies of the number of reported turnover variables. "Reporting of one turnover variable", "Reporting of two turnover variables" and "Reporting of three or more turnover variables" refer to the reporting of one, two and three or more turnover variables, respectively, in the CbCR.

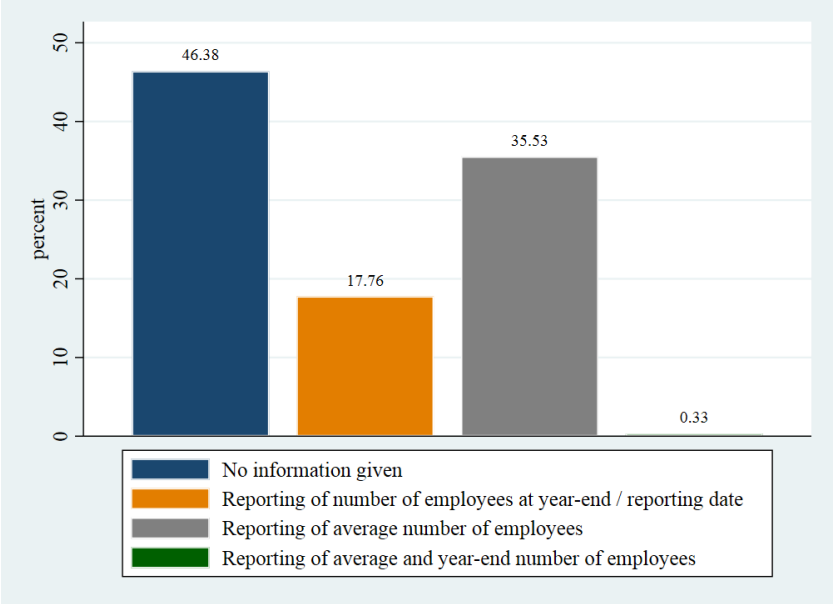
Figure 4.11: Provision of additional explanations



Notes: The graph shows the share of CbCRs that provide additional explanations. "Additional explanation on CbCR data" refers to explanations that help to interpret the CbCR data, such as explanations on extraordinarily high or low numbers or on the relation between different reported items. "Additional explanation on composition of turnover" refers to additional explanations on the notion of turnover or on the sub-items which are included in this variable. "Additional explanation on calculation of number of employees" refers to additional explanations on the calculation of the number of employees, whereby only information that goes beyond information as to whether the number of employees refers to an average over time or to a specific point in time is considered.

Article 89 of the CRD IV specifies that the number of employees shall be reported on a full-time equivalent basis, without providing more detailed instructions on the exact calculation. The lack of clear guidelines results in reporting heterogeneity with regard to two main aspects. First, the number of employees could be calculated either as an average over time or at a specific point in time, i.e. at year-end or at the reporting date. Depending on the magnitude of staff fluctuations during the year, these alternatives can give rise to substantially different reported numbers. As displayed in Figure 4.12, almost half of the CbCRs in our sample (46.38%) contain no additional information on the point in time to which the reported employee figure refers. Bank groups headquartered in Italy are the least transparent, with only 12.82% specifying the way of calculation. Transparency is highest in the United Kingdom, Sweden, the Netherlands and Spain. Among those bank groups that provide explanations, about two third (35.53% of all reports) report an average over time, whereas about one third (17.76% of all reports) consider the number of employees at a specific point in time; only a minority of bank groups from the United Kingdom report both. Germany, the Netherlands, Sweden and the United Kingdom have laws or guidelines in place that ask for an average number, which is consistent with our observations. Second, there is uncertainty as to in how far particular worker groups should be considered, for instance sub-contractors, interns, apprentices or employees on parental leave. 15.46% of the CbCRs include more specific explanations on the calculation of the number of employees that go beyond information on the point in time (average vs. specific point), such as the inclusion or exclusion of certain worker groups (see Figure 4.11). Italy is the country with the highest share of bank groups providing additional explanations, followed by Germany and the United Kingdom.

Figure 4.12: Manner of calculating number of employees

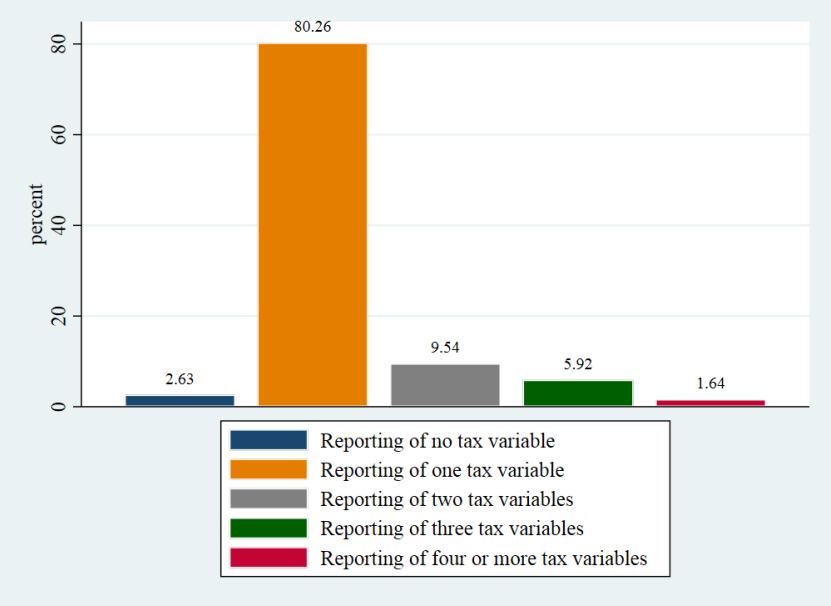


Notes: The graph shows the relative frequencies of different manners of calculating the number of employees in the CbCR. "No information given" indicates that no information as to whether the number of employees refers to an average over time or to a specific point in time is provided in the CbCR. "Reporting of number of employees at year-end/ reporting date" and "Reporting of average number of employees" indicate that the number of employees at year-end or at the reporting date and the average number of employees, respectively, are considered when calculating the number of employees. "Reporting of average and year-end number of employees" indicates that both the average and the year-end number of employees are considered.

Article 89 of the CRD IV does not prescribe how "tax on profit or loss" should be defined, which leaves room for interpretation. The EBA recommends to report taxes both on a cash basis, i.e. taxes paid, and on an accrued basis, i.e. current tax expense without deferred taxes or provisions for uncertain tax liabilities (EBA, 2014a). Several Member States, however, prescribe the reporting of one or the other tax variable. As such, Luxembourg and the United Kingdom demand the disclosure of (corporation) tax paid, while the accounting tax expense shall be disclosed in Germany, Italy and France, whereby the latter further distinguishes between current and deferred tax expense. Depending on the reported tax variable, different considerations have to be made when interpreting the CbCR data. Taxes paid also include payments for past or future periods and withholding taxes paid by other group members and therefore do not adequately reflect the country-specific tax burden in a certain year. In this regard, income tax accrued, excluding deferred taxes, would be a more suitable measure (Grotherr, 2016b, p. 713). However, due to differences between financial and tax accounting, the tax base often differs temporarily or permanently from the profit in the financial statements. Hence, the link between profits and taxes reported in the CbCR would again be distorted (Grotherr, 2016b, p. 713). If, in contrast, the sum of current and deferred tax expense is disclosed – without a further split into its components – reported profits and taxes would match

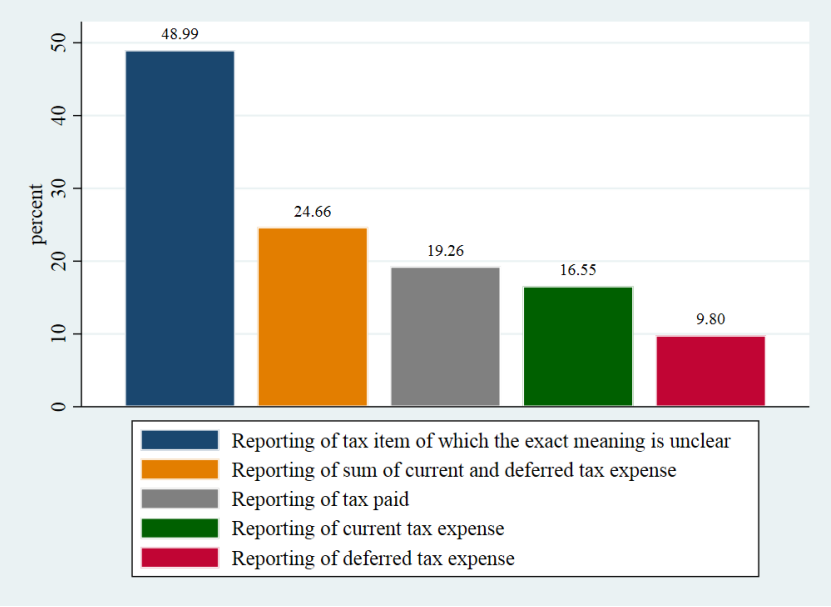
better, but no information would be provided on the amount of tax that actually accrued in the respective year. The conflict between the advantages and drawbacks of different tax variables could be partly solved by reporting several variables. However, the vast majority of the CbCRs in our sample (80.26%) report exactly one tax item (see Figure 4.13). The reporting of two or three tax variables is particularly common in France, which is in line with Article L511-45 of the "Code monétaire et financier" requiring a distinction between current and deferred taxes. A few bank groups, mainly in Spain and Italy, only report turnover and employees, thus not fully complying with the requirements of the CRD IV. Some bank groups in the United Kingdom, in contrast, even report four or more tax variables on a voluntary basis; for instance, they also disclose value added taxes, payroll taxes or bank levy paid. Figure 4.14 displays the relative frequencies of different tax variables included in the CbCR. Almost half of the CbCRs in our sample (48.99%) report at least one tax item of which the exact meaning is unclear, i.e. just labelled "taxes" or similar. 24.66% of the CbCRs include the sum of current and deferred tax expense. 19.26% of the CbCRs report tax paid, which is only common in the United Kingdom, Spain, Austria and Sweden. 16.55% and 9.80% of the reports contain data on current tax expense and deferred tax expense, respectively, whereby the latter is only observable in France and Belgium. The highest transparency on the definition of the tax variables can be found in the United Kingdom and France, followed by Sweden and Germany. In line with the national provisions, bank groups headquartered in the United Kingdom consistently report tax paid, whereas French bank groups predominantly disclose both current and deferred tax expense. Bank groups headquartered in Sweden and Germany have a clear preference for the accounting tax expense, i.e. the sum of current and deferred taxes.

Figure 4.13: Number of tax variables reported



Notes: The graph shows the relative frequencies of the number of reported tax variables. "Reporting of no tax variable", "Reporting of one tax variable", "Reporting of two tax variables", "Reporting of three tax variables" and "Reporting of four or more tax variables" refer to the reporting of no, one, two, three and four or more tax variables, respectively, in the CbCR.

Figure 4.14: Tax variables reported

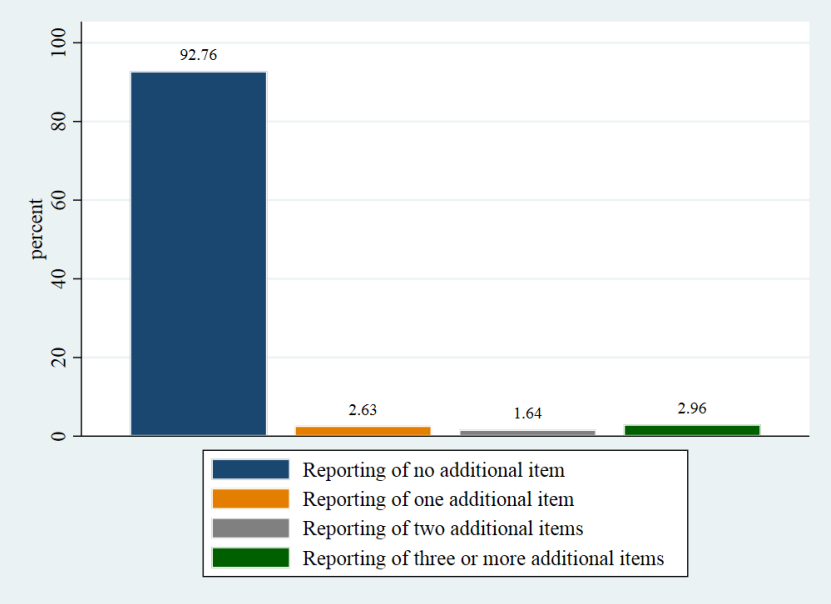


Notes: The graph shows the relative frequencies of different tax variables reported in the CbCR. The observed reported tax variables include "tax item of which the exact meaning is unclear" (e.g. only labelled "tax(es)"), "sum of current and deferred tax expense", "tax paid", "current tax expense" and "deferred tax expense".

Apart from explanations on the composition of particular variables, such as turnover and the number of employees, some CbCRs also provide explanations that help to interpret the CbCR data. Almost a fifth (18.09%) of the CbCRs in our sample contain additional explanations on for instance extraordinarily high or low numbers or on the relation between different reported items (see Figure 4.11). In the United Kingdom, the guidelines on the Capital Requirements Regulations 2013 (Statutory Instrument 2013 No. 3118) which implement Article 89 of the CRD IV into national law encourage institutions to provide additional explanations and information on a voluntary basis (HM Treasury, 2013a). Indeed, slightly more than half of the bank groups headquartered in the United Kingdom (52.50%) follow this recommendation and include clarifications in their CbCR. Such qualitative information can be very valuable because it can help to prevent misinterpretations. The uninformed reader might be inclined to simply compare reported taxes, profits, turnover and employees and thus draw potentially wrong conclusions. A low effective tax rate in terms of reported taxes over reported profits, however, is not necessarily driven by aggressive tax planning, but could also result from the utilization of existing loss carry-forwards. Similarly, a particularly low profit before tax could arise from a special amortization instead of book profit shifting activities (Deutscher Steuerberater-Verband e.V., 2016, p. 3). The provision of additional narrative information can assist the reader in interpreting the data. Still, it remains questionable in how far it is actually considered by the addressees of the CbCR besides the actual numbers (Dutt et al., 2020, p. 20).

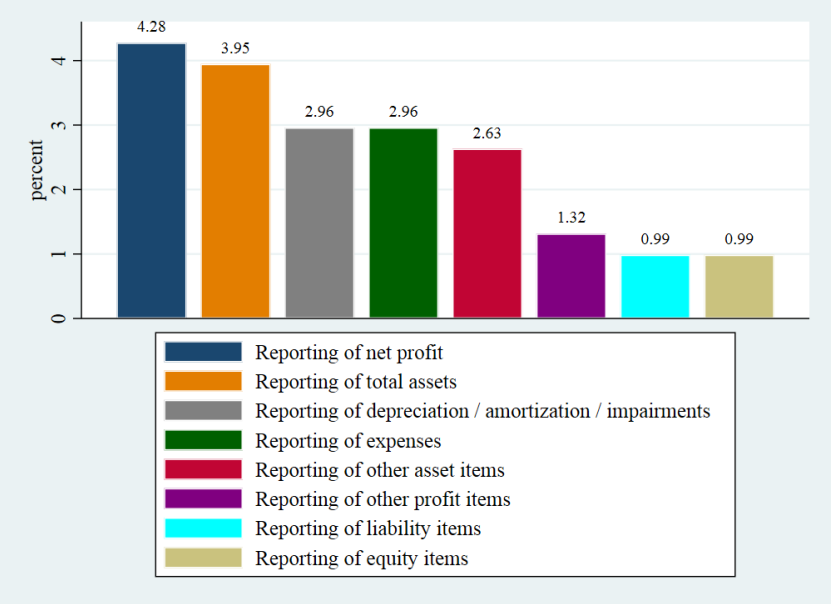
The list of variables on which financial institutions have to disclose by-country data according to Article 89 of the CRD IV is very limited (see Section 4.2.1). Financial institutions could substantially increase the informative value of their reports by voluntarily publishing data on further variables. Figure 4.15 shows that 7.24% of the CbCRs contain by-country data on additional items that are not required by Article 89 of the CRD IV, such as net profit, total assets, depreciation, certain expenses or other asset, profit, liability and equity figures (see the notes to Figure 4.16 for further examples). The only headquarter countries where the reporting of supplementary items is common, though, are Sweden, the Netherlands and Denmark.

Figure 4.15: Number of additionally reported items beyond required CbCR items



Notes: The graph shows the relative frequencies of the number of additionally reported items that go beyond the requirements of CbCR. "Reporting of no additional item", "Reporting of one additional item", "Reporting of two additional items" and "Reporting of three or more additional items" refer to the reporting of no, one, two and three or more additional items, respectively, in the CbCR.

Figure 4.16: Additionally reported items beyond required CbCR items



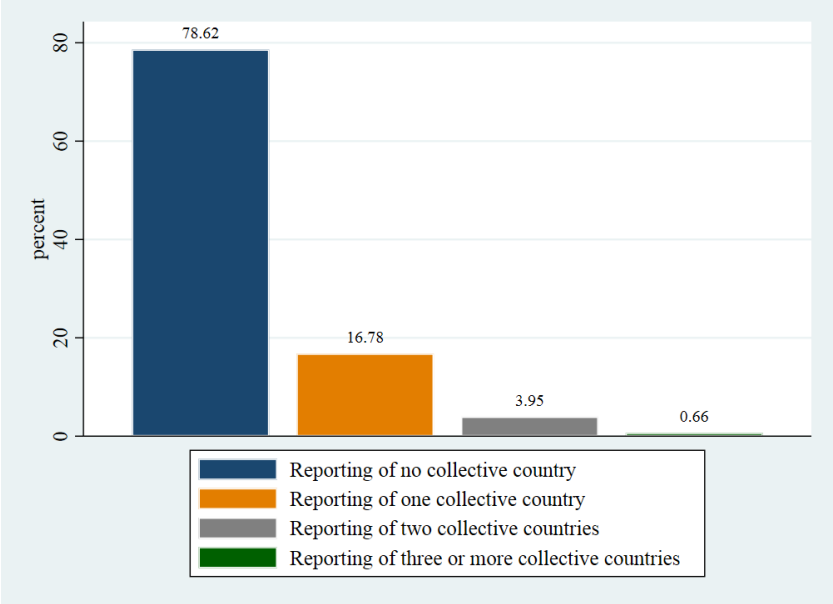
Notes: The graph shows the relative frequencies of additionally reported items that go beyond the requirements of CbCR. The observed additionally reported items include "net profit", "total assets", "depreciation/ amortization/ impairments", "expenses" (e.g. staff cost, operating expenses, administrative expenses, other expenses), "other asset items" (e.g. investments, cash, loans, bonds, financial assets, intangible and tangible fixed assets), "other profit items" (e.g. earnings before credit losses, net credit losses, profit before impairments), "liability items" (e.g. deposits and borrowings, financial liabilities, total liabilities) and "equity items" (e.g. allocated equity, non-controlling interests).

According to Article 89 of the CRD IV, the CbCR data shall be published "by Member State and by third country in which it [the institution] has an establishment". However, some bank groups pool several countries into a single entry (in the following denoted as "collective country"). A fifth (21.38%) of the CbCRs in our sample contain at least one collective country (see Figure 4.17). Still, there is a wide variety among headquarter countries, with the highest share of CbCRs including collective countries observable in Sweden (53.33%) and the lowest share observable in Italy (0%). In France, 5.13% of the CbCRs even report three or more collective countries, whereas the vast majority does not include any such item. Collective countries are mostly summarized under the expression "Rest of the world" and rarely under more specific terms, e.g. "Channel Islands", "Other EU countries", "Asia", "North America" or "Other non-EU countries" (see Figure 4.18). The pooling of several countries comes at the cost of transparency. However, the relative importance of collective countries in terms of the number of employees and profit before tax is in most cases negligible.[76] Bank groups thus do not seem to hide their activities in particular countries behind low transparency. Instead, a potential reason for the pooling could be that the costs of calculating the data by country would outweigh the benefits of disclosing more detailed information. In addition, considerations on the confidentiality of the data might play a role.

There are two simple measures to increase transparency in the CbCRs, as displayed in Figure 4.19. The first is the inclusion of totals for the items, which allows for a better assessment of the relative importance of single countries. About two third (68.42%) of the CbCRs include item sums across the reported countries. Interestingly, CbCRs of German-based bank groups, which perform well in most other dimensions, contain item sums by far the least often. The second measure is the reporting of previous-year data. Especially in case of one-time events, like a special amortization, the use of a loss carry-forward or restructurings, the comparison with data from the previous year can be helpful to the addressees of the CbCR. Previous-year data is only included in less than a third (29.28%) of the reports.

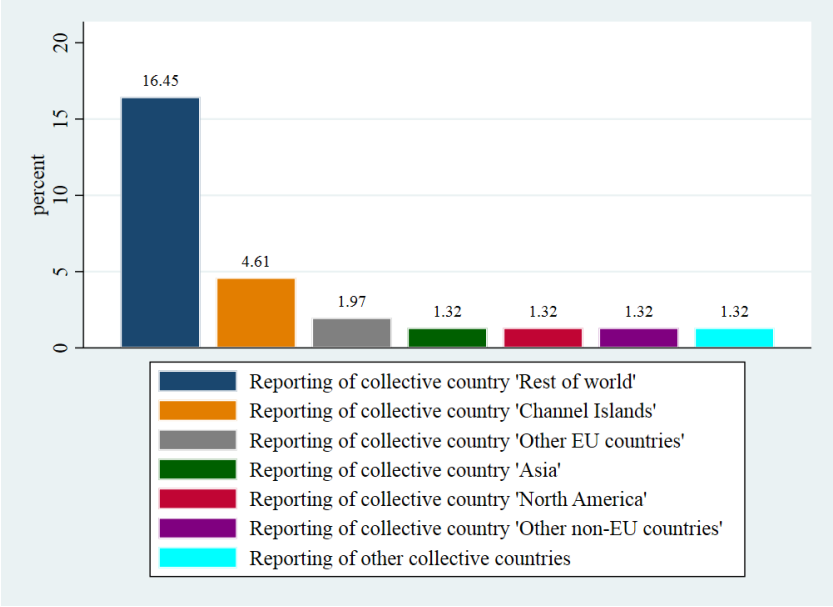
[76] We calculate the relative importance as the share of the number of employees (profit/ loss before tax) reported in collective countries in the total number of employees (profit/ loss before tax). Our calculations are based on the original CbCR dataset at bank group-year-country level of Dutt, Nicolay et al. (2019). The average share per bank group across the years 2014-2016 ranges from 0% to 4.21% (with only one outlier at 28.15%) in terms of the number of employees and from 0% to 8.09% (with only one outlier at 14.24%) in terms of profit/ loss before tax.

Figure 4.17: Number of collective countries reported



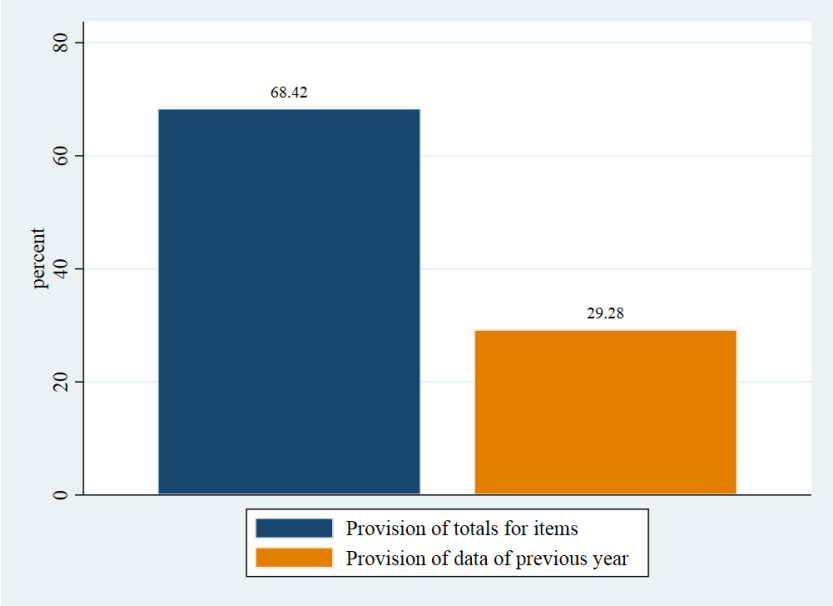
Notes: The graph shows the relative frequencies of the number of reported collective countries. "Reporting of no collective country", "Reporting of one collective country", "Reporting of two collective countries" and "Reporting of three or more collective countries" refer to the reporting of no, one, two and three or more collective countries, respectively, in the CbCR.

Figure 4.18: Different groupings of countries



Notes: The graph shows the relative frequencies of different groupings of countries (notwithstanding differences in language and spelling) in the CbCR. The observed reported groupings of countries include "Rest of the world", "Channel Islands", "Other EU countries", "Asia", "North America", "Other non-EU countries" and other collective countries (e.g. Latin America, Asia-Pacific and Latin America, Oceania).

Figure 4.19: Provision of totals for items and data of previous year



Notes: The graph shows the share of CbCRs that provide totals for the items ("Provision of totals for items") and data of the previous year ("Provision of data of previous year").

4.4.1.3 Readability of CbCR data tables

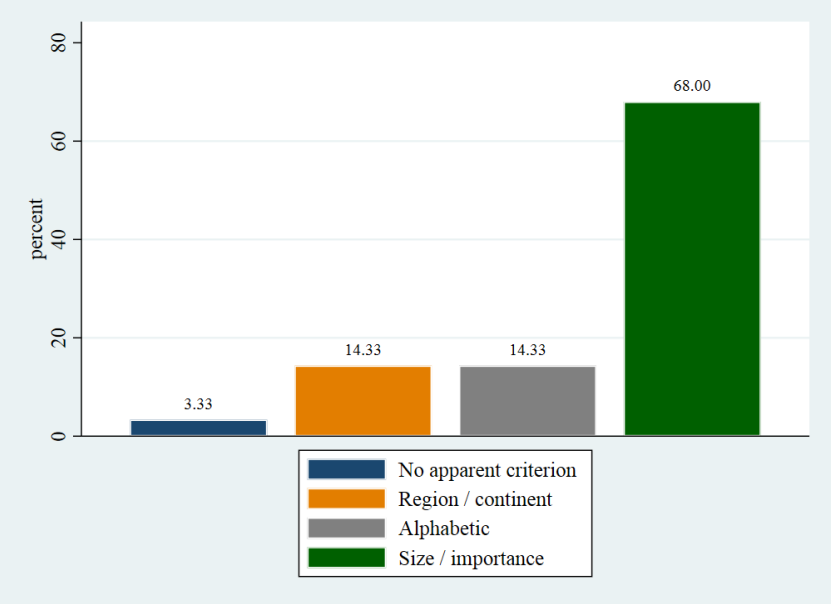
The way the CbCR data is structured and presented can support the reader of the report in processing the information. Generally, there are no guidelines as regards the design and structure of the tables which contain the by-country data, such that institutions are free to choose their preferred style. We examine the readability of the CbCR data tables along several dimensions.

First, as illustrated in Figure 4.20, there are different ways to sort the jurisdictions on which CbCR data is reported. Especially if the group is active in many countries, a sophisticated order can guide the reader through the report and helps to find a particular information. Countries are mostly (68.00%) sorted by size or importance in terms of at least one of the reportable items, such that for instance countries with many employees or a high profit before tax or turnover rank first. The primary sorting criterion employed in the remaining CbCRs is either by region/ continent or alphabetic, whereby the latter is particularly common in France and Austria.

Next, we evaluate the reader-friendliness of the tables containing the CbCR data. Figure 4.21 shows the share of CbCRs that contain certain measures in order to improve the readability of the CbCR data tables. Most bank groups align numbers to the decimal point (91.69% of the reports), use monospaced numbers (85.71%) and separate thousands by comma or dot (84.39%), which facilitates the processing of the numerical information. A mixed picture arises regarding the indication of negative values. Particularly bank groups headquartered in the

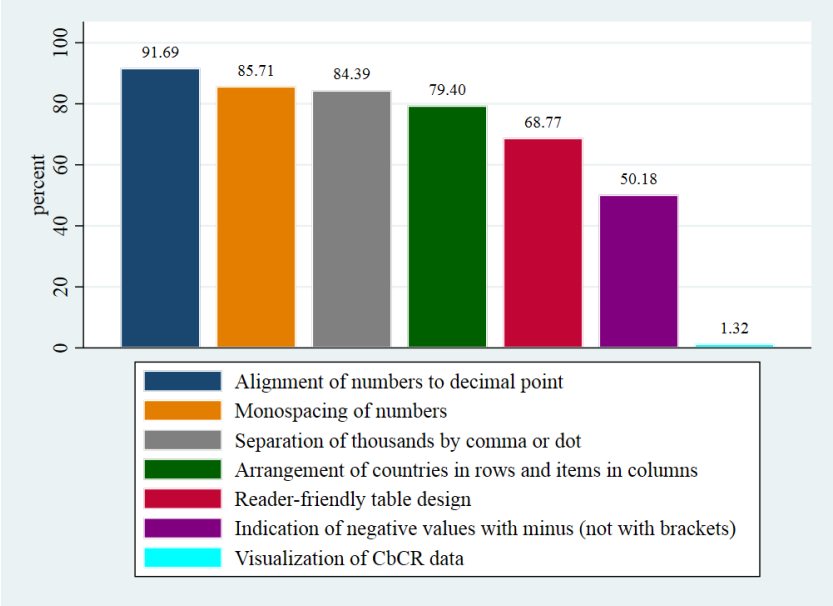
United Kingdom use brackets instead of a minus sign when indicating negative profit, turnover or tax figures, which is less intuitive. With regard to the structure of the tables, the majority of CbCRs (79.40%) arrange countries in rows and items in columns. In particular if many countries are reported, this structure is clearer and makes it easier to compare items and countries. We also consider whether additional measures are implemented to improve the readability of the data tables, for instance by using a specific layout or design or by grouping certain countries for a better overview. Especially CbCRs from bank groups in Spain and Italy offer room for improvement in this regard. Only two institutions in our sample (headquartered in France and the United Kingdom) additionally provide a visualization of the CbCR data, such as bar charts.

Figure 4.20: Primary sorting criterion for countries



Notes: The graph shows the relative frequencies of different primary sorting criteria for the countries in the CbCR. "No apparent criterion" indicates that no apparent primary sorting criterion for the countries is provided in the CbCR. "Region/ continent", "Alphabetic" and "Size/ importance" indicate that the region or continent, the alphabetic order and the size or importance (i.e. in terms of at least one of the reportable items) of the countries, respectively, are considered as the primary sorting criterion for the countries reported in the CbCR.

Figure 4.21: Readability of CbCR data tables



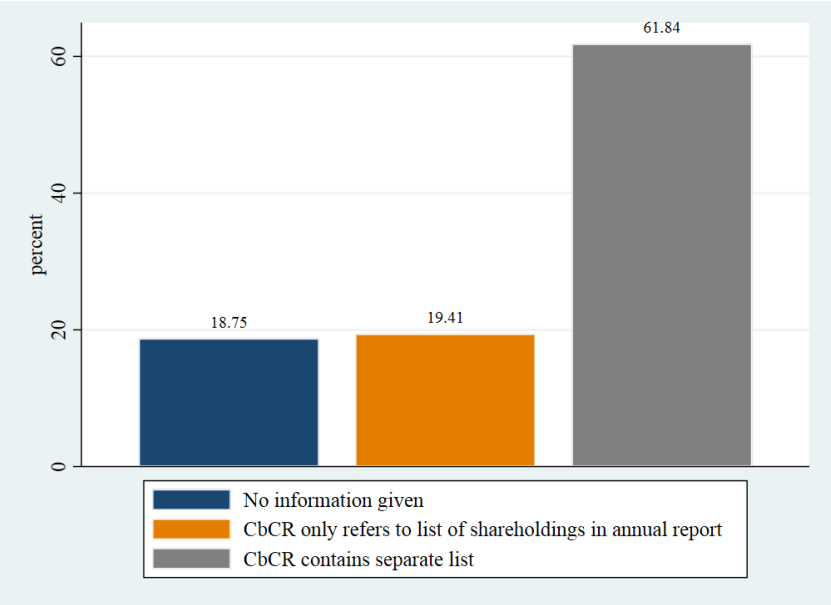
Notes: The graph shows the share of CbCRs that contain various measures in order to improve the readability of the data table(s). These measures include "Alignment of numbers to decimal point", "Monospacing of numbers", "Separation of thousands by comma or dot" (depending on the language), "Arrangement of countries in rows and items in columns", "Reader-friendly table design" (e.g. using a specific layout or design or grouping certain countries for a better overview), "Indication of negative values with minus (not with brackets)" (i.e. "-" instead of "( )"), and "Visualization of CbCR data".

4.4.1.4 List of subsidiaries and branches

Article 89 of the CRD IV prescribes that the name, nature of activities and geographical location of the group's entities are published together with the CbCR data. While 61.84% of the CbCRs contain such an entity list, the remaining reports only refer to the list of shareholdings in the annual report or even provide no details in the CbCR as to where to find the required information (see Figure 4.22). German-based bank groups exhibit the highest transparency, with the majority of CbCRs containing an own entity list. In contrast, transparency is lowest in Sweden and Spain. Among those CbCRs that publish the list of entities as part of the CbCR, about one third (29.85%) first present the entity list, followed by the CbCR core data, whereas about two third (70.15%) first present the CbCR core data, followed by the entity list, or combine both parts (see Figure 4.23). We rank the second alternative higher as the numerical CbCR data, which is presumably of higher interest for most of the readers of the report, is placed more prominently. Bank groups headquartered in the Netherlands, Spain and Sweden consistently choose this ordering. Slightly more than half (54.37%) of the entity lists in the CbCR contain both subsidiaries and branches; for Spanish and Swedish institutions, the share is highest at 100% (see Figure 4.24). In 28.64% of the cases, it remains unclear whether

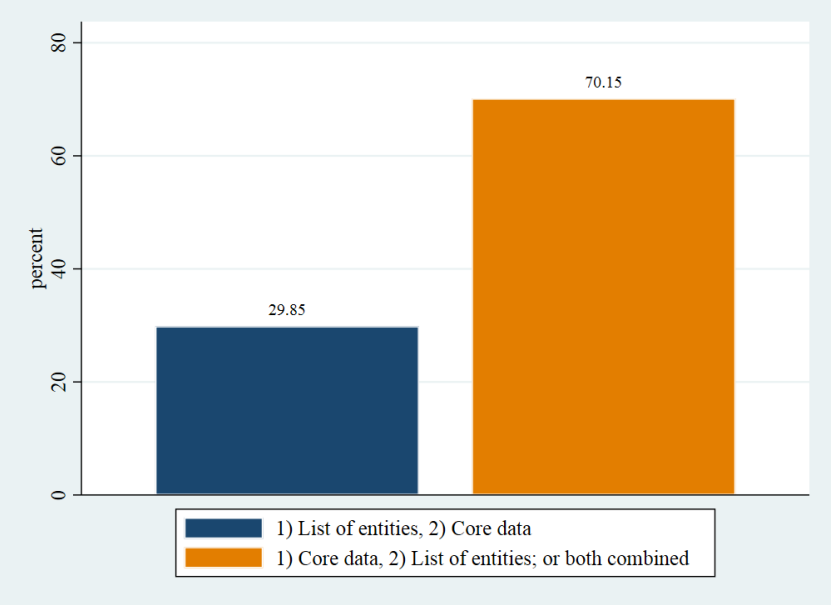
branches are included or not. Entities are mostly sorted by country or region, which is helpful for understanding which activities are behind the CbCR data (see Figure 4.25).

Figure 4.22: Place of publication of list of entities



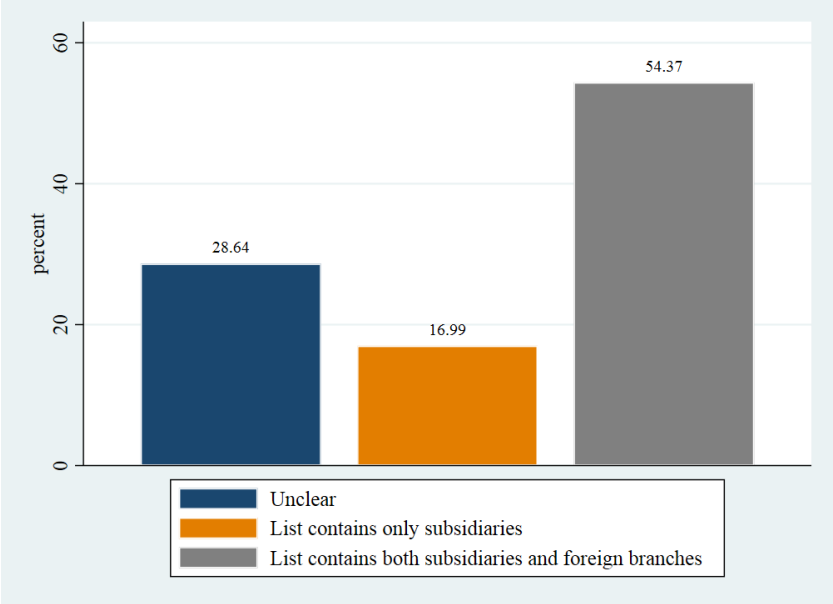
Notes: The graph shows the relative frequencies of different forms of publication of the list of subsidiaries and branches. "No information given" indicates that no information on the list of entities is provided in the CbCR. "CbCR only refers to list of shareholdings in annual report" indicates that the CbCR only refers to the list of shareholdings in the annual report. "CbCR contains separate list" indicates that the CbCR contains a separate list of entities.

