Unilateral Digital Services Taxes in the European Union: Affected firms and Impact on Effective Tax Rates

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Abstract

This study investigates firms´ reporting of Digital Services Taxes ("**DST**") the impact on the effective tax rates ("**ETR**") of affected firms based on financial statement information. I analyze the disclosure of DSTs in the notes, the accounting treatment, and the qualification of the unilateral DSTs implemented within the European Union (EU) using financial statements of 116 digital firms in 2019 and 2020. The findings indicate that about one-fifth of the sample firms are affected by DSTs. For accounting purposes, firms do not qualify DSTs consistently as direct or indirect taxes and, therefore, account for DST expenses either under Income Tax Expenses, Selling and General Administrative Expenses ("**SGA**") or Cost of Net Revenue ("**CONR**"). About one-third of firms qualify DSTs as direct taxes, about 20 % as indirect taxes, and other firms do not provide any kind of remarks on the qualification. These findings are new to the literature and highly relevant for future research to determine the implications of DSTs.

Further, I analyze if the introduction of unilateral DSTs helped to reduce the ETR differential between both affected and non-affected firms. To this end, I calculated various ETR ratios for DST-affected and non-affected firms to investigate the impact of DST on affected firms before and after the implementation of unilateral DST legislations for the first time using financial information for the financial years starting from 2011 to 2020 derived from Thomson Reuters Refinitiv. The results show that ETRs of DST-affected firms are not lower ETR compared to non-affected firms prior to the introduction of DSTs. Furthermore, the results indicate that the implemented DSTs do not have an observable effect on the ETR, SGA, or CONR of the DST-affected firms. In conclusion, the current unilateral DST legislations fail to achieve the intended increase in the ETR of DST-affected firms at the group level. The results advocate implementing a revised Europe-wide digital levy that is currently discussed as of 2025, as unilateral DSTs within the EU are ineffective measures to increase ETRs, and the different designs of unilateral DSTs observably leads to accounting distortions.

Content

A. Introduction

This study investigates, based on financial statements, the affectedness of firms´ Digital Services Taxes ("**DST**"), the accounting treatment of DSTs, and the impact of DSTs on the effective tax rates ("**ETR**") of affected firms. I analyze the financial statements of 116 digital firms for the financial years 2019 and 2020 regarding disclosures of DST in the notes, the accounting treatment of DSTs, and the qualification of unilateral DSTs implemented within the EU. This helps to conclude on the affectedness of DSTs with regard to the analyzed firm sample. Based on these findings, I calculate various ETR ratios for DST-affected and non-affected firms to show the impact of DSTs on the ETR of affected firms before and after the implementation of unilateral DST legislation for the first time. In addition, I outline the effect on the financial positions of DST-affected firms.

The analysis of the implications of DSTs has gained renewed importance owing to the current discussion on the introduction of a digital levy proposal at the European level as of 2025.[1] Until now, the implementation of a DST at the European level has failed because of political disagreement. As a result of the failure of the EU directive proposal, as of March 21, 2018[2], some (former) EU Member States, namely France, Italy, the United Kingdom ("**UK**"), Austria, and Spain introduced DSTs based on the DST Council Directive proposal at the national level.[3] Apart from the EU initiatives, the Organisation for Economic Co-operation and Development (OECD) and the Inclusive Framework (comprising about 140 countries) are working on a worldwide consensus-based two-pillar solution to deal with the problems arising from the digitalization of the economy ("**BEPS 2.0 project**"). On October 8, 2021, a political agreement[4] was reached by members of the OECD and Inclusive Framework, including the abolishment of existing unilateral DST initiatives worldwide until December 31, 2023, or a later implementation date ("**Transition Period**").

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1 Cf. ECON Committee as of August 26, 2022, 2021/0430(CNS).

2 Cf. EU Commission proposal for a Council Directive on the common system of a digital services tax on revenues resulting from the provision of certain digital services as of March 21, 2018, COM(2018), 148 final.

3 For an overview on DST legislations within Europe see: Graßl/Koch, StuW 2020, 293; Graßl/Koch, IStR 2019, 873; Kim, Alabama Law Review 2020, 131 (147 ff.); regarding the Italian DST: Stevanato, BIT 2020, 413; Bellavite/Morabito/Tognettini, ET 2020, 351; regarding the Austrian DST: Mayr, ET 2019, 350. For an overview of unilateral measures regarding the digitalized economy KPMG, Taxation of the digitalized economy – Developments summary, available at: https://tax.kpmg.us/articles/tracking-digital-services-taxes-developments.html (last access: 17.7.2022).

4 Cf. OECD, Statement on a Two-Pillar Solution to Address the Tax Challenges Arising From the Digitalisation of the Economy as of October 8, 2021, available at: https://www.oecd.org/tax/beps/statement-on-a-two-pillar-solution-to-address-the-tax-challenges-arising-from-the-digitalisation-of-the-economy-october-2021.pdf (last access: 4.11.2021). For detailed information: OECD/G20, Brochure: Two-Pillar Solution to Address the Tax Challenges Arising From the Digitalisation of the Economy as of October 2021, available at: https://www.oecd.org/tax/beps/brochure-two-pillar-solution-to-address-the-tax-challenges-arising-from-the-digitalisation-of-the-economy-october-2021.pdf (last access: 4.11.2021).

Irrespective of the agreement, Austria, France, Italy, Spain, and the UK continue to collect their DSTs in the Transition Period. As a result, unilateral DSTs are still effective and have implications for the affected firms. Due to only minor progress in the implementation of Pillar 1 of the BEPS 2.0 project and the financial crisis, the EU currently considers the implementation of a digital levy. This analysis provides relevant indications of the effectiveness of current DSTs and a future digital levy proposal.

I evaluate the financial statements for the years 2019 and 2020 of 116 digital firms that are either designated by the French Parliament as affected by the French DST or ranked on the Forbes list of the Top 100 Digital Companies (2019 Ranking).[5] Totally, 222 financial reports were examined. From this analysis, I determine which of the analyzed digital firms are affected and how they report on DST. This provides insights into the accounting treatment of DSTs. Further I analyze the characteristics of affected and non-affected firms and the impact of DSTs on affected firms using financial data for the years from 2011 to 2020 from the Thomson Reuters Refinitiv database. This sample period ensures statements on the ETR and other financial positions before and after the introduction of the DST and for a comparison of the results of DST-affected and non-affected firms.

More than one-fifth (26 firms) of the analyzed firms reported on the DSTs in their financial statements. However, based on the analyzed annual financial statements, there is no homogeneous accounting treatment for DSTs. For accounting purposes, firms do not qualify DSTs consistently as direct or indirect taxes and, therefore, account for DST expenses either under Income Tax Expenses, Selling and General Administrative Expenses ("**SGA**"), or Cost of Net Revenue ("**CONR**"). About one-third firms qualify DSTs as direct taxes, about 20 % as indirect taxes, and other firms do not provide any remarks on the qualification. The analysis of financial statements does not reveal any observable differences between the ETRs of affected and non-affected firms before and after the implementation of DSTs; that is, affected firms do not have a lower GAAP ETR and Cash ETR, on average, compared to other digital firms. Furthermore, the results show no apparent effect on the SGA or CONR ratios of the affected firms.

These results have two key implications. On the one hand, the national DST legislations fail to achieve the intended effects of a relevant increase in ETRs. In addition, a narrow scope of the DST does not seem necessary, as I find no observable gap in the ETR of affected and non-affected firms. The data also show that there is a need to implement safe harbor regulations for firms with low or negative profit margins, as DSTs are otherwise taxes on substance. Against this background, discussions on the implementation of a Europe-wide DST initiative that replaces existing DSTs

[5] Cf. Forbes, Top 100 Digital Companies List, available at: https://www.forbes.com/top-digital-companies/list/ (last access: 17.7.2022).

must continue. Such an initiative is beneficial compared to unilateral DSTs, as this would allow for a broader application of DSTs to affect the ETRs of digital firms and for reasonable adjustments of these regulations, such as for loss-making firms. On the other hand, the United States ("**U.S.**") threatened with retaliation measures in the form of tariffs on economic goods from DST countries, including French wine, in response to the implementation of unilateral DSTs, since U.S. firms are considered to be predominantly affected[6] and started corresponding national investigations.[7] The results show that these U.S. initiatives are also partly unfounded, as the DST legislations affected not only the U.S. firms and the impact of DSTs is non-observable in financial statements.

The author proceeds as follows: First, I review the existing literature on the functioning of the DST and the tax burden of digital multinational firms ("**MNE**") (Chapter B). Then, I present the empirical approach, determination, and definitions of the ETR measures, the data and adjustments made for the provided analysis (Chapter C). The empirical analysis is divided into two parts. On the one hand, firms' financial statements are evaluated in terms of DST affectedness, accounting, and qualification based on the financial reports of the years 2019 and 2020. Additionally, DST-affected and non-affected firms are compared on the basis of general financial ratios (Chapter D.I). On the other hand, I analyze the impact of DST on ETR, SGA, and CONR and recalculate the ETR and SGA for specific firms that provide concrete information on the extent of DST but reclassify it as SGA (Chapter D.II). The study ends with a conclusion (Chapter E).

B. Related literature

I. Functioning of the DST

In this chapter, I describe key characteristics of the DST proposals as proposed on unilateral level and as proposed by the EU Commission. Broadly, DSTs aim to ensure a certain degree of taxation on revenues from specific digital services. The revenues are presumably not derived from the state of the user's location (market state). *Cui*, therefore, emphasizes that DSTs should be regarded as taxes on location-specific rent that can be analogized to withholding taxes such as taxes on royalties.[8] In this context, profit shifting is expected to result in lower ETRs for the digital firms. The relocation of firms' assets or profits to low-tax countries or tax havens is made less attractive

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6 Cf. Horobin, France to Go Ahead With Digital Tax, Risking U.S. Tariffs, Bloomberg Law News, available at: https://www.bloomberg.com/news/articles/2020-10-14/france-to-go-ahead-with-digital-tax-risking-u-s-tariffs (last access: 29.10.2020).

7 For example USTR Investigations started in 2019 after France implemented its DST, see USTR, Report on France's Digital Services Tax Prepared in the Investigation under Section 301 of the Trade Act of 1974, available at: Report_On_France's_Digital_Services_Tax.pdf (ustr.gov) (last access: 16.8.2022).

8 Cf. Cui, NTJ 2019, 839 (849); Cui/Hashimzade, CESifo Working Paper No. 7737, 2019.

by turnover-based taxation and, at the same time, it is envisaged to enhance taxation in the market state.

DSTs are taxes on gross revenues derived from in-scope services. Expenses related to the provision of these taxable services are, therefore, irrelevant.[9] Affected firms must bear the DST liability if they earn profits or suffer losses. This is relevant to this analysis as firms may be affected by DSTs in both cases. However, for loss-making and low-margin firms, DSTs are taxes on substance, and may result in a harmful burden. The British DST, with a DST rate of 2 %, exempts firms with profit margins of up to 2.5 % fully or partly.[10] Irrespective of this, the Court of Justice of the European Union (CJEU) ruled that turnover-based taxation does not counteract the European primary law in general.[11] Based on the CJEU ruling on the Hungarian Online Advertisement Tax, which is comparable to DSTs to a certain extent, DSTs should not be discriminatory from a European law perspective.[12]

The scope of taxable services in the EU Directive proposal and enacted DST legislations is limited to certain digital services[13] or business models[14]. The scope has been criticized as being too narrow, as many digital firms shall ultimately not be liable to DST resulting in DSTs not being able to increase the ETRs of affected firms as intended.[15] Consequently, the published DST revenue predictions were presumed very high, which can be confirmed based on published DST income exposures[16]. Revenues from DSTs are significantly lower than the official predictions in Italy (only about 1/3 of the expected DST) and Spain. The French and Austrian DST predications could be closely held and marginally exceeded, respectively. Nevertheless, low tax revenues in Italy and Spain are surprising, as the scope of application provides lower requirements in terms of taxable

9 For criticism see Dimitropoulou, Intertax 2019, 268 (275, 279); van Horzen/van Esdonk, ITPJ 2018, 267 (268, 270); EU Commission itself in EU Commission, Impact Assessment, SWD(2018) 81 final/2, 72.

10 Cf. Bunn, Fiscal Fact No. 618 2018. For an illustration on the effect of an DST depending on the profit margin see Annex I. For a simplified illustration of the effect on the ETR of affected firms depending on profit margins and the effect of the British DST see Annex I.

11 See with regard to the Hungarian advertisement tax CJEU as of 3.3.2020 – C-75/18, Vodafone Magyarország and CJEU as of 3.3.2020 – C-323/18, Tesco-Global Áruházak.

12 Cf. Graßl/Koch, IStR 2020, 645; Nieuweboer, ET 2022, 201 with detailed analyses of the CJEU decisions.

13 These are: Online Advertising Services, Online Intermediation Services, Transmission of Data. This scope applies for the French, Spanish and Italian DST, while the scope of the Austrian DST is limited to Online Advertising Services.

14 The British DST refers to: Online Search Engines, Social Media Services, Online Marketplaces, and Online Advertising in the course of the aforementioned business models.

15 Cf. Elliffe, C., Taxing the Digital Economy, 2021, 306 f.; Alvarado, ET 2021, 403 (405); for a critical discussion of the scope for example Kofler/Sinnig, Intertax 2019, 176 (198); Vella, NTJ 2019, 821 (830 ff.). However, *Zegarra* stipulates that the DST fills some of the gaps left by the VAT regarding digitalized business models, see Zegarra, ET 2020, Vol. 60 No. 7, 10. The EU Commission itself said that the limitation on business models where the user contribution plays a central role is just a narrow scope, see EU Commission, Impact Assessment, SWD(2018) 81 final/2, 58.