Figure 4.23: Overall structure of CbCR



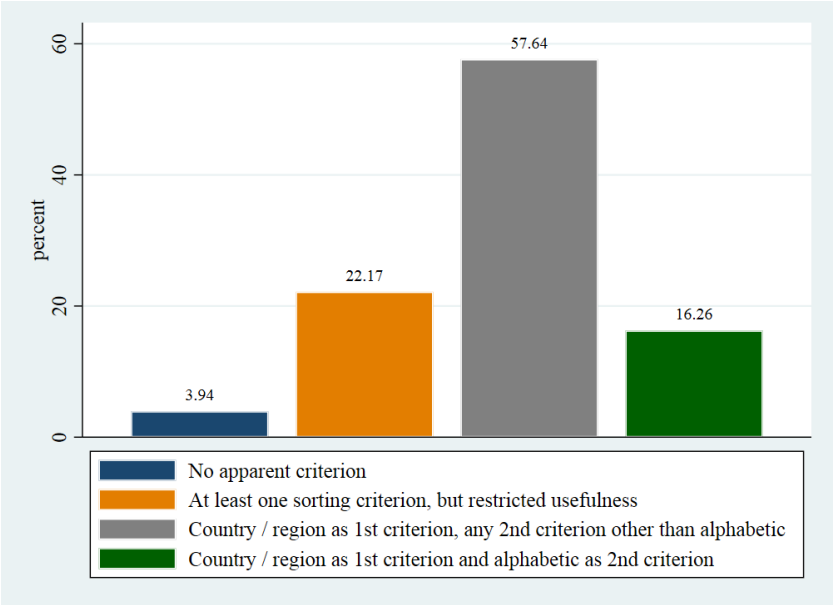
Notes: The graph shows the relative frequencies of different overall structures of the CbCR. "1) List of entities, 2) Core data" refers to the structure where the first part of the CbCR consists of the list of entities while the second part contains the core data. "1) Core data, 2) List of entities; or both combined" refers to the structure where the first part of the CbCR consists of the core data while the second part contains the list of entities or where both parts – the list of entities and the core data – are combined into a single part.

Figure 4.24: Information regarding foreign branches



Notes: The graph shows the relative frequencies of different degrees of inclusion of foreign branches in the list of entities provided in the CbCR. Entity lists in the annual report to which the CbCR refers, but which are not part of the CbCR, are not considered. "Unclear" indicates that it is not clear whether the list of entities includes branches. "List contains only subsidiaries" and "List contains both subsidiaries and foreign branches" indicate that the list of entities provided in the CbCR contains only subsidiaries and that it contains both subsidiaries and foreign branches, respectively.

Figure 4.25: Sorting criteria for list of entities in CbCR



Notes: The graph shows the relative frequencies of different sorting criteria for the list of entities in the CbCR. Entity lists in the annual report to which the CbCR refers, but which are not part of the CbCR, are not considered. "No apparent criterion" indicates that no apparent sorting criterion for the list of entities is provided in the CbCR. "At least one sorting criterion, but restricted usefulness", "Country/ region as 1st criterion, any 2nd criterion other than alphabetic" and "Country/ region as 1st criterion and alphabetic as 2nd criterion" refer to different sorting criteria for the list of entities in the CbCR.

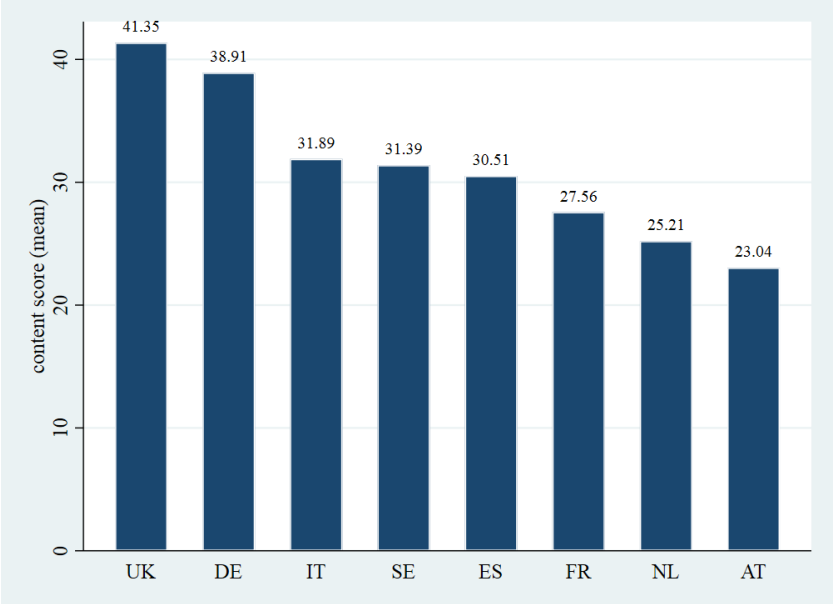
4.4.2 Transparency scores

In Section 4.4.1, we have analyzed the reporting heterogeneity in our sample of CbCRs for distinct variables. In this section, we aggregate single variables to transparency scores in order to identify bank groups and headquarter countries that are particularly (in-)transparent in certain dimensions. Our variables are defined in such a way that a higher value implies more transparency or a better readability (see Section 4.3).[77] Therefore, we can add up the values of different variables in order to achieve an overall figure which reflects the degree of transparency across several variables. We construct three different transparency scores: The *content score* reflects the degree of transparency across the variables that relate to the CbCR content, i.e. the provision of additional information that helps to interpret the CbCR data as well as the way of calculation of the reportable items in light of the lack of clear guidelines. The *readability score* relates to the way the CbCR data tables are structured and presented. The *overall score* is composed of the content score and of the readability score and also takes into consideration the place of publication of both the CbCR and the list of entities. Table C.1 in the Appendix provides an overview of the variables that are included in each transparency score. The scores are normalized to 100, whereby a score of 100 (0) indicates the highest (lowest) possible degree of transparency. In the following, we consider both the average score per headquarter country and the average score per bank group. The average score per headquarter country is calculated across all available CbCRs published by bank groups headquartered in the respective country.[78] The average score per bank group is calculated across the CbCRs published by the respective bank group over the years 2014-2016.

Figure 4.26 and Figure 4.27 show the average content score and readability score per headquarter country. CbCRs published by bank groups headquartered in the United Kingdom and Germany achieve on average the highest scores with respect to the CbCR content (41.35 and 38.91 points, respectively), whereas CbCRs published by bank groups headquartered in Austria and the Netherlands rank lowest (23.04 and 25.21 points, respectively). The readability of the CbCR data tables is best for German bank groups (72.45 points) and worst for Italian bank groups (60.52 points); however, the variation among the headquarter countries is very low.

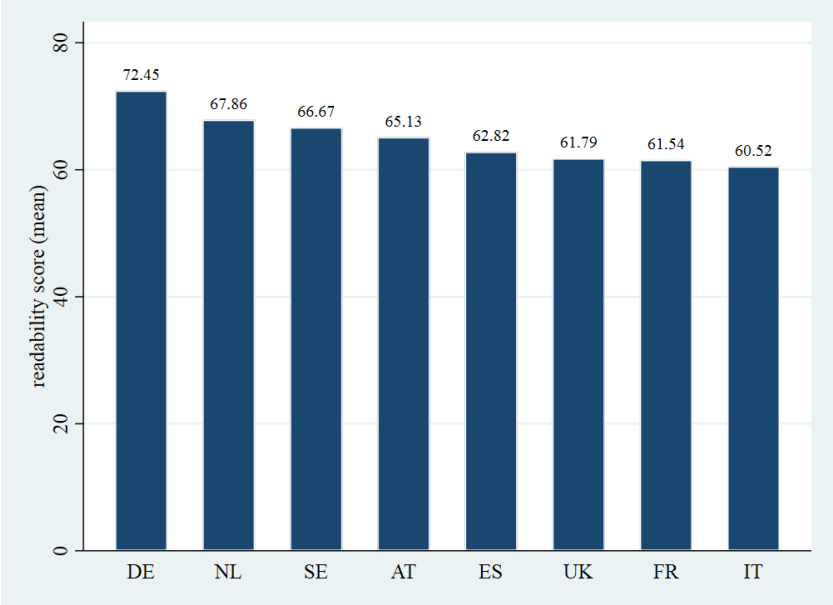
[77] The different values that a variable can take are indicated in the last column of Table C.1.
[78] We only consider headquarter countries for which at least 15 CbCRs are included in our sample.

Figure 4.26: Content score – by headquarter country



Notes: The graph shows the average score on the CbCR content for a selection of headquarter countries. The score includes the variables *cbcr_term*, *legal*, *acc_std*, *cons_scope*, *data_source_plbt*, *data_source_turn*, *cons_intra_plbt*, *cons_intra_turn*, *recon_ar*, *turn_count*, *turn_expl*, *empl_date*, *empl_add*, *tax_count*, *tax_expl*, *expl_add*, *subs_ctry*, *item_add_count*, *other_ctry_count_desc*, *items_total*, *items_prevyear* and *unit_orig* (see Table C.1 for a description of the variables). It is normalized to 100, whereby a score of 100 (0) indicates the highest (lowest) possible degree of transparency. The average score per headquarter country is calculated across all available CbCRs published by bank groups headquartered in the respective country.

Figure 4.27: Readability score – by headquarter country



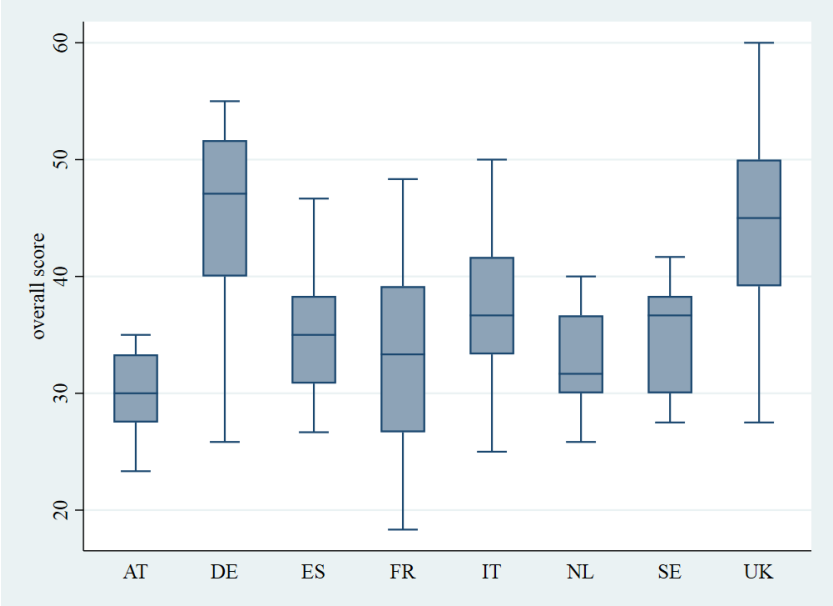
Notes: The graph shows the average score on the readability of the CbCR data table(s) for a selection of headquarter countries. The score includes the variables *num_aligned*, *num_monospaced*, *num_thousands*, *num_negative*, *table_layout*, *table_design* and *visual* (see Table C.1 for a description of the variables). It is normalized to 100, whereby a score of 100 (0) indicates the highest (lowest) possible degree of transparency. The average score per headquarter country is calculated across all available CbCRs published by bank groups headquartered in the respective country.

Across all dimensions considered, the CbCRs published by bank groups from the United Kingdom and Germany are the most transparent and readable (44.75 and 44.43 points, respectively), whereas Austrian bank groups achieve on average the lowest overall scores (29.95 points) (see Figure 4.28). Figure 4.29 shows the distribution of the overall score in each considered headquarter country (i.e. including the median, the 25th percentile, the 75th percentile as well as the lower and upper adjacent values). Especially in countries for which the number of observations in our sample is comparatively high (i.e. Germany, the United Kingdom, France, Italy and Spain, see Table 4.2), we observe a large heterogeneity among the CbCRs. At bank group level, the ranking on the overall score is led by a bank group headquartered in the United Kingdom (58.33 points); a French bank group occupies the bottom of the ranking (22.78 points) (see Figure 4.30). Still, even for those bank groups that perform best in our analyses, the reporting behavior leaves room for improvements (e.g. CbCRs from bank groups in the United Kingdom achieve on average an overall score of 44.75 of the maximum 100 points, with the leading British bank group achieving 58.33 out of 100 points).

Figure 4.28: Overall score – by headquarter country

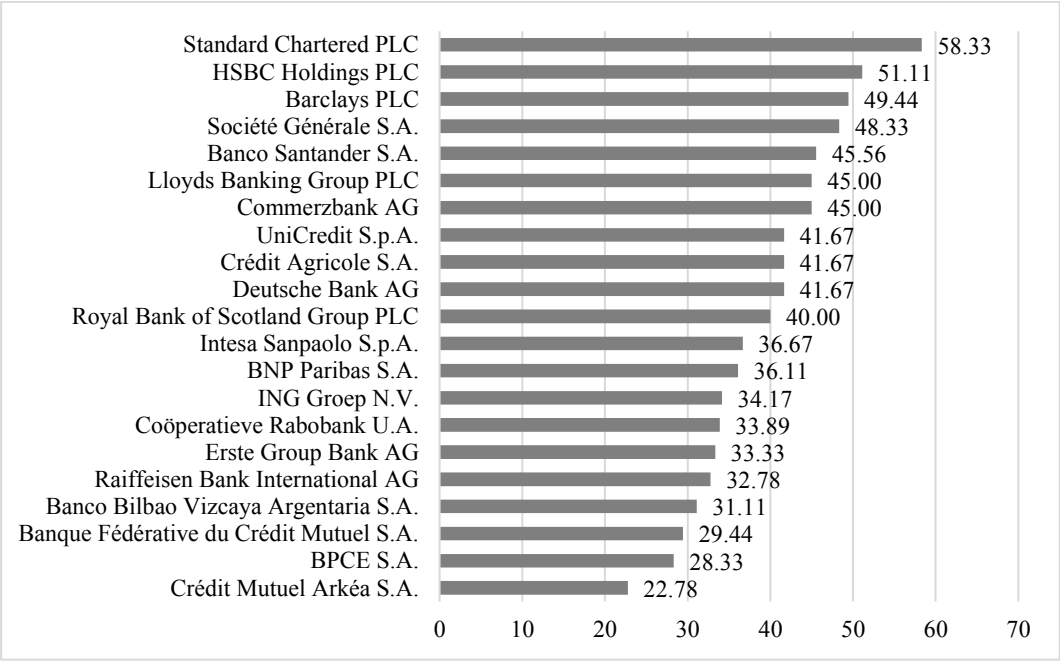
Notes: The graph shows the average overall score for a selection of headquarter countries. The overall score is composed of the content score and of the readability score and also takes into consideration the place of publication of both the CbCR and the list of entities (see Table C.1). It is normalized to 100, whereby a score of 100 (0) indicates the highest (lowest) possible degree of transparency. The average score per headquarter country is calculated across all available CbCRs published by bank groups headquartered in the respective country.

Figure 4.29: Overall score – box plot by headquarter country



Notes: The graph shows the distribution (median, 25th percentile, 75th percentile, lower and upper adjacent values) of the overall score for a selection of headquarter countries. The overall score is composed of the content score and of the readability score and also takes into consideration the place of publication of both the CbCR and the list of entities (see Table C.1). It is normalized to 100, whereby a score of 100 (0) indicates the highest (lowest) possible degree of transparency. The distribution of the score per headquarter country is calculated across all available CbCRs published by bank groups headquartered in the respective country. Outside values are not plotted.

Figure 4.30: Overall score – average across years for selected bank groups



Notes: The graph shows the average overall score for selected bank groups. The overall score is composed of the content score and of the readability score and also takes into consideration the place of publication of both the CbCR and the list of entities (see Table C.1). It is normalized to 100, whereby a score of 100 (0) indicates the highest (lowest) possible degree of transparency. The average score per bank group is calculated across the years 2014-2016. The selection of bank groups includes the 20 largest bank groups in terms of the average total number of employees and the bank groups with the highest and lowest score, respectively.

The degree of transparency in the CbCR affects the interpretability of the report. A transparent and comprehensive CbCR can help the reader to gather all relevant information and to draw the right conclusions on the group's activities. Certain bank groups, however, might be inclined to hide their activities behind low transparency in order to avoid potentially negative consequences from the disclosure, such as reputational damages, competitive disadvantages or a higher risk to be audited. Especially bank groups with a high tax haven intensity and large bank groups might be prone to such strategic considerations for the following reasons. First, tax avoidance strategies regularly include the use of jurisdictions that have low tax rates or favorable tax regimes in place. A high share of tax havens in the CbCR is thus likely to attract the attention of the public and of tax authorities. Second, large bank groups have generally more opportunities for profit shifting than smaller groups. Again, their CbCRs could be more in the focus of different stakeholders than the CbCRs disclosed by smaller groups. On the other hand, though, these two types of bank groups might as well be incentivized to prepare CbCRs which are particularly transparent in order to avoid possibly wrong conclusions.

We analyze the relationship between the reporting behavior and both the size of the bank group and the intensity of tax haven usage by conducting correlation analyses. We measure the size of the group in terms of the total number of employees reported in the CbCR. The intensity of tax haven usage is defined as the share of tax havens in the total number of reported countries, excluding the headquarter country. We calculate these variables based on the original CbCR dataset at bank group-year-country level of Dutt, Nicolay et al. (2019). Table 4.3 shows the pairwise correlation coefficients between the transparency scores, the total number of employees and the share of reported tax havens. We find positive correlation coefficients (0.207% and 0.194%, respectively) between the overall transparency score and both the total number of employees and the share of reported tax havens, which are significant at the 1% level. This finding provides evidence that large bank groups and bank groups with a high tax haven intensity do not hide their tax haven activities behind low transparency, as conjectured above, but proactively disclose their activities in a transparent CbCR. This effect mainly stems from the provision of additional information on the CbCR data and from the manner of calculation of the reportable items (i.e. the content score), whereas the readability of the tables containing the data (i.e. the readability score) is only marginally related to the size of the bank group and the share of tax havens.

Table 4.3: Pairwise correlation coefficients between transparency scores, total number of employees and share of reported tax havens

	score_ overall	*score_ content*	*score_read*	*empl_sum*	*th_share*
score_overall	1.000				
score_content	0.970***	1.000			
score_read	0.325***	0.135**	1.000		
empl_sum	0.207***	0.207***	0.054	1.000	
th_share	0.194***	0.179***	0.123**	-0.143**	1.000
N	304				

Notes: The table shows the pairwise correlation coefficients between the transparency scores, the total number of employees and the share of reported tax havens. *score_overall*, *score_content* and *score_read* denote the overall score, the content score and the readability score, respectively (see Table C.1 for a description of the variables included in the scores). *empl_sum* denotes the total number of employees reported in the CbCR and is used as proxy for the size of the bank group. *th_share* denotes the share of tax havens in the total number of countries reported in the CbCR, excluding the headquarter country. Tax havens are defined according to Hines (2010).
*, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Overall, our descriptive analysis reveals that the lack of clear and uniform guidelines as regards Article 89 of the CRD IV results in a large heterogeneity in the CbC reporting behavior across different bank groups and headquarter countries, which in turn impedes the comparability of the reports and increases the risk of misinterpretations by the public and by tax authorities. Given the high direct and indirect costs that go along with the public disclosure of by-country data (Dutt et al., 2020), it is essential to ensure that the way of calculating and presenting the required information does not reduce the added value of CbCR.

4.5 Development of a best practice approach on country-by-country reporting

The imprecise formulations of Article 89 of the CRD IV and the transposing national tax laws allow the reporting banks to choose the options that fits their needs best, thus reducing their compliance burden (PricewaterhouseCoopers, 2014a, p. 4). This flexibility, though, comes at the cost of transparency. Ultimately, the heterogeneous reporting behavior identified in Section 4.4 runs counter to the primary objective of public CbCR, which should enable the society to assess whether the taxes paid in the different jurisdictions reflect real economic activity appropriately. In this section, we develop policy recommendations in order to improve the interpretability and the readability of CbCRs published by financial institutions. In particular, we suggest guidelines that help to ensure a consistent interpretation of the reports

across different bank groups and countries, thus increasing the information content of CbCR. Our considerations are especially relevant with regard to the ongoing discussion on the introduction of a public CbCR for all large multinational firms in the EU (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021). Unambiguous instructions at EU-level are necessary in order to guarantee that the rules are implemented consistently by all Member States and that as few points as possible are open to interpretation by the reporting firms. As we derive our recommendations from the inconsistencies in reporting identified in Section 4.4, we refer primarily to the CbCR established in Article 89 of the CRD IV. However, many considerations are generalizable to other CbCR initiatives and proposals. We suggest the following best practice approach on CbCR.

CbCRs shall be accessible via the banks' websites, either in form of a separate document or as part of the annual report. In case the CbCR is published in the annual report, the table of contents should include the chapter containing the CbCR in order to facilitate finding the CbCR data among the other financial and non-financial information in the annual report. We further recommend the use of a clear and unified title, e.g. "Country-by-Country Reporting".

The CbCR should relate to the consolidation scope of the applicable accounting standards, which is regularly broader than the prudential scope of consolidation and allows for a better comparison to the consolidated financial statements. Similarly, the CbCR should be based on the same accounting standards (e.g. IFRS or local GAAP) as the financial statements (PricewaterhouseCoopers, 2014a, p. 24).

A specification of the data source on which the calculation of profit or loss before tax and turnover is based is indispensable in order to ensure the comparability of the data across different CbCRs and to provide a picture on the group's activities which is as accurate and informative as possible. As shown in Section 4.4.1.2, both consolidated and single financial statements exhibit certain drawbacks. A potential and feasible compromise would be to eliminate intra-group transactions between entities in the same country while preserving cross-border intra-group transactions (PricewaterhouseCoopers, 2014a, p. 12). This approach should be complemented by reconciliation adjustments that quantify the differences between the sum of the country profits (turnover) in the CbCR and the group profit (turnover) in the consolidated financial statements (PricewaterhouseCoopers, 2014a, p. 17). However, despite all attempts to standardize the CbCR rules, there will be no full comparability of the data across countries as long as accounting standards are not harmonized. A more far-reaching approach would

therefore be the set-up and definition of harmonized rules with respect to the determination of income (Evers et al., 2017, p. 8).

For a common understanding of the reportable items, it is necessary to establish uniform definitions. Ideally, they should be complemented by detailed guidelines on the exact way of calculation and should not offer leeway to the firms. The definition of turnover could follow the recommendation of the EBA, which stipulates that this item shall be consistent with that in the institution's financial statements. For credit institutions, for instance, the EBA considers total net banking income, i.e. "total net income before impairment and operating expenses, but including net interest income, net fees and commissions income, net trading income and other operating income" as an appropriate measure (EBA, 2014e). The number of employees should be calculated as the average over the financial year covered in the CbCR, not at year-end. Otherwise, one-time events like restructurings could distort the relation between the number of employees and the other items reported in the CbCR that relate to the whole year. In addition, the manner in which particular worker groups, such as sub-contractors, interns, apprentices or employees on parental leave, should be considered must be stipulated. Alternatively, bank groups should be obliged to provide an explanation on the underlying way of calculation. As regards tax on profit or loss, we recommend to report both current and deferred tax expense. In contrast to taxes paid, including payments for past or future years, current takes adequately reflect the country-specific tax burden in a certain year and, in combination with deferred taxes, allow for a better comparison to reported profits before tax.

The pooling of several countries to a single entry, e.g. "Rest of the world", is likely to reduce transparency and should generally not be allowed. A conceivable exception is the case where the CbCR data allows to draw conclusions on the profitability of single subsidiaries and thus risks to distort competition. Similarly, a pooling might be reasonable if the costs of calculating the data by country would outweigh the benefits of disclosing more detailed information. The possibility to pool countries could be tied to thresholds in terms of the size of the reported items, such that only data on jurisdictions where the group's activities are of minor importance is aggregated. In any case, the group should specify which countries are pooled.

We further suggest to provide additional narrative explanations that help to interpret the CbCR data, such as on extraordinarily high or low numbers or on obvious disconnects between profit before tax, taxes or employees (PricewaterhouseCoopers, 2014a, p. 17). The provision of totals for the items conveys a better idea of the relative importance of single countries and is therefore also recommendable. Ideally, all bank groups should use a uniform template for reporting –

similar to the model template of the OECD with regard to the confidential reporting by large multinational firms vis-à-vis the tax authorities (OECD, 2015, pp. 29–30) –, thus facilitating comparisons across bank groups. Above all, countries should be arranged in rows and items in columns. Bank groups should align numbers to the decimal point, use monospaced numbers and separate thousands by comma or dot. A sophisticated layout and design of the data tables can improve the reader-friendliness further. The publication of the CbCR in PDF format could be complemented by an interactive online tool on the banks' websites and by an XML or CSV spreadsheet, thereby helping the reader to process the information. The list of entities should include both subsidiaries and branches and be placed immediately before or after the CbCR data.

Prior literature reveals that the informative value of CbCR could further be strengthened by including additional variables that reflect economic activity, such as total assets and staff cost (Dutt, Nicolay et al., 2019). In addition, the reporting of specific indicators, for instance intra-group license payments, would shed light on the importance of particular profit shifting channels (Steinegger, 2016, p. 458). So far, financial institutions can provide by-country data on supplementary variables on a voluntary basis only. In this regard, the mandatory disclosure of additional items is worth considering.

Finally, whenever a certain provision is open to various interpretations, the reporting institutions should explain which option they have chosen or, if feasible and economically rational, provide the required information in several ways. Still, the trade-off between high transparency and low compliance costs needs to be considered.

4.6 Conclusion

The public CbCR requirement for EU financial institutions is supposed to allow the tax authorities and the general public to better assess whether banks are paying their "fair share of taxes" on their worldwide activities. However, the lack of clear and uniform definitions and guidelines arises in different ways of interpreting the provisions of Article 89 of the CRD IV. Generally, Member States' national laws do not close these regulatory loopholes and offer leeway to the reporting firms. Consequently, the way of preparing and presenting the required information differs widely across bank groups, which impedes the interpretability and the comparability of the reports. Ultimately, the inconsistent and heterogeneous reporting behavior is likely to diminish the informative value of CbCR.

Based on a sample of CbCRs published by EU-headquartered multinational bank groups for financial years 2014-2016, we define and manually code variables that reflect the reporting behavior and the degree of transparency in the reports. We analyze how transparently and comprehensively the information is presented across different CbCRs and headquarter countries and which open points inhibit the interpretability and the readability of the data. Finally, we derive recommendations in order to increase the information content of CbCR.

Our descriptive analysis reveals a heterogeneous reporting behavior across bank groups in terms of the place of publication of the report (e.g. annual report vs. separate document), its content – such as the underlying data source (e.g. single vs. consolidated financial statements and treatment of intra-group transactions), applied definitions (e.g. consolidated basis, turnover, number of employees and tax on profit or loss) and the provision of additional information (e.g. explanations, additional items, item totals and previous-year data) –, the readability of the data tables (e.g. table structure and design) and the list of entities that should be published together with the by-country data (e.g. inclusion in CbCR and consideration of branches). We aggregate single variables to transparency scores and identify bank groups and headquarter countries that are particularly (in-)transparent in certain dimensions. We find that CbCRs published by bank groups from the United Kingdom and Germany are the most transparent and readable, whereas the Austrian bank groups in our sample achieve on average the lowest overall scores. We also observe that large bank groups and bank groups with a high share of tax havens prepare CbCRs which are comparatively transparent. In order to ensure a consistent interpretation of the reports, we recommend to specify the underlying data source and the applicable consolidation scope and to establish uniform definitions of the reportable items which should apply to all groups preparing a report. A standardized template, comparable to the model template of the OECD (OECD, 2015, pp. 29–30), would further help to process the information and would allow for better comparisons across bank groups.

Our findings are relevant for researchers, policymakers and the addressees of public CbCR, notably tax authorities and the general public. We make an important contribution by showing which considerations should be made when analyzing and interpreting CbCR data. The lack of standardized rules becomes especially noticeable when several reports prepared by different bank groups are considered simultaneously. Thus, empirical analyses of the CbCR data would substantially gain in meaningfulness if a uniform CbCR approach was adopted as the comparability of the underlying data would considerably improve. Our analyses are particularly important in view of the current CbCR proposal for large EU multinationals which is still under

discussion (European Commission, 2016a; European Parliament, 2019; Council of the EU, 2019, 2021). Given the high direct and indirect costs that go along with the disclosure requirement (Dutt et al., 2020), it has to be ensured that different ways of calculating and presenting the information do not weaken the added value of CbCR. Since the data shall be disclosed publicly, the prevention of misinterpretations becomes even more a concern than in case of a purely confidential CbCR vis-à-vis the tax authorities. Therefore, clear guidelines for preparing the reports are essential for an appropriate consideration of the data by all addressees.

5

Impact of the Introduction of the Common Corporate Tax Base (CCTB) on the Effective Tax Burden of Corporations in the EU Member States

This chapter constitutes a shortened version of the following study commissioned by the European Commission and published as European Commission Taxation Paper:

Spengel, C., Bräutigam, R., Dutt, V. K., Fischer, L., & Stutzenberger, K. (2019). *The Impact of the CCTB on the Effective Tax Burden of Corporations: Results from the Tax Analyzer Model: Final Report.* On-Demand Economic Analysis under Framework Contract TAXUD/2017/CC/147 – Framework Contract for the Provision of Effective Tax Rates and Related Services (European Commission Taxation Paper No. 75-2019). Retrieved from https://ec.europa.eu/taxation_customs/sites/taxation/files/taxation_paper_75.pdf (23 February 2021).

5.1 Introduction

The parallel application and administration of 28 different national tax systems within the European Union (EU) impedes cross-border business activities. In light of the obstacles that go along with the coexistence of national tax systems, the idea of an EU-wide harmonization of corporate taxation has emerged. In that regard, a draft Council Directive on a Common (Consolidated) Corporate Tax Base (C(C)CTB) was launched in March 2011 (European Commission, 2011a)[79] and re-launched as a two-step process in October 2016. The first step comprises the determination of each group member's taxable income based on a common set of tax accounting rules (draft Council Directive on a Common Corporate Tax Base (CCTB), European Commission, 2016c),[80] whereas consolidation of the individual tax bases and re-allocation to the group members shall be implemented in a second step (draft Council Directive on a Common Consolidated Corporate Tax Base (CCCTB), European Commission, 2016b).[81]

The impact of the introduction of harmonized tax accounting rules on the effective corporate tax burdens in the EU Member States has already been investigated in the context of the 2011 proposal for a C(C)CTB (Spengel et al., 2008; Spengel et al., 2012; Spengel & Zöllkau, 2012). The re-launched proposal builds on the original draft Council Directive, but contains several modifications, such as the encompassment of an Allowance for Growth and Investment (AGI) or a super-deduction for costs from research and development (R&D). Therefore, the implications that the adoption of the 2016 CCTB draft Council Directive would have for companies' effective tax burdens might differ from those of the original proposal. The present chapter analyzes the consequences of the introduction of the CCTB draft Council Directive, both qualitatively and quantitatively. The aim of our study is twofold. First, the provisions for the determination of taxable income as proposed by the CCTB draft Council Directive of October 2016 shall be compared to the current[82] practice in the 28 EU Member States[83] in order to derive the need for adjustment that would arise in the course of implementing the CCTB framework. Second, the impact of the introduction of the CCTB draft Council Directive on the effective tax burden of corporations located in different Member States shall be evaluated. The

[79] Henceforth 2011 C(C)CTB draft Council Directive.
[80] Henceforth (2016) CCTB draft Council Directive.
[81] Henceforth (2016) CCCTB draft Council Directive.
[82] "Current" refers to the legal status as of 2017.
[83] We consider the 28 Member States of the EU as of 2017, namely Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), the Czech Republic (CZ), Germany (DE), Denmark (DK), Estonia (EE), Greece (EL), Spain (ES), Finland (FI), France (FR), Croatia (HR), Hungary (HU), Ireland (IE), Italy (IT), Lithuania (LT), Luxembourg (LU), Latvia (LV), Malta (MT), the Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Sweden (SE), Slovenia (SI), the Slovak Republic (SK) and the United Kingdom (UK).

quantification of the changes in effective corporate tax burdens induced by the CCTB relies on the model of the European Tax Analyzer. In addition, although the concept of a CCTB is based on the simultaneous application of all tax base provisions (Spengel et al., 2008, p. 4), the effects of the isolated harmonization of single tax base elements are further assessed in separate analyses. Finally, we also consider a specific R&D scenario to determine the impact of the CCTB introduction including the R&D super-deduction for corporations that conduct R&D activities and can currently make use of national R&D tax incentives.[84]

Our main findings can be summarized as follows: The comparison of Member States' current national tax laws and the CCTB provisions reveals that adjustment requirements in order to comply with the CCTB draft Council Directive are highest with regard to the AGI, R&D tax incentives, loss relief, the applicable depreciation rates and the use of the pool depreciation method. For the analysis of the impact of the CCTB introduction on effective corporate tax burdens, we simulate the effective corporate tax burdens in the EU Member States both at status quo and under the provisions of the CCTB draft Council Directive by means of the European Tax Analyzer. The simultaneous harmonization of all tax base elements considered (excluding R&D tax incentives) would result in a substantial decrease in the effective corporate tax burden by 5.1% on average. Only in Cyprus and Malta, the tax burden would increase due to the replacement of the current notional interest deduction (NID) schemes by the comparatively less tax-favorable AGI. The isolated analysis of single elements demonstrates that the AGI is the main driver of the overall decline in effective tax burdens, whereas the other tax base provisions exert only a modest impact. If the CCTB was introduced without the AGI while keeping national NID schemes in place, the effective tax burden would increase on average by 0.2%. For R&D companies, the impact of the CCTB introduction turns out to be very heterogeneous across Member States since the generosity of existing domestic R&D tax incentives differs widely. The replacement of current R&D tax incentives by the CCTB R&D super-deduction could reinforce, weaken or even reverse the general base narrowing effect of the CCTB.

This study proceeds as follows: Section 5.2 shortly describes the concept of the C(C)CTB and recent developments on the way towards a harmonization of corporate taxation. Section 5.3 compares specific provisions of the CCTB draft Council Directive to current national tax law in the 28 EU Member States. Section 5.4 introduces the European Tax Analyzer model on

[84] The present chapter is based on a study by Spengel, Bräutigam et al. (2019) which was commissioned by the European Commission. The original study contains some additional analyses that are not included in this thesis, such as a comparison of the overall effect of the 2016 CCTB draft Council Directive and the original C(C)CTB draft Council Directive released in 2011.

which the quantitative analysis is based. We quantify both the overall impact of the introduction of the full CCTB on the effective tax burden of corporations located in different Member States and the isolated effects of single tax base elements in Section 5.5. Section 5.6 establishes a distinct R&D scenario to analyze the impact of the CCTB introduction for corporations that conduct R&D activities. Section 5.7 concludes.

5.2 C(C)CTB: concept and recent developments

Corporations with business activities in more than one Member State are confronted with up to 28 different tax systems leading to high administrative and compliance costs. Furthermore, an enhanced risk of international double taxation arises from conflicting taxing rights, limitations to cross-border loss relief, qualification conflicts or transfer pricing issues (European Commission, 2001a, p. 239, 2001b, pp. 10–11, 2015, p. 2). To overcome such obstacles, the European Commission proposed an EU-wide harmonization of corporate taxation for the first time in 2001 (European Commission, 2001b, pp. 15–17). Building on this proposal, a draft Council Directive for the introduction of a CCCTB for eligible EU companies was published in March 2011 (European Commission, 2011a). The proposed concept of a CCCTB entails a three-step approach: First, the taxable income of each member of the corporate group would be determined separately based on a harmonized set of tax accounting rules. Second, the individual group members' corporate tax bases would be consolidated to a common tax base. Third, the consolidated tax base would be allocated to the group members in the different Member States based on a formula comprising three factors of equal weight (labor, assets, sales). Tax rates, though, would not be harmonized. Each Member State would hence tax the apportioned share of the consolidated tax base at its own statutory tax rate.[85] Especially due to unresolved issues regarding tax consolidation, the proposal released in 2011 has not been adopted yet (European Commission, 2016b, p. 3).

Increasing globalization, mobility and digitalization have formed complex business models and corporate structures that have enhanced the scope for corporate tax planning activities and continue to challenge the uncoordinated coexistence of national tax systems (European Commission, 2015, p. 2). In line with the OECD's efforts in the "Base Erosion and Profit Shifting" (BEPS) project (OECD, 2013b), the European Commission plays an active role in the fight against aggressive tax planning. Among others, five key areas for improving the efficiency

[85] See Spengel and Zöllkau (2012) for a detailed description of the 2011 C(C)CTB draft Council Directive.

and fairness of the international tax system were identified and published in an action plan in June 2015 (European Commission, 2015, pp. 7–14).