16 See Annex II.

persons (revenue thresholds) compared to the Austrian, British, and French DST laws, and therefore allows for a broader application. This narrow scope can lead to an unequal treatment of both affected and non-affected firms. This study evaluates this question. Moreover, unilateral DSTs with (uncoordinated) regulations, for example, for the allocation of revenues, lead to higher compliance costs for firms and tax administrations compared to DST revenues.[17]

Furthermore, DSTs may result in double taxation to the extent that revenues are also subject to corporate income tax ("**CIT**"). Broadly, DST expenses are deductible as current expenses for CIT purposes at the firm level. Consequently, the CIT liability is reduced by multiplying the marginal statutory income tax rate by DSTs. This is central to understanding the effect of DSTs on the ETR of the affected firms.[18] However, it is not possible to avoid double taxation completely, as DST expenses cannot be credited against CIT. Under European law, there is no general prohibition that taxpayers can invoke on such double taxation.[19] In this respect, it is also necessary to discuss if DSTs fall within the scope of double tax treaties that could prevent the application of DSTs and, therefore, double taxation.[20]

The EU Commission concluded that affected firms might increase consumer prices in response to DST implementation, depending on the price elasticity of demand.[21] *Pellefigue* also elaborated on the dependence of the respective in-scope services that firms tend to pass through the DST burden to their customers.[22] As indicated, such pass-through of the tax liability could be observed as few digital firms pronounced that they (would) increase their service fees in response to the implementation of DST initiatives.[23] Other firms, in turn, declared that they would not increase but bear the resulting DST burden.[24] Owing to the unclear reaction of firms to DST expenses, sales could also be affected by DSTs. Overall, with respect to this analysis, it implies that the impact of DSTs on the financial statements must be tested with other parameters than sales.

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17 Cf. Elliffe, C., Taxing the Digital Economy, 2021, 312; Collier/Devereux/Vella, WTJ 2021, 405 (411).

18 See also Annex E.III.3 for the theoretical effect of the DST on ETR.

19 Cf. for example CJEU as of 12.7.2005 – C-403/03, Schempp.

20 Cf. for a detailed analysis Elliffe, C., Taxing the Digital Economy, 2021, 119-146; Hohenwarter et al., Intertax 2019, 140; Graßl/Koch, StuW 2020, 293 (307-312).

21 Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 102.

22 Pellefigue, The French Digital Service Tax: An Economic Impact Assessment, 2019.

23 Cf. Pollet, Google to raise advertising fees to offset French, Spanish GAFA tax, available at: https://www.euractiv.com/section/digital/news/google-to-raise-advertising-fees-to-offset-french-spanish-gafa-tax/ (last access: 24.11.2021).

24 Cf. eBay, Protecting your business from Digital Services Tax costs – Notice as of August 10, 2020, available at: https://community.ebay.co.uk/t5/Announcements/Protecting-your-business-from-Digital-Services-Tax-costs/ba-p/6701162 (last access: 13.12.2021); Magdirila, Facebook will not increase ad fees in UK amid digital tax – Telegraph, S&P Global, available at: https://www.spglobal.com/marketintelligence/en/news-insights/blog/discovery-dives-into-a-crowded-us-ott-video-market (last access: 13.12.2021).

In addition, from a normative perspective, the discussion on the qualification of DSTs is controversial in the tax literature.[25] For this analysis, the qualification of DSTs is fundamental to the accounting treatment and implications of DSTs on the affected firms. As DSTs are taxes on turnover, few authors qualify the DSTs as indirect taxes.[26] Based on own research, which is consistent with other authors, I qualify DSTs as a direct tax from a normative tax perspective.[27] If DSTs qualify as a direct tax, then DST expenses must be accounted as income tax expense and, therefore, be included in affected firms' ETR calculation. Otherwise, if qualified as an indirect tax, DSTs should not be included under tax expenses but reduce the profit before tax ("**PBT**") that is relevant for ETR calculation.

II. Tax burden of digital MNE

The empirical literature leaves no doubt that MNEs, especially digital ones, avoid taxes.[28] The base erosion and profit shifting (BEPS) practices, especially of the U.S. MNE, and the use of tax havens are discussed.[29] The International Consortium of Investigative Journalists (ICIJ) highlighted the tax avoidance activities of MNEs and provided insights and evidence of worldwide tax avoidance practices with LuxLeaks, Panama Papers, or Paradise Papers, among others.[30] In addition, the EU has initiated state aid investigations on several MNEs tax deals.[31] However, the empirical literature regarding the DST proposals and its effects on ETRs of digital firms is ambiguous.

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25 For example, Russo, NTJ 2019, 857 (858 ff.).

26 Cf. Cui, Tax Law Review 2019, 69; Kofler/Sinnig, Intertax 2019, 176 (195); Hohenwarter et al., Intertax 2019, 140 (142 f.).

27 Cf. Lamensch, ET 2019, Vol. 59, No. 6, 1; Stevanato, ET 2019, 538 (538 f., 545); Dimitropoulou, Intertax 2019, 201 (215); Kokott, IStR 2019, 123 (127); Valta, IStR 2018, 765 (768); Sotelo et al., Digital Trade in Services and Taxation, White Paper 2021. Also KPMG in their summary on initiatives for the taxation of the digitalized economy, see KPMG, Taxation of the Digitalized Economy: Developments Summary, available at: https://tax.kpmg.us/articles/tracking-digital-services-taxes-developments.html (last access: 17.7.2022).

28 Cf. Riedel, Review of Economics 2018, 169; Dharmapala, Fiscal Studies 2014, 421; Dharmapala/Riedel, Journal of Public Economics 2013, 95; Heckemeyer/Overesch, Canadian Journal of Economics, 2017, 965; Crivelli/de Mooij/Keen, IMF Working Paper 15/118; Hines, Canadian Tax Journal 2014, 443; Desai/Foley/Hines, Journal of Public Economics 2006, 513.

29 Cf. Clausing, NTJ 2016, 905; Clausing, NTJ 2020, 1233; Clausing, Reed College working paper 2020; Blouin/Robinson, Working Paper 2020; Garcia-Bernardo/Janský/Tørsløv, International Tax Public Finance 2021, 1519; Dyreng/Markle, The Accounting Review 2016, 1601.

30 For an overview of the investigations see ICIJ, Recent investigations, available at: https://www.icij.org/category/investigations/ (last access: 5.9.2022).

31 See for example the list of state aid investigations EU Commission, State aid: Commission opens in-depth investigations into individual "excess profit" tax rulings granted by Belgium to 39 multinational companies, Press release 2019. However, not all of the EU Commission´s investigations or decisions had implications for the inspected firms, for example, Apple was relieved of a 13 billion Euro state aid bill by the decision of the ECG as of 15.7.2020, T-778/16 and T-892/16 – Ireland and Others.

In the Impact Assessment of the DST proposal, the EU Commission outlined that digital MNEs have effective average tax rates ("**EATR**") of 9.50 % and traditional MNE of 23.20 %, according to own computations based on a PricewaterhouseCoopers (PwC)/The Centre for European Economic Research (ZEW) study and further ZEW studies.[32] In 2017, PwC, ZEW, and the University of Mannheim published a common study on the EATR of digital and non-digital firms. Based on the results, digital firms face EATRs of 10.20 %, while all other MNEs have EATRs that are 11.73 % higher.[33] These findings, which are part of the underlying assumptions of DSTs, were misunderstood by EU representatives, for example, by the EU Commissioner *Moscovici*, who outlined that digital MNE have a lower ETR than non-digital MNEs.[34] This misunderstanding was publicly clarified by the ZEW,[35] as the studies did not refer to the reported ETR of MNEs but to prospective EATR based on the *Devereux/Griffith* model[36]. Other authors criticized the referrals.[37]

Only a few studies provide ETR comparisons between digital and non-digital firms based on financial statements.[38] For example, *Bauer* found that there is no clear divergence between the reported ETR of both types of MNEs. The study reveals that for the period from 2012 to 2016, digital firms in the author's sample of 140 firms that are part of EuroStoxx50, a digital group,[39] and MSCI WRLD/SOFTWARE & SERVICES Index have average ETRs of between 26.8% and 29.4 % on a five-year average and are comparable to those of traditional, that is, less digital or non-digital firms that have ETR of 27.1 % on a five-year average.[40]

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[32] Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 18 with referral to ZEW, TAXUD/2013/CC/120 and ZEW, Taxation Papers – Working Paper N. 64 - 2016.

[33] Cf. ZEW/PWC/University of Mannheim, Steuerlicher Digitalisierungsindex 2017 – Steuerliche Standortattraktivität digitaler Geschäftsmodelle, available at: https://ftp.zew.de/pub/zew-docs/gutachten/Studie_Digitale_Geschaeftsmodelle_2017.pdf (last access: 6.9.2022), 14.

[34] Cf. EU Commission, Keynote speech by Commissioner Moscovici at the 'Masters of Digital 2018' event, available at: https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_18_981 (last access: 10.7.2022).

[35] Cf. PWC, Understanding the ZEW-PWC Report, "Digital Tax Index" available at: https://www.pwc.com/us/en/press-releases/2018/understanding-the-zew-pwc-report.html (last access: 16.11.2021). Spengel, An EU Digital Tax Places an Unnecessary Additional Burden on Firms and Cannot Be in the Interest of Germany, available at: https://www.zew.de/en/press/latest-press-releases/an-eu-digital-tax-places-an-unnecessary-additional-burden-on-firms-and-cannot-be-in-the-interest-of-germany (last access: 10.7.2022).

[36] Cf. Devereux/Griffith, Institute for Fiscal Studies Working Paper 98/16; Devereux/Griffith, International Tax and Public Finance 2003, 107. This model estimates EATR based on a hypothetical investment project on a discounted cash-flow basis and therefore delivers an EATR for investment activities of specific business models considering national tax regimes.

[37] Cf. Li, WTJ 2021, 25 (36 f.); Sprague, Tax Management International Journal 2018, 468 (471).

[38] Cf. Marques, La taxation française des services numériques, un constat erroné, des effets pervers, Institut Économique Molinari, 2019; Bauer, ECIPE Occasional Paper 03/2018.

[39] The "Digital Group" includes Amazon, Expedia, Alphabet, Meta, Netflix, Microsoft, RELX Group PLC., Salesforce; Twitter, SAP, Oracle and Ebay. Cf. Bauer, ECIPE Occasional Paper 03/2018, 7.

[40] Cf. Bauer, ECIPE Occasional Paper 03/2018.

Based on the prior discussions I compare the ETR of digital firms affected by DSTs and digital firms that are not affected by DSTs based on their financial statements before and after the implementation of the DST legislation to demonstrate if the presumptions of the EU Commission are correct and DST-affected firms have lower ETRs compared to digital firms that are not affected by DSTs. The comparison also shows if DSTs affect the ETRs of MNEs. To the best of my knowledge, as yet, there is no analysis of the ETRs of DST-affected firms.

Additionally, ETRs are used to predict future changes in earnings.[41] Changes in the ETR can be used by analysts for firm valuation and stock predictions; that is, low ETR indicates that firms are better at controlling costs what results in higher stock market valuations.[42] *Klein/Ludwig/Spengel* analyzed investor reactions due to the publication of the Council Directive proposals and found a significant negative capital market reaction for potentially affected firms that led to an absolute market value reduction of more than 52 billion EUR.[43] In this regard, DSTs presumably imply a negative effect (increase) on the ETR of affected firms. The ETR analysis in this study shows if DSTs can affect ETR, which would justify a response by capital market participants.

C. Empirical approach, determination of ETR and data

I. Empirical approach

I present a two-fold empirical approach for determining the effect of DST on firms. On the one hand, I determine which of the analyzed digital firms are affected, how they report on DST, and what are the characteristics of these firms (Chapter D.I). The first part of the empirical analysis is structured as follows:

- First, I determined a list of firms that are (potentially) affected by the DST based on a discussion of the affected firms in the French parliament. In addition, the Forbes List was used. For this sample, I collected publicly available financial statements or reports for the financial years 2019 and 2020 and searched for information regarding the impact or any other information on the DST in the statements. This includes searching for keywords such as DST, digital services tax, digital tax, taxation of digital services etc., and reviewing the balance sheet, income statement, and notes to the financial statements.

[41] Cf. Lev/Thiagarajan, Journal of Accounting Research 1993, 190 (200, 209); Abarbanell/Bushee, Journal of Accounting Research 1997, 1 (6 f., 9); Dyreng/Hanlon/Maydew, The Accounting Review 2008, 61 (63 f.).
[42] Cf. Swenson, Tax Notes 1999, 1503 (1504).
[43] Cf. Klein/Ludwig/Spengel, NTJ 2022, 61.

I use financial reports since the names and numbers of firms that are subject to national DSTs are not publicly disclosed. If firms report that DSTs affect them or that DSTs are a risk, they are classified as DST-affected (Chapter D.I.1). However, firms that are liable to DSTs must include the DST expenditures in their financial statements. As turnover taxes, firms must bear DSTs, regardless of whether they earn profits or suffer losses. Therefore, DSTs affect both the profits and losses incurred. Furthermore, financial statements are reports on past activities but also include assessments of the prospects and risks from firms' future activities. In the latter case, firms must report about the risks that may have a material impact on the future financial situation. Even though such a statement does not necessarily mean that firms will be actually affected by these taxes in the future or past, it is a strong indication that, for example, firms reported on the enacted French DST in 2019.

- Second, I collected information on the qualification of DSTs as direct, indirect, or other taxes from the analyzed financial reports for 2019 and 2020. Such statements provide necessary information for determining the effect of DSTs on ETRs or other relevant financial measures. Furthermore, the analysis provides references on the accounting of DSTs as tax expenses or other expenses that are new to the tax literature (Chapter D.I.2).