In this context, the proposal for a Council Directive for the introduction of a C(C)CTB was re-launched on 25 October 2016. To facilitate the adoption of the C(C)CTB, a staged approach is suggested. Similar to the 2011 C(C)CTB draft Council Directive, as a first step, a single and common set of tax accounting rules across Member States would replace the current existing national rules for the determination of taxable income (CCTB) (European Commission, 2016c). Consolidation of the individual tax bases and allocation of the consolidated tax base to the group members shall be implemented as a second step at a later stage (CCCTB) (European Commission, 2016b). Besides the staged introduction, the re-launched C(C)CTB draft Council Directive includes additional features like the AGI as a type of notional interest deduction, a super-deduction for costs from R&D and a temporary cross-border loss offset until the final introduction of a consolidated tax base. Furthermore, in accordance with the motivation of the C(C)CTB as an instrument against aggressive tax planning, the new proposal encloses the provisions set out in the Anti-Tax Avoidance Directive (ATAD)[86] that was adopted in June 2016, such as an interest deduction limitation rule, rules against hybrid mismatches or a controlled foreign company rule. In contrast to the original proposal released in 2011, the application of the C(C)CTB framework under the re-launched proposal of 2016 would be mandatory for accounting groups with a consolidated group revenue exceeding EUR 750 million (Art. 2 (1) c) of the CCTB draft Council Directive,[87] Art. 2 (1) c) of the CCCTB draft Council Directive). The underlying provisions of the CCTB draft Council Directive should be implemented into the national laws of the Member States by 31 December 2018 (Art. 70 (1) of the CCTB draft Council Directive) whereas the CCCTB draft Council Directive should apply as of 1 January 2021 (Art. 80 (1) of the CCCTB draft Council Directive). So far, though, both draft Council Directives of 2016 have not been adopted yet.

[86] Council Directive (EU) 2016/1164 of 12 July 2016 laying down rules against tax avoidance practices that directly affect the functioning of the internal market, *Official Journal of the European Union*, *59*(L 193), 1–14 (19 July 2016).

[87] In the following, all Articles without reference to a specific law or Directive are those of the 2016 CCTB draft Council Directive.

5.3 Comparison of specific provisions of the CCTB proposal and current practice in the EU Member States

In this section, we compare specific provisions of the 2016 CCTB draft Council Directive (CD) to the current practice in the EU Member States as of 2017. We identify similarities and differences between national tax codes and the CCTB provisions and derive the need for future modifications in order to comply with the CCTB standard. The comparison follows a study by Spengel and Zöllkau (2012) on the 2011 C(C)CTB proposal. In light of the subsequent quantitative analysis of the impact of the CCTB draft Council Directive on effective corporate tax burdens, we consider only those provisions that can be modelled in the European Tax Analyzer (see Section 5.4). As such, the following elements for the computation of the tax base are included:

- Depreciation (Art. 33, 37),
- Valuation of inventory (Art. 19),
- Tax incentives for R&D (Art. 9 (3)),
- Provisions for legal obligations (Art. 23),
- Provisions for pensions (Art. 24),
- Avoidance of double taxation of dividends (Art. 8 d)),
- Interest deduction limitation rules (Art. 13),
- Inter-temporal and cross-border loss relief (Art. 41, 42), and
- Notional interest deduction schemes (Art. 11).

For each of the elements considered, we describe the respective proposals of the CCTB draft Council Directive and compare them to the current practice in the EU Member States.[88] If national tax law offers multiple options for treatment among which the taxpayer can choose, only the most favorable, i.e. tax minimizing, option for the corporation is considered. Information on national legislation is based on information provided by the International Bureau of Fiscal Documentation (IBFD).[89] If necessary, this information is complemented by additional data sources, such as the annual update on effective tax levels in the EU prepared by

[88] Estonian corporations are only subject to a flat tax on distributed profits. The majority of the tax base provisions discussed in the following are thus not relevant with regard to the current Estonian tax system. Therefore, we include Estonia in the qualitative analysis only where feasible. See also Spengel and Zöllkau (2012, p. 21) for a similar approach.

[89] We consider the latest Country Analyses update available for the fiscal year 2017, accessed via www.ibfd.org.

the ZEW – Leibniz Centre for European Economic Research (ZEW) on behalf of the European Commission (Spengel et al., 2018) as well as tax guides provided by tax consulting companies (i.e. EY, Deloitte, KPMG, PricewaterhouseCoopers).

5.3.1 Depreciation

According to Article 33 (1) of the CCTB draft Council Directive, fixed assets are subject to depreciation. Article 4 (19) defines fixed assets as acquired or self-created tangible assets and acquired intangible assets that are capable of being valued independently and that are used in the business for producing, maintaining or securing income for more than 12 months.[90] In the model framework of the European Tax Analyzer, depreciable assets include buildings, machinery and equipment as well as intangible assets. Therefore, depreciation rules for these asset categories are considered in the following sections.[91]

Buildings

Article 33 (1) of the CCTB draft Council Directive establishes that buildings shall be depreciated individually over their useful lives on a straight-line basis. In contrast to the original proposal released in 2011, the re-launched proposal distinguishes between industrial and office buildings. Office buildings shall be depreciated over a period of 40 years whereas a period of 25 years applies to industrial buildings (Art. 33 (1) a), b)).

The cross-country comparison in Figure 5.1 reveals a wide variety of depreciation methods that are in use for the depreciation of industrial and office buildings.[92] The straight-line method is most widely used and constitutes the only allowable method in 17 Member States. In certain Member States, taxpayers can choose among several methods: In addition to the straight-line method, the declining-balance method is available in Belgium, France and Lithuania. Similarly, the Czech Republic, Croatia, Malta and Poland offer both accelerated and straight-line depreciation. Finland and Latvia exclusively stipulate the depreciation of buildings according

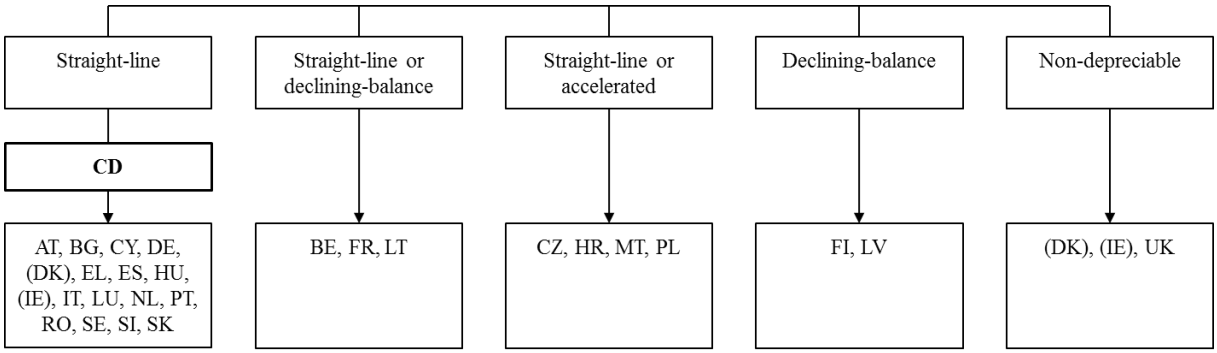
[90] The acquisition or construction costs have to be at least EUR 1,000.

[91] The following sections only deal with differences in depreciation methods. See Endres and Spengel (2015, pp. 153–156) and Bräutigam et al. (2017, p. 6) for a discussion of the characteristics and advantageousness of different depreciation methods. For a detailed comparison of depreciation rates and periods across Member States, see Spengel, Bräutigam et al. (2019, pp. 18–24). For all three asset categories considered, depreciation rates vary widely across Member States. Hence, a need for adjustment to comply with the CCTB proposal might even arise in those countries that currently employ the same depreciation method as suggested by the CCTB draft Council Directive, but prescribe a different depreciation rate.

[92] See also Spengel and Zöllkau (2012, pp. 60–62) for a similar analysis with regard to the 2011 C(C)CTB proposal.

to the declining-balance method. While buildings are in general non-depreciable in the United Kingdom, only industrial buildings qualify for depreciation in Denmark and Ireland.

Figure 5.1: Depreciation method for industrial and office buildings



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 60).

Machinery and equipment

The re-launched as well as the original C(C)CTB draft Council Directives do not follow current country practice of most Member States to classify fixed tangible assets by categories like machinery or equipment. Instead, the depreciation rules are specified according to the assets' useful lives. Depending on their useful lives, fixed assets qualify for depreciation on an individual basis or as one asset pool.

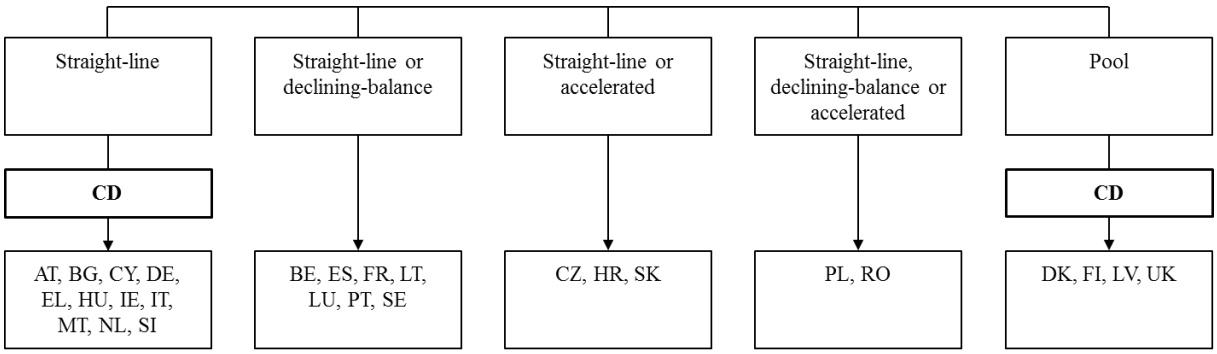
Fixed tangible assets with a useful life of at least 15 years are classified as long-life fixed tangible assets (Art. 33 (1) c), Art. 4 (22)). In contrast to the original proposal, the re-launched draft includes the classification of medium-life fixed tangible assets with useful lives between eight and 15 years (Art. 33 (1) d), Art. 4 (23)). Both groups of assets shall be depreciated individually on a straight-line basis over their useful lives which are set to 15 years and eight years, respectively (Art. 33 (1)). Other fixed tangible assets with a useful life of less than eight years shall be depreciated in one asset pool at an annual rate of 25% of the depreciation base (Art. 37 (1)).

The country practice for the depreciation of machinery and equipment is illustrated in Figure 5.2.[93] In line with the rules for long- and medium-life fixed tangible assets established by the CCTB draft Council Directive, machinery and equipment are depreciated individually on a straight-line basis in the majority of Member States. In addition to the straight-line method, the declining-balance or accelerated depreciation methods are available in seven (three) Member

[93] See also Spengel and Zöllkau (2012, pp. 63–64) for a similar analysis with regard to the 2011 C(C)CTB proposal.

States. In Poland and Romania, taxpayers can choose among all three depreciation methods.[94] By contrast, machinery and equipment have to be depreciated in an asset pool in Denmark, Finland, Latvia and the United Kingdom. In general, only one asset pool is recognized. In Latvia, however, several asset pools exist that further differ in the applicable depreciation rates. Those Member States that currently stipulate pool depreciation usually do so only for specific groups of fixed assets. Under the CCTB draft Council Directive, though, the applicability of the pool method is tied to the assets' useful life.

Figure 5.2: Depreciation method for machinery and equipment



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 63).

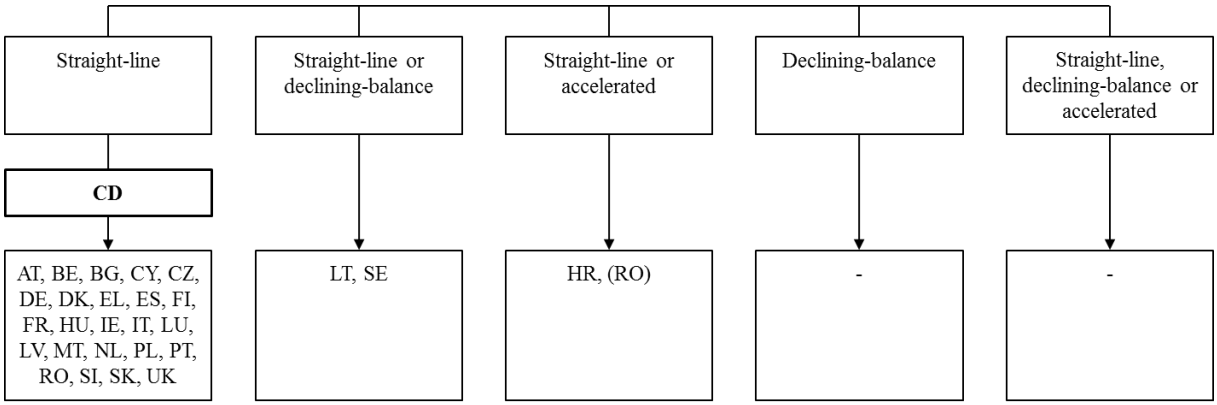
Intangible assets

Under the re-launched CCTB draft Council Directive, acquired intangible assets are subject to individual depreciation on a straight-line basis over their useful life (Art. 33 (1) e)).[95] The useful life of an intangible asset is defined as the period for which the intangible enjoys legal protection or for which the right has been granted. If this period cannot be determined, the depreciation period covers 15 years. As such, the regulations of the re-launched CCTB draft Council Directive for the depreciation of acquired intangibles are in line with the original proposal released in 2011.

In general, acquired intangibles are subject to straight-line depreciation in all Member States (Figure 5.3).[96] In Lithuania and Sweden (Croatia and Romania[97]), taxpayers can choose between the straight-line and declining-balance (accelerated depreciation) method.

[94] In Poland, however, there are restrictions for specific types of assets of the category machinery and equipment.
[95] We do not consider the treatment of internally developed intangible assets since they are not capitalized within the model framework of the European Tax Analyzer and hence not part of the quantitative analysis conducted in Section 5.5.
[96] See also Spengel and Zöllkau (2012, pp. 66–67) for a similar analysis with regard to the 2011 C(C)CTB proposal.
[97] In Romania, accelerated depreciation is only available for patents.

Figure 5.3: Depreciation method for acquired intangibles



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 66).

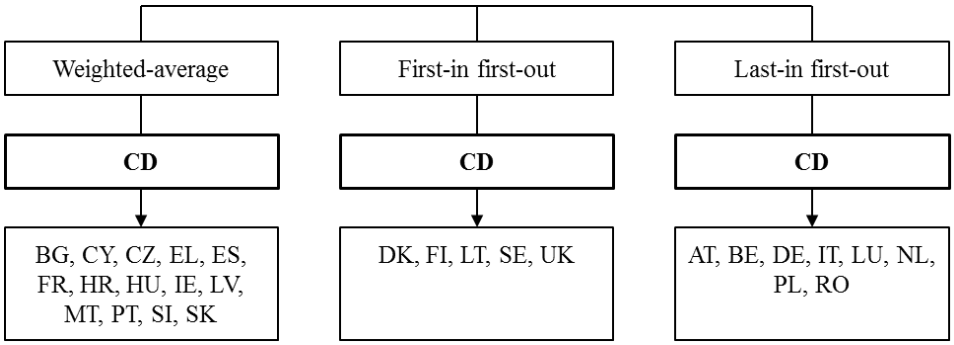
5.3.2 Valuation of inventory

Article 4 (27) of the CCTB draft Council Directive defines inventory and work-in-progress as assets for sale or in the process of production for sale or as materials and supplies consumed in the production process or in the delivery of services. The costs attributed to these assets shall be measured by using the first-in first-out method (FiFo), the last-in first-out method (LiFo) or the weighted-average cost method (Art. 19 (2)).[98] Under the original proposal for a C(C)CTB released in 2011, the LiFo method was not available (Art. 29 (1) of the 2011 C(C)CTB draft Council Directive).

Figure 5.4 gives an overview of the inventory valuation methods that are applicable in the EU Member States.[99] If several options are available according to national tax law, only the most tax-favorable provision is considered. In 14 Member States, the weighted-average cost method is the most favorable method for taxpayers. The LiFo and the FiFo methods constitute the most favorable available methods in eight and five Member States, respectively. Since under the CCTB draft Council Directive, all of the above-mentioned methods are in principle available, taxpayers would presumably choose the LiFo method as the most tax-favorable option, i.e. inventory that was produced or purchased latest is consumed or sold first. This expectation is based on the assumption of a consistent increase of asset prices in the future. Accordingly, taxpayers in 19 Member States would possibly change their valuation method for inventories upon the introduction of the CCTB. However, no strict harmonization of tax bases will be achieved due to the availability of several valuation methods.

[98] See Spengel and Zöllkau (2012, pp. 46–47) for a description of different methods for the valuation of inventory.
[99] See also Spengel and Zöllkau (2012, pp. 46–47) for a similar analysis with regard to the 2011 C(C)CTB proposal.

Figure 5.4: Valuation of inventory



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 47).

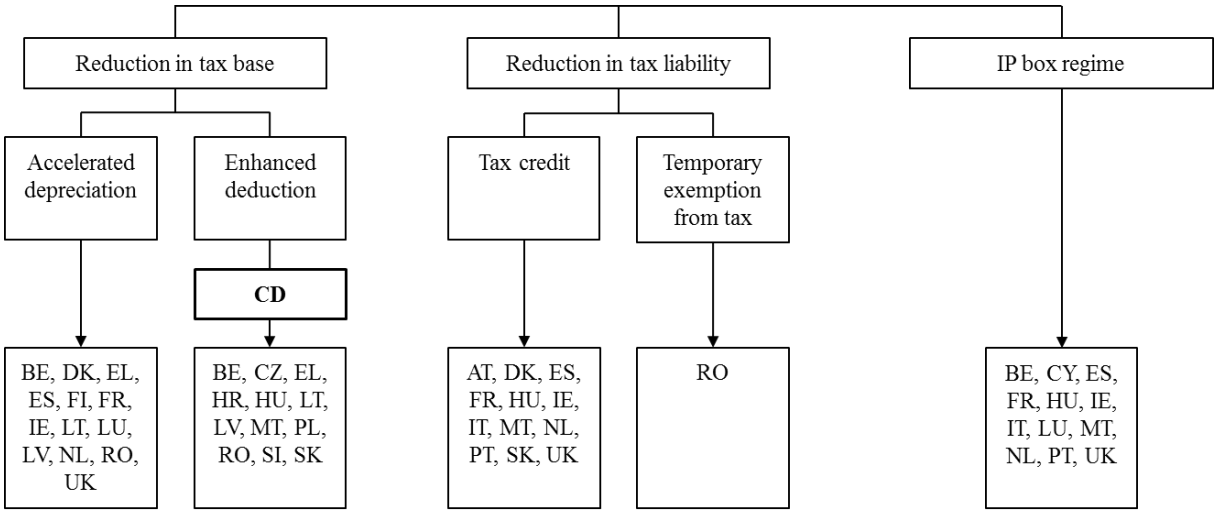
5.3.3 Tax incentives for research and development (R&D)

In general, costs incurred in the conduct of basic and applied research as well as experimental development are immediately deductible under the CCTB draft Council Directive (Art. 9 (2), Art. 4 (11)). In addition, an R&D input tax incentive designed as an enhanced deduction is available depending on the overall research expenditure: For R&D expenditure up to EUR 20 million, an additional deduction of 50% is granted leading to an overall deduction of 150% of the actual R&D costs incurred (Art. 9 (3) first sentence). Any R&D expenditure that exceeds this threshold is deductible at 125% of the actual costs (Art. 9 (3) second sentence). This so-called R&D super-deduction does not apply to costs related to movable tangible fixed assets and is thus generally available for personnel expenses, costs related to the acquisition of current assets and other miscellaneous costs (Scheffler & Köstler, 2017, pp. 101–102). For enterprises with less than 50 employees and an annual turnover or balance sheet total of less than EUR 10 million, the first EUR 20 million of R&D expenditure are deductible at 200% provided that these enterprises have not been listed on a stock exchange for at least the five preceding years, do not have any associated enterprises and have not been formed through a merger (Art. 9 (3) third sentence). In line with a general tax policy objective of the EU (e.g. European Commission, 2003, 2005a, 2005b, pp. 12–13), this measure intends to stimulate and enhance innovation in the economy (European Commission, 2016c, p. 9). Under the 2011 proposal for a C(C)CTB, immediate deduction of R&D costs in the year incurred was also available (Art. 12 of the 2011 C(C)CTB draft Council Directive) whereas the additional enhanced deductibility of R&D expenses is one of the new elements of the re-launched CCTB draft Council Directive.

In principle, several types of R&D tax incentives can be distinguished and classified into different categories (see, for example, CPB Netherlands Bureau for Economic Policy Analysis,

2014, p. 52; Valdani Vicari & Associati SRL (VVA) & ZEW, 2015, p. 60 and Annex 1, pp. 76–98). On the one hand, input-based incentives provide relief based on the R&D expenditure incurred. These incentives include accelerated depreciation, enhanced allowances, (super-) deductions as well as tax credits and temporary exemptions from tax. On the other hand, output-based incentives such as patent box regimes offer a reduced corporate income tax rate for income derived from intellectual property (IP). The exact design of R&D tax incentives varies widely across Member States. Therefore, only the most important trends and types of R&D tax incentives that are available in the Member States are illustrated in Figure 5.5.

Figure 5.5: Tax incentives for R&D



Source: Own research and illustration.

All Member States except Bulgaria, Germany, Estonia and Sweden have some form of R&D tax incentive in place. Many Member States even employ several approaches simultaneously.[100] With regard to the R&D super-deduction established in the CCTB draft Council Directive, 12 Member States are in line with the proposal and offer an enhanced deduction. However, the percentage amount of the enhanced deduction varies widely, from 13.5% in Belgium to 200% in Hungary or Lithuania. In addition, some Member States limit the deduction to a certain threshold (e.g. Malta) while others grant an enhanced deduction only if the qualifying R&D expenditure of the current tax year exceeds the expenditure incurred during the previous year (Czech Republic, Slovak Republic). Sometimes, taxpayers are allowed to carry forward the unused amount of the enhanced deduction (e.g. Malta, Poland or Slovenia).

Accelerated depreciation for qualifying R&D assets can be claimed in 13 Member States with specific national rules on the underlying rate and method. Taxpayers in 12 Member States can

[100] See, for example, also Ernst et al. (2016, p. 20) for an overview.

benefit from an R&D tax credit and reduce their tax liability accordingly. Again, the cross-country review reveals important differences regarding the amount of the credit, carry-forward or carry-backward options, time restrictions and the possibility to receive a refund of any unused amount. Taxpayers in Romania can – under certain conditions – benefit from a ten-year exemption from corporate income tax as well as from a salary income tax exemption. Twelve Member States have a special IP box regime in place.[101]

Upon the introduction of a CCTB, the application of an R&D super-deduction would become mandatory also for those Member States that currently do not envisage general R&D tax incentives in their national tax codes. In turn, any other R&D tax incentive that is currently available under national law would no longer be available for corporations that are subject to the CCTB, but would be replaced by the CCTB R&D super-deduction (Art. 1 (2) of the CCTB draft Council Directive).

5.3.4 Provisions for legal obligations (warranty provisions)

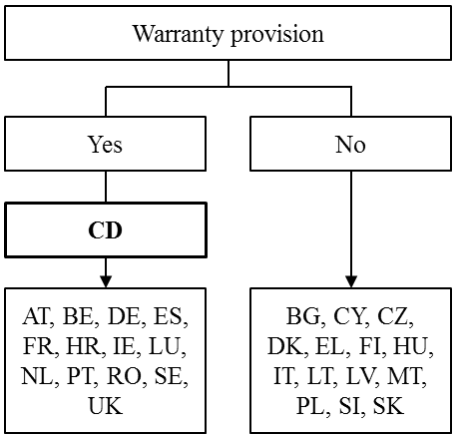
According to Article 23 (1) of the CCTB draft Council Directive, a provision is deductible if the taxpayer has a (probable future) legal obligation arising from activities or transactions carried out in the current tax year or previous years. Any amount arising from that obligation which can be reliably estimated shall be deductible, provided that the eventual settlement of the amount is expected to result in a deductible expense. A legal obligation may thereby derive from a contract, a legislation, an administrative act or another operation of law. Where the obligation relates to an activity or transaction which will continue over future tax years, the provision shall be spread proportionately over the estimated duration. Provisions shall be reviewed and adjusted at the end of every tax year. They shall be measured at the expected expenditure required to settle the obligation at the end of the tax year, provided that the estimation is based on all relevant factors (Art. 23 (2)). Account shall be taken of all risks and uncertainties, future events being reasonably expected to occur and future benefits directly linked to the event giving rise to the provision. If the term of the provision is 12 months or longer, it shall be discounted at the yearly average of the Euro Interbank Offered Rate (Euribor) for obligations with a maturity of 12 months. The recommendations on the recognition and measurement of provisions strongly resemble those of the original C(C)CTB draft Council

[101] See Spengel et al. (2017, pp. 52–55) for a recent overview on the availability and design of IP box regimes in the EU. Given that IP boxes cannot be implemented in the quantitative analysis conducted with the European Tax Analyzer, we abstain from a further consideration.

Directive (Art. 25 of the 2011 C(C)CTB draft Council Directive). What is new is the explicit prohibition to deduct provisions for contingent losses and future cost increases (Art. 23 (3)).

In the following, the focus is on provisions for warranties only, as only those are modelled in the European Tax Analyzer and hence enter the subsequent quantitative analysis. Warranty provisions satisfy the requirements for provisions according to Article 23 of the CCTB draft Council Directive. As displayed in Figure 5.6, 13 Member States permit the tax-effective deduction of warranty provisions and are hence in line with the proposed CCTB Council Directive.[102] The remaining countries generally do not recognize provisions for warranties.

Figure 5.6: Recognition of warranty provisions



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 51).

5.3.5 Provisions for pensions

Generally, post employment benefits can be provided via direct and indirect pension plans (Spengel & Zöllkau, 2012, p. 53). Direct pension plans can go along with or without the recognition of a provision during the period of employment. If no provision is created, the pension payments are deductible only when actually paid. In contrast, if a provision is built up during the period of eligibility of the employee, pension contributions are deductible when they accrue to the pension plan. In case of an indirect pension plan, pension obligations are "funded by payments to an external pension fund, e.g. an insurance company or another organization" (Spengel & Zöllkau, 2012, p. 53). The contributions to the fund affect liquidity as well as profit and loss during the period of employment. Direct pension plans with the recognition of a provision and indirect pension plans result ceteris paribus in the same consequences, except

[102] See also Spengel and Zöllkau (2012, pp. 49–53) for a similar analysis with regard to the 2011 C(C)CTB proposal.

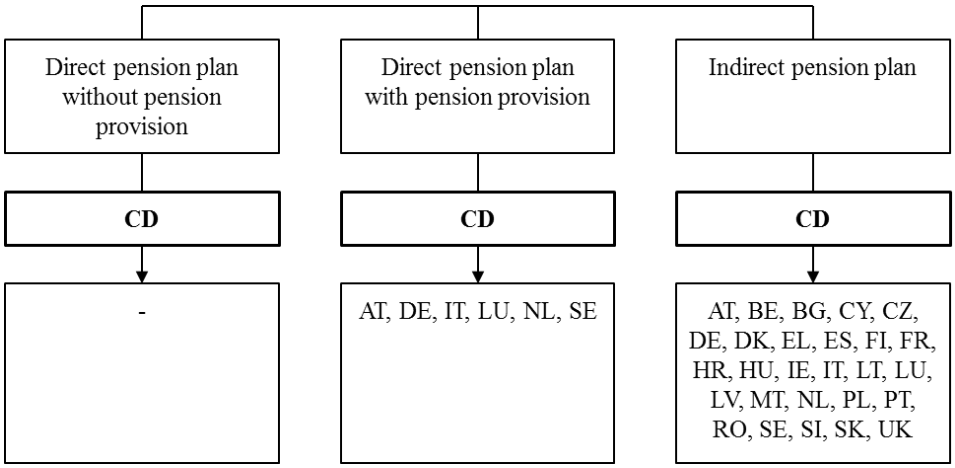
that the interest income on the pension contributions accrues to the corporation in case of a direct pension plan and to the pension fund in case of an indirect plan (Spengel, 1995, p. 186).

Contributions to indirect pension schemes – as incurred in the direct business interest of the taxpayer – shall be deductible under the CCTB draft Council Directive (Art. 9 (1)). As regards direct pension plans, Article 24 states that Member States may provide for the deduction of pension provisions. Since pension provisions fulfil the general criteria for the recognition of provisions according to Article 23 (1), the rule can be interpreted insofar as pension provisions should not be recognized according to the CCTB draft Council Directive. Still, Member States can depart from this principle in their national law (Scheffler & Köstler, 2017, p. 74). The detailed measurement of pension provisions is not further specified (Spengel & Zöllkau, 2012, p. 54). For instance, it is not clear whether the general criteria for the recognition of provisions laid down in Article 23 (1), in particular with respect to the discount rate, also apply to pension provisions (Scheffler & Köstler, 2017, p. 78). Also the original C(C)CTB proposal, prescribing that actuarial techniques shall be used in order to determine the amount of pension provisions, did not provide detailed guidance on the measurement. However, it was stated explicitly that pension provisions shall be discounted by reference to the yearly average of the Euribor for obligations with a maturity of 12 months (Art. 26 of the 2011 C(C)CTB draft Council Directive).

Figure 5.7 displays the treatment of post employment benefits.[103] Indirect pension plans are available in all Member States. Only Austria, Germany, Italy, Luxembourg, the Netherlands and Sweden in addition grant tax-effective deductions for contributions to pension provisions under direct pension schemes. In line with the CCTB draft Council Directive, specified discount rates for pension provisions apply in all six countries, for instance 6% in Germany and Austria and 4% in the Netherlands. Since the CCTB proposal leaves the deductibility of pension provisions to the discretion of Member States, no strict harmonization will be achieved in that regard.

[103] See also Spengel and Zöllkau (2012, pp. 53–54) for a similar analysis with regard to the 2011 C(C)CTB proposal.

Figure 5.7: Deductibility of pension payments



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 53).

5.3.6 Avoidance of double taxation of dividends

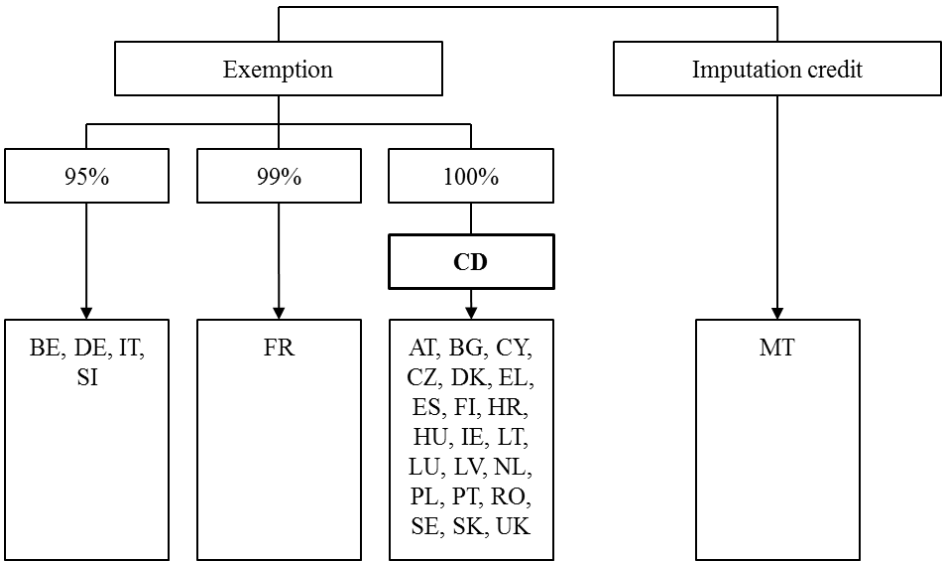
If a corporation holds shares in another corporation, Article 8 d) of the CCTB draft Council Directive fully exempts the resulting dividends from taxation at the level of the recipient corporation, provided that the shareholding amounts to at least 10% of the capital or voting rights for 12 consecutive months. The exemption relates to both domestic and foreign-source dividends. According to Article 12 g) of the CCTB draft Council Directive, costs incurred by the taxpayer in relation to this tax-exempt income are not deductible for tax purposes. For shareholdings that do not exceed the 10% threshold, in turn, inter-company dividends are fully subject to tax at the level of the receiving corporation and the related expenses are fully deductible (Art. 9 (1)). Under the original proposal for a C(C)CTB, received profit distributions were exempt from tax irrespective of the level of the shareholding (Art. 11 c) of the 2011 C(C)CTB draft Council Directive). However, Article 14 g) of the 2011 C(C)CTB draft Council Directive stipulated to add back a lump-sum amount of 5% of the exempt dividend income which would lead to an overall exemption of 95% of the received dividends.

In line with the CCTB draft Council Directive, the majority of Member States fully exempt profit distributions from a domestic substantial shareholding from taxation at the level of the receiving entity (Figure 5.8).[104] Belgium, Germany, Italy, Slovenia and France consider a lump-sum amount of 5% (1%) of the dividend as non-deductible business expense which is added back to the taxable income. In general, most Member States allow for the deductibility of costs related to tax-exempt dividends. Only in the Czech Republic, Greece and Luxembourg, such

[104] See also Spengel and Zöllkau (2012, pp. 35–37) for a similar analysis with regard to the 2011 C(C)CTB proposal.

costs cannot be deducted (Spengel et al., 2018, pp. A-25–A-26, Table A-9). In most countries, the exemption of dividends is tied to a minimum shareholding which ranges from 5% (e.g. the Netherlands or Spain) to 10% (e.g. Czech Republic or Denmark); several Member States, however, do not impose a minimum threshold (e.g. Hungary). Member States such as Belgium, Greece or Poland have further established minimum holding periods of one or two years whereas Sweden distinguishes between quoted and unquoted shares. If an Estonian parent company further distributes its received dividends, these distributions are exempt from the distribution tax provided that the parent holds a minimum share of 10% in the dividend-paying subsidiary. Under the full imputation system in Malta, dividends are subject to tax at the level of the shareholder who receives a tax credit equivalent to the amount of tax that has already been paid at the level of the distributing entity.

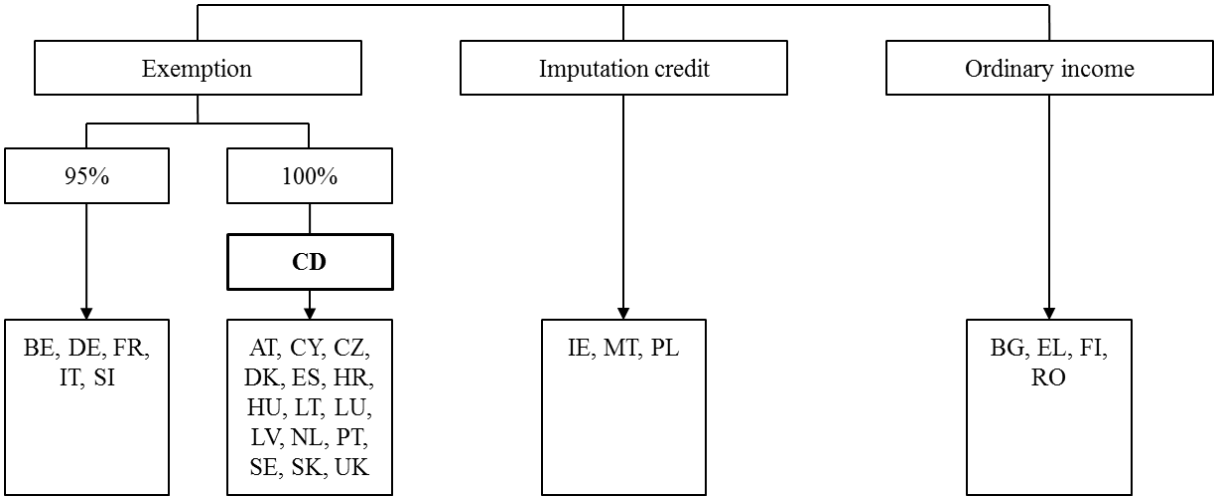
Figure 5.8: Treatment of profit distributions from domestic substantial shareholdings



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 36).

Article 8 d) of the CCTB draft Council Directive does not differentiate between proceeds received from domestic and foreign, i.e. non-EU, shareholdings. The respective country practice, however, differs (Figure 5.9). Twenty Member States exempt dividends received from non-EU/EEA corporations under certain conditions whereas three countries grant credit relief. Profit distributions from third countries are part of the ordinary taxable business income in four Member States.

Figure 5.9: Treatment of profit distributions from foreign (non-EU) substantial shareholdings

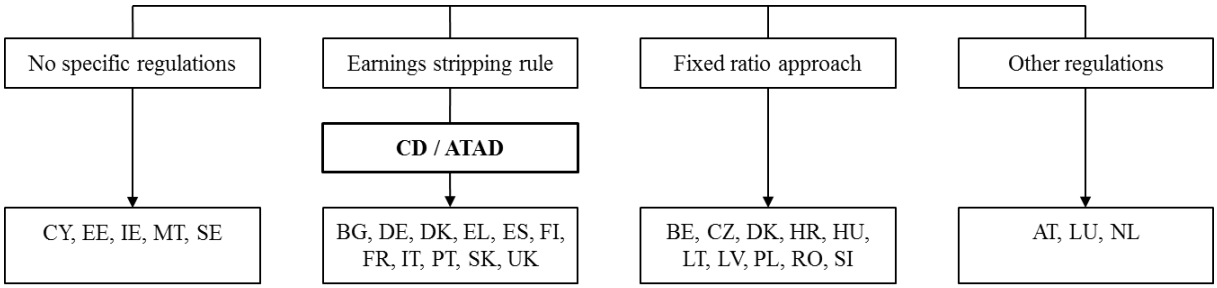


Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 36).

5.3.7 Interest deduction limitations

A rule limiting the deductibility of interest was not included in the original C(C)CTB proposal released in 2011. Already enclosed in Article 4 of the ATAD,[105] an interest deduction limitation rule has been newly included upon the 2016 re-launch (Art. 13 of the CCTB draft Council Directive). This rule limits the deductibility of interest expenses that exceed the amount of interest received to the higher of 30% of a corporation's earnings before interest, taxes, depreciation and amortization (EBITDA) and a maximum amount of EUR 3 million (Art. 13 (2)). Any non-deductible interest of a given tax year is eligible for an unlimited carry-forward (Art. 13 (6)). Unused EBITDA, in contrast, cannot be carried forward. The interest deduction limitation rule is not applicable to standalone entities (Art. 13 (4)).