- Third, for the analyzed sample of firms, I collected and compare general financial information for financial years from 2011 to 2020 from the Thomson Reuters Refinitiv database to provide insights on the DST-affected and non-affected firms and potential similarities and differences (Chapter D.I.3). The data are described in more detail in Chapter C.III.1.

On the other hand, the impact of DSTs on the financial statements of affected firms is outlined in chapter D.II. For this analysis I structure the empirical approach as follows:

- In Chapter D.II.1, I determine and compare different ETR ratios as described in Chapter C.II of affected and non-affected firms over the period from 2011 to 2020, where the GAAP ETR and the Cash ETR are the main criteria. This shows if DSTs increase the ETRs of the affected firms.[44] In addition to these ratios, I calculate ETR2 and ETR3 to show that the effect on the GAAP ETR is not due to a change in profits before taxes or is compensated by a pass-on of DSTs to customers. Furthermore, I calculate ratios using SGA and CONR, as firms also use

[44] The theoretical effect of DSTs on the net income, profit margin and ETR of an affected firm are outlined in a formulaic way in Annex III.

these profit and loss statement items to account for DSTs, as outlined in the analysis of the financial statements in Chapter D.I.2.

- In Chapter D.II.2, I recalculate the ETRs of affected firms to the extent that these firms do not treat DSTs as direct tax expenses and provide sufficient information. As previously described, DSTs are not treated as income tax expenses by all DST-affected firms. In this case, DSTs have no impact on the numerator of the reported ETRs but only on the denominator. This allows for an assessment of the (potential) impact on the ETRs of affected firms if the DST and ETR ratios are adjusted accordingly.

II. Determination of ETR and further ratios

The ETR of MNEs has been used and calculated in various ways in the tax literature. In this chapter, I outline my definition of different ETR ratios that I used to determine the empirical effect of DSTs on the ETRs of affected firms. Furthermore, I describe some limitations of these ratios and justify the reason for calculating additional ETR ratios.

Consistent with previous research, I use the GAAP ETR ratio. I define the GAAP ETR as the ratio of total tax expenses to profit before tax (PBT):[45]

$$GAAP\ ETR = \frac{Tax\ Expense}{PBT}$$

One of the main concerns about the GAAP ETR ratio is that both GAAP and tax accounting do not correspond entirely. Such distortions are expressed as book-tax-differences and may be used by firms to influence the GAAP ETR, as book-tax-differences are included in income tax expenses as deferred taxes.[46] However, DST expenses must not be included in the deferred taxes.

Tax researchers use Cash ETR extensively because it has significant advantages. Generally, Cash ETR comprises tax payments independent of beneficial transactions such as mergers or stock options and other tax avoidance measures and is irrespective of deferred taxes that can be used

[45] Cf. Buijink/Janssen/Schols, JIAAT 2002, 115 (121); Dyreng/Hanlon/Maydew, The Accounting Review 2008, 61 (65); Chen et al., Journal of Financial Economics 2010, 41 (46); Dyreng/Lindsey, Journal of Accounting Research 2009, 1283 (1291); Markle/Shackelford, NBER Working Papers 15091, 2009, 11 f. In turn, *Rego* uses Income Taxes Payable instead of Total Tax Expenses, cf. Rego, Contemporary Accounting Research 2003, 805 (808). Due to the data limitations, I use total tax expenses instead like Markle/Shackelford, NBER Working Papers 15091, 2009, 12.

[46] Cf. for a detailed analysis Manzon/Plesko, Tax Law Review 2002, 175. Furthermore, Frank/Lynch/Rego, The Accounting Review 2009, 467 (493) find a strong, positive relation between financial and tax reporting aggressiveness. Cf. Hanlon/Dyreng, NTJ 2009, 127 for book-tax conformity of MNE in general.

to increase GAAP ETR.[47] Nonetheless, Cash ETR is also influenced by book-tax-differences.[48] Consistent with prior research, I define Cash ETR as the ratio of taxes paid to PBT:[49]

$$Cash\ ETR = \frac{Taxes\ Paid}{PBT}$$

Annual taxes paid and annual tax expenses face timing distortions, as tax payments and refunds of former years are also captured.[50] Consequently, for a longer period, it is expected that the underlying revenues will be recognized with the relevant taxes, even in the event of prolonged tax disputes with the tax authorities. Against this background, and to reduce variations through book-tax-differences, I measure GAAP ETR and Cash ETR over longer periods.[51] *Dyreng/Hanlon/Maydew*, for example, use a ten-year period as annual Cash ETR is not an accurate proxy for long-run tax avoidance.[52] I calculate the ratios for the financial years from 2011 to 2014, 2015 to 2018, and 2019 to 2020.

The comparison of the ETR of firms domiciled in different countries is tainted by diverging financial reporting practices.[53] Furthermore, the discrepancy in tax systems makes it difficult to compare the ETR from MNEs with different locations and statutory tax rates, which strongly influence the ETR of firms.[54] For example, the U.S. MNEs can include the income of foreign subsidiaries at will (check-the-box election) in the U.S. tax return, while the income of controlled foreign corporations (CFC) is generally not recognized in the U.S. tax return, except if it is qualified

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47 Cf. Dyreng/Hanlon/Maydew, The Accounting Review 2008, 61; Hanlon/Dyreng, NTJ 2009, 127 (143); Dyreng et al., Journal of Financial Economics 2017, 441.

48 Cf. Dyreng et al., Journal of Financial Economics 2017, 441 (457 f.); Edwards/Kubata/Shevlin, The Accounting Review 2021, 231 (232, 249).

49 Cf. Dyreng et al., Journal of Financial Economics 2017, 441 (445); Dyreng/Hanlon/Maydew, The Accounting Review 2008, 61 (66 f.); Chen et al., Journal of Financial Economics 2010, 41 (46); Markle/Shackelford, NTJ 2012, 493 (501, 504 f.); Gorter/de Mooij, Capital Income Taxation in Europe: Trends and Trade-offs, 2001, 16.

50 For French DST, there were discussions on the postponement of the DST (installment) payments due to the economic tensions and discussions with the U.S., cf. Lieb/Vail/Vallat, French tax authorities confirm postponement of Digital Services Tax payments for 2020, but 2019 payments remain due, available at French tax authorities confirm postponement of Digital Services Tax payments for 2020, but 2019 payments remain due (ey.com) (last access: 17.8.2022). The DST payment for the French DST for the year 2019 was nonetheless due in April 2020.

51 Cf. Dyreng/Hanlon/Maydew, The Accounting Review 2008, 61 (65 f.).

52 Cf. Dyreng/Hanlon/Maydew, The Accounting Review 2008, 61 (67).

53 Four prominent differences in accounting methods are depreciation, goodwill amortization, pension expense, and research and development expense ("**R&D Expenses**"), cf. Collins/Shackelford, International Tax and Public Finance 1995, 55 (58). Due to data limitation the calculation of an ETR adjusted for these expenses cannot be estimated reasonably in the case at hand, i.e., there is bare data on goodwill amortization, pension expenses and minor data on R&D expenses.

54 Cf. Markle/Shackelford, NTJ 2012, 493 (498, 507) found that the domicile of MNE significantly affect a firm´s ETR; Collins/Shackelford, International Tax and Public Finance 1995, 55 (58 f.); Chennells/Griffith, Taxing profits in a changing world, IFS Report No. R56, 1997.

as Subpart F income or repatriated.[55] The CFC rules were tightened and enhanced with measures such as the global intangible low-taxed income (GILTI) or additional regulations implemented in the U.S. Tax Reform 2017 (Tax Cuts and Jobs Act)[56] over the past few years.[57]

Therefore, I use additional ETR ratios for comparing the ETR of the MNE.[58] *Edwards/Kubata/Shevlin* show that the ETR of firms may decrease over time with increasing PBT, irrespective of enhanced tax avoidance measures.[59] Therefore, consistent with the tax literature, I use sales as the denominator for calculating ETR2 to avoid distortions through PBT [60]:

$$ETR2 = \frac{Tax\ Expense}{Sales}$$

The use of sales as the denominator eliminates intercountry differences in accounting for expenses. However, it also implicitly assumes that profit margins are constant across firms.[61]

Accordingly, the ETR2 should not change due to the DST expenses if firms pass on the DST burden. To avoid distortions of a potential pass-through of the DST on the ETR2 results, I use total assets as the denominator for ETR3.[62]

$$ETR3 = \frac{Tax\ Expense}{Total\ Assets}$$

The ETR2 and ETR3 ratios are also calculated based on the average values of annual statements for financial years from 2011 to 2014, 2015 to 2018, and 2019 to 2020 to minimize the volatility effects and timing distortions of GAAP and tax accounting.[63]

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55 Cf. Hanlon/Dyreng, NTJ 2009, 127 (130 f.).

56 Cf. Clausing, NTJ 2020, 1233; for an overview and the expected implications on MNE and highly taxed firms see Kalcheva et al., Journal of Banking and Finance 2020, 105860.

57 For the use of CFC and the check-the-box election for base erosion and profit shifting activities see Dharmapala, Fiscal Studies 2014, 421 (437); Desai/Dharmapala, Corporate tax avoidance and firm value, Review of Economics and Statistics 2009, 537 (542 ff.); Dharmapala, University of Chicago Coase-Sandor Institute for Law & Economics Research Paper No. 910, 23 f. For an overview see Altshuler/Grubert, Tax Notes 2006, 459 (461 f.).

58 Even though there are also more differences between financial and tax accounting, see for example Manzon/Plesko, Tax Law Review 2002, 175.

59 Cf. Edwards/Kubata/Shevlin, The Accounting Review 2021, 231; Drake/Hamilton/Lusch provide evidence that lower ETR do not indicate intentional tax avoidance, see Drake/Hamilton/Lusch, Journal of Accounting and Economics 2020, 1.

60 Cf. Collins/Shackelford, International Tax and Public Finance 1995, 55 (58 f.); Collins/Shackelford, Tax Policy and the Economy 2003, 141 (155 f.); Buijink/Janssen/Schols, JIAAT 2002, 115 (121).

61 Cf. Collins/Shackelford, International Tax and Public Finance 1995, 55 (59); Collins/Shackelford, Tax Policy and the Economy 2003, 141 (155 f.).

62 Even though distortions may arise due to the firm-specific values of the variables used.

63 Cf. Dyreng/Hanlon/Maydew, The Accounting Review 2008, 61-82.

I test the results for the GAAP ETR using sales (ETR2) and total assets (ETR3) as the denominators to show if the effect of DSTs on GAAP ETR could be offset by a corresponding increase in PBT or the pass-through of DSTs. The findings on accounting for DSTs, as described in Chapter D.I.2, suggest that DST expenses are included in the items "Income Tax Expense," "SGA, " or "CONR." Therefore, I calculate and compare the ETR4 for DST-affected and non-affected firms by adding these variables to the numerator of ETR2. As a result, ETR4 contains the sum of "Income Tax Expense," "SGA, or "CONR" as the numerator to ensure that the DST is included in the ratio, irrespective of the accounting treatment of the DST. Therefore, I define ETR4 as follows:

$$ETR4 = \frac{Tax\ Expense + SGA + Cost\ of\ Net\ Revenue}{Sales}$$

I use total assets instead of sales as the denominator in ETR5 because DSTs may be passed-on and, therefore, increase sales accordingly. Therefore, I define ETR5 as follows:

$$ETR5 = \frac{Tax\ Expense + SGA + Cost\ of\ Net\ Revenue}{Total\ Assets}$$

Aside from a potential effect on the ETR, I calculated the ratios for SGA and CONR to determine for any change in these items after the implementation of DSTs. I define the following ratios for SGA and CONR, whereby I use sales and total assets as the denominator, respectively:

- SGA expenses to Sales ("**SGA1**"): $SGA1 = \frac{SGA}{Sales}$
- SGA expenses to Total Assets ("**SGA2**"): $SGA2 = \frac{SGA}{Total\ Assets}$
- CONR to Sales ("**CONR1**"): $CONR1 = \frac{CONR}{Sales}$
- CONR to Total Assets ("**CONR2**"): $CONR2 = \frac{CONR}{Total\ Assets}$

III. Data

1. Data

In the following section, I outline the data collection method and the preparation for empirical analysis. As the empirical analysis is divided into two parts, there are two different databases.

The firm sample comprises 28 firms that were discussed in the French parliament to be likely within the scope of the French DST ("**French List**")[64] and the Forbes list of Top 100 Digital Companies (2019 Ranking)[65] ("**Forbes List**"). The Forbes List adds 88 firms to the 28 firms mentioned by the French parliament since 12 firms are also part of the French List. Hence, the sample comprises 116 in total ("**Total Sample**").[66] I use the Forbes List as it only includes firms that are perceptibly the "most digital" firms worldwide, and only particular digitalized MNEs and digital business models should presumably fall within the scope of the DST legislations.

For the determination of affected and non-affected firms, and the accounting treatment of DSTs, I analyze financial statements for the financial years 2019 and 2020 for the Total Sample as the French DST became effective as of January 1, 2019, and the Austrian, British, and Italian DST in 2020. Financial statements are publicly available in English for 26 firms on the French List and for 85 firms on the Forbes List each for 2019 or 2020. Totally, 222 financial reports were analyzed.