Figure 5.10: Deductibility of interest expenses



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 79).

[105] In general, the interest deduction limitation rule proposed in the CCTB draft Council Directive corresponds to the rule set out in the ATAD. However, the ATAD grants more generous escape clauses (Scheffler & Köstler, 2017, p. 87).

As summarized in Figure 5.10, only five Member States – among them Cyprus or Malta – do not have specific rules to limit the deductibility of interest expenses in place.[106] Although Austria, Luxembourg and the Netherlands have not codified interest deduction limitation rules into their tax laws, national courts or tax administrations have established certain guidelines or administrative practice for the determination of an adequate debt/equity ratio. In line with the CCTB draft Council Directive, 11 Member States apply an earnings stripping rule that limits the deductibility of interest expenses to a certain percentage of EBIT(DA). Seven of these Member States, for instance France, Germany, Spain or the United Kingdom, provide for a safe haven threshold below which full interest deductibility is granted. Moreover, ten Member States restrict the deductibility of interest if a corporation's debt exceeds a certain debt-to-equity or debt-to-asset ratio (fixed ratio approach). Denmark is the only Member State that applies a combination of both approaches. Except for France and the Slovak Republic, all Member States that limit the deductibility of interest by means of an earnings stripping rule allow for a carry-forward of non-deductible interest to future periods as also proposed by the CCTB draft Council Directive.[107] Among the Member States that apply a fixed ratio approach, a carry-forward is only available in Romania.

Although the country practice of many Member States seems to deviate from Article 13 of the CCTB draft Council Directive, these differences will be dispelled until the end of 2018: According to Article 11 (1) of the ATAD, Member States have to adjust their national tax laws to comply with the Directive and apply the interest deduction limitation rule contained therein from 1 January 2019.[108]

5.3.8 Loss relief

5.3.8.1 Inter-temporal loss relief

Article 4 (9) of the CCTB draft Council Directive defines a loss as an excess of deductible expenses and other deductible items over revenues in a tax year. Article 41 grants a carry-forward of losses without restrictions in time or amount. There is, however, no possibility to carry losses back to previous years. These provisions are in line with the 2011 C(C)CTB proposal (Art. 43 of the 2011 C(C)CTB draft Council Directive). The entitlement to carry

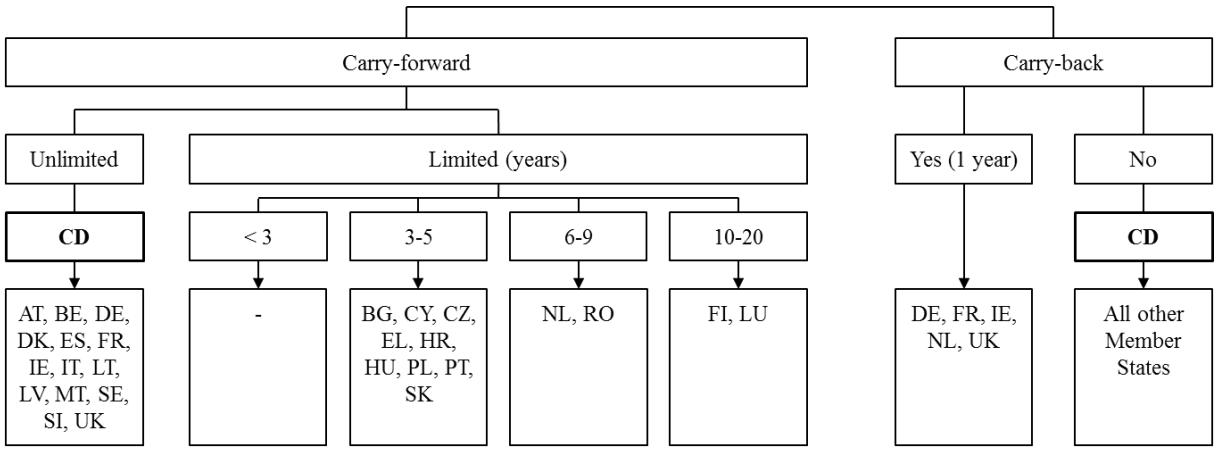
[106] See also Spengel and Zöllkau (2012, pp. 79–80) for a similar analysis with regard to the 2011 C(C)CTB proposal.

[107] Germany, Italy and Spain additionally allow for a carry-forward of unused EBITDA.

[108] In case Member States currently already have an "equally effective" interest deduction limitation rule in place, they are entitled to apply the national rule at the latest until 31 December 2023 (Art. 11 (6) of the ATAD).

forward non-deductible losses is lost upon an acquisition if the acquired company becomes a qualifying subsidiary of the acquirer or following major changes of business activity (Art. 41 (3)). This amendment to the original rule constitutes an "anti-abuse provision [that should] discourage attempts to circumvent the rules on loss deductibility through purchasing loss-making companies" (European Commission, 2016c, p. 10). For unrelieved losses that exist upon joining the system, Article 47 of the CCTB draft Council Directive limits the deductibility of such losses to the allowable amount under the previous national rules.

Figure 5.11: Relief of ordinary losses



Source: Own research; illustration based on Spengel and Zöllkau (2012, p. 83).

As illustrated in Figure 5.11, a carry-forward of excess unrelieved losses is available in all Member States.[109] With regard to the allowable carry-forward period, country practice differs: In line with the CCTB draft Council Directive, 14 Member States do not impose any temporal restrictions on the loss carry-forward. For the remainder of Member States, the carry-forward period ranges from four years (Slovak Republic) to 17 years (Luxembourg). In five Member States, losses can be carried back one year.[110]

Apart from restrictions to the carry-forward period, 12 Member States impose relative limitations on the allowable loss amount which can be set off against future profits (minimum tax regulations).[111] Four of these Member States, however, allow for a basic loss amount up to which losses are fully deductible. In Germany, for instance, a basic amount of EUR 1 million applies. Above this threshold, losses may only be set off against 60% of total taxable income,

[109] See also Spengel and Zöllkau (2012, pp. 81–83) for a similar analysis with regard to the 2011 C(C)CTB proposal.

[110] In Ireland and the United Kingdom, the availability of a loss carry-back is restricted to trading losses.

[111] Respective rules are in place in Austria, Denmark, France, Germany, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Slovenia and Spain.

which leads to a minimum taxation of 40% (Spengel & Zöllkau, 2012, p. 82).[112] In the other eight Member States, no basic amount is applicable and losses may be set off against 50% (Hungary, Poland, Slovenia) up to 80% (Italy) of taxable income.

5.3.8.2 Cross-border loss relief

The possibility of a cross-border loss offset represents one of the new elements of the CCTB (Art. 42). Since the original proposal for a C(C)CTB was intended to be implemented in one step, a mechanism for cross-border loss relief was not necessary because it was automatically granted through consolidation (European Commission, 2016c, p. 3; Spengel, 2008, pp. 29–30). In line with the introduction of a CCCTB as a two-step approach under the re-launched draft Council Directive, the mechanism for a cross-border loss offset is only temporary until the final introduction of a consolidated tax base (European Commission, 2016c, pp. 3, 10–11).

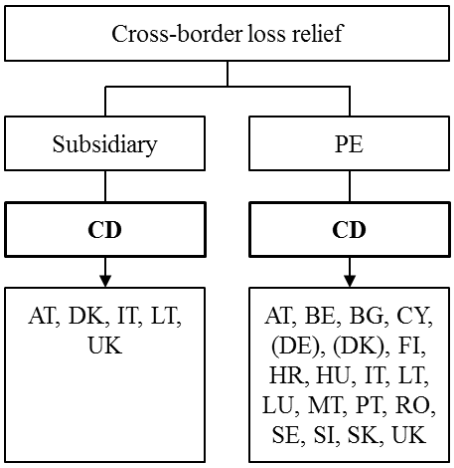
According to Article 42 (1), cross-border loss relief is available with regard to immediate qualifying subsidiaries (as defined by Art. 3 (1)) or permanent establishments (PE) situated in other Member States. A cross-border loss offset is not possible for PEs in third countries (Art. 12 j)). For qualifying subsidiaries, cross-border loss relief is possible in proportion to the underlying shareholding whereas for PEs, full offset is granted (Art. 42 (2)). Any subsequent profits of the qualifying subsidiary or PE must be added back up to the amount of the previously deducted loss (Art. 42 (3)). Furthermore, Article 42 (4) of the CCTB draft Council Directive prescribes a recapture in cases where the loss-making entity has not (yet) become profitable during a five-year period as well as upon sale, liquidation or transformation.

Figure 5.12 displays the current country practice for the treatment of cross-border losses of a foreign subsidiary or PE. Contrary to the provisions laid out in the CCTB draft Council Directive, most Member States do not provide for a cross-border compensation of current losses of a foreign subsidiary; such relief is currently only available in five Member States. Regarding current losses of a foreign PE, in contrast, 17 countries generally allow for a cross-border loss compensation, subject to specific requirements.[113] In this regard, losses of a foreign PE are usually treated similarly to the existing country or treaty practice for the taxation of PE profits. In line with the CCTB draft Council Directive, Austria and Cyprus have recapture rules in place.

[112] A basic amount is in place in Denmark, France and Spain as well.

[113] For instance, in Denmark, losses of a foreign PE can only be set off against domestic income if the taxpayer opts for cross-border tax consolidation. In Germany, relief of current losses of a foreign PE is only granted with respect to active PEs conducting certain kinds of activities.

Figure 5.12: Cross-border loss relief



Source: Own research and illustration.

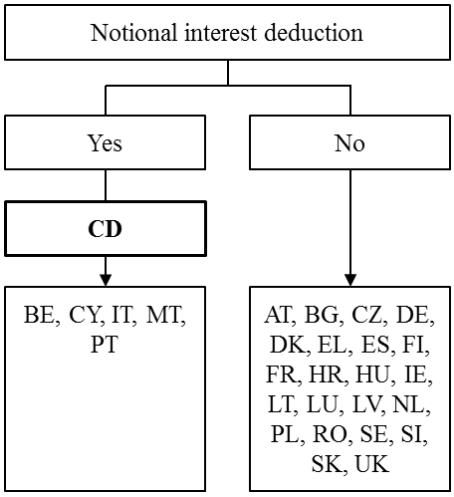
5.3.9 Notional interest deduction schemes

Article 11 of the CCTB draft Council Directive proposes an Allowance for Growth and Investment which resembles a notional interest deduction. This element is new compared to the 2011 C(C)CTB draft Council Directive. The allowance aims to mitigate the asymmetric tax treatment of debt and equity financing, whereby interest paid on loans is deductible (subject to certain limitations, see Section 5.3.7) while dividends paid to shareholders can generally not be deducted (European Commission, 2016c, p. 10). This asymmetry encourages companies to take on debt rather than equity, making them potentially more prone to economic shocks and bankruptcy. The AGI aims to attenuate this debt bias by granting a tax deduction for companies that increase their equity financing (e.g. by issuing new shares or retaining profits). The allowance shall work as follows: The relevant base for calculating the deductible amount is the increase of the equity base at the end of the relevant tax year compared to the equity base on the first day of the first year under the rules of the Directive. After the first ten tax years that a taxpayer is subject to the Directive, the reference equity base shall annually be moved forward by one tax year (Art. 11 (4)). The definition of the equity itself is based on Directive 2013/34/EU[114] and the International Financial Reporting Standards (Art. 11 (2)). In order to avoid a manifold benefit, the tax value of participations in the capital of associated enterprises shall be deducted from the equity of the taxpayer when calculating the equity base (Art. 11 (1)). The allowance shall be calculated by multiplying the change in the equity base by a fixed rate

[114] Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC, *Official Journal of the European Union*, *56*(L 182), 19–76 (29 June 2013).

which equals the yield of the euro area ten-year government benchmark bond in December of the year preceding the relevant tax year, as published by the European Central Bank, increased by a risk premium of two percentage points. In case of a negative yield, a floor of 2% shall apply (Art. 11 (5)). For the tax year 2017, which is the year underlying the quantitative analysis, the yield would amount to 3.2882%.[115] If there is an equity base decrease, an amount equal to the defined yield on the equity base decrease shall become taxable (Art. 11 (3) second sentence).

Figure 5.13: Existence of notional interest deduction schemes



Source: Own research and illustration.

As displayed in Figure 5.13, only Belgium, Cyprus, Italy, Malta and Portugal provide for NID schemes in 2017.[116] Still, the design of the regimes, in particular the definition of the equity base and of the notional interest rate, differs from the CCTB proposal. In Belgium, Malta and Portugal, the NID is available for the whole equity stock (i.e. (adjusted) net accounting equity or share capital contributions), whereas in Cyprus and Italy, the allowance is only granted for new equity, defined as the incremental increase in the company's equity as compared to the year where the NID regime was implemented.[117] The notional interest rates range from 0.237% in Belgium and 1.6% in Italy to 6.489% in Cyprus, 7.0% in Portugal and 7.03% in Malta. Sometimes, the deduction is subject to additional conditions. In Cyprus, the NID is capped at 80% of the taxable income. In Portugal, the NID is limited to a maximum amount of

[115] As we assume an introduction of the CCTB for the tax year 2017, the relevant yield is from December 2016, namely 1.2882%. The other economic data (interest rates) for the simulation is derived from 2012. The yield for 2012 does not substantially deviate from the yield for 2016 (only 0.8107 percentage points). See European Central Bank (ECB) (2018) for the euro area ten-year government benchmark bond yield.

[116] See Spengel, Bräutigam et al. (2019, pp. 36–38) for a detailed description of the NID schemes that are currently in place.

[117] As of 2018, the NID in Belgium is only granted on incremental equity over a period of five years.

EUR 2 million and is only available in the five years after the capital contribution. The NID in Malta is restricted to 90% of the chargeable income whereby the non-deductible amount can be carried forward indefinitely. A carry-forward of unused NID is also available in Italy where the deduction of fictitious interest may not result in a tax loss.

5.3.10 Interim conclusion

If the CCTB draft Council Directive was implemented as it stands, most Member States would need to adjust at least some elements of the tax base computation. Still, the proposal of the European Commission does not completely deviate from current country practice. Depending on the element and on the Member State, more or less need for adjustment arises. Figure 5.14 illustrates in how far the tax base provisions imply a need for adjustment in the EU Member States in order to comply with the CCTB draft Council Directive. We determine for each Member State and element separately whether major or minor amendments of current national rules are necessary in the course of adopting the CCTB draft Council Directive. The red and green bars indicate the proportion of countries that are classified as requiring major and minor adjustments, respectively.

The comparison of current national tax rules and the CCTB provisions reveals that adjustment requirements are highest with regard to NID rules, loss relief and R&D tax incentives. Only five Member States provide for a NID scheme, whereby the respective design is considerably different from the AGI set out in the CCTB draft Council Directive.[118] With regard to the relief of losses, the CCTB proposal neither imposes restrictions on the amount nor on the timing of the loss compensation, thereby deviating from the current provisions in the majority of Member States. The refusal of a loss carry-back, however, is predominantly in line with country practice. The need for adaptation is even higher with regard to cross-border loss compensation which is only available in few Member States.[119] While most Member States grant R&D tax incentives, only 12 countries are in line with the CCTB proposal and offer an enhanced deduction for costs related to R&D.[120] Still, the exact design of the incentive varies widely, in particular with regard to the amount of the enhanced deduction.

[118] Member States that currently offer a NID regime are classified as having only minor needs for adjustment.
[119] Member States that grant cross-border loss compensation are considered as facing only little need for adjustment.
[120] In case Member States provide for some form of an enhanced deduction, they are regarded as requiring only little adjustments. All Member States that offer any other R&D tax incentive apart from an enhanced deduction or even no R&D tax incentive at all have a high need for adjustment.

Figure 5.14: Need for adjustment in EU Member States to comply with the CCTB draft Council Directive

Selected provisions of the CCTB draft Council Directive	Article	Need for adjustment in EU Member States
		Major Minor
Depreciation		
Commercial and office buildings	Art. 33 (1) a)	
Industrial buildings	Art. 33 (1) b)	
Long-life fixed tangible assets (useful life ≥ 15 years)	Art. 33 (1) c)	
Medium-life fixed tangible assets (useful life ≥ 8 years and < 15 years)	Art. 33 (1) d)	
Asset pool (useful life < 8 years)	Art. 37	
Fixed intangible assets	Art. 33 (1) e)	
Valuation of inventory	Art. 19	
Tax incentives for R&D	Art. 9 (3)	
Provisions for legal obligations	Art. 23	
Provisions for pensions	Art. 24	
Avoidance of double taxation of dividends	Art. 8 d)	
Domestic dividends		
Foreign (non-EU) dividends		
Interest deduction limitations	Art. 13	
Loss relief		
Inter-temporal	Art. 41	
Cross-border	Art. 42	
Notional interest deduction schemes	Art. 11	

Source: Own analysis.

A mixed picture arises from the rules for depreciation, inventory valuation and provisions for legal obligations. As regards the depreciation method, most of the Member States are in line with the CCTB draft Council Directive and provide for the straight-line method.[121] Still, there are remarkable differences with respect to the underlying depreciation rates or categorization of assets. Besides, only few countries allow for the depreciation of machinery and equipment as an asset pool. Under the CCTB draft Council Directive, inventory can be valued by the FiFo, the LiFo or the weighted-average cost method. Since Member States should offer all three methods and leave the decision of which one to use to the taxpayers' discretion, a need for adjustment arises in those Member States that currently do not provide for all three methods. However, no strict harmonization of tax bases will be achieved due to the availability of several valuation methods.[122] With respect to the tax-effective recognition of provisions for legal

[121] Countries that provide for the straight-line method are categorized as having little need for adjustment, regardless of whether other methods are applicable in addition or not. Countries that currently do not provide for the straight-line method are considered as requiring major adjustments.

[122] In practice, the LiFo method constitutes the most favorable method from the perspective of taxpayers. This expectation is based on the assumption of a consistent increase of asset prices in the future. Hence, taxpayers

obligations, slightly more than half of the Member States need to adapt their current system and to allow for the deduction of warranty provisions in order to comply with the CCTB proposal.

Only little or even no adjustments are required as regards the elimination of double taxation of inter-company dividends, the treatment of pension provisions and interest deduction limitation rules. All Member States, except for Malta, are in line with the CCTB draft Council Directive and exempt dividends received from another resident company. With respect to foreign dividends, however, the impact of the CCTB draft Council Directive is stronger since foreign dividends are currently fully subject to tax in several Member States.[123] The CCTB draft Council Directive leaves the deduction of pension provisions to the Member States' discretion. Hence, no need for further adjustment arises in the course of implementing the CCTB proposal and no strict harmonization will be achieved. Although most Member States dispose of a rule to limit the deductibility of excessive interest, the underlying approaches are quite heterogeneous. Only 11 Member States apply an earnings stripping rule that is similar to the one proposed by the CCTB draft Council Directive. Still, interest deduction limitation rules have to be harmonized by the ATAD with effect from 2019. Consequently, the introduction of the CCTB would not induce any further adjustment requirements in that regard.

in 19 Member States – those that currently do not offer the LiFo method – will presumably switch to the LiFo method upon the introduction of the CCTB. These countries are classified as having major needs for adjustment.

[123] Member States that exempt a certain percentage of domestic or foreign dividends are regarded as requiring only minor adjustments.

5.4 Methodology for the computation of effective tax burdens

5.4.1 European Tax Analyzer model

The quantitative analysis of the impact of the introduction of the CCTB on effective corporate tax burdens is based on the European Tax Analyzer model.[124] The European Tax Analyzer is a computer-based model that calculates and compares effective average tax burdens of companies located in different jurisdictions.[125] It simulates the development of a model corporation over a ten-year period. The effective average tax burden is determined as the difference between the pre-tax and the post-tax value of the model firm at the end of the simulation period.

The value of the company is represented by the value of its net assets and the estimated cash flows in each simulation period. In order to determine the company's post-tax value, the tax liabilities in each period are taken into account. Since at the end of period ten, the tax value of the assets and liabilities may not reflect their fair value, hidden reserves and liabilities are added to the taxable income and taxed accordingly. Similarly, unused loss carry-forwards are liquidated at the end of the simulation period.[126]

The European Tax Analyzer uses financial and economic data on the model corporation (see Section 5.4.2) as well as national tax regulations (see Section 5.4.3) as input.

5.4.2 Model firm and economic assumptions

The model firm is characterized by its initial capital stock and corporate planning estimators that determine the development of the corporation over the ten-year simulation period. It represents an EU-28 average company. The financial data used for the generation of the model firm is mainly taken from the AMADEUS database.[127] Table 5.1 sets out the balance sheet of

[124] The following description of the methodology of the European Tax Analyzer is based on Spengel et al. (2008, pp. 12–16); Spengel and Zinn (2011, pp. 498–500); Spengel and Oestreicher (2012, pp. 3–7); Spengel et al. (2012, pp. 202–206); VVA and ZEW (2015, pp. 69–72); Bräutigam et al. (2018, pp. 66–67). For further descriptions of the model, see also Spengel (1995); Jacobs and Spengel (1996).

[125] The current version of the European Tax Analyzer covers the tax systems of the 28 EU Member States, Canada, China, Japan, Switzerland and the United States.

[126] In countries without constraints to the use of loss carry-forwards, 50% of the remaining loss carry-forward are added to the equity value. If there are restrictions, e.g. if the loss carry-forward is limited in time, only 25% of the loss carry-forward are dissolved. A similar approach is followed with respect to remaining carry-forwards of interest or EBITDA that have accrued in the context of interest deduction limitation rules.

[127] The AMADEUS database (Bureau van Dijk Electronic Publishing, https://amadeus.bvdinfo.com) provides financial and supplementary information for more than 17 million companies in the EU (update September 2013). The data used for the construction of the model firm consists of financial data for the year 2011 of

the generated EU-28 average company in the middle of the simulation period, including the different types of investments and their sources of finance. Selected key figures, in particular common financial ratios, are depicted in Table 5.2. The company is profitable and growing over the whole simulation period.

Table 5.1: Tax balance sheet of the EU-28 model firm (period 6 of 10)

Assets	**EUR**	**Equity and liabilities**	**EUR**
A. Fixed assets		*A. Equity*	
I. Intangible assets	5,199,376	I. Subscribed capital	21,305,895
II. Tangible assets		II. Revenue reserves	41,504,474
1. Land and buildings	17,604,472	III. Net profit / Net loss	10,383,662
2. Technical equipment and machinery	13,320,641	*B. Provisions*	
3. Factory and office equipment	10,226,065	I. Provisions for pensions and similar obligations	0
III. Financial assets		II. Other provisions	8,062,568
1. Participating interests	11,167,634		
2. Long-term receivables	1,240,848	*C. Creditors*	
		I. Long-term bank loans	19,937,409
B. Current assets		II. Amounts owed to shareholders	22,660,522
I. Stocks	27,361,625	III. Trade creditors	15,709,464
II. Trade debtors	41,937,873	IV. Short-term bank loans and overdrafts	32,385,194
III. Securities, cash, deposits	43,890,654		
Total	**171,949,188**	**Total**	**171,949,188**

Source: VVA and ZEW (2015, Annex 1, pp. 67, 73–74).

Table 5.2: Key figures and financial ratios of the EU-28 model firm (period 6 of 10)

Net profit / Net loss for period (EUR)	10,383,662
Total assets (EUR)	171,949,188
Sales (EUR)	209,689,369
Share of tangible fixed assets (capital intensity) (%)	23.93
Return on sales (profitability) (%)	4.95
Return on equity (%)	16.53
Equity ratio (%)	42.57
Inventories to capital (%)	15.91
Costs for personnel to turnover (labor intensity) (%)	10.46

Source: VVA and ZEW (2015, Annex 1, pp. 67, 70).

The computations require various estimates and assumptions on both the model firm and the prevailing economic conditions.[128] The underlying assumptions include i.a. information on

2,424,612 EU-28 corporations. For a description of the selection steps to generate the final sample of firms, see VVA and ZEW (2015, Annex 1, pp. 58–68).

[128] For a detailed description of the estimates and assumptions, see e.g. Spengel et al. (2008, p. 13); Spengel and Oestreicher (2012, pp. 3–4); VVA and ZEW (2015, Annex 1, pp. 65–66).

production and sales, the acquisition of goods, the expected economic lifetime of assets, the firm's financing, investment and profit distribution strategy, staff expenditure as well as macro-economic data, such as interest rates[129] and price increases.[130]

The model firm shows identical data before taxes in each considered country, i.e. the balance sheet, the profit and loss account and the corporate planning of the model firm are the same in each country. Differences between the pre-tax and the post-tax value across jurisdictions are hence only attributable to differing tax rules in the respective countries.

5.4.3 Tax parameters incorporated into the model

In order to calculate the tax liability in each country, the European Tax Analyzer accounts for various provisions of the national tax codes in a detailed manner. The following elements of the tax base are considered for profit computation:

- Depreciation,
- Valuation of inventory,
- R&D costs,
- Employee pension schemes,
- Provisions for bad debt and guarantee accruals,
- Avoidance of double taxation of dividends,
- Interest deduction limitation rules,
- Non-deductible items,
- Notional interest deductions, and
- Loss relief.

Besides the corporate income tax and country-specific surcharges, consideration is also given to real estate taxes, payroll taxes, different types of trade taxes and net wealth taxes. Since only the corporate income tax base shall be harmonized under the CCTB draft Council Directive, all

[129] Interest rates are based on the monetary financial institutions (MFI) interest rate statistics of the European Central Bank and calculated as averages of the monthly values in 2012. The following interest rates are considered: short-term credit (1.1%), long-term credit (2.5%), short-term debt (3.9%), long-term debt (3.5%). See also VVA and ZEW (2015, Annex 1, p. 65).

[130] Inflation rates are based on data from Eurostat and the Statistical Office of Germany and calculated as averages of the monthly or quarterly values in 2012. The following price indices are considered: consumer price index (2.7%), price index for basic material (2.5%), price index for wages (2.2%), price index for investment goods (2.7%), price index for real estate (2.5%). See also VVA and ZEW (2015, Annex 1, p. 65).

other country-specific taxes remain unchanged when calculating the changes in effective tax burdens induced by the introduction of the CCTB.[131]

5.5 Impact of the CCTB provisions on the effective tax burdens in the EU Member States

5.5.1 Assumptions for the model calculations

The calculations of the effective corporate tax burdens by means of the European Tax Analyzer are based on assumptions with respect to both the underlying model and the implementation of the CCTB provisions in Member States' national tax laws.

First, we consider the legal status as of 2017 as a baseline scenario. That is, we analyze the effect the CCTB introduction would have if it was implemented at the end of the fiscal year 2017. Any envisaged future reforms that have not yet become effective in 2017 will not be taken into account. For instance, we disregard future adaptations to Member States' tax accounting rules that would be necessary to comply with the provisions of the ATAD until the end of 2018 or announced tax rate reductions.

Second, to ensure the future validity of our results and to avoid confounding effects, we abstain from including temporary changes to Member States' national tax codes into our calculations if these changes are only valid for 2017.[132]

Third, since 1 January 2000, Estonia applies a special corporate tax system and taxes only profit distributions. Consequently, rules for the determination of the tax base are currently not relevant for the taxation of corporations in Estonia. For a comprehensive analysis of the consequences of the CCTB introduction across all Member States, we include Estonia into the model calculations. However, corporate income tax rates and the system of levying taxes only on distributed profits will both not be affected by the adoption of the CCTB. Therefore, the change in effective tax burdens for Estonian corporations is always zero.

[131] See also Spengel et al. (2012, p. 205). An exception concerns taxes that are derived from the corporate income tax base (see Section 5.5.1).

[132] From 2017, for instance, the French distribution tax has been repealed with retroactive effect after a ruling of the Constitutional Court. To compensate for the revenue losses associated with the abolition, two exceptional surtaxes on corporate income tax were introduced for 2017. Since the surtaxes will presumably not be imposed in subsequent years, their inclusion into our model calculations would bias the results and conclusions on the general effects of the CCTB adoption. We therefore disregard these exceptional surtaxes.

Fourth, we assume that the model corporation belongs to a corporate group with consolidated revenues of more than EUR 750 million and that all other conditions specified in Article 2 (1) of the CCTB draft Council Directive are fulfilled. Hence, the application of the CCTB provisions would be mandatory for the underlying model firm. Furthermore, we assume that the earnings of the model corporation are fully subject to the regular corporate income tax rate. We thus abstain from considering potential IP box regimes. The impact of other R&D tax incentives is considered in a distinct R&D scenario in Section 5.6.

Fifth, all values are expressed in EUR. For the conversion of foreign currencies, we consider the exchange reference rates of the European Central Bank as of 2017.

Sixth, the deductibility of other taxes for corporate income tax purposes is generally maintained as stipulated under current national tax law. We assume that any additional local profit taxes that are derived from the corporate income tax base will subsequently rely on the corporate income tax base determined according to the provisions of the CCTB (e.g. including interest deduction limitation rules or AGI deduction).

Seventh, tax accounting rules regarding the valuation of inventory and pension provisions are not harmonized by the CCTB draft Council Directive. Article 19 (2) prescribes that inventory shall be measured by using the FiFo, the LiFo or the weighted-average cost method. As all three methods shall be available, it would be up to the companies to decide which method to use. We propose that the LiFo method as the most tax-favorable approach is consistently adopted by companies across all Member States. The CCTB proposal leaves the deductibility of pension provisions to the discretion of Member States (Art. 24). Since the treatment of pension obligations is an integral part of national social systems, we assume that Member States continue to apply their current practice of direct and indirect pension plans. We further assume that the general criteria for the recognition of provisions laid down in Article 23, in particular as regards the discount rate, do not apply to pension provisions, such that national discount rates remain applicable.

Eighth, Article 4 (12) of the CCTB draft Council Directive classifies the defined yield on net equity increases in terms of the AGI (Art. 11) as borrowing costs. Hence, we assume that the AGI must also be included in the EBITDA calculations. This assumption should also hold in the reverse case when the equity base decreases and a defined yield is taxed. In this particular case, EBITDA would decrease. Furthermore, if national regulations for any other tax besides corporate income tax refer to an interest figure, this should always refer to interest as defined

by Article 4 (12) of the CCTB draft Council Directive. Regarding the trade tax add-backs in Germany, for instance, any positive or negative AGI has to be added at 25% and thus in a similar way as regular interest payments or receipts (Sec. 8 (1) a) of the German Trade Tax Code).

5.5.2 Overall effect of the introduction of the CCTB

First, we calculate the effective corporate tax burdens in the EU Member States according to national tax law (baseline scenario). Then, we replace the national tax rules by the CCTB regulations on depreciation, inventory valuation, provisions for legal obligations, interest deduction limitation, inter-temporal loss relief and notional interest deduction. The change in effective tax burdens between the baseline scenario and the CCTB framework constitutes the reference scenario for the subsequent analysis. Table 5.3 displays the effective corporate tax burdens in the Member States, the rank under both national tax regulations and the CCTB, the percentage deviation between the tax burdens and the change in rank.

Over the simulation period of ten years, the effective corporate tax burdens range from EUR 17.02 million in Bulgaria to EUR 76.27 million in France, whereby the unweighted average effective tax burden across all EU-28 Member States amounts to EUR 38.92 million. Effective tax burdens are comparatively low in "new" Member States that joined the EU in 2004 or later, such as Bulgaria, Cyprus, Latvia, Romania, Lithuania and Croatia. Among the "old" Member States, Ireland is the only country where the effective tax burden is relatively low. By contrast, tax burdens in large Member States such as France, Germany and Spain are comparatively high. The effective tax burdens in e.g. Sweden, Denmark, Malta,[133] Portugal and the Netherlands are relatively close to the EU average.[134]

[133] As regards Malta, the high effective tax burden is striking. Still, we consider only the tax burden at corporate level which is mainly determined by the rather high Maltese corporate income tax rate of 35%. The overall tax burden in Malta across both the corporate and the shareholder level, though, is comparatively low because shareholders are entitled to credit the tax paid at corporate level against their personal income tax liability (full imputation system).

[134] See also Spengel et al. (2008, pp. 38–40); Spengel and Oestreicher (2012, p. 31); Spengel et al. (2012, p. 206) for similar findings in the context of the 2011 C(C)CTB proposal.

Table 5.3: Changes in effective tax burdens under a CCTB compared to the application of national tax base provisions

Country	Ten-year tax burden in m. EUR		Deviation	Rank national	Rank CCTB	Rank change
	National	CCTB				
AT	51.10	47.92	-6.2%	24	22	2
BE	57.99	54.82	-5.5%	27	27	0
BG	17.02	15.23	-10.5%	1	1	0
CY	19.81	21.55	8.8%	2	3	-1
CZ	31.53	28.57	-9.4%	9	9	0
DE	53.64	49.83	-7.1%	26	24	2
DK	39.10	36.07	-7.7%	16	16	0
EE	32.96	32.96	0.0%	11	13	-2
EL	49.89	46.01	-7.8%	22	21	1
ES	50.80	48.01	-5.5%	23	23	0
FI	34.79	31.90	-8.3%	12	11	1
FR	76.27	73.09	-4.2%	28	28	0
HR	29.21	26.73	-8.5%	7	7	0
HU	53.15	52.50	-1.2%	25	25	0
IE	21.01	18.97	-9.7%	3	2	1
IT	45.03	43.95	-2.4%	20	20	0
LT	28.23	26.15	-7.4%	6	6	0
LU	47.62	43.80	-8.0%	21	19	2
LV	27.29	25.15	-7.8%	4	5	-1
MT	40.99	52.99	29.3%	17	26	-9
NL	41.46	37.81	-8.8%	19	17	2
PL	32.85	30.04	-8.5%	10	10	0
PT	41.23	39.94	-3.1%	18	18	0
RO	27.31	24.81	-9.2%	5	4	1
SE	36.86	33.64	-8.7%	15	15	0
SI	31.32	28.47	-9.1%	8	8	0
SK	35.97	33.09	-8.0%	14	14	0
UK	35.34	32.63	-7.7%	13	12	1
Average	**38.92**	**37.02**	**-5.1%**			

Notes: Effective tax burden as the model firm's total tax payment over ten simulation periods in million EUR, rounded to two decimals. National: status quo (current national tax accounting rules as of 2017). CCTB: full CCTB. Deviation: percentage change based on unrounded tax burdens for individual countries; (CCTB-National)/National. Rank: Member States are ranked based on the level of the effective tax burden with a value of 1 indicating the lowest tax burden and a value of 28 indicating the highest tax burden. Average is the simple arithmetic average.

The main drivers of the effective corporate tax burdens are the different kinds of taxes imposed in the Member States (e.g. corporate income tax, real estate taxes, trade taxes on income and/or capital, net wealth taxes), including the applicable tax rates and the size of the underlying tax bases. In general, the overall tax burden is mostly influenced by the corporate income tax

(Spengel et al., 2008, p. 40; Spengel & Oestreicher, 2012, p. 32; Spengel et al., 2012, p. 207).[135] In Germany, though, the tax burden is determined almost equally by the corporate income tax and the local trade tax; in Hungary, the impact of the local trade taxes even exceeds the impact of the corporate income tax.

In all EU Member States except for Cyprus and Malta, the effective tax burden would decline upon the introduction of the CCTB. This decline ranges from -10.5% in Bulgaria to -1.2% in Hungary. The average (median) change amounts to -5.1% (-7.8%). A strong decrease of effective tax burdens, i.e. below the median, can be explained as follows: First, in most cases, a relatively low corporate income tax rate applies, which results in a higher after-tax profit and a higher amount attributable to the equity reserves. This effect, in turn, increases the relevant equity for the calculation of the AGI in subsequent periods. Second, the overall tax burden is mostly driven by the corporate income tax only. In contrast, the relatively slight reduction in the effective tax burden in Hungary, France and Italy is due to other taxes besides the corporate income tax that also influence the overall tax burden, such as the local business tax and the innovation tax in Hungary. Hence, as these taxes continue to apply unchanged under the CCTB framework, the impact of the CCTB is smaller than in other Member States. The model firms' effective tax burden would increase only in Cyprus (+8.8%) and Malta (+29.3%). Malta is also the only country for which the ranking position substantially changes after the introduction of the CCTB (from 17 to 26). The positive deviation in Cyprus and Malta is a result of the NID which is investigated in more detail in Section 5.5.3.2. The stronger effect in Malta compared to Cyprus is due to the different characteristics of the NID and because the total tax burden in Malta is only determined by the corporate income tax whereas in Cyprus, an additional payroll tax is levied at corporate level. Besides, Malta has a much higher corporate income tax rate (35%) than Cyprus.

For 15 of the countries considered, no change in the ranking position occurs. Apart from Malta with a rank change of nine positions, 12 countries exhibit a change in ranking position between -2 and +2. The CCTB will not induce a harmonization of national corporate income tax rates.

[135] Although the corporate income tax base heavily influences the overall tax burden, differences in tax bases hardly explain the spread in effective tax burdens. This spread remains remarkably high upon the introduction of the CCTB, which indicates that tax bases are already harmonized to a large extent under current national tax law. Corporate income tax rates and additional local taxes, though, are harmonized neither under current tax law nor under the CCTB framework and are therefore the key drivers for the observed spread in tax burdens both before and after the implementation of the CCTB.

Hence, the remarkable spread in effective tax burdens across Member States will persist (Spengel et al., 2012, p. 208).