In addition to this, I use consolidated financial statement data for the Total Sample with regard to the financial years from 2011 until 2020 that are collected from the Thomson Reuters Refinitiv.[67] Financial information is required for the financial years 2019 and 2020 for determining the impact of DSTs, and financial data for the years from 2011 to 2018 are relevant to reveal and compare the data of affected (26 firms) and non-affected (90) firms before and after the implementation of the DST initiatives. The financial data comprises 1,097 firm-year observations. I adjust the data for the analysis as follows:

- **Descriptive statistics:** For the descriptive statistics outlined in Chapter D.I.3.b), the sample includes firms with positive sales, any nonzero value (positive or negative) for PBT and net margin, and nonnegative values for total assets and intangibles during the financial years from 2011 to 2020 if firms have less than two missing observations for these criteria. The

64 Cf. Giraud, Assemblée Nationale 2019, available at: Rapport de la commission des finances sur le projet de loi, après engagement de la procédure accélérée, portant création d'une taxe sur les services numériques et modification de la trajectoire de baisse de l'impôt sur les sociétés (n°1737). (M. Joël Giraud) (assemblee-nationale.fr) (last access: 5.11.2021); see also Pellefigue, The French Digital Service Tax: An Economic Impact Assessment, 2019; USTR, Report on France's Digital Services Tax Prepared in the Investigation under Section 301 of the Trade Act of 1974, available at: Report_On_France's_Digital_Services_Tax.pdf (ustr.gov) (last access: 16.8.2022).

65 Cf. Forbes, Top 100 Digital Companies List, available at: https://www.forbes.com/top-digital-companies/list/ (last access: 17.7.2022).

66 The list of firms and their headquarter location is included in Annex IV.

67 The use of consolidated financial statements has no implications for the present analysis as intercompany transactions are not subject to DST.

resulting sample consists of 96 firms and, therefore, 960 firm years. There are 170 firm-year observations for the affected firms and 790 for the non-affected firms.[68]

- **Effect of the DST:** To analyze the effect of DSTs in Chapter D.II, I exclude any firm-year observations consistent with *Overesch/Schenkelberg/Wamser*, whose numerator or denominator of the ETR is negative over the deemed period, and ETRs with negative values.[69] The sample is therefore restricted to MNEs with positive PBT or tax expenses during the respective years and to firms with an ETR of 1.05 or less (ETR of 100 % plus 5 % DST rate of as applicable in Austria). I use the winsorized mean ETR at the 10 % level to minimize extreme outliers.[70] Firms are included if they have fewer than two missing observations for the respective values of the calculated ETR ratio in the respective period. Firms with missing or zero values for tax expenses, taxes paid, sales, total assets, SGA, or CONR during the deemed periods are also excluded. Totally, the sample comprises 962 firm years; 175 firm-year observations for affected firms and 787 for non-affected firms.[71]

2. Restrictions

In this chapter, I explain some general and specific limitations with regard to the empirical analysis and the database.

Primarily, this analysis relies on the completeness and accuracy of financial statement disclosures and the information provided in the notes on financial statements and reports. The same applies to the financial data from Thomson Reuters Refinitiv. It is also limited with regard to variations in accounting standards.[72] Ideally, the impact of DSTs would be assessed based on the actual tax filings for CIT and DST purposes across all countries of the affected firms.[73] However, due to tax secrecy, neither the names nor the number of affected firms in DST countries in Europe are known.

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68 In correspondence with Collins/Shackelford, International Tax and Public Finance 1995, 55 (59); Chennells/Griffith, Taxing profits in a changing world, IFS Report No. R56, 1997.

69 Negative PBT leads to indeterminate ETR in the respective year and effect tax expenses in the future or past. Cf. also Overesch/Schenkelberg/Wamser, CESifo Working Paper No. 6960.

70 Other authors mitigate outliers and errors in the data by restricting the sample to truncated means, i.e., to firms with a positive ETR of 70 % or less, to obtain realistic values, cf. Collins/Shackelford, International Tax and Public Finance 1995, 55 (62); Chennells/Griffith, Taxing profits in a changing world, IFS Report, No. R56, 1997, 95; Markle/Shackelford, NBER Working Papers 15091, 2009, 12 f.; Markle/Shackelford, NTJ 2012, 493 (499).

71 In correspondence with Collins/Shackelford, International Tax and Public Finance 1995, 55 (59); Chennells/Griffith, Taxing profits in a changing world, IFS Report No. R56, 1997.

72 Cf. Markle/Shackelford, NTJ 2012, 493 (498); Chennells/Griffith, Taxing profits in a changing world, IFS Report No. R56, 1997, 96; Buijink/Janssen/Schols, JIAAT 2002, 115 (126) even though there is a broad harmonization within Europe (IFRS).

73 Cf. Collins/Shackelford, Tax Policy and the Economy 2003, 141 (154).

Another limitation is that firms do not solely provide revenues within the scope of DST laws. Instead, firms' revenues are earned worldwide and only small portions of revenues are potentially subject to DST. However, the Thomson Reuters Refinitiv data base does not provide firm-level data. Therefore, the effect of DSTs on firms bearing DSTs cannot be assessed based on available data. However, such an analysis would be interesting for future research.

Databases such as Orbis and Compustat, which are alternatives to Thomson Reuters, provide data at the firm level, but exclude most data on profits in tax havens from the MNE.[74] For instance, *Tørsløv/Wier/Zucman* found that in 2012, about 83 % of global profits of MNE could not be traced by Orbis, or the data were not available.[75] Based on the presumptions of the DST proposal, revenue from digital services is often derived from low-tax jurisdictions or tax havens. Therefore, it is questionable if these data sources can reveal the effects on the ETRs of affected firms. Furthermore, the impact on a firm bearing the DST liability does not have implications for the effectiveness of DSTs at the group level and is, therefore, not relevant for this analysis.

In addition, for several reasons, country, regional, or segment reporting does not provide sufficient information to assess the impact of DSTs. First, such reporting is only available for certain firms. Second, it lacks information and details relevant to assessing the impact of DSTs, such as the number of users in a particular DST country relevant for DST collection. Third, segmented reporting based on the accounting principles does not provide any information on the group firms that generate taxable digital services and the country in which the firm in question is located; thus, no conclusions can be derived from regional segmentation. Finally, such reporting does not deliver relevant information on the impact of DSTs at the group level analyzed here.

In addition, the COVID-19 pandemic posed several challenges for economies worldwide in 2020. While few digital firms were able to enhance their influence in social life or in the provision of goods and services, such as Amazon or food delivery services like Doordash, other digital firms were negatively affected due to restrictions such as those Uber had to stop driving services across various countries for some time. Such variations may have influenced the results in 2020 and affect financial reports in 2020.

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[74] Cf. Tørsløv/Wier/Zucman, NBER Working Paper No. 24701, 2020; Hanlon/Dyreng, NTJ 2009, 127 (143); Clausing, Reed College working paper, 2020; Markle/Shackelford, NTJ 2012, 493 (499 f.); Dharmapala, Fiscal Studies 2014, 421 (427); Dyreng/Lindsey, Journal of Accounting Research 2009, 1283 (1296 f.).

[75] Cf. Tørsløv/Wier/Zucman, NBER Working Paper No. 24701, 2020; for an overview of literature on tax havens: Dharmapala, University of Chicago Coase-Sandor Institute for Law & Economics Research Paper No. 910; Dyreng/Lindsey, Journal of Accounting Research 2009, 1283; Markle/Shackelford, NTJ 2012, 493 (516, 519).

D. Implications of DSTs

I. DST-affected and non-affected firms and its characteristics

1. Firms affected by DSTs

In this chapter, I present the results of the analysis of financial reports of the Total Sample. About 26 of the 116 firms (22.41 %) indicated that DSTs have or could have an (potential) effect on the financial statements. So far, 21 of the 26 firms in the French List and 5 firms in the Forbes List report on the (potential) impact of DSTs. The results are as follows:

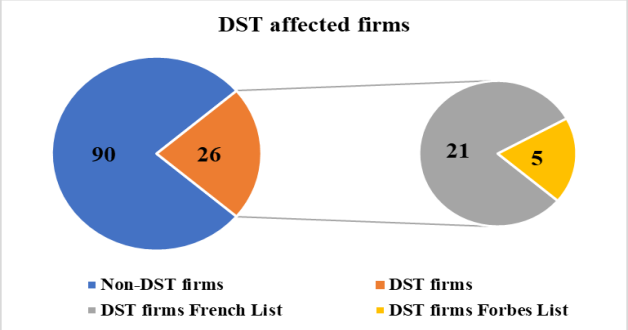

Figure 1: DST-affected firms in the Total Sample, own illustration.

The results suggest that distinctions are necessary for "digital" firms regarding the DST, as nearly 78 % of the analyzed firms do not report on DSTs. This "non-statement" regarding the DST is, however, Janus-faced. Primarily, the findings indicate that not all "digital" firms are (potentially) affected by DSTs. Such an outcome is not surprising, as the DSTs require in-depth analysis of revenues against the background of taxable services, as defined by the unilateral DST measures and additionally (re-)allocation of revenues to user jurisdictions.[76] Concurrently, the non-statement also indicates that the impact of DSTs is not material based on the size of firms, as DSTs are not a reportable risk or impact the financial situation of the firm. This implies that risks are, in general, only reportable if the risk has or could have a material impact on the financial situation of the firm based on the materiality for accounting purposes.

2. Accounting, qualification, and amount of DSTs in financial statements

In this chapter, I present the findings regarding accounting treatment, qualification, and the amount of DST expenses in the 222 analyzed financial statements. Based on the financial reports, firms either report on DSTs in the general statements, disclosure statements, or in the description of chances and risks in case of the (potential) impact of DSTs. Overall, the remarks provided on

[76] Cf. Sheppard, BIT 72 (4a) 2018, 9 (10 f.).

DSTs were limited and are often not longer than one or half a sentence. More than half of the firms reported on the unilateral DSTs in connection with the EU Directive proposal to implement a DST in 2019 and 2020. In addition, half the DST-affected firms provide statements on uncertain future tax risks through the BEPS 2.0 project related to the remarks regarding the DSTs.

Most firms commenting on DSTs also provide remarks on the qualification of DSTs as direct or indirect taxes. Based on the financial statements, DSTs were qualified as follows:

Qualification	2019	2020
Direct Tax	10	7
Indirect Tax	4	6
Other Tax	5	4
No statement	5	6

Table 1: Qualification of DSTs by affected firms.

The results show that there is no dominant opinion on how DSTs must be qualified. Most firms do not conclude that DSTs are direct taxes but neither predominantly qualify the DSTs as indirect taxes. Some firms do not provide any indications on the qualification. However, the most frequent assessment is the qualification of DSTs as direct taxes. However, one firm revised its qualification in 2020 and changed the qualification to indirect taxes.

Some statements are, however, not clear and precise; that is, some firms did not state that DSTs are qualified as direct or indirect taxes. Consequently, the comments have been interpreted accordingly. I presume the qualification of DSTs as direct taxes if firms mention that DSTs should or may have an adverse effect on the income tax liability or the ETR, as the ETR should only include direct tax expenses. Regarding the affected balance sheet items, five firms in 2019 and four firms in 2020 explicitly noted that DSTs increased or could increase their (income) tax liability.

Firms made sharper statements if DSTs qualified as indirect taxes. In this case, firms mostly mention DSTs as indirect taxes or as taxes similar to VAT or other consumption taxes by either concluding DSTs as non-income taxes or mentioning DSTs in relation to potential tax risks affecting firms' financial positions (and not ETR). Regarding affected balance sheet items, five firms explicitly included DSTs in SGA in 2019 and 2020, and two firms included DSTs in their CONR in 2020. The findings indicate that there is no clear accounting treatment for DSTs in financial statements, as DSTs are included in Income Tax Expenses, SGA, and CONR of the affected firms.

Only four of the 26 affected firms outlined the amount of the (expected) DST tax burden in 2019. The cumulative DST tax revenue of these firms was approximately 48 million EUR in 2019. In 2020, only two firms provided information in terms of the DST liability amount, which resulted in a DST revenue of 11.4 million USD in 2020.

3. Characteristics of DST-affected and non-affected firms

In the following, I show the locations of the affected and non-affected firms. This provides relevant information on whether DSTs are "targeted" at U.S. firms. In addition, I present the industry classification of the Total Sample, which could be relevant for future research on DST-affected firms. Finally, I identify descriptive statistics for the Total Sample that provide information on the distinctions and similarities between the affected and non-affected firms. The respective measures and ratios are chosen against the background of the specificities of digital business models in relation to taxation, as outlined by the EU Commission in its Impact Assessment to the Council Directive proposals on the implementation of a significant digital presence and a DST.[77]

a) Location and industry classification

Firms´ location in the Total Sample are grouped based on their headquarters, whereby 52 firms are situated in North America (48 in the U.S.), 25 in Europe, 37 in Asia, one each in Africa, Australia, and Oceania. The locations of the affected and non-affected firms are as follows:

Regions/ Group	Total Sample	DST-affected firms	Ratio of DST-affected firms	Non-affected firms	Ratio of non-affected firms
North America	52	18	15.52 %	34	29.31 %
Asia	37	1	0.86 %	36	31.04 %
Europe	25	7	6.03 %	18	15.52 %
Australia and Oceania	1	0	0.00 %	1	0.86 %
Africa	1	0	0.00 %	1	0.86 %
Sum	**116**	**26**	**22.41 %**	**90**	**77.59 %**

Table 2: Location of the Total Sample, DST-affected and non-affected firms. The table shows the location of the Total Sample categorized based on the location used for affected and non-affected firms according to the Thomson Reuters Refinitiv database for the financial year 2020.

[77] Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 16 f., 46, 110 ff. These are: (a) Limited physical presence, (b) Disruption in value creation and indirect revenue generation, (c) Importance of intangible assets, and (d) Winner takes most dynamics.

The analysis of financial reports suggests that about 70 % of DST-affected firms are domiciled in the U.S. This study has several important implications. Primarily, the results show that the US investigations[78] on the European DST proposal are not unfounded, as more than half of the firms have their headquarters in the U.S. However, this is obviously not a complete data set, so that the actual discriminatory effect of the DST initiative could only be reviewed against the DST returns of the affected firms. Second, DSTs, including their personal and substantive scope, are not discriminatory per se, as they do not exclusively affect US firms.