The tax burden reducing effect of the CCTB is robust to variations in the financial characteristics of the model firm, such as the capital intensity, the equity ratio and the profitability. In that regard, our results also hold for industry-specific model firms, i.e. where several financial ratios of the average model firm are altered simultaneously. However, the magnitude of the decline in effective tax burdens induced by the CCTB differs across industries.[136]

5.5.3 Isolated effects of single elements of the CCTB

In the following, we analyze the impact of selected elements of the CCTB on effective corporate tax burdens in isolation. We thereby follow two approaches: First, we simulate a scenario where national tax rules apply for all other elements, while the particular element of interest is harmonized according to the CCTB draft Council Directive. This exercise allows to isolate the single effect of a CCTB provision and its interaction with current national tax provisions. Second, we simulate a scenario where all other CCTB elements apply, while the respective element under consideration is implemented according to national tax law. This analysis illustrates the effect of the CCTB introduction without harmonizing a particular element. Overall, the additional simulations help to identify the determinants of the overall change in effective tax burdens and to assess the relative importance of certain elements of the CCTB. It is, however, important to note that the sum of all changes caused by the isolated consideration of single CCTB elements is not equal to the overall effect of the CCTB introduction as indicated in Table 5.3. Due to timing effects and interdependencies, the isolated impact of certain regulations on the tax burden may be either intensified or weakened (Spengel et al., 2012, p. 210).

5.5.3.1 Overview of isolated effects

The average effects of the isolated analyses across the 28 EU Member States are depicted in Table 5.4. As already conjectured in the overall analysis in Section 5.5.2, the AGI seems to be the most important driver of the changes in effective tax burdens that result from the CCTB introduction. We analyze the effect of the AGI in detail in Section 5.5.3.2. In contrast, the harmonization of other elements of the tax base on average only seems to have a minor impact

[136] For a detailed sensitivity analysis, see Spengel, Bräutigam et al. (2019, pp. 80–86).

on effective tax burdens. Therefore, the isolated effects of all other provisions of the CCTB apart from the AGI are only shortly summarized in the following. Please see Spengel, Bräutigam et al. (2019) for a detailed analysis of the impact of single tax base provisions.

If only depreciation rules were harmonized, the average change in effective tax burdens would approximately amount to 0.4%. If, in turn, the CCTB was introduced without harmonizing national depreciation rules, the average decrease in the effective tax burden when compared to status quo would be at 4.6% and thus similar to the decrease upon the introduction of the full CCTB (at 5.1%). On average, the effective tax burden is by 0.5% lower when the tax burdens for the CCTB with and without harmonized depreciation rules are compared. Yet, the overall impact of harmonized depreciation schemes is very heterogeneous across Member States and strongly depends on the characteristics and favorability of the current depreciation systems in relation to the CCTB provisions. Due to a wide variety of assets considered, it could also be that the effect of taxpayer-friendly rules with regard to a certain asset category is diminished by less favorable rules with regard to another category.

With respect to the valuation of inventory, we assume that all corporations will use the most tax-favorable LiFo method upon the introduction of the CCTB. If the LiFo method was consistently adopted across Member States while keeping all other tax base provisions unchanged, the effective tax burden would decrease on average by 0.1%, whereas it would increase on average by 0.1% when assuming that all other provisions of the CCTB already hold and harmonizing the rules for inventory valuation in a last step. Overall, the changes in effective tax burdens are quite uniform and small across Member States.

The isolated analysis of warranty provisions only reveals a change in the effective tax burden in those countries that currently do not provide for the recognition of provisions for warranties. If all Member States allowed for the deductibility of warranty provisions while continuing to apply national rules with respect to all other elements of the tax base, the effective tax burden would decrease on average by 0.2%. In turn, the effective tax burden would increase on average by 0.3% if all other CCTB provisions were already in place and harmonized rules for the treatment of warranty provisions were implemented in a final step.

The treatment of inter-company dividends only has a meaningful impact on effective tax burdens if Member States currently grant credit relief for inter-company dividends; the change in tax burdens under any current form of exemption is of minor magnitude. On average, the effective tax burden decreases by 0.3% (0.2%) in the context of the two-sided analysis.

Table 5.4: Isolated effects of single elements of the CCTB on the effective tax burdens (average across EU Member States)

Element	Ten-year tax burden in m. EUR				Average deviation			
	National	CCTB	National with isolated CCTB element	CCTB with isolated national element	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
	[A]	[B]	[C]	[D]				
AGI	38.92	37.02	37.09	39.00	-5.1%	-4.9%	0.2%	-5.3%
Depreciation	38.92	37.02	39.06	37.18	-5.1%	0.4%	-4.6%	-0.5%
Inventory valuation	38.92	37.02	38.90	36.99	-5.1%	-0.1%	-5.2%	0.1%
Warranty provisions	38.92	37.02	38.87	36.94	-5.1%	-0.2%	-5.3%	0.3%
Inter-company dividends	38.92	37.02	38.83	37.11	-5.1%	-0.3%	-4.8%	-0.2%
Interest deduction limitation rules	38.92	37.02	38.92	37.02	-5.1%	0.0%	-5.1%	0.0%
Loss relief	38.92	37.02	38.92	37.02	-5.1%	0.0%	-5.1%	0.0%
Interest deduction limitation rules (crisis scenario)	28.31	27.57	28.20	27.50	-3.1%	-0.1%	-3.4%	0.3%
Loss relief (loss scenario)	16.97	16.40	16.57	16.74	-3.0%	-2.2%	-1.0%	-2.0%

Notes: Average effective tax burden across the EU Member States under different scenarios and corresponding deviations. Effective tax burden as the model firm's total tax payment over ten simulation periods in million EUR, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: element considered according to CCTB, other elements according to current national rules. [D]: element considered according to current national rules, other elements according to CCTB. Average deviation: Simple average of national percentage changes to tax burden under each comparison.

For the profitable model corporation in the reference scenario, the isolated analyses of interest deduction limitation rules and loss compensation rules do not show a change in the average effective tax burden since the profitable model firm incurs neither regular losses nor non-deductible interest expenses during the ten-year simulation period. To evaluate the isolated effect of both sets of rules, we introduce two distinct additional reference scenarios.

First, we model a so-called crisis scenario by simulating an exogenous shock in terms of a one-time decline in revenue in the middle of the simulation period and by increasing short-term and long-term borrowing rates to take account of rising interest rates during an economic crisis.[137] The crisis scenario reveals only a small impact of harmonized interest deduction limitation rules: On average, the effective tax burden would decrease by 0.1% if only interest deduction limitation rules were harmonized. The tax burden under a full CCTB would on average be by 0.3% higher than the tax burden under a CCTB with national interest deduction limitation rules. Yet, the impact of harmonized interest deduction limitation rules crucially depends on the rules which are currently in place and is thus mixed across Member States.

Second, we simulate a specific loss scenario by means of increased extraordinary expenses for the first six simulation periods. On average, the effective tax burden would decrease by 2.2% upon the harmonization of loss compensation rules in a setting where all other national tax accounting rules continue to apply and by 2.0% upon the harmonization of loss compensation rules in a setting where all other CCTB provisions have already been implemented. Thus, in the loss scenario, the isolated effect of loss compensation rules is on average comparatively more pronounced. The impact is especially strong if losses cannot be offset against future profits within the ten-year simulation period, resulting in a (partial) loss forfeiture in the end. For the majority of Member States, though, the introduction of common rules for inter-temporal loss relief would only induce small changes in the effective tax burden.

Overall, in the reference scenario with a profitable model corporation, the separate harmonization of all tax base elements apart from the AGI only has a minor effect or even no impact at all. The changes in effective tax burdens as compared to status quo range on average from -0.3% to +0.4%. If the CCTB was introduced without harmonizing the respective element, the effective tax burden would decrease on average by 4.6% to 5.3%, which is close to the decrease upon the introduction of the full CCTB (-5.1%). Hence, it is presumably the AGI

[137] For a similar approach, see Bräutigam (2017, p. 80); Spengel and Zinn (2011, p. 506, 2012, p. 43).

which drives the overall decline in effective tax burdens induced by the CCTB. In the following sub-section, we therefore investigate the impact of the AGI in detail.

5.5.3.2 Effect of the Allowance for Growth and Investment

In order to evaluate the effect of the AGI, we proceed as described above. First, we calculate the effective tax burden under current national tax law except for NID schemes and assume that all Member States introduce the AGI as proposed in the CCTB draft Council Directive. Second, we consider the effective tax burden under the CCTB while excluding the AGI. For those Member States which currently have a NID scheme in place (Belgium, Cyprus, Italy, Malta and Portugal), the national rules are implemented instead.[138] The respective figures are displayed in Table 5.5 (columns [C] and [D]). The effective tax burdens under national tax accounting rules at status quo and upon the full introduction of the CCTB are repeated in columns [A] and [B].

When implementing the AGI and keeping all other rules for the tax base computation unchanged, i.e. as under current national tax law, the effective tax burden would decline on average ([C] vs. [A]). The average change amounts to -4.9% across all countries and to -7.2% across those countries that currently do not provide for the deduction of fictitious interest on equity. For most Member States, the changes in the effective tax burden when implementing only the AGI ([C] vs. [A]) resemble the changes in the effective tax burden when adopting the CCTB as a whole ([B] vs. [A]). The AGI is thus the pivotal element which drives the overall impact of the CCTB on the effective tax burdens. Our findings are based on the model assumptions outlined in Sections 5.4 and 5.5.1, in particular the consideration of a newly founded, profitable and growing company over a time horizon of ten years.

[138] Strictly speaking, as the NID influences the computation of the tax base which should be harmonized under the CCTB, it could not continue to apply as prescribed under national tax law if a CCTB came into effect. Still, Member States would have the possibility to grant a tax credit in the amount of the NID. Under this assumption, national rules on NID would still be applicable. It is hence meaningful to investigate the scenario where the provisions of the CCTB are combined with national rules on NID.

Table 5.5: Isolated effect of the AGI under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with AGI [C]	CCTB with national NID [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	51.10	47.92	47.95	51.11	-6.2%	-6.2%	0.0%	-6.3%
BE	57.99	54.82	55.35	58.05	-5.5%	-4.5%	0.1%	-5.6%
BG	17.02	15.23	15.31	17.05	-10.5%	-10.0%	0.2%	-10.7%
CY	19.81	21.55	21.89	19.41	8.8%	10.5%	-2.0%	11.0%
CZ	31.53	28.57	28.72	31.61	-9.4%	-8.9%	0.2%	-9.6%
DE	53.64	49.83	49.50	53.59	-7.1%	-7.7%	-0.1%	-7.0%
DK	39.10	36.07	35.92	39.02	-7.7%	-8.1%	-0.2%	-7.6%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%	0.0%
EL	49.89	46.01	45.39	49.49	-7.8%	-9.0%	-0.8%	-7.0%
ES	50.80	48.01	48.22	50.95	-5.5%	-5.1%	0.3%	-5.8%
FI	34.79	31.90	31.74	34.70	-8.3%	-8.8%	-0.2%	-8.1%
FR	76.27	73.09	73.29	76.37	-4.2%	-3.9%	0.1%	-4.3%
HR	29.21	26.73	27.16	29.77	-8.5%	-7.0%	1.9%	-10.2%
HU	53.15	52.50	52.50	53.50	-1.2%	-1.2%	0.7%	-1.9%
IE	21.01	18.97	18.87	20.96	-9.7%	-10.2%	-0.2%	-9.5%
IT	45.03	43.95	43.73	45.49	-2.4%	-2.9%	1.0%	-3.4%
LT	28.23	26.15	26.45	28.38	-7.4%	-6.3%	0.5%	-7.9%
LU	47.62	43.80	44.31	47.67	-8.0%	-6.9%	0.1%	-8.1%
LV	27.29	25.15	25.37	27.40	-7.8%	-7.0%	0.4%	-8.2%
MT	40.99	52.99	52.76	42.10	29.3%	28.7%	2.7%	25.9%
NL	41.46	37.81	37.99	41.55	-8.8%	-8.4%	0.2%	-9.0%
PL	32.85	30.04	29.84	32.75	-8.5%	-9.1%	-0.3%	-8.3%
PT	41.23	39.94	40.24	41.32	-3.1%	-2.4%	0.2%	-3.3%
RO	27.31	24.81	25.12	27.46	-9.2%	-8.0%	0.6%	-9.7%
SE	36.86	33.64	33.84	36.95	-8.7%	-8.2%	0.3%	-9.0%
SI	31.32	28.47	28.46	31.23	-9.1%	-9.1%	-0.3%	-8.8%
SK	35.97	33.09	33.14	35.99	-8.0%	-7.9%	0.1%	-8.1%
UK	35.34	32.63	32.49	35.27	-7.7%	-8.1%	-0.2%	-7.5%
Average	**38.92**	**37.02**	**37.09**	**39.00**	**-5.1%**	**-4.9%**	**0.2%**	**-5.3%**

Notes: Effective tax burden as the model firm's total tax payment over ten simulation periods in million EUR, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: current national rules without national rules for NID, plus AGI. [D]: CCTB without AGI, plus national rules for NID. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

In Member States which currently do not provide for a NID, the implementation of the AGI, while keeping all other elements of the tax base computation unchanged, would lead to a narrowing of the tax base. The effective tax burden would hence decline, with a decrease ranging from 1.2% in Hungary to 10.2% in Ireland. The relatively weak effect in Hungary is due to the levying of additional taxes at corporate level, namely the local business tax and the innovation tax, which continue to apply unchanged under the CCTB framework. The strong decrease in Ireland is determined by two reasons: First, a low corporate income tax rate applies (12.5%), resulting in a higher after-tax profit and a higher amount attributable to the equity reserves, which in turn increase the relevant equity for the calculation of the AGI in subsequent periods. Second, the real estate tax is the only additional tax at corporate level, such that the overall tax burden is mainly determined by the corporate income tax.

In those Member States that already have a NID scheme in place, the impact of the AGI decisively depends on the exact design of the current NID scheme and in particular on the NID rate and the NID base. Table 5.6 provides an overview of the NID schemes currently in place and an explanation for the observed changes in effective tax burdens when replacing the national NID by the AGI. In Cyprus and Malta, the national NID rates (6.489% and 7.03%, respectively) are substantially higher than the rate of the AGI (3.2882%). Hence, the tax base under the CCTB framework would increase, resulting in a higher effective tax burden than under national tax rules. The different strength of the increase in Cyprus and Malta is i.a. due to the different national rules for the calculation of the relevant equity base.[139] While in Malta, the whole equity stock qualifies for a deduction, the NID in Cyprus is limited to new equity introduced in a company as from 1 January 2015. Although Portugal also provides for a NID rate which more than doubles the AGI rate (7%), the national NID is only granted for the first five periods and is limited to a maximum amount of EUR 2 million. This is why Portugal, in contrast to Cyprus and Malta, shows a decrease in the effective tax burden under the CCTB. In Belgium and Italy, the tax advantage of the national NID is comparatively low (NID rates of 0.237% and 1.6%, respectively). The AGI is thus more advantageous, resulting in a lower effective tax burden when replacing the national NID by the AGI.

[139] For further reasons, see Section 5.5.2.

Table 5.6: Comparison of national NID rates and bases and effect of a replacement of national NID schemes by the AGI

Country	NID base	NID rate	Effect on effective tax burden due to replacement of national NID by AGI
CCTB (AGI)	New equity	3.2882%	-
BE	All equity	0.237%	Decrease (higher AGI rate overcompensates narrower base)
CY	New equity	6.489%	Increase (lower AGI rate)
IT	New equity	1.6%	Slight decrease (higher AGI rate)
MT	All equity	7.03%	Substantial increase (lower AGI base/ rate)
PT	All equity	7.0%	Slight decrease (lower AGI rate & narrower AGI base vs. national limitations in time & amount)

If the CCTB was introduced without the AGI (and if all current national NID schemes were kept in place), the changes in the effective tax burden relative to the tax burden at status quo ([D] vs. [A]) would be significantly smaller than for a CCTB including the AGI ([B] vs. [A]) – ranging from -2.0% in Cyprus to +2.7% in Malta. On average, the deviation for all countries under consideration is almost zero (+0.2%). In turn, if all other provisions of the CCTB were already in place and the AGI was adopted in a last step ([B] vs. [D]), the changes in the effective tax burden (on average -5.3%) would resemble those in the reference scenario ([B] vs. [A]). Again, it becomes obvious that the AGI plays a crucial role whereas the effect of the other CCTB provisions is only of minor magnitude.

In Table 5.7, we consider additional scenarios that shed more light on the particularities of the AGI. First, we assume that the AGI rate varies. According to Article 11 (5) of the CCTB draft Council Directive, the AGI rate should equal the yield of the euro area ten-year government benchmark bond in December of the year preceding the relevant tax year, as published by the European Central Bank – i.e. 1.2882% for the tax year 2017 –, increased by a risk premium of two percentage points. Instead of considering a risk premium of two percentage points, we now assume a risk premium of zero percentage points, resulting in an AGI rate of 1.2882% instead of 3.2882%. Second, we vary the calculation of the equity base. Article 11 (4) of the CCTB draft Council Directive defines the relevant base for calculating the deductible amount as the increase of the equity base at the end of the relevant tax year compared to the equity base on the first day of the first year under the rules of the Directive. After the first ten tax years that a taxpayer is subject to the Directive, the reference equity base shall annually be moved forward by one tax year. Instead of considering a rolling equity base after ten years, we now assume a

rolling equity base after five years. We conduct the analyses for those Member States that currently have a NID scheme in place (Belgium, Cyprus, Italy, Malta and Portugal) and for the Member States where the AGI has the strongest and weakest effect, namely Ireland and Hungary.

Table 5.7: Analysis of different AGI schemes

Country	Ten-year tax burden in m. EUR				Deviation		
	National	CCTB	CCTB with 1.2882% AGI rate	CCTB with 5 yr. rolling AGI base	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]
	[A]	[B]	[C]	[D]			
BE	57.99	54.82	57.08	55.73	-5.5%	-1.6%	-3.9%
CY	19.81	21.55	22.86	22.08	8.8%	15.4%	11.5%
HU	53.15	52.50	53.11	52.76	-1.2%	-0.1%	-0.7%
IE	21.01	18.97	20.19	19.46	-9.7%	-3.9%	-7.4%
IT	45.03	43.95	45.77	44.69	-2.4%	1.6%	-0.8%
MT	40.99	52.99	55.64	54.07	29.3%	35.7%	31.9%
PT	41.23	39.94	42.12	40.81	-3.1%	2.1%	-1.0%

Notes: Effective tax burden as the model firm's total tax payment over ten simulation periods in million EUR, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: variation of AGI rate. [D]: variation of AGI base year. Deviation: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A] and [D] vs. [A] calculated as ([C]-[A])/[A] and ([D]-[A])/[A].

When considering a lower AGI rate, the tax advantage of the AGI is less pronounced. Hence, for those Member States that exhibit a decline in the effective tax burden under the CCTB framework, the decline is weaker (Belgium, Hungary, Ireland) or even turns into an increase (Italy, Portugal). For those Member States where the effective tax burden increases under the CCTB (Cyprus, Malta), the increase becomes even stronger with a lower AGI rate because the tax disadvantage of the AGI compared to the current national NID schemes is reinforced.

Changing the rolling equity base from ten to five years results in a similar effect, i.e. the tax advantage of the AGI declines. The model of the European Tax Analyzer simulates the effective tax burden over a time horizon of ten years. When implementing the AGI as proposed, with a rolling equity base after ten years, the calculation of the relevant equity base increase is determined by reference to the equity base in the first year throughout the whole simulation period. The rolling base would start to be effective from year 11 onwards and is hence not reflected in the results. When considering a rolling equity base after five years instead, the equity base increase declines from period six onwards. While for period one to five, the equity base increase is determined as the difference between the equity at the end of the relevant tax year and the equity at the beginning of the first year, it is defined as the equity at the end of the

relevant tax year minus the equity that has been accumulated as retained earnings until the fifth preceding year for period six to ten. Hence, the equity base in the last five periods considered is smaller than in the original CCTB scenario, resulting in a lower AGI and in a higher effective tax burden. Still, it is important to note that the precise effect of the rolling equity base crucially depends on the investment policy of the firm. If, for instance, the firm increases its equity stock after the first five years, the equity base increase in period six, determined as the difference of the equity base in period six and two, is stronger, resulting in a higher AGI.

In contrast to existing NID regimes, Article 11 (3) of the CCTB draft Council Directive provides for the taxation of negative equity interest, i.e. in case of an equity base decrease, an amount equal to the defined yield on the equity base decrease shall become taxable. As described in Section 5.4.2, the model framework of the European Tax Analyzer considers a profitable model firm in the original scenario. Thus, the effect of this special property of the AGI is not reflected in the effective tax burdens. In order to analyze the impact of the AGI in the case of a decrease in the relevant equity base, we simulate a loss-making model firm by means of increased extraordinary expenses for the first six simulation periods.

Table 5.8 depicts the effective tax burdens at status quo and under the CCTB framework in case of a loss-making model firm. In columns [C] and [D], the AGI rate and the definition of the AGI base, respectively, are varied as described above. Again, we conduct the analysis for those Member States that currently have a NID scheme in place and for the Member States where the AGI has the strongest and weakest effect in the reference scenario.

Table 5.8: Analysis of different AGI schemes for a loss-making model firm

Country	Ten-year tax burden in m. EUR				Deviation		
	National	CCTB	CCTB with 1.2882% AGI rate	CCTB with 5 yr. rolling AGI base	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]
	[A]	[B]	[C]	[D]			
BE	23.64	22.77	22.55	22.42	-3.7%	-4.6%	-5.1%
CY	13.69	9.51	9.60	9.46	-30.5%	-29.8%	-30.9%
HU	52.49	47.59	47.28	47.40	-9.3%	-9.9%	-9.7%
IE	7.38	6.67	6.66	6.56	-9.5%	-9.8%	-11.0%
IT	20.41	21.46	21.28	21.20	5.1%	4.2%	3.8%
MT	14.83	19.66	19.90	19.55	32.6%	34.2%	31.9%
PT	15.68	15.26	15.22	15.02	-2.7%	-3.0%	-4.2%

Notes: Effective tax burden as the model firm's total tax payment over ten simulation periods in million EUR, rounded to two decimals, for a loss-making model firm. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: variation of AGI rate. [D]: variation of AGI base year. Deviation: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A] and [D] vs. [A] calculated as ([C]-[A])/[A] and ([D]-[A])/[A].

The size and – in case of Cyprus and Italy – also the sign of the percentage change when moving from status quo to the CCTB are different than for the profitable model firm. The difference is mainly driven by those rules that did not apply to the profitable model firm, i.e. loss compensation and interest deduction limitation rules as well as the taxation of negative equity interest.

For a loss-making model firm, the effect of a reduced AGI rate is ambiguous: On the one hand, a lower yield on equity base increases results in lower positive AGI amounts which are deductible. On the other hand, a lower yield on equity base decreases results in lower negative AGI amounts which are taxable. As the model firm generates negative AGI amounts during the loss periods and positive AGI amounts during the profitable periods, both effects are present. While for Belgium, Hungary, Ireland, Italy and Portugal, the positive effect from the reduced AGI rate on equity base decreases slightly overcompensates the negative effect of the lower AGI rate on equity base increases, the effect is reversed for Cyprus and Malta.

When changing the rolling equity base from ten to five years, the tax advantage of the AGI increases in all Member States considered. The model firm generates losses in the first six periods. If the equity base in the first year is used as reference base for the calculation of the AGI in all ten periods, the positive AGI amounts in the last periods are smaller than in the case where the reference equity base annually moves forward. This is because the year-end equity bases decline compared to the equity base in the first year due to the losses. When calculating the equity base increase with reference to a lower basis, the increase thus becomes stronger. Overall, given the simulation of the loss scenario with increased expenses in the first six periods, the negative AGI amounts in the first periods are unaffected by the application of a rolling equity base after five years instead of ten years, but the positive AGI amounts which are deductible in the last years of the simulation period increase, resulting in a lower effective tax burden.

5.5.4 Interim conclusion

We investigate the impact of the CCTB introduction on the effective corporate tax burdens in the EU Member States. At status quo, effective tax burdens are considerably different across Member States. On average, the effective tax burden amounts to EUR 38.92 million. While country-specific characteristics of the corporate income tax such as tax rates or tax bases are certainly the most important driver of the tax burden in the majority of Member States, it is further influenced by other profit or non-profit taxes due at corporate level. Upon the

introduction of the CCTB, the effective tax burden would decline in all Member States except for Cyprus and Malta. Here, the AGI that replaces current national NID schemes is less tax-favorable and would thus lead to a higher tax burden. After the CCTB introduction, the average effective tax burden would amount to EUR 37.02 million representing an average decrease of 5.1%.

To distinguish the isolated effects of the different CCTB elements that are considered, we analyze the impact of single elements in isolation. In this context, a two-sided approach is adopted: First, we replace the relevant national rule by the applicable CCTB provision while keeping all other national tax rules unchanged. Second, we simulate the introduction of the CCTB with the respective tax base element modelled according to current national tax law.

The two-sided isolated analysis reveals the AGI as the most important driver of the changes in effective corporate tax burdens upon the introduction of the CCTB. On average, the effective tax burden would decrease by 4.9% if the AGI was simultaneously introduced across Member States and all other tax base provisions remained unchanged. For Member States that currently do not have any NID scheme in place, the additional deduction granted by the AGI narrows the tax base, thereby decreasing the effective tax burden. If, in contrast, Member States currently already offer a NID scheme, the tax effect of the AGI depends on the design of the current NID regime, especially on the NID base and rate. Due to the particular characteristics of the AGI proposed by the CCTB, we further vary the time horizon of the rolling AGI base year as well as the AGI rate. Both analyses confirm that the tax advantage of the AGI is weaker if the AGI characteristics are less pronounced.

In the reference scenario with a profitable model corporation, the separate harmonization of all other tax base elements apart from the AGI on average only has a minor effect (depreciation, valuation of inventory, provisions for warranties, avoidance of double taxation of dividends) or even no impact at all (interest deduction limitation, loss compensation). The introduction of a CCTB without the AGI while keeping national NID schemes in place would result in an average increase of the effective tax burden by 0.2%. To analyze the isolated effect of interest deduction limitation and loss compensation rules, we modify the economic setting to account for a crisis and a loss scenario, respectively. In the specifically modelled scenarios, the introduction of harmonized interest deduction limitation rules only has a small effect on average, whereas the impact of common rules for inter-temporal loss relief is comparatively strong in some Member States and thus more pronounced on average.

5.6 R&D scenario: impact of the CCTB provisions including R&D tax incentives on the effective tax burdens in the EU Member States

5.6.1 Motivation and assumptions for the R&D scenario

One of the new elements that was introduced upon the re-launch of the C(C)CTB draft Council Directive in 2016 is the R&D super-deduction. According to Article 9 (3) of the CCTB draft Council Directive, R&D expenditure up to EUR 20 million can be deducted at 150% of the actual R&D costs whereas any R&D expenditure that exceeds this threshold is deductible at 125% of the actual costs. To distinguish the effect of the CCTB R&D super-deduction from the impact of the harmonization of the other tax base provisions, this section replicates the main analysis of the overall effects of the CCTB introduction for a specific R&D scenario within the model framework of the European Tax Analyzer. Based on a first general analysis of the impact of input-based R&D tax incentives that are currently available in the Member States, we examine the effect that the replacement of national tax accounting rules and input-based R&D tax incentives by the CCTB including the R&D super-deduction would have for R&D companies.[140] We limit our considerations to general input-based R&D tax incentives and thus abstain from the inclusion of specific incentives that are only applicable to corporations in certain regions, to certain narrow types of activity, to corporations of a specific size or under similar constraints.[141] As such, we implement input-based R&D tax incentives for 21 out of 28 Member States (legal status as of 2017) into the model framework of the European Tax Analyzer.[142]

For the R&D scenario, we consider the same model corporation as for the rest of the analysis. The research intensity of the model firm has been determined based on the "7th Community Innovation Survey 2010" which was conducted by Eurostat (VVA & ZEW, 2015, Annex 1, pp. 65–66). It is assumed that R&D tax incentives only apply to certain expense categories (e.g.

[140] Output-based R&D tax incentives, i.e. so-called IP box regimes, offer a special reduced tax rate for income from intellectual property (see Section 5.3.3). Since there is no publicly available data on the royalty and license income that an average EU corporation derives from the use of its IP, we do not include IP box regimes into the following analysis. See also VVA and ZEW (2015, pp. 76–77).

[141] See VVA and ZEW (2015, p. 76) for a similar approach.

[142] Information on current national R&D tax incentives has been gathered from the IBFD database and from special R&D tax guides and studies, such as Ernst et al. (2016); EY (2017); PricewaterhouseCoopers (2017). See Spengel, Bräutigam et al. (2019, pp. 106–108) and Table D.1 in the Appendix for an overview of the implemented R&D tax incentives. Due to the exclusion of specific R&D tax incentives, some R&D tax incentives depicted in Figure 5.5 (Section 5.3.3) are not considered in the following analysis.

R&D personnel, assets used for R&D purposes).[143] We allocate the overall R&D expenses to the different categories according to average values across EU Member States based on OECD statistics (OECD, 2018).[144]

5.6.2 Impact of national R&D tax incentives

In a first step, we analyze the impact of R&D tax incentives in relation to the baseline scenario, i.e. the status quo according to national tax provisions without any R&D tax incentives (Table 5.9).[145] When current national R&D tax incentives are considered, the effective corporate tax burden is on average by 6.2% lower than in the baseline scenario ([B] vs. [A]). The reduction in the effective tax burden varies from 0.4% in Finland to 29% in Ireland. In Finland, a 20% accelerated depreciation is available for industrial and office buildings used for R&D purposes. Although this rate is substantially higher than the regular depreciation rates for industrial and office buildings (7% and 4%, respectively), its scope is limited to buildings that are used for R&D purposes, which explains the comparatively small effect. The high reduction in Ireland, in contrast, is driven by the generous immediate depreciation for all assets used in the R&D process. In addition, two volume-based tax credits are in place: A 25% tax credit is available for R&D capital expenditure, personnel and current costs. If the tax credit cannot be fully used during a given period, it may be carried back to the previous period or carried forward indefinitely. Another 25% tax credit is granted for costs related to the construction or refurbishment of buildings used for R&D purposes. In general, high reductions exceeding 10% result especially in Member States where the effective tax burden is already comparatively low at status quo (e.g. Croatia, Czech Republic, Ireland, Latvia, Lithuania, Slovenia). Hence, from a mere tax perspective, Member States with an attractive overall corporate tax system also seem to establish an attractive environment for corporations that conduct R&D activities (VVA & ZEW, 2015, p. 78).

[143] See VVA and ZEW (2015, Annex 1, p. 66) for a similar approach.
[144] Division factors refer to data from 2013 due to data availability.
[145] The subsequent analysis follows the approach and reasoning of VVA and ZEW (2015, pp. 77–78).

Table 5.9: Impact of the CCTB R&D super-deduction on the effective tax burdens in the EU Member States

Country	Ten-year tax burden in m. EUR				Deviation		
	National without R&D tax incentives [A]	National with national R&D tax incentives [B]	National with CCTB R&D super-deduction [C]	CCTB with CCTB R&D super-deduction [D]	[B] vs. [A]	[C] vs. [B]	[D] vs. [B]
AT	51.10	48.69	48.83	45.57	-4.7%	0.3%	-6.4%
BE	57.99	56.82	54.91	51.60	-2.0%	-3.4%	-9.2%
BG	17.02	17.02	16.10	14.31	0.0%	-5.4%	-15.9%
CY	19.81	19.81	18.73	20.39	0.0%	-5.5%	2.9%
CZ	31.53	26.57	29.81	26.79	-15.7%	12.2%	0.8%
DE	53.64	53.64	50.79	46.87	0.0%	-5.3%	-12.6%
DK	39.10	39.10	37.10	34.01	0.0%	-5.1%	-13.0%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%
EL	49.89	47.06	47.26	43.28	-5.7%	0.4%	-8.0%
ES	50.80	48.37	48.55	45.67	-4.8%	0.4%	-5.6%
FI	34.79	34.66	32.97	30.03	-0.4%	-4.9%	-13.3%
FR	76.27	71.98	73.15	69.82	-5.6%	1.6%	-3.0%
HR	29.21	24.73	27.58	25.05	-15.4%	11.5%	1.3%
HU	53.15	53.15	52.33	51.66	0.0%	-1.5%	-2.8%
IE	21.01	14.92	19.87	17.81	-29.0%	33.2%	19.4%
IT	45.03	44.61	42.82	41.69	-0.9%	-4.0%	-6.5%
LT	28.23	22.77	26.87	24.76	-19.3%	18.0%	8.7%
LU	47.62	47.38	45.22	41.31	-0.5%	-4.6%	-12.8%
LV	27.29	24.00	25.92	23.75	-12.1%	8.0%	-1.0%
MT	40.99	39.28	37.47	49.67	-4.2%	-4.6%	26.5%
NL	41.46	40.00	39.19	35.46	-3.5%	-2.0%	-11.4%
PL	32.85	31.40	31.12	28.27	-4.4%	-0.9%	-10.0%
PT	41.23	35.64	38.76	37.35	-13.6%	8.7%	4.8%
RO	27.31	25.83	25.85	23.32	-5.4%	0.1%	-9.7%
SE	36.86	36.86	34.86	31.58	0.0%	-5.4%	-14.3%
SI	31.32	27.39	29.59	26.70	-12.5%	8.0%	-2.5%
SK	35.97	34.64	34.07	31.12	-3.7%	-1.7%	-10.2%
UK	35.34	32.14	33.61	30.85	-9.1%	4.6%	-4.0%
Average	**38.92**	**36.84**	**37.01**	**35.06**	**-6.2%**	**1.9%**	**-3.9%**

Notes: Effective tax burden as the model firm's total tax payment over ten simulation periods in million EUR, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017, without R&D tax incentives). [B]: status quo incl. R&D tax incentives. [C]: current national rules without R&D tax incentives, plus CCTB R&D super-deduction. [D]: full CCTB incl. R&D super-deduction. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [B] and [D] vs. [B] calculated as ([C]-[B])/[B] and ([D]-[B])/[B]. Average is the simple arithmetic average.

The majority of Member States offer R&D tax incentives that are targeted at the corporate income tax base, i.e. accelerated depreciation or enhanced deductions (see Section 5.3.3). The impact of accelerated depreciation schemes depends on the design of the underlying rules:[146] In Luxembourg, for example, machinery and equipment used for R&D are depreciable at a rate which is slightly higher than the general declining-balance rate (40% instead of 30%), resulting only in a modest reduction of the effective tax burden at 0.5%. In the United Kingdom, though, immediate depreciation is available for machinery, equipment, furniture, buildings and intangibles which has a considerably stronger effect due to both a broader scope of assets covered and a larger difference in the applicable depreciation rates. In combination with an 11% volume-based tax credit for R&D personnel and current costs, the reduction in the effective tax burden amounts to 9.1%. In other Member States such as Belgium, Greece, Latvia and Romania, accelerated depreciation of assets used for R&D is complemented by an enhanced deductibility of certain costs, which ranges from 13.5% in Belgium (based on capital expenditure on tangible and intangible assets) to a 200% additional deduction of personnel expenses in Latvia. In the Czech Republic, Croatia, Lithuania, Poland, the Slovak Republic and Slovenia, only an enhanced deduction is in place that varies between a 25% additional deduction for current costs in the Slovak Republic and an additional deduction of 200% for personnel and current costs in Lithuania. The enhanced deductibility reduces the effective tax burden by more than 12% in the respective Member States except for Poland and the Slovak Republic.

Several Member States grant R&D tax credits that reduce the amount of tax due (Austria, France, Ireland, Malta, the Netherlands, Portugal, Spain and the United Kingdom). Usually, the tax credits are related to R&D personnel and current expenses. Apart from Austria, the Netherlands and Portugal, all of these Member States additionally offer another R&D tax incentive. Nevertheless, it depends on the design of each particular R&D tax incentive whether a combination of two or more incentives has a stronger impact on the effective tax burden than the application of a single incentive. Hence, a very generous tax base incentive such as the 200% volume-based additional deduction in Lithuania could induce a higher reduction of the overall tax burden than the combination of a comparatively narrow tax base incentive and several tax credits in Spain.[147]

[146] See also VVA and ZEW (2015, p. 77) for a similar reasoning and explanations with regard to the effect of tax base incentives.

[147] See also VVA and ZEW (2015, p. 77) for a similar reasoning and explanations with regard to the effect of tax credits.

In sum, R&D tax incentives can have a considerable impact on the effective tax burden of corporations. However, the implications of single R&D tax incentives cannot be traced back to the instrument itself. Rather, the effect is influenced by the scope of the instrument, its design (e.g. rates, volume-based or incremental character, costs covered) as well as the interaction with other provisions of the general tax code.

5.6.3 Overall effect of the introduction of the CCTB for R&D companies

If national R&D tax incentives were replaced by the R&D super-deduction according to Article 9 (3) of the CCTB draft Council Directive (Table 5.9, [C]), the impact on effective tax burdens would be very heterogeneous across Member States. On average, the effective tax burden would increase by 1.9% compared to the tax burden under prevailing national R&D tax incentives ([C] vs. [B]). Changes range from a decrease of 5.5% in Cyprus to an increase of 33.2% in Ireland. Especially in Member States where current R&D tax incentives are very favorable for corporations, effective tax burdens would increase upon the harmonization of R&D tax incentives (e.g. Croatia, Czech Republic, Ireland, Lithuania). In these countries, the additional deduction of 50% (or 25% for R&D expenditure above EUR 20 million) offered by Article 9 (3) of the CCTB draft Council Directive is less attractive for companies than existing national R&D tax incentives. Reasons are manifold and include higher additional deductions (e.g. Czech Republic, Lithuania), a broader scope of eligible costs (e.g. Croatia) or the availability of other, more generous incentives (e.g. Ireland).