Based on the Thomson Reuters Refinitiv industry classification[79], firms classified as "Technology Equipment" and "Telecommunications Services" are generally not affected by the DST. This is in accordance with the DST Directive proposal, pursuant to which the supply of digital goods and telecommunications services shall not be within the scope of the DST. In turn, categories like "Software & IT Services" and "Retailers" and "Cyclical Consumer Services"[80] are apparently good indications for potential affected firms as these comprise 22 of 26 firms that are affected by DST based on the financial report analysis. Nonetheless, the data suggests that there is no classic example of "the" digital firms that is subject to DST, but rather that it is a case-by-case decision, as not all firms categorized as "Software and IT Services," or "Cyclical Consumer Services" are affected by the DST. These firms are perceptibly the most digital MNE in the world.

b) Descriptive statistics

Table 4 provides summary statistics for certain balance sheet and income statement items and ratios thereof for the financial years from 2011 to 2020 for DST-affected firms and non-affected firms, as determined in Chapter D.I.

[78] Cf. for example USTR, Section 301 Investigations – Report on France's Digital Services Tax, available at: Report_On_France's_Digital_Services_Tax.pdf (ustr.gov) (last access: 16.8.2022), 1 and 31 ff.
[79] See Annex IV.3.
[80] These are, in particular, firms offering intermediation services based on the analyzed financial reports.

	2011–2020				2011–2020				Difference between mean of affected and non-affected firms
	Affected firms				Non-affected firms				
	Mean	Standard Deviation	Median	N	Mean	Standard Deviation	Median	N	
PBT	**3,051,309**	6,803,800	508,300	169	**3,985,276**	5,943,957	1,868,798	788	-933,967*
Profit Margin	**11.89 %**	20.99 %	12.70%	169	**17.07 %**	11.27 %	16.85 %	788	-5.18 %***
Employees	**80,932**	163,495	14,000	165	**90,293**	98,032	51,297	749	-9,360
Revenue per Employee	**445,49**	313,16	376,23	165	**409,36**	320,87	314,62	749	36,13
Sales	**22,600,170**	44,525,563	5,659,234	169	**27,079,488**	30,689,696	13,989,327	788	-4,479,318
Ratio Foreign Sales / Total Sales	**50.51 %**	16.97 %	49.34 %	168	**60.98 %**	31.40 %	70.04 %	643	-10.47 %***
Total Assets	**33,196,657**	56,438,277	10,890,473	168	**49,069,785**	62,792,652	25,225,237	788	-15,873,128***
Intangible Assets	**7,871,108**	13,893,301	3,064,910	168	**13,963,506**	26,983,324	5,129,173	785	-6,092,397***
Amortization of Intangibles	**443,908**	1,091,131	109,978	165	**781,035**	1,182,265	360,275	731	-337,127***
R&D Expenses	**4,033,538**	7,379,834	856,811	94	**1,829,961**	2,580,623	935,852	583	2,203,577***
Ratio Intangible Assets / Total Assets	**31.51 %**	20.45 %	26.63 %	168	**26.35 %**	20.13 %	22.81 %	785	5.17 %***
Sales / Total Assets	**79.54 %**	48.27 %	59.79 %	168	**65.89 %**	39.65 %	55.37 %	788	13.64 %***
Foreign Assets / Total Assets	**15.73 %**	20.35 %	3.92 %	156	**22.33 %**	26.20 %	10.45 %	550	-6.60 %***
International Footprint	**3.21**				**2.73**				

Table 3: Comparison of mean, standard deviation, and median for the descriptive statistics of DST-affected and non-affected firms from 2011 until 2020. All the data are in thousand EUR, except those in percentages and the International Footprint ratio. In this table, I show the mean, standard deviation, and median for the outlined balance sheet and income statement items and ratios thereof for DST-affected firms and non-affected firms for the financial years from 2011 until 2020. The respective ratios are enhanced with the ratio "International Footprint," which is defined as Foreign Sales/Total Sales to Foreign Assets/Total Assets. The significance of the difference in the means was determined by a t-test. The results of the t-test are added to the difference of means of both affected and non-affected firms. *, **, *** indicate significance at the 10 %, 5 % and 1 % level respectively. The firms are categorized as DST-affected and non-affected firms based on the statements in the financial statements and reports, as described in Chapter D.I.1.

The DST proposal implies that digital firms are in a position to earn high profits.[81] However, the results show that DST-affected firms had significantly lower profit margins than non-affected firms on average from 2011 to 2020, but also on a yearly basis (data not shown here). The results counteract the statements of the EU Commission and anecdotal evidence, respectively, to which the DST should affect firms that are able to generate high profit margins through their digitalized services compared to other (digital) firms and question the material scope of application of the DST measures. However, the results can be partially explained by the fact that many digital firms that potentially fall within the scope of DSTs, such as Uber, Snapchat, AirBnB, or Twitter, suffer many years of operating losses before they are able to generate positive net operating profits. Therefore, it is advisable and necessary to include exemptions in the DST proposals for digital businesses facing losses, as is the case in the British DST.

The information provided in Table 4 can also be used to evaluate the following specifications of digital business models, that the EU Commission used on a qualification for the DST[82]:

- **Importance of intangible assets:** According to the EU Commission, intangible assets are particularly important for firms with significant digital activities. In this context, the EU Commission refers to high market caps compared to the book value of firms' equity.[83] Furthermore, intangible assets facilitate the provision of digital services in jurisdictions without constituting a permanent establishment or residency. In addition, the EU Commission points out that even when a permanent establishment exists, taxes can be avoided by shifting mobile intangible assets to low-tax jurisdictions.[84] Such a shift cannot and should not be verified based on the available data.

  The importance of intangible assets for the analyzed firms also becomes apparent when looking at the ratio of these to total assets (31.51 % and 26.35 %, respectively). This applies to a similar extent to the firms affected by DSTs, and to those not affected. However, the overcompensation of the amortization of intangibles by the R&D expenses of DST-affected firms on average over the last 10 years is particularly remarkable. However, excessive investment coverage is also found in non-affected firms. This indicates that firms make high

[81] Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 46.
[82] The "Disruption in value creation and indirect revenue generation" aspect refers to digital business models in general, for example, regarding the relevance of user contributions for digital business models. Based on the financial information of firms, such indication cannot be drawn and is, therefore, not outlined in more detail. See for an overview EU Commission, Impact Assessment, SWD(2018) 81 final/2, 113 ff.
[83] Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 14, 115 f.
[84] Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 17.

investments over the period under consideration and strive for corresponding (internal) growth. Overall, the importance of intangible assets for DST-affected firms can be confirmed based on financial data from the financial years from 2011 to 2020.

- **Limited physical presence:** One of the main objectives of the DST is to counteract the so-called "scale without mass" business structures. This means that digital firms can conduct businesses in countries without a physical nexus in these market jurisdictions. Therefore, the EU Commission concludes that digital firms have fundamentally different international footprints with far fewer assets in the location of their foreign sales. This assumption is confirmed by the results of this analysis, according to which digital firms tend to realize higher foreign sales with fewer foreign assets. Although the share of foreign assets in total assets is quite limited, the analyzed firms generate more than half of their sales abroad. Thus, there is an observable imbalance between foreign assets and foreign sales of digital firms, which is even larger for DST-affected firms based on financial statements.

  For the assessment of the extent of "scale without mass" business models the EU Commission refers to ratio "International Footprint" used in the UNCTAD 2017 World Investment Report[85]. The International Footprint is measured as the ratio of Foreign Sales/Total Sales to Foreign Assets/Total Assets.[86] According to the UNCTAD analysis, the International Footprint is particularly striking, with values exceeding 2.0. In the case at hand, DST-affected firms and non-affected firms exceed this value by 3.21 and 2.73. According to the UNCTAD report, firms may, therefore, be classified as Internet platforms. For comparison purposes, the International Footprint of other industries, such as automotive, chemicals, pharmaceuticals, and utilities, was between 0.6 and 1.8 in 2010 and 2015.[87]

  Based on these results, the effect of DSTs, that is, the reallocation of revenues from certain digital services to market countries seems to be comprehensible and justified.

- **Winner takes most dynamics:** This criterion requires an overall assessment of the business models and markets of the digital firms in question, so that such an assessment cannot be made based only on financial data. Nevertheless, the high standard deviation and large difference between the mean and median show that there are significant differences in PBT and sales in some cases. The EU Commission is precise that certain firms are superior

85 UNCTAD, World Investment Report 2017: Investment and the Digital Economy, 2017.
86 Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 12, 112 f.; UNCTAD, World Investment Report 2017: Investment and the Digital Economy, 2017, 166.
87 Cf. UNCTAD, World Investment Report 2017: Investment and the Digital Economy, 2017, 172.

in terms of size (total assets, sales, and employees) compared to other firms.[88] However, based on the firm data provided in Table 4, this applies in the same way to non-affected firms, which outperform firms affected by DSTs over the last 10 years across all relevant data in terms of amount, such as PBT, profit margin, employees, sales, and assets, with the exception of profit per employee (operational efficiency). Thus, the factual scope of the application of DSTs can be questioned again.

- I also only calculate descriptive statistics for the financial years from 2019 to 2020 (years after the implementation of the DSTs).[89] The results show no changes in the differences between the affected and non-affected firms (last column of the table). Significant divergences in intangible assets, amortization of intangible assets, R&D expenses, profit margin, and the ratio of foreign sales to total sales remain. The data show that significant changes have occurred in PBT, employees, and sales. Here, the mean values of the DST-affected firms exceeded (however statistically insignificant) the mean values of the non-affected firms in these categories in 2019 and 2020. Based on these data, this is due to a sharp increase of a few firms (including Amazon, Meta) in 2020 and the suggestive influence of the COVID-19 crisis. Therefore, the time horizon from 2011 to 2020 provides more reliable information.

II. Implications of DSTs on firms

1. Empirical effect of the DSTs

In the following chapter, I compare the GAAP ETR and Cash ETR as defined in Chapter C.II for both affected and non-affected firms before and after the implementation of unilateral DST legislations (financial years 2011 to 2020). The results show whether there is an empirically observable effect of DSTs on these ratios based solely on financial statements. For the qualification of firms as affected or non-affected, I use the financial statements analysis results, as outlined in Chapter D.I.1.

a) Impact on ETR

The calculations of the ETR provide the following results:

88 Cf. EU Commission, Impact Assessment, SWD(2018) 81 final/2, 14.
89 See Annex V.

	2011–2014		2015–2018		2019–2020	
	Affected firms (n = 53)	**Non-affected firms (n = 268)**	**Affected firms (n = 67)**	**Non-affected firms (n = 255)**	**Affected firms (n = 55)**	**Non-affected firms (n = 264)**
GAAP ETR						
Mean	**30.86 %**	**28.03 %**	**25.59 %**	**21.60 %**	**19.62 %**	**21.72 %**
Standard Deviation	10.97 %	14.42 %	8.64 %	7.97 %	8.37 %	10.03 %
Median	30.49 %	25.67 %	25.91 %	22.90 %	19.68 %	22.80 %
Cash ETR						
Mean	**23.36 %**	**25.90 %**	**25.89 %**	**20.24 %**	**26.00 %**	**25.29 %**
Standard Deviation	16.35 %	18.90 %	12.15 %	8.61 %	20.63 %	16.72 %
Median	20.21 %	21.47 %	26.47 %	18.24 %	18.86 %	21.29 %
ETR2						
Mean	**5.73 %**	**3.93 %**	**3.19 %**	**4.05 %**	**2.95 %**	**3.31 %**
Standard Deviation	3.71 %	2.31 %	1.83 %	2.30 %	1.90 %	1.95 %
Median	5.13 %	3.63 %	3.26 %	4.07 %	2.87 %	3.14 %
ETR3						
Mean	**3.51 %**	**2.31 %**	**2.38 %**	**2.33 %**	**2.16 %**	**1.88 %**
Standard Deviation	1.92 %	1.28 %	1.59 %	1.54 %	1.59 %	1.35 %
Median	3.15 %	2.10 %	2.15 %	1.92 %	1.32 %	1.51 %

ETR4						
Mean	**77.82 %**	**75.29 %**	**77.28 %**	**74.42 %**	**76.52 %**	**73.99 %**
Standard Deviation	10.99 %	11.23 %	13.52 %	11.38 %	14.05 %	12.67 %
Median	75.77 %	74.29 %	80.43 %	74.03 %	81.97 %	73.52 %
ETR5						
Mean	**62.06 %**	**49.53 %**	**65.58 %**	**46.95 %**	**62.89 %**	**45.87 %**
Standard Deviation	46.79 %	23.21 %	45.13 %	25.85 %	41.16 %	27.80 %
Median	48.80 %	40.94 %	46.15 %	37.79 %	47.37 %	35.89 %

Table 4: Comparison of mean, standard deviation, and median of the GAAP ETR, Cash ETR, ETR2, ETR3, ETR4, and ETR5 for DST-affected and non-affected firms during financial years 2011 to 2014, 2015 to 2018 and 2019 to 2020. The table compares the ETR ratios as defined hereafter for DST-affected and non-affected firms based on the data from Thomson Reuters Refinitiv for the financial years from 2011 until 2020. The data are winsorized at the 10 % level. Firms with more than two missing observations for the respective values of the ETR ratios in the respective period and firms with missing or zero values for tax expense, taxes paid, sales, total assets, SGA, or CONR during the periods are excluded. I define the ratios as follows:

- **GAAP ETR reported:** $GAAP\ ETR = \frac{Tax\ Expense}{Profit\ before\ Taxes}$
- **Cash ETR reported:** $Cash\ ETR = \frac{Taxes\ Paid}{PBT}$
- **ETR2:** $ETR2 = \frac{Tax\ Expense}{Sales}$
- **ETR3:** $ETR3 = \frac{Tax\ Expense}{Total\ Assets}$
- **ETR4:** $ETR4 = \frac{Tax\ Expense+SGA+Cost\ of\ Net\ Revenue}{Sales}$
- **ETR5:** $ETR5 = \frac{Tax\ Expense+SGA+Cost\ of\ Net\ Revenue}{Total\ Assets}$

The proposed DST of the EU Commission aimed at increasing the tax liability of digital firms, as firms providing certain digital business activities (Online Advertising, Online Intermediation Services, Provision of Data) have lower ETR compared to other firms. The results for the GAAP ETR and Cash ETR ratios, as provided in Table 5, indicate that the presumption can be partly verified based on the financial statements for the financial years from 2011 to 2018 (before the enactment of DSTs). Consistent with the GAAP ETR, the Cash ETR of DST-affected firms is more than 5.6 percentage points or about 27.92 % higher, between the years 2015 until 2018 than for non-affected firms. On average, the analyzed DST-affected firms faced higher GAAP ETR and Cash ETR in the financial years from 2011 to 2014 and 2015 to 2018, compared to non-affected firms with an exemption for the Cash ETR from 2011 to 2014 and ETR2 from 2015 to 2018. The data, therefore, suggest that the factual scope of DSTs was not chosen correctly, even though the results may be influenced by diverging statutory tax rates in the resident states of firms.