For the majority of Member States where no R&D tax incentive has been modelled in the R&D baseline scenario (Bulgaria, Cyprus, Denmark, Germany, Sweden), the tax burden would decrease by approximately 5%. Only in Hungary, the impact of the CCTB R&D super-deduction as an additional deduction from the corporate income tax base is less pronounced (decrease at 1.5%) since the effective tax burden at corporate level is mainly driven by the local trade tax (see also Section 5.5.2). Especially corporations in Bulgaria would benefit from the (harmonized) introduction of the R&D super-deduction: In the baseline scenario without any R&D tax incentives ([A]), the effective tax burden is lowest in Bulgaria. In the R&D baseline scenario ([B]), though, the effective tax burden is lowest in Ireland since Bulgaria does not offer any R&D tax incentive whereas Irish R&D tax incentives are very generous. Upon the EU-wide harmonization of R&D tax incentives ([C]), the tax burden would increase for Irish

corporations while it would decrease for Bulgarian corporations and thereby enhance the tax attractiveness of Bulgaria as a location for R&D.

In a next step, we evaluate the effects of the introduction of the CCTB including the R&D super-deduction by extending the analysis conducted in Section 5.5.2 to corporations that engage in R&D activities (Table 5.9, [D]).[148] If the CCTB was introduced for R&D companies, the effective tax burden would decrease in 20 Member States whereas it would increase in seven Member States ([D] vs. [B]).[149] The change in effective tax burdens ranges from a decline of 15.9% in Bulgaria to an increase of 26.5% in Malta. On average, the effective tax burden would decrease by 3.9%.

Except for Cyprus and Malta, the effective tax burden would increase in those countries where the CCTB R&D super-deduction has a lower tax burden reducing effect than current national R&D tax incentives (e.g. Croatia, Ireland, Lithuania). Hence, the tax burden increasing effect that results from replacing current R&D tax incentives by the CCTB R&D super-deduction would outweigh the overall tax burden reducing effect induced by the introduction of the CCTB in the reference scenario without R&D tax incentives (Section 5.5.2, Table 5.3).

In Cyprus and Malta, the adoption of the R&D super-deduction would mitigate the overall increase in the effective tax burden upon the CCTB introduction in the reference scenario without national R&D tax incentives. In the reference scenario, the tax burden would increase by 8.8% in Cyprus and by 29.3% in Malta (Section 5.5.2, Table 5.3) which is mainly driven by the replacement of the national NID by the AGI (Section 5.5.3.2). In Cyprus, no R&D tax incentive has been modelled in the R&D baseline scenario, such that the availability of the R&D super-deduction can at least in part counterbalance the tax burden increasing effect associated with the AGI. Similarly, in Malta, the R&D super-deduction has a slightly more favorable impact on the effective tax burden than the combination of an additional 50% volume-based deduction of current expenses and a 15% volume-based tax credit for expenditure incurred during the preceding period that apply under current domestic law (Table 5.9, [C] < [B]). Hence, the tax burden increases in Cyprus and Malta upon the introduction of the CCTB would be (slightly) reduced to 2.9% and 26.5%, respectively, when including the R&D super-deduction.

[148] We do not consider a scenario where the CCTB is implemented without the R&D super-deduction and national R&D tax incentives continue to apply instead.

[149] In Estonia, the introduction of a CCTB would not affect the effective corporate tax burden (see Section 5.5.1).

The effective tax burden would decrease upon the introduction of the CCTB especially in Member States where the impact of national R&D tax incentives is low in the R&D baseline scenario (e.g. Finland, Italy, Luxembourg) or where even no national R&D tax incentive is available (except for Cyprus, see above). The additional deduction of R&D expenses would reinforce the tax burden reducing effect of the CCTB introduction for corporations conducting R&D activities in these Member States.

5.6.4 Interim conclusion

To date, the vast majority of Member States offer some sort of R&D tax incentive. In general, the design of the R&D tax incentives varies widely across Member States and many countries combine the use of several approaches. Depending on the design and scope of the incentives as well as on their relation to current regular tax accounting rules, the impact of Member States' R&D tax incentives on the effective tax burden differs.

For corporations that pursue R&D activities, the effect of the CCTB introduction is very heterogeneous. In Member States where no R&D tax incentive is in place under current domestic law or where the impact of such incentives is only minor, the inclusion of the R&D super-deduction set out in Article 9 (3) of the CCTB draft Council Directive would reinforce the overall tax burden reducing effect associated with the introduction of the other provisions of the CCTB. In Member States that currently offer very generous R&D tax incentives, though, the tax burden increasing effect that results from the replacement of these incentives by the CCTB R&D super-deduction would outweigh the overall tax burden reducing effect of the other CCTB provisions, leading to higher effective tax burdens than at status quo.

5.7 Conclusion

In the context of its 2015 Action Plan for a Fair and Efficient Corporate Tax System in the EU, the European Commission re-launched a draft Council Directive for a staged introduction of the C(C)CTB in October 2016. Although the re-launched proposal is largely in line with the first draft Council Directive issued in 2011, it includes several new provisions such as the AGI, an R&D super-deduction and various anti-tax avoidance rules. The present study provides a comprehensive analysis of the consequences of the introduction of the recent CCTB draft Council Directive. First, we identify the need for adjustment that would arise in the course of implementing the provisions of the CCTB into the national laws of the EU Member States.

Second, we quantify the changes in effective corporate tax burdens across the Member States induced by the replacement of current national tax accounting rules by the regulations of the CCTB, considering both the simultaneous harmonization of all tax base elements and the isolated adoption of single provisions in order to determine the relative importance of selected elements.

The comparison of Member States' tax practice as of 2017 and the CCTB provisions reveals that the implementation of the CCTB draft Council Directive would require major amendments to current national tax laws with regard to the AGI, R&D tax incentives, rules for inter-temporal and especially cross-border loss relief, the applicable depreciation rates and the use of the pool depreciation method.

The impact of the introduction of the CCTB draft Council Directive on effective corporate tax burdens is quantified based on the model framework of the European Tax Analyzer. Effective tax burdens of corporations situated in different Member States are calculated as the difference between the pre-tax and the post-tax value of a model corporation at the end of a ten-year simulation period. We find that the introduction of the CCTB draft Council Directive (without considering R&D tax incentives) would reduce the effective tax burden in all Member States except for Cyprus and Malta. The average decline across all Member States amounts to 5.1%. In Cyprus and Malta, the tax burden would increase due to the replacement of the current NID by the comparatively less tax-favorable AGI. Despite the harmonization of corporate tax bases, remarkable differences in the effective tax burdens across Member States would persist, which demonstrates the role of the corporate income tax rate as a key determinant of the tax burden. We identify the AGI as the main driver of the overall decline in effective tax burdens, whereas the impact of the other tax base provisions is predominantly minor. If the CCTB was introduced without the AGI and national NID schemes were kept in place, the effective tax burden would increase on average by 0.2%. For R&D companies that can currently make use of national R&D tax incentives, the impact of the CCTB introduction would differ widely across Member States. Depending on the favorability of existing domestic R&D tax incentives, the replacement of current R&D tax incentives by the CCTB R&D super-deduction could reinforce, weaken or even reverse the general base narrowing effect of the CCTB.

The concept of a C(C)CTB has the potential to reduce tax compliance costs and to overcome obstacles to cross-border business activity that arise from the coexistence of different national tax systems within the EU. However, the introduction of a harmonized set of rules for the determination of taxable income would not only require (partly substantial) amendments to

current national tax laws, but could also have considerable implications with regard to Member States' tax revenues. If the CCTB was introduced as suggested in the most recent proposal as of 2016, i.e. including the AGI and the R&D super-deduction, some Member States might face remarkable tax revenue losses. This fact could hinder the agreement on a common set of tax base provisions. Thus, it remains to be seen whether the C(C)CTB draft Council Directives will be adopted one day.

6

Conclusion

Tax transparency and harmonization are two much-debated measures that aim to overcome the obstacles that multinational companies and tax authorities face in an increasingly globalized business environment. In particular, the coexistence of different national tax systems results in high compliance costs as well as in loopholes and mismatches which are regularly exploited for profit shifting, thus giving rise to an erosion of the tax base. This thesis provides empirical and analytical evidence on the effectiveness and consequences of two prominent instruments that reflect the current effort in the EU to increase transparency and harmonization in international corporate taxation, namely CbCR and a CCTB. The thesis consists of four self-contained chapters. The research questions addressed therein as well as the main results and conclusions are summarized in the following.

Chapter 2 examines how investors evaluate the introduction of the public CbCR requirement for EU financial institutions based on an event study methodology. The key empirical findings and conclusions are as follows:

(1) The analysis of stock returns around the day of the surprising political decision to include a CbCR obligation in the CRD IV proposal is suggestive of a zero capital market response in the full sample of financial institutions headquartered in the EU. Sample splits reveal that banks particularly exposed to the increase in transparency (proxied by tax haven usage) and banks more sensitive to reputational concerns (proxied by an above-average B2C orientation) exhibit a more negative investor reaction, while banks characterized by higher information asymmetries between managers and shareholders (proxied by a below-average share of institutional investors) show a more positive investor reaction. However, the effects are small in size and statistically insignificant.

(2) The cross-sectional analysis provides some evidence of different channels driving the stock market response. On the one hand, investors might have perceived the new disclosure requirement to be costly for banks, mainly due to the expectation of a decline in their tax avoidance opportunities and potential reputational damages. On the other hand, investors might have appreciated the upcoming increase in transparency, notably because it could reduce information asymmetries between managers and shareholders, thus impeding private rent extraction by managers. These simultaneous expectations imply both negative and positive capital market reactions, which on average offset each other.

(3) Prior literature finds that the capital market reacted negatively to the adoption of other tax transparency measures. Differences compared to the investor reaction to the CbCR

requirement in the financial sector can be traced back either to differences in research design or to the specific characteristics of the underlying transparency measure. Ultimately, investors' perception of increases in tax transparency hinges on the particular objective and design of the initiative.

Chapter 3 explores a self-created dataset of CbCRs of more than 100 multinational bank groups headquartered in the EU for financial years 2014-2016. It assesses in how far the published CbCR data increases transparency on EU banks' worldwide activities and the extent of their profit shifting compared to conventional datasets. The chapter delivers the following conclusions:

(1) Existing studies on firms' profit shifting still disagree on the actual size of the phenomenon. While studies using micro-level financial data of multinational firms tend to underestimate the magnitude of profit shifting due to the incomplete coverage of the underlying databases, macro-level datasets have been blamed for including a double counting of foreign profits, thus inflating profit shifting estimates. CbCR data has the potential to overcome these shortcomings, mainly because of its comprehensive geographical coverage.

(2) CbCRs uncover a substantial part of banks' global profits and real activities in terms of employees that rests opaque when relying on conventional datasets (e.g. Orbis). The transparency gain is particularly pronounced for tax havens and for the largest non-EU economies.

(3) The reports also reveal a strong misalignment between profits and employees, especially in tax havens. While tax havens account on average for about 18% of EU banks' worldwide pre-tax profits, they only employ 5% of their global workforce. However, there is considerable heterogeneity within the group of tax havens, suggesting that only some of them are preferably used for profit shifting.

(4) The comparison of profits actually reported in the CbCR to the profits we would expect if a bank group's global profit was allocated to the country presences according to the worldwide distribution of employees suggests that the EU-headquartered bank groups in the considered sample shift about 10% of their total global profit and 14% of their foreign profit to tax havens annually. The amount of shifted profits is largely underestimated when considering single financial statement data from Orbis.

(5) The size of the tax sensitivity of profits obtained by regression analyses of conventional micro-level datasets such as Bank Focus is likely to be biased downwards due to missing financial data on many subsidiaries in low-tax countries. Against this background, the comparison of regression estimates based on the full sample of CbCRs (i.e. with complete geographical coverage) and on a more restricted sample from Bank Focus reveals a sample selection bias in prior regression estimates of the tax semi-elasticity of banks' reported profits of approximately three percentage points. The inclusion of additional variables reflecting economic input factors, i.e. total assets and staff cost, in the CbCRs would allow to estimate the tax sensitivity of profits based on CbCR data alone and would therefore greatly improve the informative value of the disclosure requirement.

Chapter 4 investigates the reporting behavior and the degree of transparency in the CbCRs of EU-headquartered multinational bank groups and identifies open points that weaken the added value of the reporting requirement. The major findings can be summarized as follows:

(1) The public CbCR requirement for EU financial institutions according to Article 89 of the CRD IV lacks clear and uniform guidelines with regard to the calculation and presentation of the reportable data. Generally, Member States' national laws do not close these regulatory loopholes and offer leeway to the reporting firms.

(2) The inconsistent and imprecise implementation of the CbCR obligation results in a heterogeneous reporting behavior across different bank groups and Member States. Major differences concern the underlying consolidation scope, the data source as well as the definition of turnover, employees and tax on profit or loss. The provision of additional qualitative and quantitative information, the readability of the data tables, the preparation of the entity list and the place of publication of the report further vary within the considered sample of CbCRs. The options chosen by the reporting firms determine the degree of transparency of the report. Across all dimensions considered, the CbCRs published by bank groups from the United Kingdom and Germany are the most transparent and readable, while still exhibiting room for improvements.

(3) A poor level of transparency impedes the interpretability of the reports. In particular, missing information on the underlying way of calculation is likely to give rise to wrong conclusions on the relationship between reported profits, taxes and real activity in terms of employees. Potential misinterpretations are especially a concern in view of the public availability of the data. The heterogeneity in reporting further diminishes the comparability

across several bank groups or Member States as the meaning of the reported information might differ. Ultimately, the absence of standardized rules casts doubt on the added value of CbCR.

(4) In order to ensure that the published data can be considered appropriately by all addressees, unambiguous guidelines are indispensable. Above all, the specification of the underlying data source and of the applicable consolidation scope as well as the establishment of uniform definitions of the reportable items would considerably increase the information content of CbCR.

Chapter 5 analyzes the implications of the introduction of the CCTB draft Council Directive of 2016 for Member States' tax laws and companies' tax burdens. It identifies what amendments to current national tax systems would be required when implementing the provisions of the CCTB and quantifies the impact of the adoption of the CCTB on effective corporate tax burdens in the EU Member States. The chapter provides the following main insights:

(1) In October 2016, the European Commission re-launched its proposal for a Council Directive for the introduction of a C(C)CTB. In contrast to the original proposal released in 2011, the re-launched draft contains several modifications. Most importantly, it suggests a staged implementation of the CCCTB. The first step comprises the introduction of a harmonized set of tax accounting rules for the determination of each group member's taxable income (draft Council Directive on a CCTB). The second step includes the consolidation of the individual tax bases to a common tax base and the allocation of the consolidated tax base to the group members by formula apportionment and should be postponed to a later stage (draft Council Directive on a CCCTB). The new CCTB draft Council Directive also encompasses new elements, such as the AGI, a super-deduction for R&D costs, a temporary cross-border loss relief until the final introduction of a consolidated tax base and an interest deduction limitation rule.

(2) The comparison of Member States' current tax practice and the CCTB draft Council Directive reveals that adjustment needs in order to fulfil the CCTB provisions are highest with regard to the AGI, R&D tax incentives, inter-temporal and cross-border loss relief, the applicable depreciation rates and the use of the pool depreciation method. Since interest deduction limitation rules have to be harmonized by the ATAD with effect from 2019, the introduction of the CCTB would not induce any further adjustment requirements. The other

current national tax regulations considered (inventory valuation, warranty provisions, pension provisions, avoidance of double taxation of dividends) are largely in line with the CCTB draft Council Directive and generally demand only minor amendments.

(3) The impact of the CCTB introduction on effective corporate tax burdens in the Member States is quantified based on the model of the European Tax Analyzer, which simulates the development of a model corporation over a ten-year period. The simultaneous harmonization of all tax base elements (excluding R&D tax incentives) would result in a substantial decrease in the effective corporate tax burden by 5.1% on average. Only in Cyprus and Malta, the tax burden would increase because the AGI would replace comparatively more tax-favorable existing NID regimes. Since corporate income tax rates and additional local taxes should not be harmonized under the CCTB, remarkable differences in tax burdens across countries would persist.

(4) The isolated analysis of single elements demonstrates that the AGI is the main driver of the overall decline in effective corporate tax burdens, whereas the other tax base provisions exert only a modest impact. A shortened time horizon for the rolling AGI equity base as well as a reduced AGI rate would weaken the tax base narrowing effect of the AGI. For R&D companies, the effect of the CCTB introduction depends on the advantageousness of existing domestic R&D tax incentives compared to the CCTB R&D super-deduction and therefore varies widely across Member States.

(5) The concept of a C(C)CTB has the potential to overcome obstacles to cross-border business activity that arise from the coexistence of different national tax systems, such as high tax compliance costs as well as loopholes and mismatches. Still, the considerable implications of certain provisions of the CCTB, notably the AGI and the R&D super-deduction, on Member States' tax laws and companies' tax burdens might hinder the agreement on a harmonized set of tax accounting rules.

In summary, this thesis sheds light on two currently discussed measures that aim at tackling the tax challenges posed by an increasingly complex and international economic environment. It shows in particular that CbCR increases transparency on companies' worldwide activities. However, its informative value crucially depends on the set of reportable variables as well as on uniform definitions and guidelines that ensure a common understanding. These insights are especially relevant in light of the proposal for a public CbCR for large multinational firms in the EU, which is still under discussion. The thesis also suggests that the harmonization of

corporate tax bases could have undesired side effects for Member States' tax revenues. While most provisions of the latest CCTB proposal as of 2016 would only have a small impact on corporate tax burdens, policymakers should reconsider the inclusion of the AGI and the R&D super-deduction.

References

Abernathy, J. L., Davenport, S. A., & Rapley, E. T. (2013). Schedule UTP: Stock Price Reaction and Economic Consequences. *The Journal of the American Taxation Association*, *35*(1), 25–48. https://doi.org/10.2308/atax-50246

Andries, K., Gallemore, J., & Jacob, M. (2017). The effect of corporate taxation on bank transparency: Evidence from loan loss provisions. *Journal of Accounting and Economics*, *63*(2–3), 307–328. https://doi.org/10.1016/j.jacceco.2017.03.004

Aubry, M., & Dauphin, T. (2017). *Opening the Vaults: The Use of Tax Havens by Europe's Biggest Banks*. Retrieved from https://www-cdn.oxfam.org/s3fs-public/bp-opening-vaults-banks-tax-havens-270317-en_0.pdf (4 January 2021).

Aubry, M., Dauphin, T., & Watrinet, L. (2016). *Following the Money: French Banks' Activities in Tax Havens*. Retrieved from https://oi-files-d8-prod.s3.eu-west-2.amazonaws.com/s3fs-public/following_the_money_final_english.pdf (4 January 2021).

Austin, C. R., & Wilson, R. J. (2017). An Examination of Reputational Costs and Tax Avoidance: Evidence from Firms with Valuable Consumer Brands. *The Journal of the American Taxation Association*, *39*(1), 67–93. https://doi.org/10.2308/atax-51634

Austin, D. H. (1993). An Event-Study Approach to Measuring Innovative Output: The Case of Biotechnology. *The American Economic Review*, *83*(2), 253–258.

Beer, S., De Mooij, R., & Liu, L. (2020). International Corporate Tax Avoidance: A Review of the Channels, Magnitudes, and Blind Spots. *Journal of Economic Surveys*, *34*(3), 660–688. https://doi.org/10.1111/joes.12305

Bennedsen, M., & Zeume, S. (2018). Corporate Tax Havens and Transparency. *The Review of Financial Studies*, *31*(4), 1221–1264. https://doi.org/10.1093/rfs/hhx122

Blouin, J., & Robinson, L. (2020). *Double counting accounting: How much profit of multinational enterprises is really in tax havens?* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3491451 (4 January 2021).

Bouvatier, V., Capelle-Blancard, G., & Delatte, A.-L. (2018). *Banks Defy Gravity in Tax Havens* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3190602 (4 January 2021).

Bozanic, Z., Hoopes, J. L., Thornock, J. R., & Williams, B. M. (2017). IRS Attention. *Journal of Accounting Research*, *55*(1), 79–114. https://doi.org/10.1111/1475-679X.12154

Bratten, B., Gleason, C. A., Larocque, S. A., & Mills, L. F. (2017). Forecasting Taxes: New Evidence from Analysts. *The Accounting Review*, *92*(3), 1–29. https://doi.org/10.2308/accr-51557

Bräutigam, R. (2017). *Die Entwicklung der Unternehmensbesteuerung in der Europäischen Union: Eine Analyse von nationaler Steuerpolitik, EuGH-Rechtsprechung und möglichen Reformvorschlägen unter Verwendung von Effektivsteuermaßen* (Dissertation). University of Mannheim. Retrieved from https://madoc.bib.uni-mannheim.de/43216/1/Dissertation_Rainer_Br%C3%A4utigam_2017-1.pdf (15 January 2021).

Bräutigam, R., Spengel, C., & Stutzenberger, K. (2017). *The Development of Corporate Tax Structures in the European Union from 1998 to 2015 – Qualitative and Quantitative Analysis* (ZEW Discussion Paper No. 17-034). Retrieved from http://ftp.zew.de/pub/zew-docs/dp/dp17034.pdf (15 January 2021).

Bräutigam, R., Spengel, C., & Stutzenberger, K. (2018). Steuerstrukturen in der Europäischen Union – eine Analyse der Entwicklungen bei der Unternehmensbesteuerung von 1998 bis 2015. *Steuer und Wirtschaft*, *95*(1), 60–74.

Brooks, C., Godfrey, C., Hillenbrand, C., & Money, K. (2016). Do investors care about corporate taxes? *Journal of Corporate Finance*, *38*, 218–248. https://doi.org/10.1016/j.jcorpfin.2016.01.013

Brown, R. J., Jorgensen, B. N., & Pope, P. F. (2019). The interplay between mandatory country-by-country reporting, geographic segment reporting, and tax havens: Evidence from the European Union. *Journal of Accounting and Public Policy*, *38*(2), 106–129. https://doi.org/10.1016/j.jaccpubpol.2019.02.001

Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) (2015). *Fachgremium Säule 3: Auslegungsfragen zur länderspezifischen Berichterstattung nach § 26a Absatz 1 Satz 2 KWG*. Retrieved from https://www.bafin.de/SharedDocs/Downloads/DE/Protokoll/dl_protokoll_141127_fg_offenlegung_ba.html (4 January 2021).

Chen, S. (2017). *Do Investors Value Corporate Tax Return Information? Evidence from Australia* (Dissertation). University of Texas, Austin. Retrieved from https://repositories.lib.utexas.edu/bitstream/handle/2152/63281/CHEN-DISSERTATION-2017.pdf?sequence=1&isAllowed=y (15 January 2021).

Chen, S., Schuchard, K., & Stomberg, B. (2019). Media Coverage of Corporate Taxes. *The Accounting Review*, *94*(5), 83–116. https://doi.org/10.2308/accr-52342

Clausing, K. A. (2016). The Effect of Profit Shifting on the Corporate Tax Base in the United States and Beyond. *National Tax Journal*, *69*(4), 905–934. https://doi.org/10.17310/ntj.2016.4.09

Clausing, K. A. (2020a). *How Big is Profit Shifting?* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3503091 (4 January 2021).

Clausing, K. A. (2020b). *Profit Shifting Before and After the Tax Cuts and Jobs Act* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3274827 (4 January 2021).

Cockfield, A. J., & MacArthur, C. D. (2015). Country-by-Country Reporting and Commercial Confidentiality. *Canadian Tax Journal*, *63*(3), 627–660.

Council of the EU (2019). *Proposal for a Directive of the European Parliament and of the Council amending Directive 2013/34/EU as regards disclosure of income tax information by certain undertakings and branches – (poss) General Approach*. 14038/19. Brussels.

Council of the EU (2021). *Proposal for a Directive of the European Parliament and of the Council amending Directive 2013/34/EU as regards disclosure of income tax information by certain undertakings and branches – consolidated compromise proposal*. 5183/21. Brussels.

CPB Netherlands Bureau for Economic Policy Analysis (2014). *A Study on R&D Tax Incentives: Final Report*. TAXUD/2013/DE/315 (European Commission Taxation Paper No. 52-2014). Retrieved from https://ec.europa.eu/futurium/en/system/files/ged/28-taxud-study_on_rnd_tax_incentives_-_2014.pdf (15 January 2021).

De Simone, L., & Olbert, M. (2020). *Real Effects of Private Country-by-Country Disclosure* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3398116 (4 January 2021).

Demeré, P. (2018). *Is Tax Return Information Useful to Equity Investors?* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3110199 (15 January 2021).

Desai, M. A., & Dharmapala, D. (2006). Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics*, *79*(1), 145–179. https://doi.org/10.1016/j.jfineco.2005.02.002

Desai, M. A., Dyck, A., & Zingales, L. (2007). Theft and taxes. *Journal of Financial Economics*, *84*(3), 591–623. https://doi.org/10.1016/j.jfineco.2006.05.005

Deutscher Steuerberater-Verband e.V. (2016). *Stellungnahme zum Vorschlag der Europäischen Kommission vom 12. April 2016 zur Änderung der Richtlinie 2013/34/EU im Hinblick auf die Offenlegung von Ertragsteuerinformationen durch bestimmte Unternehmen und Zweigniederlassungen*. Berlin. Retrieved from https://www.dstv.de/interessenvertretung/rechnungslegung/stellungnahmen-rechnungslegung/b-05-16-country-by-counry-reporting (4 January 2021).

Dharmapala, D. (2014). What Do We Know about Base Erosion and Profit Shifting? A Review of the Empirical Literature. *Fiscal Studies*, *35*(4), 421–448. https://doi.org/10.1111/j.1475-5890.2014.12037.x

Dharmapala, D., & Riedel, N. (2013). Earnings shocks and tax-motivated income-shifting: Evidence from European multinationals. *Journal of Public Economics*, *97*, 95–107. https://doi.org/10.1016/j.jpubeco.2012.08.004

Donohoe, M. P., & McGill, G. A. (2011). The Effects of Increased Book-Tax Difference Tax Return Disclosures on Firm Valuation and Behavior. *The Journal of the American Taxation Association*, *33*(2), 35–65. https://doi.org/10.2308/atax-10056

Dowd, T., Landefeld, P., & Moore, A. (2017). Profit shifting of U.S. multinationals. *Journal of Public Economics*, *148*, 1–13. https://doi.org/10.1016/j.jpubeco.2017.02.005

Dutt, V. K., Ludwig, C. A., Nicolay, K., Vay, H., & Voget, J. (2019). Increasing tax transparency: investor reactions to the country-by-country reporting requirement for EU financial institutions. *International Tax and Public Finance*, *26*(6), 1259–1290. https://doi.org/10.1007/s10797-019-09575-4

Dutt, V. K., Nicolay, K., Vay, H., & Voget, J. (2019). *Can European Banks' Country-by-Country Reports Reveal Profit Shifting? An Analysis of the Information Content of EU Banks' Disclosures* (ZEW Discussion Paper No. 19-042). Retrieved from http://ftp.zew.de/pub/zew-docs/dp/dp19042.pdf (23 February 2021).

Dutt, V. K., Spengel, C., & Vay, H. (2020). *The EU Proposal for Country-by-Country Reporting on the Internet: Costs, Benefits and Consequences*. Study for Stiftung Familienunternehmen (2nd ed.). Munich. Retrieved from https://www.familienunternehmen.de/media/public/pdf/publikationen-studien/studien/The-EU-Proposal-for-Country-by-Country-Reporting-on-the-Internet_2020_Stiftung-Familienunternehmen.pdf (29 January 2021).

Dyreng, S. D., & Hanlon, M. (2019). *Tax Avoidance and Multinational Firm Behavior* (Working Paper). Retrieved from https://www.brookings.edu/wp-content/uploads/2019/12/Dyreng-Hanlon-12.14.19.pdf (1 February 2021).

Dyreng, S. D., Hoopes, J. L., Langetieg, P., & Wilde, J. H. (2020). Strategic Subsidiary Disclosure. *Journal of Accounting Research*, *58*(3), 643–692. https://doi.org/10.1111/1475-679X.12308

Dyreng, S. D., Hoopes, J. L., & Wilde, J. H. (2016). Public Pressure and Corporate Tax Behavior. *Journal of Accounting Research*, *54*(1), 147–186. https://doi.org/10.1111/1475-679X.12101

Eberhartinger, E., Speitmann, R., & Sureth-Sloane, C. (2020). *Real Effects of Public Country-by-Country Reporting and the Firm Structure of European Banks* (WU International Taxation Research Paper Series No. 2020-01). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3523909 (4 January 2021).

Eckbo, B. E., Masulis, R. W., & Norli, O. (2007). Security Offerings. In B. E. Eckbo (Ed.), *Handbooks in Finance: Vol. 3. Handbook of Corporate Finance: Empirical Corporate Finance. Volume 1* (pp. 233–373). Amsterdam: Elsevier North-Holland.

Endres, D., & Spengel, C. (Eds.) (2015). *International Company Taxation and Tax Planning*. Alphen aan den Rijn: Kluwer Law International.

Ernst, C., Gebert, G., King, C. C., Malke, C., Pfeiffer, O., Spangenberg, S., Spengel, C., von der Hellen, C., Welling, B., Werner, A.-C., & Wünnemann, M. (2016). *360-Grad-Check: Steuerliche Rahmenbedingungen für Forschung & Entwicklung* (BDI Publication No. 49). Berlin. Retrieved from https://www.zvei.org/fileadmin/user_upload/Presse_und_Medien/Publikationen/2016/Dezember/360-Grad-Check__Steuerliche_Rahmenbedingungen_fuer_Forschung_und_Entwicklung/BDI-ZVEI-360-Grad-Check-Steuerliche-Rahmenbedingungen-FuE.pdf (15 January 2021).

European Banking Authority (EBA) (2014a). *Single Rulebook Q&A*. Question ID 2014_1043. Retrieved from https://eba.europa.eu/single-rule-book-qa/-/qna/view/publicId/2014_1043 (4 January 2021).

European Banking Authority (EBA) (2014b). *Single Rulebook Q&A*. Question ID 2014_1044. Retrieved from https://eba.europa.eu/single-rule-book-qa/-/qna/view/publicId/2014_1044 (4 January 2021).

European Banking Authority (EBA) (2014c). *Single Rulebook Q&A*. Question ID 2014_1045. Retrieved from https://eba.europa.eu/single-rule-book-qa/-/qna/view/publicId/2014_1045 (4 January 2021).

European Banking Authority (EBA) (2014d). *Single Rulebook Q&A*. Question ID 2014_1248. Retrieved from https://eba.europa.eu/single-rule-book-qa/-/qna/view/publicId/2014_1248 (4 January 2021).

European Banking Authority (EBA) (2014e). *Single Rulebook Q&A*. Question ID 2014_1249. Retrieved from https://eba.europa.eu/single-rule-book-qa/-/qna/view/publicId/2014_1249 (4 January 2021).

European Banking Authority (EBA) (2019). *Additional background and guidance for asking questions*. Retrieved from https://eba.europa.eu/sites/default/documents/files/documents/10180/210008/8a482c32-8ad3-4fd3-a7c1-995069ec685b/Additional%20background%20and%20guidance%20for%20asking%20questions.pdf (4 January 2021).

European Central Bank (ECB) (2018). Euro area 10-year Government Benchmark bond yield. Retrieved from http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=143.FM.M.U2.EUR.4F.BB.U2_10Y.YLD (18 January 2018).

European Commission (2001a). *Company Taxation in the Internal Market*. SEC(2001) 1681. Brussels.

European Commission (2001b). *Towards an Internal Market without tax obstacles: A strategy for providing companies with a consolidated corporate tax base for their EU-wide activities*. COM(2001) 582 final. Brussels.

European Commission (2003). *Investing in research: an action plan for Europe*. COM(2003) 226 final. Brussels.

European Commission (2005a). *Implementing the Community Lisbon Programme: More Research and Innovation – Investing for Growth and Employment: A Common Approach*. COM(2005) 488 final. Brussels.

European Commission (2005b). *Implementation of the Community Lisbon Programme: The Contribution of Taxation and Customs Policies to the Lisbon Strategy*. COM(2005) 532 final. Brussels.

European Commission (2011a). *Proposal for a Council Directive on a Common Consolidated Corporate Tax Base (CCCTB)*. COM(2011) 121/4, 2011/0058 (CNS). Brussels.

European Commission (2011b). *Proposal for a Directive of the European Parliament and of the Council on the access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms and amending Directive 2002/87/EC of the European Parliament and of the Council on the supplementary supervision of credit institutions, insurance undertakings and investment firms in a financial conglomerate*. COM(2011) 453 final, 2011/0203 (COD). Brussels.

European Commission (2014). *Report from the Commission to the European Parliament and the Council: General assessment of economic consequences of country-by-country disclosure requirements set out in Article 89 of Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013*. COM(2014) 676 final. Brussels.

European Commission (2015). *A Fair and Efficient Corporate Tax System in the European Union: 5 Key Areas for Action*. COM(2015) 302 final. Brussels.

European Commission (2016a). *Proposal for a Directive of the European Parliament and of the Council amending Directive 2013/34/EU as regards disclosure of income tax information by certain undertakings and branches*. COM(2016) 198 final, 2016/0107 (COD). Strasbourg.

European Commission (2016b). *Proposal for a Council Directive on a Common Consolidated Corporate Tax Base (CCCTB)*. COM(2016) 683 final, 2016/0336 (CNS). Strasbourg.

European Commission (2016c). *Proposal for a Council Directive on a Common Corporate Tax Base*. COM(2016) 685 final, 2016/0337 (CNS). Strasbourg.

European Parliament (2013). *Open letter to all ECOFIN ministers as of 25 February 2013*. Retrieved from https://guildfordlibdems.org.uk/en/article/2013/0662792/sharon-signs-open-letter-to-ecofin-ministers-calling-for-country-by-country-reporting (15 January 2021).

European Parliament (2019). *Disclosure of income tax information by certain undertakings and branches: European Parliament legislative resolution of 27 March 2019 on the proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU as regards disclosure of income tax information by certain undertakings and branches (COM(2016)0198 – C8-0146/2016 – 2016/0107(COD))*. P8_TA-PROV(2019)0309.

Evers, A., & Hundsdoerfer, J. (2014). *Country-by-Country Reporting: Eine neue Rechnungslegung über länderspezifische Wertschöpfung und Ertragsteuern?* (Diskussionsbeiträge FACTS No. 2014/20). Retrieved from https://www.econstor.eu/bitstream/10419/102025/1/796880875.pdf (4 January 2021).

Evers, M. T., Meier, I., & Spengel, C. (2017). *Country-by-Country Reporting: Tension between Transparency and Tax Planning* (ZEW Discussion Paper No. 17-008). Retrieved from http://ftp.zew.de/pub/zew-docs/dp/dp17008.pdf (4 January 2021).

EY (2014). *Worldwide Corporate Tax Guide 2014*. Retrieved from https://www.ey.com/gl/en/services/tax/worldwide-corporate-tax-guide---country-list (12 July 2017).

EY (2015). *Worldwide Corporate Tax Guide 2015*. Retrieved from https://www.ey.com/gl/en/services/tax/worldwide-corporate-tax-guide---country-list (12 July 2017).

EY (2016). *Worldwide Corporate Tax Guide 2016*. Retrieved from https://www.ey.com/gl/en/services/tax/worldwide-corporate-tax-guide---country-list (12 July 2017).

EY (2017). *Worldwide R&D Incentives Reference Guide 2017*. Retrieved from https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/tax/guides/worldwide-randd-incentives-reference-guide-2017-18.pdf (15 January 2021).

Fatica, S., & Gregori, W. D. (2020). How much profit shifting do European banks do? *Economic Modelling*, *90*, 536–551. https://doi.org/10.1016/j.econmod.2020.01.026

Fiordelisi, F., Soana, M.-G., & Schwizer, P. (2014). Reputational losses and operational risk in banking. *The European Journal of Finance*, *20*(2), 105–124. https://doi.org/10.1080/1351847X.2012.684218

Frischmann, P. J., Shevlin, T., & Wilson, R. (2008). Economic consequences of increasing the conformity in accounting for uncertain tax benefits. *Journal of Accounting and Economics*, *46*(2–3), 261–278. https://doi.org/10.1016/j.jacceco.2008.08.002

Gallemore, J., Maydew, E. L., & Thornock, J. R. (2014). The Reputational Costs of Tax Avoidance. *Contemporary Accounting Research*, *31*(4), 1103–1133. https://doi.org/10.1111/1911-3846.12055

Garcia-Bernardo, J., Janský, P., & Tørsløv, T. R. (2019). *Multinational Corporations and Tax Havens: Evidence from Country-by-Country Reporting* (IES Working Paper No. 31/2019). Retrieved from http://ies.fsv.cuni.cz/sci/publication/show/id/6150/lang/cs (4 January 2021).

Global Sustainability Standards Board (GSSB) (2019). *GRI 207: Tax 2019*.

Graham, J. R., Hanlon, M., Shevlin, T., & Shroff, N. (2014). Incentives for Tax Planning and Avoidance: Evidence from the Field. *The Accounting Review*, *89*(3), 991–1023. https://doi.org/10.2308/accr-50678

Grotherr, S. (2016a). Der geplante öffentliche Ertragsteuerinformationsbericht – Teil 1. *IWB – Internationales Steuer- und Wirtschaftsrecht*, *21*(23), 854–867.

Grotherr, S. (2016b). Länderbezogene Berichterstattung: Ziele, Zielerreichung, Potenzial für Fehlinterpretationen und dessen Minimierung (Teil II). *Die Unternehmensbesteuerung*, *9*(12), 709–719.