Nonetheless, DSTs aim to increase the ETR of affected firms, which can also be observed from the theoretical effect of the DST on the ETR of affected firms.[90] I test this presumption through GAAP ETR and Cash ETR for the financial years from 2019 to 2020 (after the implementation of the unilateral DST). The affected firms' GAAP ETR declined in 2019 and 2020. In turn, the Cash ETR of DST-affected firms is about 0.7 percentage points or 2.8 % higher than for firms that were not affected by DSTs in 2019 and 2020. However, the Cash ETR was relatively stable during the financial years from 2011 to 2020, with a slight increase (0.11 percentage points) for DST-affected firms for the period from 2019 to 2020. Notably, the GAAP ETR of affected firms is below the ratio of non-affected firms. Based on the financial statements, the results indicate that DSTs did not show any substantial increase in the ETRs of affected firms.

The ETR2 tests if the change in the GAAP ETR is affected by a corresponding increase in PBT. Presumably, the ETR2 would increase if the tax expenses increased disproportionally (due to the implementation of a revenue-based taxation such as DSTs) compared to sales. The decline in ETR2 during financial years from 2019 to 2020 compared to the financial years from 2011 to 2014 or 2015 to 2018 shows otherwise. Nevertheless, future research could consider testing if the ETR decreases over time owing to increasing PBT, consistent with the literature.[91]

Nevertheless, it is conceivable that firms may pass on the DSTs to their customers. In such a case, ETR2 would also not represent reasonable results, as sales would be biased. Therefore, I calculate

[90] See Annex E.III.3.

[91] Cf. Edwards/Kubata/Shevlin, The Accounting Review 2021, 231; Drake/Hamilton/Lusch, Journal of Accounting and Economics 2020, 1.

ETR3 using total assets instead of sales. The results of ETR3 show a decline in the ETR ratio, similar to that of GAAP ETR and ETR2.

Notably, ETR4 and ETR5 contain SGA and CONR, which are used to account for DSTs in addition to income tax expenses as a numerator because of the diverging accounting treatment of DSTs in the financial statements. These ETR ratios show no increase for DST-affected firms during the financial years from 2019 to 2020 compared to the prior financial years, even though DSTs must be included in these items. Instead, in each case, ETR4 and ETR5 were higher than those of the non-affected firms. Nevertheless, considering the analysis of firms that provide concrete information on the DST burden (see Chapter D.II.2), these results are not unexpected as the amount of DST expenses appears small compared to Tax Expenses, SGA, and CONR.

Furthermore, I calculate the ratios for firms that qualify DSTs as direct taxes (six firms) and for such firms that qualify DSTs as indirect or other taxes (five firms). The results are outlined in Annex VI. and VII. The ETR ratios for firms qualifying DSTs as direct taxes show no effect, but decline on average. In turn, for firms qualifying DSTs as indirect taxes, there is an observable increase in SGA ratios, on average. However, these ratios are volatile due to the small number of firms.

The results of the empirical analysis based on financial data indicate two relevant aspects for the DST proposals. Primarily, the presumed gap between the ETR of firms liable and those that are not liable to DSTs before the implementation of the DST legislations is not observable based on financial statements, even though the EU Commission outlines otherwise. Thus, this anecdotal evidence cannot be confirmed based on financial data. This could imply that the current scope of unilateral DSTs is simply too narrow and other digital firms that are affected by DSTs are able to generate low ETRs and should, therefore, also be part of the scope. Second, there is no observable increase in the ETRs of affected firms after the implementation of DSTs. One explanation may be that affected firms only generate low ratios of DST taxable revenues in the respective countries compared to the amount of revenues at the group level. Hence, it is likely that there is an impact at the single-firm level, but such an impact cannot be observed in the financial statements of affected firms at the group level. If DSTs are effective measures, there would be a discernible effect on the ETRs of affected firms. These findings also suggest that the factual scope of DSTs is very narrow, leading to low ratios of DST taxable revenues.

b) Impact on SGA and CONR

The calculations of the SGA and CONR ratios provide the following results:

	2011–2014		2015–2018		2019–2020	
	Affected firms (n = 53)	**Non-affected firms (n = 268)**	**Affected firms (n = 67)**	**Non-affected firms (n = 255)**	**Affected firms (n = 55)**	**Non-affected firms (n = 264)**
SGA1						
Mean	**40.07 %**	**26.93 %**	**37.67 %**	**27.36 %**	**38.79 %**	**25.76 %**
Standard Deviation	15.35 %	9.58 %	18.41 %	11.99 %	13.95 %	11.05 %
Median	39.30 %	27.18 %	34.84 %	24.36 %	38.62 %	22.70 %
SGA2						
Mean	**27.17 %**	**16.97 %**	**28.29 %**	**15.97 %**	**27.48 %**	**14.53 %**
Standard Deviation	11.40 %	6.81 %	16.47 %	7.79 %	13.27 %	7.27 %
Median	29.09 %	15.69 %	25.94 %	13.61 %	23.59 %	12.41 %
CONR1						
Mean	**32.02 %**	**43.02 %**	**36.43 %**	**42.33 %**	**34.78 %**	**44.32 %**
Standard Deviation	21.64 %	17.57 %	23.37 %	17.84 %	20.92 %	18.92 %
Median	27.13 %	41.62 %	49.82 %	44.52 %	32.02 %	43.39 %
CONR2						
Mean	**31.38 %**	**30.80 %**	**34.91 %**	**28.54 %**	**33.25 %**	**28.32 %**
Standard Deviation	41.73 %	23.29 %	35.87 %	24.28 %	32.42 %	23.08 %
Median	13.31 %	21.41 %	19.02 %	20.35 %	18.95 %	19.22 %

Table 5: Comparison of mean, standard deviation, and median of SGA1, SGA2, CONR1 and CONR2 for DST-affected and non-affected firms during the financial years from 2011 to 2014, 2015 to 2018, and 2019 to 2020. In this table, the comparison of SGA1, SGA2, CONR1, and CONR2, as defined hereafter for DST, affected and non-affected firms based on the data from Thomson Reuters Refinitiv for the financial years from 2011 until 2020 are presented. The data are winsorized at the 10 % level. Firms with less than two missing observations for the respective values of the ETR ratios in the respective period and firms with missing or zero values for Tax Expense, Taxes Paid, Sales, Total Assets, SGA, or CONR in the respective period are also excluded. The ratios are defined as follows:

- **SGA1:** $SGA1 = \frac{SGA}{Sales}$
- **SGA2:** $SGA2 = \frac{SGA}{Total\ Assets}$
- **CONR1:** $CONR1 = \frac{CONR}{Sales}$
- **CONR2:** $CONR2 = \frac{CONR}{Total\ Assets}$

Based on the financial statements, there was no significant increase or decrease in the SGA and CONR ratios for the Total Sample. For affected firms during the financial years from 2019 to 2020, there is a slight increase in the SGA1 ratio, but a small decrease in the CONR1 ratio. This could indicate that there is no apparent increase or decrease in sales if the SGA and CONR are constantly changing.

The increase in the SGA1 ratio during the financial years from 2019 to 2020 (after the implementation of the DST) may be caused by a disproportionately higher increase in the SGA due to the additional DST burden that is considered as SGA expenses by some firms, as described in Chapter D.I.2. Another possible explanation is that the increase in the SGA1 was caused by a lower increase in sales. Based on firm-year data, sales increased strongly, on average, in the financial years from 2011 to 2019, while the increase in sales was smaller during the financial year 2020 (potentially due to the COVID-19 financial crisis). This is also indicated by the decrease in the SGA2 ratio, which did not increase accordingly. Presumably, if the SGA expenses increased disproportionately, the SGA2 ratio would also increase. However, this did not occur based on financial data.

The SGA1 ratio could also be biased for firms that pass on the DST to customers, as the DST would increase the SGA expenses (numerator) and sales (denominator) at the same time, even though some firms declared not to increase but to bear the resulting DST exposure.[92] However, to avoid distortions between firms that bear DSTs and to increase their service fees, I determine the SGA2 ratio. However, the SGA2 ratio did not increase, as previously described.

For the financial years from 2011 to 2020, DST affected firms have lower CONR1 compared to non-affected firms. After the implementation of the DST legislation, as of 2019, there was a decrease in CONR1 and CONR2. The decrease in CONR1 was contrary to the small increase in SGA1, as discussed previously. As CONR1 and CONR2 of DST-affected firms decline on average from the financial years 2015–2020 to the financial years 2019–2020 there seems to be no apparent, disproportional increase in CONR. However, this is in contrast to the expected effect, according to which the CONR must increase disproportionately due to the DST burden.

[92] Cf. eBay, Protecting your business from Digital Services Tax costs – Notice as of August 10, 2020, available at: https://community.ebay.co.uk/t5/Announcements/Protecting-your-business-from-Digital-Services-Tax-costs/ba-p/6701162 (last access: 13.12.2021); Magdirila, Facebook will not increase ad fees in UK amid digital tax – Telegraph, S&P Global, available at: https://www.spglobal.com/marketintelligence/en/news-insights/blog/discovery-dives-into-a-crowded-us-ott-video-market (last access: 13.12.2021).

Interestingly, the data show a significant difference between the SGA2 and CONR2 ratios of DST-affected firms and non-affected firms. On average, the SGA2 ratio is nearly twice as high for the DST-affected firms. Primarily, the difference may be explained by the fact that the affected firms have a lower dependence on tangible assets, such as production sites. This may be concluded from the industry classification of the DST-affected firms but also from the ratio of intangible assets to total assets, which is about 31.51 % on average for DST-affected firms but only 26.35 % for non-affected firms, as outlined in Chapter D.I.3. Moreover, this also corresponds with further results received from the general financial information, as outlined in the descriptive statistics, that is, DST-affected firms rely more heavily on total assets for generating sales compared to firms that are not affected by the DST legislation. Therefore, DST-affected firms seem to generate higher sales with the same or lower level of assets.

Therefore, based on financial data alone, it cannot be confirmed for the Total Sample that DST led to an increase in SGA expenses. However, these results must be tested based on a regression analysis to determine if DST is causally related to SGA spending and, thus, the SGA1 ratio.

2. DST adjusted effect on firms

In this chapter, I analyze the impact of DSTs on firms that do not qualify DSTs as direct taxes and, therefore, include DSTs as SGA or CONR. For this, I reclassified DST expenses by adjusting the GAAP ETR, Cash ETR, and SGA, as described below.

The DSTs should be qualified as direct taxes from a normative perspective, as outlined in Chapter B.I and, therefore, included in income tax expenses. However, only ten firms in 2019 and seven firms in 2020 qualified DSTs as direct taxes or income taxes, while four in 2019 and six in 2020 categorized DSTs as indirect taxes or other taxes, and four firms in 2019 and five firms as other taxes in 2020. In return, five (2019) and six (2020) firms did not provide remarks on the qualification of DSTs.[93] Based on the financial statements of the Total Sample, only four firms – Booking Holdings, Match Group, Schibsted, and TripAdvisor – provided remarks regarding the amount of DST expenses during the financial years 2019 and 2020. The respective firms included DSTs in their financial statements as SGA, whereas Booking Holdings and Schibsted did not report on the amount of DST expenses in 2020.

To determine the impact of DSTs on the ETR of affected firms, a distinction must be made between firms qualifying DSTs as indirect taxes and those qualifying DSTs as direct taxes. The impact of DSTs on ETRs should be observable directly from the increase in ETRs for firms qualifying DSTs

[93] See also chapter D.I.2.

as direct taxes, as DSTs must be included in direct tax expenses. Even though such an effect is not observable, as described in Chapter D.II.1 and can be observed from the data presented in Annex VI. In turn, the actual effect of DSTs on the ETRs of affected firms remains hidden when firms qualify DSTs as indirect taxes or other taxes. In the following section, I compute an adjusted ETR, including DSTs, to reveal the effect of DSTs on firms' income tax liability.

Based on this, I adjust the GAAP ETR and Cash ETR, as defined in Chapter C.II, by requalifying the DST expenses from SGA to tax expenses and taxes paid for firms accounting for the DSTs as SGA. Therefore, the adjusted ETR formula is as follows:

$$GAAP\ ETR_{adj.} = \frac{Tax\ Expense_{CIT} + Tax\ Expense_{DST}}{PBT + Tax\ Expense_{DST}} \quad \text{and} \quad Cash\ ETR_{adj.} = \frac{Taxes\ paid_{CIT} + Taxes\ paid_{DST}}{PBT + Tax\ Expense_{DST}}$$

In turn, the currently reported SGA must be adjusted with regard to the SGA1 calculation to outline the relative impact of DSTs on this ratio, as follows:

$$SGA1_{adj.} = \frac{SGA - Tax\ Expense_{DST}}{Sales}$$

The recalculation of ratios is limited to the described firms (Booking Holdings, Match Group, Schibsted, and TripAdvisor) and to the extent to which they report on the amount of DSTs and have a positive PBT and positive income tax expenses, respectively, income taxes paid in the respective financial year. These restrictions apply to the 2020 financial year of TripAdvisor and Schibsted.

The impact of DSTs becomes particularly apparent when the ratio of DST expenses to total tax expenses are considered. The DST ratio is calculated as the share of DST expenses to total tax expenses (including DST expenses) and taxes paid (including DST expenses). Furthermore, the impact of DSTs strongly depends on the ratio of DST taxable sales to total sales (x_{DST}), as described theoretically in Annex III. The DST taxable sales are determined on a simplified basis by: $Sales_{DST} = \frac{Tax\ Expense_{DST}}{0{,}03}$.

The recalculation using the aforementioned ratios provides the following results:

	Booking Holdings		Match Group		Schibsted		TripAdvisor	
	2019	2020	2019	2020	2019	2020	2019	2020
GAAP ETR								
Reported	**18.63 %**	**91.01 %**	**3.78 %**	**5.60 %**	**38.60 %**	**NA**	**35.05 %**	**NA**
Adjusted	**19.12 %**	**NA**	**4.58 %**	**7.40 %**	**38.89 %**	**NA**	**36.04 %**	**NA**
Cash ETR								
Reported	**18.03 %**	**56.26 %**	**0.00 %**	**1.87 %**	**50.21 %**	**NA**	**24.23 %**	**NA**
Adjusted	**18.52 %**	**NA**	**0.84 %**	**3.74 %**	**50.43 %**	**NA**	**25.38 %**	**NA**
SGA1								
Reported	**61.41 %**	**86.60 %**	**40.87 %**	**40.33 %**	**37.23 %**	**38.00 %**	**73.91 %**	**117.38 %**
Adjusted	**61.17 %**	**NA**	**40.64 %**	**39.86 %**	**37.18 %**	**NA**	**73.72 %**	**117.05 %**
DST Ratio								
Tax Expenses	**3.14 %**	**NA**	**18.33 %**	**34.68 %**	**1.18 %**	**NA**	**4.23 %**	**NA**
Taxes Paid	**3.24 %**	**NA**	**100.00 %**	**50.95 %**	**0.91 %**	**NA**	**6.00 %**	**40.00 %**
Ratio of DST taxable Sales (x_{DST})	**7.96 %**	**NA**	**7.64 %**	**15.89 %**	**1.57 %**	**NA**	**6.41 %**	**11.04 %**

Table 6: Comparison of reported and adjusted GAAP ETR, Cash ETR, SGA1, and results of the DST ratio and the ratio of DST taxable sales for the Total Sample for the financial years 2019 and 2020. In this Table 7, I provide the comparison of key ratios based on the reported data and the ratios

adjusted for DSTs. The adjustment for DSTs indicates the reclassification of DSTs as direct tax expenses instead of SGA expenses. Furthermore, I show the DST ratio defined as the ratio of DST expense to total tax expense respectively taxes paid. Finally, I outline the ratio of DST taxable sales (x_{DST}). The recalculation of ratios is limited to the described firms (Booking Holdings, Match Group, Schibsted, and TripAdvisor) and to the extent in which they report on the amount of DSTs and have a positive PBT and positive income tax expenses respectively income taxes paid in the respective financial year. These restrictions apply to TripAdvisor and Schibsted for the financial year 2020. Furthermore, Booking Holdings and Schibsted do not provide information on the amount of DST expenses in the financial year 2020. In turn, TripAdvisor outlines the amount of DST expenses but has a negative PBT. The ratios are defined as follows:

- **GAAP ETR reported:** $GAAP\ ETR = \frac{Tax\ Expense}{Profit\ before\ Taxes}$
- **GAAP ETR adjusted:** $GAAP\ ETR_{adj.} = \frac{Tax\ Expense_{CIT} + Tax\ Expense_{DST}}{PBT + Tax\ Expense_{DST}}$
- **Cash ETR reported:** $Cash\ ETR = \frac{Taxes\ Paid}{PBT}$
- **Cash ETR adjusted:** $Cash\ ETR_{adj.} = \frac{Taxes\ paid_{CIT} + Taxes\ paid_{DST}}{PBT + Tax\ Expense_{DST}}$
- **SGA1 reported:** $SGA1 = \frac{SGA}{Sales}$
- **SGA1 adjusted:** $SGA1_{adj.} = \frac{SGA - Tax\ Expense_{DST}}{Sales}$
- **DST Ratio Tax expenses:** $Ratio\ I_{DST} = \frac{Tax\ Expense_{DST}}{0{,}03}$
- **DST Ratio Taxes paid:** $Ratio\ II_{DST} = \frac{Tax\ Expense_{DST}}{Taxes\ Paid}$
- **Ratio of DST taxable Sales:** $x_{DST} = \frac{Sales_{DST}}{Total\ Sales}$ with: $Sales_{DST} = \frac{Tax\ Expense_{DST}}{0{,}03}$

The adjusted GAAP ETRs for the DST-affected firms are between 0.29 and 1.80 percentage points higher than the GAAP ETR before the adjustments, with a relative increase of between 0.75 and 32.14 %. Therefore, DSTs can have a major effect on the GAAP ETRs for some firms, but for other firms, DSTs may have a very low impact on GAAP ETRs, as the DSTs are only a small amount compared to income tax expenses. The results of the adjusted Cash ETRs show an absolute increase between 0.22 and 1.87 percentage points, but a relative increase of between 0.44 and 100 %. On the other hand, the impact of DSTs on Cash ETRs of the affected firms ranges from very small to very high.

The impact of DSTs on ETRs strongly depends on the ratio of DST taxable sales to total sales. As outlined in Annex E.III.3, the impact of DSTs on ETRs in the context of more diversified groups is lower if the proportion of sales subject to DST (= $x_{DST} = \frac{Sales_{DST}}{Total\ Sales}$) is minor. This can be seen in Booking Holdings, Schibsted, and TripAdvisor in 2019. The results are supported by the share of DSTs in relation to the adjusted income tax expenses (including DST expenses), which is apparently higher for firms with a higher share of x_{DST}.

Moreover, the effect of DSTs depends on firms' profit margins. This can be seen in the Match Group. The effect of DSTs is relatively higher for the Match Group compared to the effect of Booking Holdings or TripAdvisor in 2019 and 2020. This can be explained by a lower profit margin comprising lower tax expenses, taxes paid, and PBT. As revenue-based taxes, DSTs are generally independent of the profit margin (with the exception of the British DST), therefore, the impact of DSTs is even larger for firms with low PBT. In turn, DSTs have only a minor impact on the Cash ETR if the DST expenses are small compared to the total taxes paid, as observed in the case of Booking Holdings, Schibsted, and TripAdvisor in 2019. These results are supported by the share of DSTs in relation to the adjusted income taxes paid (including DST expenses). This finding implies that DST proposals should include regulations for firms with low profit margins.

The results for the adjusted SGA1 ratio show an absolute decrease of 0.05 and 0.47 percentage points and a relative decrease of 0.13 % and 1.17 %. This indicates that DSTs have only a minor impact on the SGA of the affected firms. This can be supported by the low ratios of DST expenses to SGA expenses for each firm, which are about 1 % of the total SGA expenses. As a result, DSTs should also not have an observable impact on the profitability (profit margin) of affected firms that qualify DSTs as indirect taxes or other taxes.

E. Conclusion

The study results can be summarized thematically as follows:

- **Determination of affected firms**

The analysis of the 222 financial statements shows that the list of firms discussed by the French Parliament is a good indication for DST-affected firms, while the Forbes List for the "most digital" firms worldwide leads to five additional firms providing remarks regarding DSTs. More than one-fifth of the analyzed firms, that is, 26 firms reported on DSTs. This indicates that for future research on DSTs, analysis of financial statements are a potential the starting point for identifying DST-affected firms.[94] However, the analysis shows that DST affectedness can also be silent or hidden in financial statements even if firms are likely to be affected. For example, the French DST was proclaimed as GAFA tax.[95] However, Apple's 2019 and 2020 financial reports do not provide any comments on DSTs. An (improbable) explanation could be that Apple is not affected by DSTs. Another reason is that Apple, like other firms, has identified DSTs as having no material impact on their financial statements. Otherwise, they would need to report or at least refer to the corresponding effects on the tax expenses or any other general operating expenses.

- **Accounting for and qualification of DSTs**

Based on the analyzed financial statements, there is no dominant opinion on how DSTs are qualified and neither do the analyzed firms predominantly qualify DSTs as direct nor indirect taxes. The divergence in the qualifications of DSTs is also reflected in the accounting treatment, as there is no homogeneous accounting treatment for DST expenses. Firms record DST expenses in income tax expenses, SGA, or CONR. These results are not yet available in the tax literature but are of high importance for future research on the impact of DSTs on affected firms, as the results make it imperative to evaluate annual financial statements to assess the effect accordingly. However, analyzing the outcomes of the DST legislation is challenging, assuming that parts of the affected firms do not include DSTs in their income tax expenses, and only a small number of firms provide information on their DST liability, which allows an adjustment for DST expenses and corresponding recalculation.

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[94] The Thomson Reuters Refinitiv industry classification (Code TR2N) criteria "Software and IT Services" and "Cyclical Consumer Services" seem also to be helpful for identifying DST affected firms.

[95] GAFA stands for Google, Apple, Facebook, and Amazon, cf. French Government, GAFA tax: a major step towards a fairer and more efficient tax system, available at: https://www.gouvernement.fr/en/gafa-tax-a-major-step-towards-a-fairer-and-more-efficient-tax-system (last access: 30.12.2021).

- **Financial data results**

The DST proposals aim to eliminate insufficient taxation from specific in-scope services. However, the presumed disparities in ETR between DST-affected and non-affected firms cannot be observed empirically before and after the implementation of unilateral DSTs based on financial data; that is, the affected firms do not have a lower ETR, on average, compared to other digital firms. Furthermore, the results show no apparent effect on the GAAP ETR, Cash ETR, and SGA or CONR ratios of the affected firms after the implementation of DSTs. The recalculation of the GAAP ETR and Cash ETR shows only a marginal increase in the ETR ratios of the affected firms. This effect is highly dependent on the share of DST taxable revenue to total sales. However, the additional tax burden caused by DSTs cannot be dismissed for a few firms, so DSTs represent a targeted measure in individual cases. In my opinion, the different accounting treatments of DSTs could be one of the reasons why no or only a minor effect on the ETRs and other profit and loss statement items can be observed. This impression is reinforced by the fact that ETR4 and ETR5, which are adjusted for tax expenses, SGA, and CONR, show no corresponding changes in 2019 and 2020. Future research could rely on and enhance these findings, for example, by testing if DSTs have a significant effect on firms' ETRs and if there is a causal relationship between the minor increase in Cash ETR and the implementation of DSTs in 2019 and 2020.

The comparison of DST-affected firms and non-affected firms shows that DST-affected firms have higher GAAP ETR and Cash ETR than firms that are not affected by the DST and, at the same time, lower profit margins on average. Thus, DSTs should lead to higher increases in the ETR of affected firms (see Annex I. and Annex E.III.3). Against the background of DSTs, one could speak of an unjustified unequal treatment of affected firms compared to those that are not subject to DSTs. At the same time, this speaks in favor of an extension to firms that not only provide certain digital services.

- **Policy implications and outlook**

This study has two key implications. On the one hand, the national DST legislations fail to achieve the intended outcomes for the affected groups, as a relevant increase in ETR is not observable. This can be mainly attributed to the fact that only a few (digital) firms are subject to DSTs, and even if the firms are liable to DSTs, the amount of DST is minor or apparently below the relevance threshold for financial accounting purposes. This speaks in favor of implementing a Europe-wide DST. Furthermore, if the DST proposal were to be implemented at an appropriate time in the future, the design of the existing EU Council Directive proposal must be adjusted to be effective, and the underlying assumptions of the DST would need to be revised accordingly. Conceivable

adjustments would be to expand the scope of digital services or to lower the national and global turnover thresholds because, on average, many digital firms are able to generate a lower ETR than firms that are currently affected. However, raising the DST rate would not be an appropriate option because it would have to a significant impact on affected firms with low profit margins. Hence, it must be noted that some firms affected by national DSTs already generate negative PBT. Consequently, DSTs are a form of substance-based taxation. Therefore, the implementation of safe harbor regulations for firms with profit margins below the DST rate is mandatory for inclusion in a revised DST proposal.