Hanlon, M. (2018). Country-by-Country Reporting and the International Allocation of Taxing Rights. *Bulletin for International Taxation*, *72*(4/5), 209–217.

Hanlon, M., Laplante, S. K., & Shevlin, T. (2005). Evidence for the Possible Information Loss of Conforming Book Income and Taxable Income. *The Journal of Law and Economics*, *48*(2), 407–442. https://doi.org/10.1086/497525

Hanlon, M., & Slemrod, J. (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. https://doi.org/10.1016/j.jpubeco.2008.09.004

Heckemeyer, J. H., & Overesch, M. (2017). Multinationals' profit response to tax differentials: Effect size and shifting channels. *Canadian Journal of Economics*, *50*(4), 965–994. https://doi.org/10.1111/caje.12283

Hillert, A., Jacobs, H., & Müller, S. (2014). Media Makes Momentum. *The Review of Financial Studies*, *27*(12), 3467–3501. https://doi.org/10.1093/rfs/hhu061

Hines, J. R. (2010). Treasure Islands. *Journal of Economic Perspectives*, *24*(4), 103–126. https://doi.org/10.1257/jep.24.4.103

Hines, J. R., & Rice, E. M. (1994). Fiscal Paradise: Foreign Tax Havens and American Business. *The Quarterly Journal of Economics*, *109*(1), 149–182. https://doi.org/10.2307/2118431

HM Treasury (2013a). *Capital Requirements (Country-by-Country Reporting) Regulations 2013: Guidance*. Retrieved from https://www.gov.uk/government/publications/capital-requirements-country-by-country-reporting-regulations-2013-guidance/capital-requirements-country-by-country-reporting-regulations-2013-guidance (4 January 2021).

HM Treasury (2013b). *Explanatory Memorandum to the Capital Requirements (Country-by-Country Reporting) Regulations 2013: 2013 No. 3118*. Retrieved from https://www.legislation.gov.uk/uksi/2013/3118/pdfs/uksiem_20133118_en.pdf (4 January 2021).

Hoopes, J. L., Robinson, L., & Slemrod, J. (2018). Public tax-return disclosure. *Journal of Accounting and Economics*, *66*(1), 142–162. https://doi.org/10.1016/j.jacceco.2018.04.001

Hope, O.-K., Ma, M., & Thomas, W. B. (2013). Tax avoidance and geographic earnings disclosure. *Journal of Accounting and Economics*, *56*(2–3), 170–189. https://doi.org/10.1016/j.jacceco.2013.06.001

Horst, T., & Curatolo, A. (2020). Assessing the Double Count of Pretax Profit in the IRS Summary of CbC Data for Fiscal 2017. *Tax Notes International*, *98*(4), 427–432.

Huesecken, B., Overesch, M., & Tassius, A. (2018). *Effects of Disclosing Tax Avoidance: Capital Market Reaction to LuxLeaks* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2848757 (15 January 2021).

Hugger, F. (2020). *The Impact of Country-by-Country Reporting on Corporate Tax Avoidance* (ifo Working Paper No. 304). Retrieved from https://www.ifo.de/DocDL/wp-2019-304-hugger-corporate-tax-avoidance.pdf (4 January 2021).

Huizinga, H., & Laeven, L. (2008). International profit shifting within multinationals: A multi-country perspective. *Journal of Public Economics*, *92*(5–6), 1164–1182. https://doi.org/10.1016/j.jpubeco.2007.11.002

IBM (2009). *Fit, focused and ready to fight: How banks can get in shape for the battle ahead*. Executive Summary. Somers, New York. Retrieved from https://www.ibm.com/downloads/cas/EB0BB0QJ (15 January 2021).

Jacobs, O. H., & Spengel, C. (1996). *European Tax Analyzer: EDV-gestützter Vergleich der Steuerbelastung von Kapitalgesellschaften in Deutschland, Frankreich und Großbritannien*. *Schriftenreihe des ZEW: Vol. 11*. Baden-Baden: Nomos.

Janský, P. (2020). European banks and tax havens: evidence from country-by-country reporting. *Applied Economics*, *52*(54), 5967–5985. https://doi.org/10.1080/00036846.2020.1781773

Johannesen, N., & Larsen, D. T. (2016). The power of financial transparency: An event study of country-by-country reporting standards. *Economics Letters*, *145*, 120–122. https://doi.org/10.1016/j.econlet.2016.05.029

Johnson, N. J. (1978). Modified t Tests and Confidence Intervals for Asymmetrical Populations. *Journal of the American Statistical Association*, *73*(363), 536–544. https://doi.org/10.2307/2286597

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. https://doi.org/10.1111/1475-679X.12304

Joshi, P., Outslay, E., & Persson, A. (2018). *Does Public Country-by-Country Reporting Deter Tax Avoidance and Income-Shifting? Evidence from Capital Requirements Directive IV* (Working Paper). Retrieved from https://www.mccombs.utexas.edu/~/media/Files/MSB/Texas-Waterloo-Conference/Does%20Public%20Country-by-Country%20Reporting%20Deter%20Tax%20Avoidance%20and%20Income-Shifting.pdf (25 April 2019).

Joshi, P., Outslay, E., & Persson, A. (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. https://doi.org/10.1111/1911-3846.12601

Kahl, A., & Belkaoui, A. (1981). Bank Annual Report Disclosure Adequacy Internationally. *Accounting and Business Research*, *11*(43), 189–196. https://doi.org/10.1080/00014788.1981.9729700

Kothari, S. P., & Warner, J. B. (2007). Econometrics of Event Studies. In B. E. Eckbo (Ed.), *Handbooks in Finance: Vol. 3. Handbook of Corporate Finance: Empirical Corporate Finance. Volume 1* (pp. 3–36). Amsterdam: Elsevier North-Holland.

KPMG (2015). *2015 Global Tax Rate Survey*. Retrieved from https://assets.kpmg/content/%20dam/kpmg/pe/pdf/global-tax-rate-survey-2015.pdf (12 July 2017).

KPMG (2017). *Corporate tax rates table*. Retrieved from https://home.kpmg/xx/en/home/services/%20tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html (12 July 2017).

Lagarden, M., Schreiber, U., Simons, D., & Sureth-Sloane, C. (2020). Country-by-Country Reporting Goes Public – Cui Bono? *International Transfer Pricing Journal*, *27*(2), 91–97.

Lang, M., & Lundholm, R. (1993). Cross-Sectional Determinants of Analyst Ratings of Corporate Disclosures. *Journal of Accounting Research*, *31*(2), 246. https://doi.org/10.2307/2491273

Langenmayr, D., & Reiter, F. (2017). *Trading Offshore: Evidence on Banks' Tax Avoidance* (CESifo Working Paper No. 6664). Retrieved from https://www.cesifo-group.de/DocDL/cesifo1_wp6664.pdf (15 January 2021).

Lawrence, F. (2013, February 11). Barclays secret tax avoidance factory that made £1bn a year profit disbanded. *The Guardian*. Retrieved from https://www.theguardian.com/business/2013/feb/11/barclays-investment-banking-tax-avoidance (15 January 2021).

Linsley, P. M., Shrives, P. J., & Crumpton, M. (2006). Risk disclosure: An exploratory study of UK and Canadian banks. *Journal of Banking Regulation*, *7*(3–4), 268–282. https://doi.org/10.1057/palgrave.jbr.2350032

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, *35*(1), 13–39.

Merz, J., & Overesch, M. (2016). Profit shifting and tax response of multinational banks. *Journal of Banking & Finance*, *68*, 57–68. https://doi.org/10.1016/j.jbankfin.2016.03.015

Miethe, J. (2020). *The Elusive Banker: Using Hurricanes to Uncover (Non-)Activity in Offshore Financial Centers* (CESifo Working Paper No. 8625). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3715277 (1 February 2021).

Murphy, R. (2015). *European Banks' Country-by-Country Reporting: A review of CRD IV data*. For the Greens/EFA MEPs in the European Parliament. Retrieved from http://mollymep.org.uk/wp-content/uploads/CBCR_Full-report-PDF-July-2015.pdf (4 January 2021).

Nielsen, N. (2017, March 27). European banks stashing billions in tax havens. *EU Observer*. Retrieved from https://euobserver.com/justice/137385 (15 January 2021).

O'Donovan, J., Wagner, H. F., & Zeume, S. (2019). The Value of Offshore Secrets: Evidence from the Panama Papers. *The Review of Financial Studies*, *32*(11), 4117–4155. https://doi.org/10.1093/rfs/hhz017

OECD (2013a). *Addressing Base Erosion and Profit Shifting* (OECD Publishing). Retrieved from https://www.oecd-ilibrary.org/taxation/addressing-base-erosion-and-profit-shifting_9789264192744-en (4 January 2021).

OECD (2013b). *Action Plan on Base Erosion and Profit Shifting* (OECD Publishing). Retrieved from https://www.oecd.org/ctp/BEPSActionPlan.pdf (4 January 2021).

OECD (2015). *Transfer Pricing Documentation and Country-by-Country Reporting: Action 13: 2015 Final Report* (OECD/G20 Base Erosion and Profit Shifting Project, OECD Publishing). Retrieved from https://www.oecd.org/ctp/transfer-pricing-documentation-and-country-by-country-reporting-action-13-2015-final-report-9789264241480-en.htm (4 January 2021).

OECD (2018). Gross Domestic Expenditure on R-D by sector of performance and type of cost. Retrieved from https://stats.oecd.org/Index.aspx?DataSetCode=GERD_COST (13 June 2018).

OECD (2019a). *Common errors made by MNEs in preparing Country-by-Country reports* (OECD Publishing). Retrieved from https://www.oecd.org/tax/beps/common-errors-mnes-cbc-reports.pdf (4 January 2021).

OECD (2019b). *Guidance on the Implementation of Country-by-Country Reporting: BEPS Action 13* (OECD Publishing). Retrieved from http://www.oecd.org/tax/guidance-on-the-implementation-of-country-by-country-reporting-beps-action-13.pdf (4 January 2021).

OECD (2020). *Corporate Tax Statistics: Second Edition* (OECD Publishing). Retrieved from https://www.oecd.org/tax/tax-policy/corporate-tax-statistics-second-edition.pdf (4 January 2021).

Overesch, M., & Wolff, H. (2019). *Financial Transparency to the Rescue: Effects of Country-by-Country Reporting in the EU Banking Sector on Tax Avoidance* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3075784 (25 April 2019).

Overesch, M., & Wolff, H. (2020). *Financial Transparency to the Rescue: Effects of Public Country-by-Country Reporting in the EU Banking Sector on Tax Avoidance* (Working Paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3075784 (4 January 2021).

PricewaterhouseCoopers (2014a). *A practical guide to the UK regulations: Country by country reporting under CRD IV*. Retrieved from https://www.pwc.co.uk/tax/assets/a-practical-guide-to-the-uk-regulations-cbcr-under-crd-iv.pdf (4 January 2021).

PricewaterhouseCoopers (2014b). *General assessment of potential economic consequences of country-by-country reporting under CRD IV: Study prepared by PwC for European Commission DG Markt following the contract 2014/S 102-177729*. Retrieved from https://www.pwc.com/gx/en/eu-institutions-services/pdf/pwc-cbcr-report-en.pdf (4 January 2021).

PricewaterhouseCoopers (2014c). *Worldwide Tax Summaries: Corporate Taxes 2014/15*. Retrieved from https://www.pwc.com/taxsummaries (12 July 2017).

PricewaterhouseCoopers (2015). *Worldwide Tax Summaries: Corporate Taxes 2015/16*. Retrieved from https://www.pwc.com/taxsummaries (12 July 2017).

PricewaterhouseCoopers (2016). *Worldwide Tax Summaries: Corporate Taxes 2016/17*. Retrieved from https://www.pwc.com/taxsummaries (12 July 2017).

PricewaterhouseCoopers (2017). *Global Research & Development Incentives Group: April 2017*. Retrieved from https://www.pwc.com/kr/ko/tax/samilpwc_global-r-and-d-brochure-april2017.pdf (15 January 2021).

Rauter, T. (2020). The Effect of Mandatory Extraction Payment Disclosures on Corporate Payment and Investment Policies Abroad. *Journal of Accounting Research*, *58*(5), 1075–1116. https://doi.org/10.1111/1475-679X.12332

Reibel, R. (2015). Tax Transparency – How to Make it Work. *European Taxation*, *55*(5), 209–212.

Riedel, N. (2018). Quantifying International Tax Avoidance: A Review of the Academic Literature. *Review of Economics*, *69*(2), 169–181. https://doi.org/10.1515/roe-2018-0004

Rodrigues, V. (2013, February 25). Italian election triggers sharp sell-off. *Financial Times*.

Scheffler, W., & Köstler, M. (2017). *Richtlinie über eine Gemeinsame Körperschaftsteuer-Bemessungsgrundlage – mehr als eine Harmonisierung der steuerlichen Gewinnermittlung* (ifst-Schrift No. 518).

Schreiber, U., & Voget, J. (2017). Internationale Gewinnverlagerung und Publikation länderbezogener Ertragsteuerinformationen. *Steuer und Wirtschaft*, *94*(2), 145–158.

Securities and Exchange Commission (SEC) (2019). *Disclosure of Payments by Resource Extraction Issuers*. 17 CFR Parts 240 and 249b, Release No. 34-87783, File No. S7-24-19, RIN 3235-AM06. Retrieved from https://www.sec.gov/rules/proposed/2019/34-87783.pdf (4 January 2021).

Spengel, C. (1995). *Europäische Steuerbelastungsvergleiche: Deutschland – Frankreich – Großbritannien*. Dissertation, University of Mannheim. Düsseldorf: IDW-Verlag.

Spengel, C. (2008). Concept and Necessity of a Common Tax Base – an academic introduction. In W. Schön, U. Schreiber, & C. Spengel (Eds.), *A Common Consolidated Corporate Tax Base for Europe: Eine einheitliche Körperschaftsteuerbemessungsgrundlage für Europa* (pp. 1–47). Berlin, Heidelberg: Springer.

Spengel, C., Bräutigam, R., Dutt, V. K., Fischer, L., & Stutzenberger, K. (2019). *The Impact of the CCTB on the Effective Tax Burden of Corporations: Results from the Tax Analyzer Model: Final Report*. On-Demand Economic Analysis under Framework Contract TAXUD/2017/CC/147 – Framework Contract for the Provision of Effective Tax Rates and Related Services (European Commission Taxation Paper No. 75-2019). Retrieved from https://ec.europa.eu/taxation_customs/sites/taxation/files/taxation_paper_75.pdf (23 February 2021).

Spengel, C., Nicolay, K., Werner, A.-C., Olbert, M., Schmidt, F., & Wolf, T. (2017). *Steuerliche Standortattraktivität digitaler Geschäftsmodelle: Steuerlicher Digitalisierungsindex 2017*. Retrieved from http://ftp.zew.de/pub/zew-docs/gutachten/Studie_Digitale_Geschaeftsmodelle_2017.pdf (15 January 2021).

Spengel, C., & Oestreicher, A. (2012). *Common Corporate Tax Base in the EU: Impact on the Size of Tax Bases and Effective Tax Burdens*. *ZEW Economic Studies: Vol. 43*. Heidelberg: Physica-Verlag.

Spengel, C., Oestreicher, A., Elschner, C., Reister, T., Ernst, C., Grünewald, M., Finke, K., Prassel, J., & Cui, L. (2008). *Study on the impact of reforms of corporate income taxation systems at the EU level on the size of the tax bases of the EU companies, using the model "European Tax Analyzer": Final Report*. Project for the EU Commission TAXUD/2007/DE/325. Mannheim, Göttingen.

Spengel, C., Ortmann-Babel, M., Zinn, B., & Matenaer, S. (2012). A Common Corporate Tax Base for Europe: An Impact Assessment of the Draft Council Directive on a CC(C)TB. *World Tax Journal*, *4*(3), 185–221.

Spengel, C., Schmidt, F., Heckemeyer, J., Nicolay, K., Bartholmeß, A., Bräutigam, R., Braun, J., Buchmann, P., Bührle, A. T., Casi, E., Dutt, V. K., Fischer, L., Harendt, C., Olbert, M., Pfeiffer, O., Schwab, T., Steinbrenner, D., Stutzenberger, K., Todtenhaupt, M., Vay, H., & Werner, A.-C. (2018). *Effective Tax Levels Using the Devereux/Griffith Methodology: Final Report 2017*. Project for the EU Commission TAXUD/2013/CC/120. Mannheim. Retrieved from https://ec.europa.eu/taxation_customs/sites/taxation/files/final_report_2017_effective_tax_levels_revised_en.pdf (15 January 2021).

Spengel, C., Vay, H., & Weck, S. (2019). Das Country-by-Country Reporting der OECD: Eine steuerliche und quantitative Analyse des aktuellen Implementierungsstandes. *Die Unternehmensbesteuerung*, *12*(10), 573–584.

Spengel, C., & Zinn, B. (2011). Non-profit Taxation on Corporations in the EU: Lessons from Corporate Tax Reforms in Germany and Tax Implications of the Global Economic Crisis. *Intertax*, *39*(10), 494–520.

Spengel, C., & Zinn, B. (2012). Steuerpolitik nach der Krise: Welche Maßnahmen sind für die Unternehmensbesteuerung in Deutschland zu ergreifen? *Perspektiven der Wirtschaftspolitik*, *13*(1–2), 19–51.

Spengel, C., & Zöllkau, Y. (2012). *Common Corporate Tax Base (CC(C)TB) and Determination of Taxable Income: An International Comparison*. Berlin, Heidelberg: Springer.

Steinegger, A. (2016). Country-by-Country-Reporting: Spannungsfeld zwischen Transparenz und Steuerplanung. *Der Konzern*, *14*(10), 454–461.

The Guardian Data Blog (2013). Where are Europe's banks most exposed? Retrieved from https://www.theguardian.com/news/datablog/2013/mar/26/europe-banks-sovereign-exposure (14 May 2019).

Tørsløv, T. R., Wier, L. S., & Zucman, G. (2020). *The Missing Profits of Nations* (NBER Working Paper No. 24701). Retrieved from https://www.nber.org/papers/w24701.pdf (1 February 2021).

Transparency International (2012). *Transparency in Corporate Reporting: Assessing the World's Largest Companies*. Retrieved from https://www.transparency.org/whatwedo/publication/transparency_in_corporate_reporting_assessing_the_worlds_largest_companies (15 January 2021).

Transparency International (2014). *Transparency in Corporate Reporting: Assessing the World's Largest Companies*. Retrieved from https://www.transparency.org/whatwedo/publication/transparency_in_corporate_reporting_assessing_worlds_largest_companies_2014 (15 January 2021).

Treanor, J. (2013a, February 27). Avaaz bank tax transparency petition attracts more than 200,000 signatures. *The Guardian*. Retrieved from https://www.theguardian.com/business/2013/feb/27/eu-tax-transparency-avaaz-petition (15 January 2021).

Treanor, J. (2013b, April 3). Barclays tax avoidance division generated £1bn a year – Salz review. *The Guardian*. Retrieved from https://www.theguardian.com/business/2013/apr/03/barclays-tax-avoidance-salz-review-scm (15 January 2021).

Valdani Vicari & Associati SRL (VVA), & ZEW – Leibniz Centre for European Economic Research (ZEW) (2015). *SME taxation in Europe: An empirical study of applied corporate income taxation for SMEs compared to large enterprises*. CIP Programme 186/PP/ENT/CIP/12/F/S01C24. Brussels. Retrieved from https://ec.europa.eu/growth/content/sme-taxation-europe-%E2%80%93-empirical-study-applied-corporate-income-taxation-smes-compared-0_en (15 January 2021).

List of Directives and Regulations

Council Directive (EU) 2016/1164 of 12 July 2016 laying down rules against tax avoidance practices that directly affect the functioning of the internal market, *Official Journal of the European Union*, *59*(L 193), 1–14 (19 July 2016) [Anti-Tax Avoidance Directive, ATAD].

Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC, *Official Journal of the European Union*, *56*(L 182), 19–76 (29 June 2013) [Accounting Directive].

Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, *Official Journal of the European Union*, *56*(L 176), 338–436 (27 June 2013) [Capital Requirements Directive IV, CRD IV].

Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, *Official Journal of the European Union*, *56*(L 176), 1–337 (27 June 2013) [Capital Requirements Regulation, CRR].

Appendices

A Appendix to Chapter 2

This Appendix[150] provides additional tests for the study on the capital market reaction to the introduction of a mandatory country-by-country reporting for banks in the EU. In addition to further robustness tests, the main analysis and the heterogeneity tests are conducted for different treatment samples.

A.1 General robustness tests and additional descriptive statistics

Table A.1: Dispersion of control banks over countries

Country	Banks		Percent	Country	Banks		Percent
	Number	Thereof parents			Number	Thereof parents	
Argentina	4	2	0.74	Niger	1	0	0.19
Australia	8	7	1.49	Nigeria	11	7	2.05
Bangladesh	18	18	3.35	Oman	1	1	0.19
Bermuda	12	7	2.23	Pakistan	10	6	1.86
Brazil	9	6	1.68	Palestine	1	1	0.19
Bulgaria	1	0	0.19	Panama	1	1	0.19
Canada	11	11	2.05	Peru	2	0	0.37
Chile	4	2	0.74	Philippines	6	5	1.12
China	18	16	3.35	Poland	1	0	0.19
Colombia	6	3	1.12	Qatar	7	6	1.30
Egypt	6	4	1.12	Russian Federation	5	5	0.93
Germany	1	0	0.19	Saudi Arabia	6	6	1.12
Ghana	2	1	0.37	Serbia	2	1	0.37
Hong Kong	15	11	2.79	Singapore	8	6	1.49
India	26	22	4.84	Slovenia	1	0	0.19
Indonesia	9	5	1.68	South Africa	9	7	1.68
Israel	6	6	1.12	Sri Lanka	8	7	1.49
Japan	43	37	8.01	Switzerland	20	18	3.72
Jordan	9	8	1.68	Syrian Arab Republic	1	0	0.19
Kazakhstan	4	2	0.74	Taiwan	22	21	4.10
Kenya	5	3	0.93	Tanzania	1	1	0.19
Korea	14	11	2.61	Thailand	15	9	2.79
Kuwait	7	6	1.30	Togo	1	1	0.19
Lebanon	2	2	0.37	Tunisia	10	6	1.86
Malaysia	12	8	2.23	Turkey	19	12	3.54
Mauritius	1	1	0.19	United Arab Emirates	12	9	2.23
Mexico	5	4	0.93	United States	89	85	16.57
Morocco	4	4	0.74	Vietnam	4	4	0.74
New Zealand	1	1	0.19	**Total**	**537**	**433**	**100.00**

Notes: Control banks are stock-listed entities of bank groups whose global ultimate owner is located outside the EU. As some of these bank groups also have stock-listed subsidiaries in EU countries, the sample of treated banks also contains a few bank entities located in EU countries. In total, we have 537 control banks in our main sample. The depicted countries reflect the residence of the listed bank entities, which corresponds to the place of stock issuance. In general, the shares of listed banks are traded in the local currency of their home country, except for the shares of the two banks located in Lebanon (traded in USD) and of one bank in the United States (traded in EUR). The column "Banks – Thereof parents" depicts the number of banks in a country that are global ultimate owners (N=433).

[150] The supplementary material provided in Appendix A is available at https://link.springer.com/article/10.1007/s10797-019-09575-4#Sec14 (23 February 2021).

Table A.2: Cumulative average abnormal returns – three-day window centered on alternative event dates

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
26-28 Jun. 2013	-0.003	-0.001	-0.012
	(-0.350)	(-0.159)	(-1.150)
29-31 Oct. 2014	-0.004	0.002	-0.014
	(-0.505)	(0.388)	(-1.512)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on alternative event dates. The first (second) row tests the main specification on 27 June 2013 (30 October 2014), where 177 (165) banks are in the sample of treated firms. Treated banks are entities of bank groups whose global ultimate owner is located in the EU.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.3: Modified event windows, buy-and-hold returns and sample modification

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Panel A: Modified event windows			
25-27 Feb. 2013	-0.006	-0.002	-0.005
	(-0.823)	(-0.308)	(-0.573)
27 Feb. – 4 Mar. 2013	-0.004	0.001	-0.001
(4 trading days)	(-0.465)	(0.076)	(-0.137)
25 Feb. – 1 Mar. 2013	-0.003	0.001	-0.005
(5 trading days)	(-0.292)	(0.111)	(-0.409)
Panel B: Buy-and-hold average abnormal returns – three-day window centered on event date			
26-28 Feb. 2013	-0.007	-0.001	-0.004
	(-0.902)	(-0.087)	(-0.424)
Panel C: Cumulative average abnormal returns for banks listed in the EU – three-day window centered on event date			
26-28 Feb. 2013	-0.008	-0.003	-0.006
	(-1.175)	(-0.549)	(-0.691)

Notes: The 155 treated banks are entities of bank groups whose global ultimate owner is located in the EU. Panel A displays the cumulative average abnormal returns for alternative event windows. The first row shows the cumulative average abnormal returns if the event date is assumed to be the 26 February 2013 and includes the preceding day and the following day (25-27 February 2013). The confidence intervals for the three specifications are [-0.021, 0.009], [-0.014, 0.010] and [-0.023, 0.012], respectively. Panel B displays the buy-and-hold average abnormal returns ($BHAAR = \frac{1}{N}\sum_{i=1}^{N}\left[\prod_{t=1}^{T}\left(1 + R_{i,t}^{act}\right) - \prod_{t=1}^{T}\left(1 + R_{i,t}^{exp}\right)\right]$) around the event date. The t-test statistic for this panel is skewness-adjusted. Panel C displays the cumulative average abnormal returns for a three-day window centered on the event date for 219 treated bank entities that are listed in the EU, irrespective of the location of the headquarter of the bank group.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.4: Variation of event study method I – OLS regression

Average realized return	(1)	(2)	(3)
S&P Global 1200	0.75013***		
	(0.03043)		
MSCI World Banks		0.67430***	
		(0.02067)	
Control group			1.05753***
			(0.04662)
26-28 Feb. 2013	-0.00213	-0.00031	-0.00107
	(0.00376)	(0.00154)	(0.00342)
Constant	0.00035*	0.00036**	-0.00006
	(0.00018)	(0.00015)	(0.00019)
Obs.	783	783	783
R^2	0.49444	0.67213	0.42855

Notes: The table presents the results of the following regression model: $R_{p,t} = \alpha_p + \beta_p R_{m,t} + \beta_d D_t + e_{p,t}$, which is comparable to the method of Chen (2017) and Frischmann et al. (2008). $R_{p,t}$ is the return of the portfolio of banks with an ultimate owner located in the EU (group of treated banks in all other specifications), $R_{m,t}$ is the return of the control index (S&P Global 1200, MSCI World Banks or the average return of the control group), D_t is a dummy set equal to 1 in the three-day event window and $e_{p,t}$ is an error term. The coefficient can thus be interpreted as the three-day CAR at the event date. The estimation uses daily returns from 1 January 2012 to 31 December 2014.

Robust standard errors are in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.5: Variation of event study method II – difference-in-differences

Three-day buy-and-hold return (26-28 Feb. 2013)	
Bank HQ in EU	-0.00248**
	(0.00110)
26-28 Feb. 2013 BHR	-0.00011
	(0.00085)
Bank HQ in EU # 26-28 Feb. 2013 BHR	-0.00145
	(0.00110)
Constant	0.00381***
	(0.00085)
Obs.	44,288
R^2	0.00082

Notes: The table presents the results of the following difference-in-differences regression: $BHR_{i,t} = \beta_0 + \beta_1 TB_i + \beta_2 D_t + \beta_3 TB_i D_t + e_{p,t}$, which is comparable to the regression model of Hoopes et al. (2018). $BHR_{i,t}$ is the three-day buy-and-hold return (BHR) for each bank i, $BHR_{i,t} = \prod_{t=1}^{T}\left(1 + R_{i,t}^{act}\right) - 1$, centered on day t. The 155 treated banks are entities of bank groups whose global ultimate owner is located in the EU. The treatment dummy TB_i equals 1 for the treated banks and 0 for all banks in our sample with a global ultimate owner outside the EU. The time dummy D_t is equal to 1 only for the day that captures the buy-and-hold return for the three-day period from 26 to 28 February 2013, which includes our event date, and 0 otherwise. Similar to the time period used by Hoopes et al. (2018), the calculation of the buy-and-hold returns is based on daily return data from 1 January to 31 March 2013. In general, we would require that the regression allows for serial correlation and we acknowledge that the single constant is probably not sufficient to control for potential differences between the two groups.
Standard errors, clustered by calendar date, are in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.6: Engagement in tax havens sample split – extended tax haven classification

Expected return	(1)	(2)
	S&P Global 1200	MSCI World Banks
Banks not engaging in tax havens		
26-28 Feb. 2013	0.000	0.005
	(0.000)	(0.518)
Banks engaging in tax havens		
26-28 Feb. 2013	-0.008	-0.002
	(-1.148)	(-0.359)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. Banks are classified to be exposed to tax havens if they have an affiliate in a country that is categorized as a tax haven according to the Hines (2010) list. We gather the relevant information from hand-collected CbCRs. If we cannot obtain information from the public CbCR, we complement the sample by checking the residence of treated banks' affiliates. We employ CbCR data relating to the financial year 2014 since this is the first year for which the full CbCR information has to be published. Despite a small time lag between the first published CbCRs and our event date, we are confident that the tax haven activity at the time of the CbCR introduction is well reflected in the first wave of published CbCRs since it presumably takes time to react to the increase in tax transparency by withdrawing from tax havens. 37 (109) banks are part of a group without (with) an engagement in the selected tax havens. This test excludes the specification where the expected return is based on a control group of banks because comprehensive CbCRs are generally not available for banks with a global ultimate owner located outside the EU. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.176 and 0.273.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

A.2 Restricted treatment group I (only banks located in EU countries)

Table A.7: Cumulative average abnormal returns – three-day window centered on event date (restricted treatment group I)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
26-28 Feb. 2013	-0.007 (-0.857) [-0.025, 0.010]	-0.001 (-0.114) [-0.015, 0.013]	-0.004 (-0.395) [-0.025, 0.017]

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The 130 treated banks are listed entities which are located in the EU and at the same time belong to a bank group whose global ultimate owner is located in the EU. Accordingly, the control group in column (3) consists of listed bank entities which are located in non-EU countries and at the same time belong to a bank group whose global ultimate owner is located outside the EU.
t-test statistic in parenthesis and 95% confidence interval in square brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.8: Daily average abnormal returns – around event date (restricted treatment group I)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
25 Feb. 2013	0.006 (1.039)	0.000 (0.039)	0.001 (0.217)
26 Feb. 2013	-0.012** (-2.193)	-0.005 (-1.104)	-0.012* (-1.887)
27 Feb. 2013	-0.001 (-0.125)	0.003 (0.593)	0.004 (0.650)
28 Feb. 2013	0.005 (0.945)	0.001 (0.322)	0.004 (0.573)

Notes: The table displays daily average abnormal returns. The 130 treated banks are listed entities which are located in the EU and at the same time belong to a bank group whose global ultimate owner is located in the EU. The control group in column (3) is defined as described in the notes to Table A.7.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.9: ETR sample split (restricted treatment group I)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with ETR below median ETR in the EU			
26-28 Feb. 2013	0.007	0.012	0.004
	(0.452)	(0.846)	(0.287)
Banks with ETR above median ETR in the EU			
26-28 Feb. 2013	-0.015	-0.007	-0.009
	(-1.241)	(-0.694)	(-0.546)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.7. We use the 2011 financial statements to calculate the ETR for our event. We split all listed banks according to the median ETR and then perform the data cleaning procedure described in Section 2.3. This can lead to slight numerical inequalities between the two ETR groups. The sample adjustment leaves us with 39 (44) treated banks with an ETR below (above) the median ETR. For the specification in column (3), the control group is split accordingly at the median ETR. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.000, 0.001 and 0.018, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.10: Engagement in selected tax havens sample split (restricted treatment group I)

Expected return	(1)	(2)
	S&P Global 1200	MSCI World Banks
Banks not engaging in selected tax havens		
26-28 Feb. 2013	-0.005	0.001
	(-0.611)	(0.162)
Banks engaging in selected tax havens		
26-28 Feb. 2013	-0.010	-0.003
	(-0.979)	(-0.321)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. Following Overesch and Wolff (2019), banks that have an entity located in either Cyprus, Ireland, Liechtenstein, Luxembourg or Malta are considered to engage in tax havens. We gather the relevant information from hand-collected CbCRs. If we cannot obtain information from the public CbCR, we check annual reports of treated banks. We employ CbCR and annual report data for the financial year 2014 since this is the first year for which the full CbCR information has to be published. Despite a small time lag between financial year 2014 and our event date, we are confident that the tax haven activity at the time of the CbCR introduction is well reflected in the first wave of published CbCRs since it presumably takes time to react to the increase in tax transparency by withdrawing from tax havens. We reduce the sample to the treated banks for which we could find the relevant information. 60 (62) banks are part of a group without (with) an engagement in the selected tax havens. This test excludes the specification where the expected return is based on a control group of banks because comprehensive CbCRs are generally not available for banks with a global ultimate owner located outside the EU. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.330 and 0.424, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.11: B2B/B2C sample split (restricted treatment group I)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-average B2C orientation			
26-28 Feb. 2013	-0.006	-0.001	-0.001
	(-0.585)	(-0.065)	(-0.117)
Banks with an above-average B2C orientation			
26-28 Feb. 2013	-0.009	-0.001	-0.006
	(-0.730)	(-0.116)	(-0.374)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.7. Banks are classified according to the specialization code in Bank Focus: Commercial banks, Investment & Trust corporations, Investment banks, Private banking/ Asset management companies and Securities firms are assumed to be mainly B2B-oriented. Cooperative banks, Finance companies, Real Estate & Mortgage banks, Savings banks and Specialized governmental credit institutions are regarded to be mainly B2C-oriented. Central banks, Clearing & Custody institutions, Group finance companies, Islamic banks, Micro-financing institutions, Multi-lateral government banks and Other non-banking credit institutions are not considered. Consequently, 178 of 940 entities in the complete sample of banks listed on a stock market are categorized as B2C-oriented. At the group level, bank groups are classified to have a high or low B2C orientation depending on the fraction of affiliates with B2C orientation. We split all bank groups at the mean of the B2C fraction (about 20%). Hence, the treatment and control group are split in accordance. In the complete sample, about 30% of the bank groups are classified to have an above-average B2C orientation. Roughly in line with the ratio in the raw data, we have categorized 68 (33) treated banks as part of a group with a low (high) B2C orientation. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.564, 0.907 and 0.354, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.12: Ownership concentration sample split (restricted treatment group I)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-median share of institutional investors			
26-28 Feb. 2013	-0.006	0.001	-0.003
	(-0.596)	(0.160)	(-0.265)
Banks with an above-median share of institutional investors			
26-28 Feb. 2013	-0.010	-0.003	-0.006
	(-1.214)	(-0.480)	(-0.615)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.7. Banks are classified according to the proportion of institutional investors based on the shareholder data obtained from Bureau van Dijk's Orbis database, similar to Chen (2017). We use ownership data from the financial year 2013, which is our best proxy for the group structure at the event date. Based on this information on the investors, we calculate the share of institutional investors and split the sample at the median, which is at about 48%. We classify 63 (65) treated banks to have a below- (above-) median share of institutional investors. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.401, 0.334 and 0.578, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

A.3 Restricted treatment group II (only banks located in EU countries with at least ten listed banks)

Table A.13: Cumulative average abnormal returns – three-day window centered on event date (restricted treatment group II)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
26-28 Feb. 2013	-0.013 (-1.548) [-0.028, 0.003]	-0.006 (-0.878) [-0.019, 0.007]	-0.009 (-0.975) [-0.028, 0.009]

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The treated banks are listed entities which are located in the EU and at the same time belong to a bank group whose global ultimate owner is located in the EU. As an additional restriction, we only consider entities located in EU countries with at least ten listed banks (i.e. Germany, France and United Kingdom). Consequently, we arrive at 58 treated banks. The control group in column (3) only consists of bank entities which are located in non-EU countries with more than ten listed banks and at the same time belong to a bank group whose global ultimate owner is located outside the EU.
t-test statistic in parenthesis and 95% confidence interval in square brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.14: Daily average abnormal returns – around event date (restricted treatment group II)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
25 Feb. 2013	0.010** (2.003)	0.005 (1.153)	0.008 (1.266)
26 Feb. 2013	-0.013*** (-2.575)	-0.006 (-1.507)	-0.013** (-2.190)
27 Feb. 2013	-0.001 (-0.293)	0.002 (0.444)	0.003 (0.485)
28 Feb. 2013	0.002 (0.405)	-0.002 (-0.387)	0.001 (0.149)

Notes: The table displays daily average abnormal returns. The 58 treated banks are listed entities which are located in Germany, France or the United Kingdom and at the same time belong to a bank group whose global ultimate owner is located in the EU. The control group in column (3) is defined as described in the notes to Table A.13.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.15: ETR sample split (restricted treatment group II)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with ETR below median ETR in the EU			
26-28 Feb. 2013	0.004	0.009	-0.000
	(0.303)	(0.828)	(-0.011)
Banks with ETR above median ETR in the EU			
26-28 Feb. 2013	-0.017	-0.009	-0.010
	(-1.551)	(-1.004)	(-0.686)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.13. We use the 2011 financial statements to calculate the ETR for our event. We split all listed banks according to the median ETR and then perform the data cleaning procedure described in Section 2.3. This can lead to slight numerical inequalities between the two ETR groups. The sample adjustment leaves us with 7 (17) treated banks with an ETR below (above) the median ETR. For the specification in column (3), the control group is split accordingly at the median ETR. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.021, 0.021 and 0.200, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.16: Engagement in selected tax havens sample split (restricted treatment group II)

Expected return	(1)	(2)
	S&P Global 1200	MSCI World Banks
Banks not engaging in selected tax havens		
26-28 Feb. 2013	-0.009	-0.002
	(-0.930)	(-0.270)
Banks engaging in selected tax havens		
26-28 Feb. 2013	-0.017	-0.009
	(-1.640)	(-1.055)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. Following Overesch and Wolff (2019), banks that have an entity located in either Cyprus, Ireland, Liechtenstein, Luxembourg or Malta are considered to engage in tax havens. We gather the relevant information from hand-collected CbCRs. If we cannot obtain information from the public CbCR, we check annual reports of treated banks. We employ CbCR and annual report data for the financial year 2014 since this is the first year for which the full CbCR information has to be published. Despite a small time lag between financial year 2014 and our event date, we are confident that the tax haven activity at the time of the CbCR introduction is well reflected in the first wave of published CbCRs since it presumably takes time to react to the increase in tax transparency by withdrawing from tax havens. We reduce the sample to the treated banks for which we could find the relevant information. 25 (28) banks are part of a group without (with) an engagement in the selected tax havens. This test excludes the specification where the expected return is based on a control group of banks because comprehensive CbCRs are generally not available for banks with a global ultimate owner located outside the EU. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.314 and 0.367, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.17: B2B/B2C sample split (restricted treatment group II)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-average B2C orientation			
26-28 Feb. 2013	-0.010	-0.004	-0.003
	(-1.331)	(-0.552)	(-0.289)
Banks with an above-average B2C orientation			
26-28 Feb. 2013	-0.015	-0.007	-0.013
	(-1.049)	(-0.550)	(-0.735)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.13. Banks are classified according to the specialization code in Bank Focus: Commercial banks, Investment & Trust corporations, Investment banks, Private banking/ Asset management companies and Securities firms are assumed to be mainly B2B-oriented. Cooperative banks, Finance companies, Real Estate & Mortgage banks, Savings banks and Specialized governmental credit institutions are regarded to be mainly B2C-oriented. Central banks, Clearing & Custody institutions, Group finance companies, Islamic banks, Micro-financing institutions, Multi-lateral government banks and Other non-banking credit institutions are not considered. Consequently, 178 of 940 entities in the complete sample of banks listed on a stock market are categorized as B2C-oriented. At the group level, bank groups are classified to have a high or low B2C orientation depending on the fraction of affiliates with B2C orientation. We split all bank groups at the mean of the B2C fraction (about 20%). Hence, the treatment and control group are split in accordance. In the complete sample, about 30% of the bank groups are classified to have an above-average B2C orientation. Roughly in line with the ratio in the raw data, we have categorized 26 (16) treated banks as part of a group with a low (high) B2C orientation. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.478, 0.642 and 0.140, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.18: Ownership concentration sample split (restricted treatment group II)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-median share of institutional investors			
26-28 Feb. 2013	-0.014	-0.007	-0.011
	(-1.549)	(-0.949)	(-0.998)
Banks with an above-median share of institutional investors			
26-28 Feb. 2013	-0.011	-0.004	-0.008
	(-1.207)	(-0.519)	(-0.684)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.13. Banks are classified according to the proportion of institutional investors based on the shareholder data obtained from Bureau van Dijk's Orbis database, similar to Chen (2017). We use ownership data from the financial year 2013, which is our best proxy for the group structure at the event date. Based on this information on the investors, we calculate the share of institutional investors and split the sample at the median, which is at about 48%. We classify 28 (29) treated banks to have a below- (above-) median share of institutional investors. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.736, 0.623 and 0.618, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

A.4 Restricted treatment group III (only global ultimate owner banks)

Table A.19: Cumulative average abnormal returns – three-day window centered on event date (restricted treatment group III)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
26-28 Feb. 2013	-0.008 (-0.793) [-0.026, 0.011]	-0.001 (-0.069) [-0.016, 0.015]	-0.004 (-0.336) [-0.027, 0.019]

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The 104 treated banks are the listed global ultimate owners of bank groups headquartered in the EU, i.e. the restricted sample does not contain any listed subsidiaries. The control group in column (3) is the same as used throughout the main tests in the paper.
t-test statistic in parenthesis and 95% confidence interval in square brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.20: Daily average abnormal returns – around event date (restricted treatment group III)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
25 Feb. 2013	0.003 (0.447)	-0.003 (-0.615)	-0.002 (-0.265)
26 Feb. 2013	-0.012** (-2.012)	-0.005 (-0.949)	-0.012* (-1.722)
27 Feb. 2013	0.001 (0.130)	0.004 (0.847)	0.006 (0.835)
28 Feb. 2013	0.004 (0.643)	-0.000 (-0.011)	0.002 (0.333)

Notes: The table displays daily average abnormal returns. The 104 treated banks are the listed global ultimate owners of bank groups headquartered in the EU. The control group in column (3) is defined as described in the notes to Table A.19.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.21: ETR sample split (restricted treatment group III)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with ETR below median ETR in the EU			
26-28 Feb. 2013	0.008	0.014	0.007
	(0.370)	(0.686)	(0.314)
Banks with ETR above median ETR in the EU			
26-28 Feb. 2013	-0.016	-0.007	-0.010
	(-1.358)	(-0.775)	(-0.607)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.19. We use the 2011 financial statements to calculate the ETR for our event. We split all listed banks according to the median ETR and then perform the data cleaning procedure described in Section 2.3. This can lead to slight numerical inequalities between the two ETR groups. The sample adjustment leaves us with 27 (35) treated banks with an ETR below (above) the median ETR. For the specification in column (3), the control group is split accordingly at the median ETR. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.001, 0.002 and 0.014, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.22: Engagement in selected tax havens sample split (restricted treatment group III)

Expected return	(1)	(2)
	S&P Global 1200	MSCI World Banks
Banks not engaging in selected tax havens		
26-28 Feb. 2013	-0.004	0.002
	(-0.488)	(0.322)
Banks engaging in selected tax havens		
26-28 Feb. 2013	-0.012	-0.004
	(-0.944)	(-0.324)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. Following Overesch and Wolff (2019), banks that have an entity located in either Cyprus, Ireland, Liechtenstein, Luxembourg or Malta are considered to engage in tax havens. We gather the relevant information from hand-collected CbCRs. If we cannot obtain information from the public CbCR, we check annual reports of treated banks. We employ CbCR and annual report data for the financial year 2014 since this is the first year for which the full CbCR information has to be published. Despite a small time lag between financial year 2014 and our event date, we are confident that the tax haven activity at the time of the CbCR introduction is well reflected in the first wave of published CbCRs since it presumably takes time to react to the increase in tax transparency by withdrawing from tax havens. We reduce the sample to the treated banks for which we could find the relevant information. 50 (47) banks are part of a group without (with) an engagement in the selected tax havens. This test excludes the specification where the expected return is based on a control group of banks because comprehensive CbCRs are generally not available for banks with a global ultimate owner located outside the EU. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.150 and 0.285, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.23: B2B/B2C sample split (restricted treatment group III)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-average B2C orientation			
26-28 Feb. 2013	-0.007	-0.002	-0.002
	(-0.655)	(-0.160)	(-0.184)
Banks with an above-average B2C orientation			
26-28 Feb. 2013	-0.007	0.001	-0.005
	(-0.552)	(0.084)	(-0.267)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.19. Banks are classified according to the specialization code in Bank Focus: Commercial banks, Investment & Trust corporations, Investment banks, Private banking/ Asset management companies and Securities firms are assumed to be mainly B2B-oriented. Cooperative banks, Finance companies, Real Estate & Mortgage banks, Savings banks and Specialized governmental credit institutions are regarded to be mainly B2C-oriented. Central banks, Clearing & Custody institutions, Group finance companies, Islamic banks, Micro-financing institutions, Multi-lateral government banks and Other non-banking credit institutions are not considered. Consequently, 178 of 940 entities in the complete sample of banks listed on a stock market are categorized as B2C-oriented. At the group level, bank groups are classified to have a high or low B2C orientation depending on the fraction of affiliates with B2C orientation. We split all bank groups at the mean of the B2C fraction (about 20%). Hence, the treatment and control group are split in accordance. In the complete sample, about 30% of the bank groups are classified to have an above-average B2C orientation. Roughly in line with the ratio in the raw data, we have categorized 60 (20) treated banks as part of a group with a low (high) B2C orientation. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.982, 0.642 and 0.705, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table A.24: Ownership concentration sample split (restricted treatment group III)

Expected return	(1)	(2)	(3)
	S&P Global 1200	MSCI World Banks	Control group
Banks with a below-median share of institutional investors			
26-28 Feb. 2013	-0.006	0.002	-0.003
	(-0.518)	(0.196)	(-0.211)
Banks with an above-median share of institutional investors			
26-28 Feb. 2013	-0.011	-0.004	-0.006
	(-1.211)	(-0.476)	(-0.576)

Notes: The table displays the cumulative average abnormal returns for a three-day window centered on the event date. The control group in column (3) is defined as described in the notes to Table A.19. Banks are classified according to the proportion of institutional investors based on the shareholder data obtained from Bureau van Dijk's Orbis database, similar to Chen (2017). We use ownership data from the financial year 2013, which is our best proxy for the group structure at the event date. Based on this information on the investors, we calculate the share of institutional investors and split the sample at the median, which is at about 48%. We classify 53 (48) treated banks to have a below- (above-) median share of institutional investors. The p-value of a paired test on the difference between the estimated cumulative average abnormal returns of the two groups is 0.377, 0.312 and 0.512, respectively.
t-test statistic in parenthesis. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

B Appendix to Chapter 3

B.1 Additional material to Section 3.3

Table B.1: CbCR search terms

English	annual report; annual financial statement; country-by-country report; country by country reporting; capital requirements directive iv; art "89" crd iv; tax report country; name, nature of activities and geographical location; information location businesses country; information location activities; locations information by country
German	"jahresbericht" OR "konzernabschluss" OR "geschaeftsbericht"; laenderbezogen bericht; laenderspezifisch bericht; 26 a kwg; art 89 eu-richtlinie 2013/36/eu
French	document de reference; informations sur les implantations et les activites relatives a l'exercice; informations relatives aux implantations et activites; implantation par pays; art L.511-45; nom des implantations, nature d'activite et localisation geographique; rapport financier annuel
Italian	relazioni e bilanci; informativa al pubblico stato per stato; dell'art 89 della direttiva 2013/36/UE; informativa al pubblico ex art 89; comunicazione per paese
Spanish	cuentas anuales; informe bancario annual; informacion para el cumplimiento del art 89; denominacion, naturaleza y ubicacion; art 87 de la ley 10/2014; cuentas anuales consolidadas, informe de gestion e informe de audioria
Portuguese	relatorio de gestao e contas; denominacao, natureza das atividades e localizacao geografica; informacio por pais

Notes: The table displays typical expressions used to refer to CbCRs or within CbCRs. The terms are derived from the inspection of several exemplary hand-collected reports and used as input in a Google search programmed with Python. See Section 3.3.1 for a description of the CbCR data collection process.

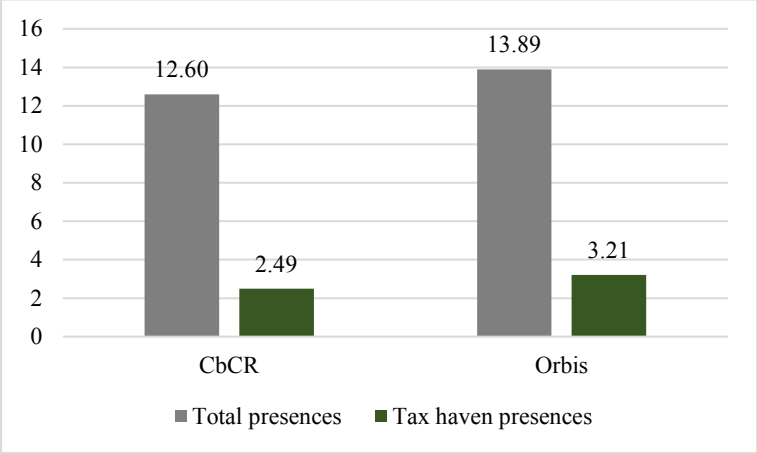
B.2 Additional material to Section 3.4

Table B.2: Orbis financials sample composition (subsidiary level) – tax havens vs. other countries

	2014	2015	2016	Total
All subsidiaries	8,048	8,692	8,607	25,347
Subsidiaries in tax havens	295	416	432	1,143
Subsidiaries in non-tax havens	7,753	8,276	8,175	24,204

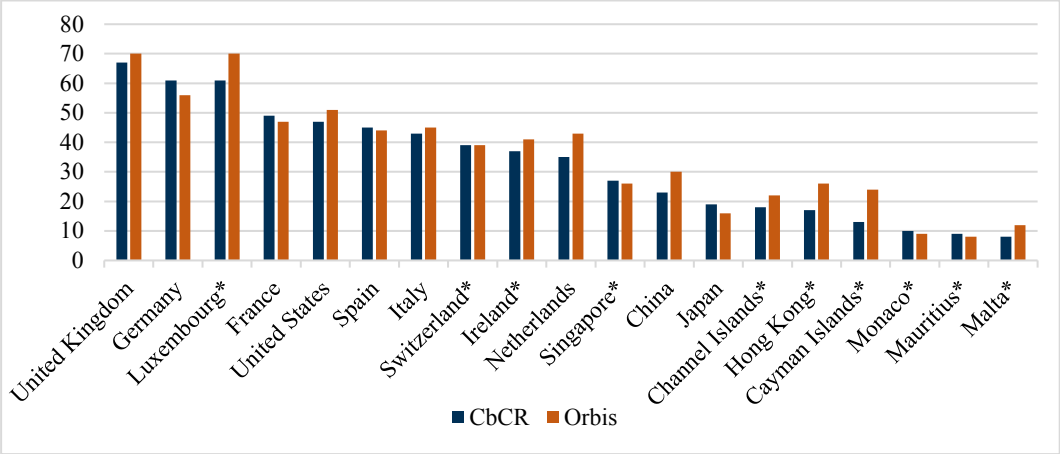
Notes: The table shows the number of subsidiaries in the Orbis financials sample underlying the analysis in Section 3.4. Tax havens are defined according to Hines (2010).

Figure B.1: Number of total country presences and of tax haven presences – average per parent bank (ownership data, 2015)



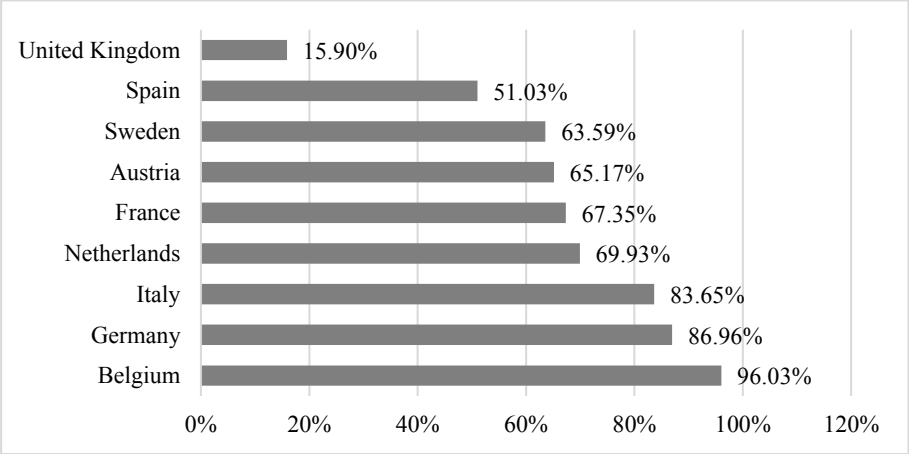
Notes: The graph shows the average number of total country presences and of tax haven presences per parent bank. Country presences are defined based on ownership information. More precisely, we record a country presence in the CbCR dataset if a bank group includes a certain country in the section of key financials in its CbCR. We extract this information from the 2015 reports since this is the financial year with the most comprehensive CbCR coverage. We record a country presence in the Orbis dataset if a bank group controls at least one subsidiary in a certain country according to Orbis ownership data. Tax havens are defined according to Hines (2010).

Figure B.2: Total number of presences in selected countries (ownership data, 2015)



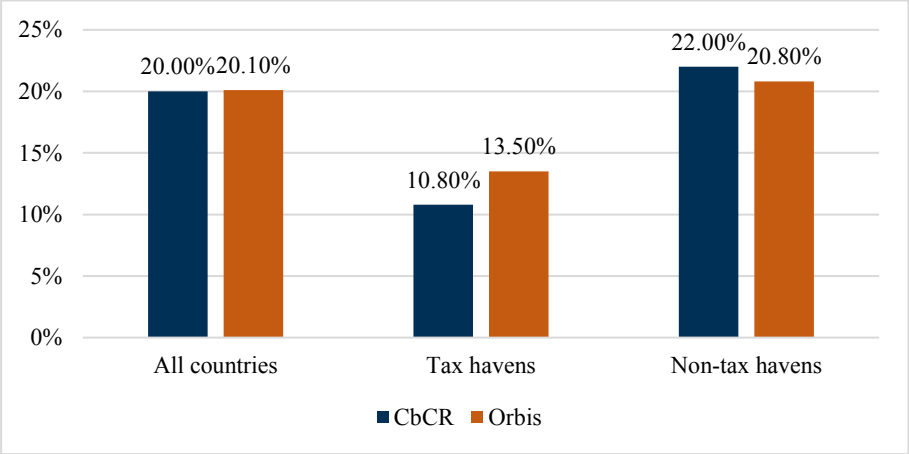
Notes: The graph shows the total number of presences reported in selected countries. Country presences are defined based on ownership information. More precisely, we record a country presence in the CbCR dataset if a bank group includes a certain country in the section of key financials in its CbCR. We extract this information from the 2015 reports since this is the financial year with the most comprehensive CbCR coverage. We record a country presence in the Orbis dataset if a bank group controls at least one subsidiary in a certain country according to Orbis ownership data. * denotes tax havens according to Hines (2010).

Figure B.3: Number of employees in Orbis single financial statements relative to CbCR data – by headquarter country



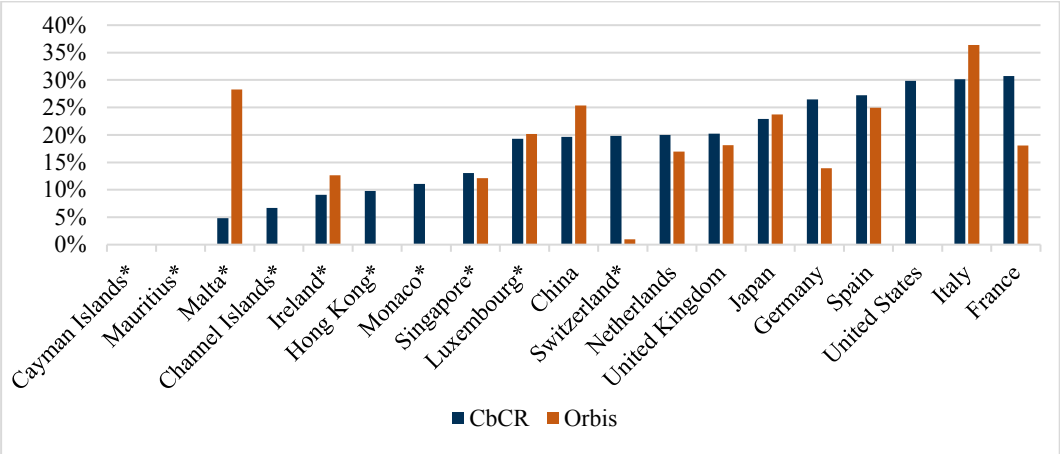
Notes: The graph shows the ratio of the aggregated number of employees in Orbis single financial statements and the aggregated number of employees in the CbCR dataset, both calculated at the level of the headquarter country. To this end, we calculate the average number of employees over the years 2014-2016 for each bank group and add up the averages across all bank groups headquartered in the same country.

Figure B.4: Effective tax rate in tax havens vs. other countries



Notes: The graph shows the effective tax rates of bank presences in tax havens vs. other countries. We calculate the ETR as the ratio of income tax expense over profits before tax (both aggregated over 2014-2016) at bank group-country level and take the median across all countries, tax havens and non-tax havens, respectively. Tax havens are defined according to Hines (2010). Some CbCRs state the amount of income tax paid (instead of current income tax expense). In these cases, we use the cash tax figure and calculate a cash ETR. While timing differences may impair the comparability between current ETRs and cash ETRs to a certain extent, the problem is mitigated since we observe three consecutive years of most bank groups. We do not consider observations with effective tax rates outside the range of [0;1] or with a pre-tax loss.

Figure B.5: Effective tax rate in selected countries



Notes: The graph shows the effective tax rates of bank presences in selected countries. We calculate the ETR as the ratio of income tax expense over profits before tax (both aggregated over 2014-2016) at bank group-country level and take the median across selected countries. Some CbCRs state the amount of income tax paid (instead of current income tax expense). In these cases, we use the cash tax figure and calculate a cash ETR. While timing differences may impair the comparability between current ETRs and cash ETRs to a certain extent, the problem is mitigated since we observe three consecutive years of most bank groups. We do not consider observations with effective tax rates outside the range of [0;1] or with a pre-tax loss. * denotes tax havens according to Hines (2010).

B.3 Additional material to Section 3.5

Table B.3: Bank Focus sample composition (subsidiary level) – tax havens vs. other countries

	2014	2015	2016	Total
All subsidiaries	310	367	323	1,000
Subsidiaries in tax havens	23	30	4	57
Subsidiaries in non-tax havens	287	337	319	943

Notes: The table shows the number of subsidiaries in the Bank Focus sample underlying the regression analysis in Section 3.5. Observations with missing, zero or negative profit before tax, missing or zero total assets, missing or zero staff cost, missing or zero employees, a missing tax incentive variable and missing, negative or zero inflation are dropped. Tax havens are defined according to Hines (2010).

Table B.4: Summary statistics on Bank Focus data (subsidiary level)

	Obs.	Mean	Std. Dev.	p25	p50	p75
PLBT (ln)	1,000	17.527	1.973	16.270	17.583	18.787
TOAS (ln)	1,000	22.442	2.109	20.887	22.282	23.877
STAFF (ln)	1,000	17.534	1.816	16.279	17.395	18.747
OFFBS (ln)	1,000	20.141	2.961	18.407	20.234	22.074
GROWTH	1,000	1.057	0.201	0.984	1.039	1.106
TOEAS	1,000	0.902	0.121	0.869	0.946	0.973
STR	1,000	-0.007	0.064	-0.030	0.007	0.022
INF (ln)	1,000	-4.541	1.005	-5.098	-4.436	-4.021

Notes: The table shows summary statistics for the Bank Focus sample underlying the regression analysis in Section 3.5. *PLBT*, *TOAS* and *STAFF* denote profit or loss before tax, total assets and staff cost, respectively. *OFFBS*, *GROWTH* and *TOEAS* are additional bank-level variables, i.e. off-balance sheet items, subsidiary growth and the share of total earning assets in total assets. *STR* is defined as the difference between the statutory corporate tax rate of the host country and the simple average tax rate of the bank group. *INF* is the host country's inflation rate, measured as the annual growth rate of the ratio of GDP in current local currency to GDP in constant local currency.

Table B.5: CbCR sample composition (regression analysis) – tax havens vs. other countries

		2014	2015	2016	Total
CbCRs (bank group-years)		86	106	95	287
Observations	All host countries	691	814	746	2,251
	Tax havens	60	126	56	242
	Non-tax havens	631	688	690	2,009

Notes: The table shows the number of CbCRs (bank group-years) and of observations (bank group-year-countries) in the CbCR dataset underlying the regression analysis in Section 3.5. The regression sample is derived from the CbCR sample underlying the analysis in Section 3.4 (see Table 3.1), after excluding observations with missing, zero or negative profit before tax, missing or zero employees, a missing tax incentive variable and missing, negative or zero inflation. Tax havens are defined according to Hines (2010).

Table B.6: Summary statistics on CbCR data

	Obs.	Mean	Std. Dev.	p25	p50	p75
PLBT (ln)	2,251	16.932	2.472	15.672	17.111	18.530
EMPL (ln)	2,251	5.731	2.155	4.248	5.694	7.137
STR	2,251	0.011	0.080	-0.049	0.011	0.072
INF (ln)	2,251	-4.222	1.195	-4.770	-4.107	-3.693

Notes: The table shows summary statistics for the CbCR dataset underlying the regression analysis in Section 3.5. *PLBT* and *EMPL* denote profit or loss before tax and the number of employees, respectively. *STR* is defined as the difference between the statutory corporate tax rate of the host country and the simple average tax rate of the bank group. *INF* is the host country's inflation rate, measured as the annual growth rate of the ratio of GDP in current local currency to GDP in constant local currency.

Table B.7: Stepwise transformation of Bank Focus subsidiary-level regression to reduced regression model

	Dependent variable: *PLBT* (ln)				
	(1)	(2)	(3)	(4)	(5)
STR	-2.017***	-1.569***	-1.583**	-0.944	4.945***
	(0.561)	(0.459)	(0.727)	(0.761)	(0.929)
TOAS (ln)	0.649***	0.567***	0.694***	0.728***	
	(0.043)	(0.035)	(0.055)	(0.047)	
STAFF (ln)	0.238***	0.312***	0.193***		
	(0.048)	(0.038)	(0.050)		
EMPL (ln)				0.164***	0.783***
				(0.042)	(0.046)
INF (ln)	-0.012	0.013	0.012	0.007	-0.125
	(0.034)	(0.031)	(0.038)	(0.037)	(0.079)
Intercept	-0.829	0.960	-1.483**	0.067	12.162***
	(0.868)	(0.773)	(0.639)	(0.872)	(0.513)
Other subsidiary-level controls	Yes	No	No	No	No
Bank-type FE	Yes	Yes	No	No	No
Parent & Year FE	Yes	Yes	Yes	Yes	Yes
Level	Subsidiary	Subsidiary	Country	Country	Country
Obs.	1,000	1,168	486	486	486
Adj. R^2	0.754	0.734	0.794	0.796	0.662

Notes: The table shows the results of OLS regressions with profit or loss before tax (ln) as the dependent variable. See Section 3.5 for a description of the explanatory variables. Column (1) corresponds to the subsidiary-level regression shown in equation (1) in Section 3.5. In column (2), we drop the supplemental subsidiary-level control variables. In column (3), we aggregate the subsidiary-level data at country level. Column (4) replaces staff cost by the number of employees. Total assets are dropped in column (5), which corresponds to the regression shown in equation (2) in Section 3.5.
We use heteroscedasticity-robust standard errors clustered at country-year level, shown in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

C Appendix to Chapter 4

Table C.1: List of variables and transparency scores

Scores		Variables		
		Name	**Description**	**Values**
Overall score	**Content score**	*cbcr_term*	Use of literal expression of "CbCR" or equivalent terms	0: No 1: Yes
		legal	Explanation on legal basis of CbCR	0: No reference 1: Reference only to national legal rules 2: Reference only to CRD IV 3: Reference to both national rules and CRD IV
		acc_std	Underlying accounting standards	0: No information given 1: Local GAAP 2: IFRS
		cons_scope	Underlying consolidation scope	0: No information given 1: Only statement that 'consolidated entities' are included 2: Prudential scope of consolidation 3: Group financial accounts consolidation scope
		data_source_plbt	Underlying data source for profit before tax	0: No information given 1: Single financial statements 2: Consolidated financial statements
		data_source_turn	Underlying data source for turnover	0: No information given 1: Single financial statements 2: Consolidated financial statements
		cons_intra_plbt	Underlying treatment of intra-group transactions with regard to the calculation of profit before tax	0: No information given 1: No elimination of intra-group transactions 2: Elimination of all intra-group transactions 3: Elimination only of transactions between entities in the same country

Table C.1: List of variables and transparency scores *(continued)*

Scores		Variables		
		Name	**Description**	**Values**
Overall score	**Content score**	*cons_intra_turn*	Underlying treatment of intra-group transactions with regard to the calculation of turnover	0: No information given 1: No elimination of intra-group transactions 2: Elimination of all intra-group transactions 3: Elimination only of transactions between entities in the same country
		recon_ar	Degree of compatibility between CbCR and consolidated financial statements	0: No information given 1: Statement that reconciliation is not possible 2: Statement that CbCR data and consolidated financial statements are compatible 3: Differences between CbCR data and consolidated financial statements quantified
		turn_count	Number of turnover variables reported	0: Reporting of one turnover variable 1: Reporting of two turnover variables 2: Reporting of three or more turnover variables
		turn_expl	Provision of additional explanation on composition of turnover	0: No 1: Yes
		empl_date	Manner of calculating number of employees	0: No information given 1: Reporting of number of employees at year-end/ reporting date 2: Reporting of average number of employees 3: Reporting of average and year-end number of employees
		empl_add	Provision of additional explanation on calculation of number of employees	0: No 1: Yes
		tax_count	Number of tax variables reported	0: Reporting of no tax variable 1: Reporting of one tax variable 2: Reporting of two tax variables 3: Reporting of three tax variables 4: Reporting of four or more tax variables

Table C.1: List of variables and transparency scores *(continued)*

Scores		Variables		
		Name	**Description**	**Values**
Overall score	**Content score**	*tax_expl*	Definition of all income tax items	0: No additional explanation 1: Indirect explanation on all income tax items 2: Explicit explanation on all income tax items
		expl_add	Provision of additional explanation on CbCR data	0: No 1: Yes
		subs_ctry	Provision of data on public subsidies received on by-country basis	0: No 1: Yes
		item_add_count	Number of additionally reported items beyond required CbCR items	0: Reporting of no additional item 1: Reporting of one additional item 2: Reporting of two additional items 3: Reporting of three or more additional items
		other_ctry_count_desc	Number of collective countries reported (descending order)	0: Reporting of three or more collective countries 1: Reporting of two collective countries 2: Reporting of one collective country 3: Reporting of no collective country
		items_total	Provision of totals for items	0: No 1: Yes
		items_prevyear	Provision of data of previous year	0: No 1: Yes
		unit_orig	Unit used for money amounts of CbCR items	0: Millions 1: Thousands 2: Exact number

Table C.1: List of variables and transparency scores *(continued)*

Scores		Variables		
		Name	**Description**	**Values**
Overall score	**Readability score**	*num_aligned*	Alignment of numbers to decimal point	0: No 1: Yes
		num_monospaced	Monospacing of numbers	0: No 1: Yes
		num_thousands	Separation of thousands by comma or dot	0: No 1: Yes
		num_negative	Indication of negative values	0: With brackets 1: With minus
		table_layout	Arrangement of countries in rows and items in columns	0: No 1: Yes
		table_design	Reader-friendly table design	0: No 1: Yes
		visual	Visualization of CbCR data	0: No 1: Yes
	Additional variables included in overall score	*publ_ar*	Publication of CbCR in annual report	0: No 1: Yes
		publ_sep	Publication of CbCR in separate document	0: No separate CbCR document 1: Separate CbCR document 2: CbCR information as part of a larger tax report
		list_sep	Place of publication of list of entities	0: No information given 1: CbCR only refers to list of shareholdings in annual report 2: CbCR contains separate list

Table C.1: List of variables and transparency scores *(continued)*

Scores	Variables		
	Name	**Description**	**Values**
Additional variables not included in score analysis (Reason: Variable values do not imply an increase in transparency or variables are only applicable to a sub-sample of CbCRs.)	*ar_section*	Publication of CbCR in separate chapter of annual report	0: No 1: Yes
	turn_variables	Expressions used for turnover	Free text
	tax_variables	Tax variables reported	Free text
	item_add_variables	Additionally reported items beyond required CbCR items	Free text
	other_ctry_variables	Different groupings of countries	Free text
	countries_sort	Primary sorting criterion for countries	0: No apparent criterion 1: Region/ continent 2: Alphabetic 3: Size/ importance
	list_order	Overall structure of CbCR	0: 1) List of entities, 2) Core data 1: 1) Core data, 2) List of entities; or both combined
	list_branch	Information regarding foreign branches	0: Unclear 1: List contains only subsidiaries 2: List contains both subsidiaries and foreign branches
	entities_sort	Sorting criteria for list of entities in CbCR	0: No apparent criterion 1: At least one sorting criterion, but restricted usefulness 2: Country/ region as 1st criterion, any 2nd criterion other than alphabetic 3: Country/ region as 1st criterion and alphabetic as 2nd criterion

Notes: The table shows the variables included in the analyses and the composition of the transparency scores. Generally, a higher value implies more transparency or a better readability.

D Appendix to Chapter 5

Table D.1: Implemented R&D tax incentives in the EU Member States

Country	Reduction in tax base (depreciation, allowances and deductions)	Reduction in tax liability (tax credits)
AT	-	12% volume-based tax credit for capital expenditure, personnel and current costs
BE	33.33% accelerated depreciation for plant and machinery; 13.5% volume-based deduction for capital expenditure on tangibles and intangibles; EUR 15,660 deduction per qualified scientific employee	Instead of the investment deduction, a tax credit that is equal to the resulting tax benefit can be applied
BG	-	-
CY	-	-
CZ	100% volume-based additional deduction (i.e. in total 200%) for personnel, depreciation and operating costs; 110% incremental deduction for personnel, depreciation and operating costs for R&D expenses in excess of the expenses incurred during the previous period	-
DE	-	-
DK	-	-
EE	-	-
EL	33.33% accelerated depreciation for machinery, furniture and equipment; 30% volume-based additional deduction (i.e. in total 130%) for personnel and current costs	-

Table D.1: Implemented R&D tax incentives in the EU Member States *(continued)*

Country	Reduction in tax base (depreciation, allowances and deductions)	Reduction in tax liability (tax credits)
ES	10% accelerated depreciation for buildings	8% volume-based tax credit for capital expenditure on movable tangible assets and intangibles; 17% tax credit for personnel engaged in R&D; Tax credit for current costs and depreciation (volume-based (25%) and incremental (42%) for expenses in excess of the average of the previous 2 years); If sum of tax credits > 10% tax due: 50% of all tax credits are usable; If sum of tax credits < 10% tax due: 25% of all tax credits are usable; Overall cap on tax credits: EUR 3 million; Carry-forward for unused tax credits available (18 years)
FI	20% accelerated depreciation for industrial and office buildings used for R&D purposes	-
FR	Accelerated depreciation for machinery, equipment, furniture and intangibles: declining-balance with 150%, 200% or 250% of the regular straight-line rate (depending on useful life: 3-4 years, 5-6 years or more)	30% volume-based tax credit for personnel, current costs and depreciation up to EUR 100 million and 5% on the excess amount (40% and 35% instead of 30% apply for the first and the second year of a five-year period during which the company did not benefit from the tax credit)
HR	125% volume-based deduction (i.e. in total 225%) for personnel, current costs and depreciation	-
HU	-	-

Table D.1: Implemented R&D tax incentives in the EU Member States *(continued)*

Country	Reduction in tax base (depreciation, allowances and deductions)	Reduction in tax liability (tax credits)
IE	100% immediate depreciation for machinery, equipment, intangibles, land and buildings	25% volume-based tax credit for capital expenditure, personnel and current costs; Carry-back (1 year) or carry-forward (indefinite); 25% volume-based tax credit for costs related to construction and refurbishment of buildings if used for R&D by 35% for 4 years
IT	Imposta Regionale sulle Attività Produttive (IRAP): personnel costs related to R&D employees are deductible	-
LT	200% volume-based additional deduction (i.e. in total 300%) for personnel and current costs	-
LU	40% (or four times the straight-line rate) accelerated depreciation for machinery, equipment, furniture and intangibles with special rates for the declining-balance method	-
LV	1.5 times accelerated depreciation for machinery; 200% volume-based additional deduction (i.e. in total 300%) for personnel costs	-
MT	50% volume-based additional deduction (i.e. in total 150%) for current expenses	15% volume-based tax credit (large enterprise) for capital expenditure in preceding period
NL	-	32% volume-based tax credit against wage withholding tax with respect to salaries paid to employees who carry out certain R&D activities up to wage expenses of EUR 350,000; 16% for wage costs that exceed EUR 350,000

Table D.1: Implemented R&D tax incentives in the EU Member States *(continued)*

Country	Reduction in tax base (depreciation, allowances and deductions)	Reduction in tax liability (tax credits)
PL	50% volume-based additional deduction (i.e. in total 150%) for personnel costs; 30% volume-based additional deduction (i.e. in total 130%) for other qualifying expenses (current costs and depreciation)	-
PT	-	32.5% volume-based tax credit for capital expenditure on personnel and other costs; 50% incremental tax credit for expenses in excess of the average of the previous 2 years, max. EUR 1.5 million
RO	Accelerated depreciation (declining-balance) for patents; 50% volume-based additional deduction (i.e. in total 150%) for personnel and current costs	-
SE	-	-
SI	100% volume-based deduction (i.e. in total 200%) for capital expenditure on tangible and intangible assets, personnel and current costs	-
SK	25% volume-based additional deduction (i.e. in total 125%) for wages, depreciation and other current costs; 25% incremental deduction for expenses in excess of the expenses incurred during the previous period	-
UK	100% immediate depreciation for machinery, equipment, furniture, buildings and intangibles	11% volume-based tax credit for personnel and current costs (only for large enterprises)

Notes: Legal status as of 2017. The classification of R&D tax incentives follows VVA and ZEW (2015, Annex 1, pp. 76–98).

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