On the other hand, the national investigations initiated by the U.S. and the threatened tariffs against countries with DSTs are also partly unfounded. Even though most DST-affected firms are domiciled in the U.S. and digital firms gain on average more than 50 % of its sales in foreign countries (see Chapter D.I.3), there is no observable impact of the DST legislations based on financial statements. Furthermore, the perception of destination-based taxation allocated, based on the location of online users, has changed decisively in the U.S.[96], even though the state of Maryland has also implemented a local DST.[97]

The analysis of the impact of DSTs is currently of strong interest because the COVID-19 pandemic accelerated and led to the massive use of online services, while countries continue to look for financing options to counteract financial losses from the economic crisis triggered by the COVID-19 shock and the persistent Russia-Ukraine war.[98] Against this background, and as the enactment of Pillar 1 of the BEPS 2.0, the project cannot be foreseen at this point, and the implementation of a European digital levy, as of 2025, is once again back in discussion.[99] Aside from the comprehensive proposals at the OECD- and EU-level, unilateral DSTs are experiencing renewed relevance, as can be seen by the number of newly introduced legislations and the introduction of Art. 12B of the UN-Model.[100]

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96 This can mainly be referred to the milestone decision *South Dakota v. Wayfair (*South Dakota v. Wayfair, Inc. - 138 S. Ct. 2080 (2018). Cf. for a detailed discussion Stark, NTJ 2021, 221 (222); Agrawal/Fox, NTJ 2021, 257) of the Supreme Court that has led to a change in determination of the remittance obligation of online vendors from physical presence to economic nexus for sales tax purposes.

97 Cf. Jensen/Hogroian/Gorton, Maryland breaks new ground in taxing digital realm, available at: https://www.thetaxadviser.com/issues/2022/mar/maryland-taxing-digital.html (last access: 9.9.2022) regarding the DST in Maryland and other initiatives to tax digital goods and services in the U.S.

98 For a discussion see also Alvarado, ET 2021, 403 (409 f.).

99 Cf. ECON Committee as of August 26, 2022, 2021/0430(CNS).

100 Cf. Collier/Devereux/Vella, WTJ 2021, 405 for a comparison of Pillar One, Art. 12B UN-Model, DST and residual profit allocation. For a critical reflection on Art. 12B UN-Model (withholding tax on Automated Digital Services) see Báez Moreno, WTJ 2021, 501.

Annex

I. Impact of DST depending on profit margins

To illustrate the impact on the ETR of affected firms, ETRs of the following firms are compared:

- **Firm A:** Firm A's sales are not subject to DST; therefore, Firm A is not liable to DST.
- **Firm B:** Firm B's entire sales are subject to the French DST; therefore, Firm B is liable to the French DST.
- **Firm C:** Firm C's entire sales are subject to the British DST; therefore, Firm C is liable to the British DST.

For simplification reasons, Firm A and Firm B generate sales of 1.000 million EUR and Firm B generates sales of 1.000 million GBP and are subject to CIT at the rate of 20 %. The profit margin is treated as a variable.[101] The impact on the ETR of these three firms can be illustrated as follows:

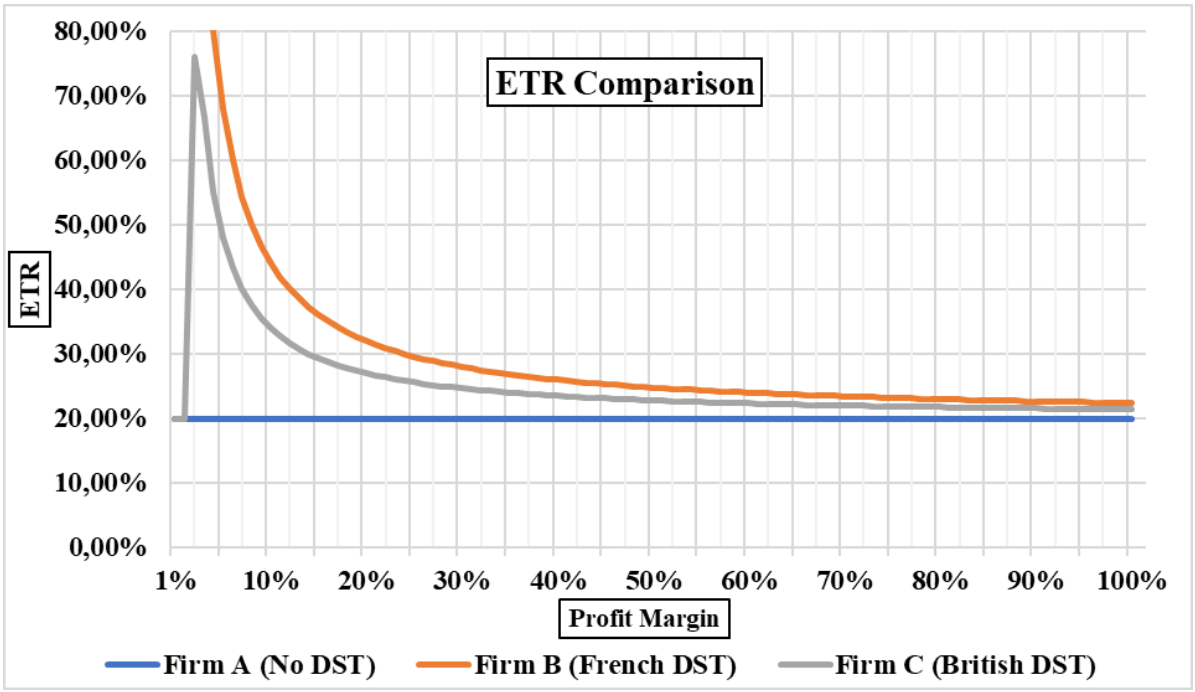

Figure 2: ETR comparison for Firm A, Firm B and Firm C depending on the applicable unilateral DST and depending on the profit margin. Own illustration.

[101] Following Graßl/Giese, Beck.digitax 2021, 13.

The graphs show the substance-based taxation effect of the DST. For Firm A, the ETR is a flat rate and 0 % for return on sales of 0 %. For Firm B, in turn, the ETR grows exponentially for a declining profit margin; that is, the ETR increases as the profit margin decreases. For example, the ETR of Firm B is 50 % in case it generates a profit margin of 8 % and is 80 % when Firm B generates a profit margin of 4 %. The results clarify that revenue-based taxation is causal to substance-based taxation.

The British DST law provides an exemption reduction of the DST liability for firms with a profit margin of up to 2.5 % from the services subject to DST. This can mitigate the taxation on substance for Firm C. Otherwise, if the profit margin falls below the DST tax rate, as the curve for Firm B in the case of the French DST shows, the DST is a tax on substance, as it exceeds the generated profit margin. At the same time, the graph of Firm C rises less sharply due to the tax allowance and the DST rate of only 2 % in the UK, while the French DST rate is at 3 %.

II. DST revenues

	2019		2020		2021		2022
Country	**Estimated**	**Actual**	**Estimated**	**Actual**	**Estimated**	**Actual**	**Estimated**
EU-Proposal	3.600	N/A	3.816 – 4.212	N/A	4.045 – 4.928	N/A	4.288 – 5.766
France	400 – 500	352	400	421	487	474	518
Italy	700	N/A	708	233	700	N/A	N/A
Austria	N/A	N/A	20	43,1	70	80,2	100
UK	70	N/A	280	N/A	390	N/A	425
Spain	N/A	N/A	N/A	N/A	968	167	225

Table 7: DST revenues. The table shows the estimated and actual DST revenues in France, Italy, Austria, UK, Spain and for the EU Directive proposal. The DST revenues are in million EUR and for UK in million GBP.[102]

[102] For the EU Directive proposal: EU Commission, SWD(2018) 81 final/2, 69 f. The national DST revenues were collected from national revenue services or other sources. For France: estimations and actual DST revenues 2020: https://www.budget.gouv.fr/index.php/documentation/documents-budgetaires/exercice-2020/plfr-4-pour-2020; for 2021: https://www.budget.gouv.fr/documentation/documents-budgetaires/exercice-2021/projet-de-loi-de-reglement for 2022: http://www.senat.fr/tableau-historique/pjlf2022.html; for Italy: actual DST revenues 2020: https://www.ilfattoquotidiano.it/2021/05/26/web-tax-dalla-prima-applicazione-dellimposta-sui-servizi-digitali-un-gettito-di-233-milioni-per-lo-stato-che-contava-di-raccoglierne-700/6210911/; for Austria: actual DST revenues and estimations 2021: https://www.bmf.gv.at/dam/bmfgvat/budget/das-budget/budget-2022/Budgetbericht_2022.pdf; for estimations 2022: https://www.bmf.gv.at/dam/bmfgvat/budget/das-budget/budget-2023/Budgetbericht_2023.pdf; for UK: estimations 2020: https://www.gov.uk/government/publications/introduction-of-the-digital-services-tax/digital-services-tax; for Spain: estimations and actual 2021: https://www.igae.pap.hacienda.gob.es/sitios/igae/es-ES/Contabilidad/ContabilidadPublica/CPE/rcasp/Documents/CUENTA%20AGE%202021%20Registro%20cuentas%20anuales%20del%20sector%20p%C3%BAblico.pdf; estimations 2022: https://www.sepg.pap.hacienda.gob.es/Presup/PGE2022Proyecto/MaestroTomos/PGE-ROM/doc/L_22_A_2.PDF. All last accessed on 30.10.2022.

III. Theoretical effect of DST on the net income, profit margin, and ETR of affected firms

In the following scenarios, I outline the theoretical effect of the DST on the net income, profit margin, and ETR of DST-affected firms based on the following assumptions. According to the EU Directive proposal and countries with DST legislations, the DST shall be treated as a deductible expense for CIT purposes by the affected firms to reduce double taxation with DST and CIT.[103] Consequently, DST expenses may not be credited to the national CIT. To the best of my knowledge, no country allows to credit the DST against the national CIT. Furthermore, the DST must be treated as a direct tax based on own research results and consistent with the most frequent qualification based on the financial reports (see also Chapter D.I.2). However, results from the analyzed financial statements show that some firms qualify the DST as an indirect tax or other tax. In addition, according to the statements of some firms, it is possible for them to pass on the DST to customers. Based on this, I differ in the following scenarios for determining the theoretical impact of DSTs on affected firms:

- **Scenario 1**: DST does not apply.
- **Scenario 2**: DST qualifies as an indirect tax. This implies that the DST is treated as a deductible expense (for accounting purposes) but is not included in the ETR calculation.
- **Scenario 3:** DST qualifies as a direct tax. This implies that the DST is a deductible expense (for CIT purposes) and it is included in the ETR calculation.
- **Scenario 4:** DST is fully passed to customers. This implies that the DST is a deductible expense and it is included in the ETR calculation.

These scenarios theoretically show the impact of the DST on the net income, profit margin, and ETR of affected firms, depending on the accounting and tax treatment of DST. The following descriptions refer exclusively to the single-firm level. This is sufficient, however, as changes at the group level only arise to the extent that the cumulative values of the group firms must be considered.

[103] Cf. EU Commission, COM(2018), 148 final, 21 (no. 27). For example, for the British DST: HMRC internal manual, UK CT Deductability of DST, available at: https://www.gov.uk/hmrc-internal-manuals/digital-services-tax/dst47100 (last access: 13.12.2021).

1. Net Income

In *Scenario 1*, net income after taxes before the introduction of the DST laws is:

$$Net\ Income_{before\ DST} = PBT_{before\ DST} * (1 - \tau_{CIT})$$

The applicable CIT rate is expressed as τ_{CIT}.

In *Scenario 2*, the DST is deducted as other tax expense in the calculation of the PBT for accounting purposes and the DST is deductible for CIT purposes. The net income of an affected firm qualifying the DST as an indirect tax is as follows:

$$Net\ Income_{after\ DST} = PBT_{after\ DST} * (1 - \tau_{CIT})$$

The DST is calculated on the gross income derived from in-scope services ($Sales_{DST}$) multiplied by the DST tax rate (τ_{DST}).

In *Scenario 3*, the DST is not deducted from the PBT as a direct tax is generally not deducted from PBT for accounting purposes. However, the DST is deductible for CIT purposes and therefore to be deducted from PBT. Net income of an affected firm qualifying the DST as a direct tax is therefore

$$Net\ Income_{after\ DST} = \left(PBT_{before\ DST} - Sales_{DST} * \tau_{DST}\right) * (1 - \tau_{CIT})$$

In *Scenario 4*, the DST is fully passed-on to customers. There is no effect on the formulas for *Scenario 2* and *Scenario 3* as the DST increases Sales and therefore PBT in both cases. However, using the formula for *Scenario 3* the effect could be rewritten as:

$$Net\ Income_{DST} = [(PBT_{before\ DST} + x_{DST} * Sales * \tau_{DST}) - x_{DST} * (Sales + x_{DST} * Sales * \tau_{DST}) * \tau_{DST}) * (1 - \tau_{CIT})$$

According to the formula above, the 100 % pass-through of the DST does not result in a net income that is equal to the net income before the introduction of the DST as the increase in sales in the amount of the DST simultaneously leads to an increase in the DST liability. Mathematical transformations show that, if sales volumes remain constant, affected firms must increase the prices in the amount of $\frac{1}{1 - \tau_{DST}}$ in order to receive the same net income after the implementation of the DST. Consequently, firms need to increase their prices by more than a 100 % of the DST.[104]

[104] See also Graßl/Giese, beck.digitax 2021, 13. The increase in prices (Sales) is at a DST rate of 2 % (UK) 2.04 %; at a DST rate of 3 % (France, Italy, Spain) 3.09 %; and at a DST rate of 5 % (Austria) 5.26 %.

2. Profit Margin

In *Scenario 1)*, the profit margin can be formulated as follows:

$$Profit\ Margin_{before\ DST} = \frac{Net\ Income}{Sales} = \frac{PBT * (1 - \tau_{CIT})}{Sales}$$

In *Scenario 2)*, the DST is deducted as other tax expense in the calculation of the PBT for accounting purposes and the DST is deductible for CIT purposes. The profit margin of an affected firm qualifying the DST as an indirect tax is as follows:

$$Profit\ Margin_{after\ DST} = \frac{PBT_{after\ DST} * (1 - \tau_{CIT})}{Sales}$$

In *Scenario 3)*, the DST is not deducted from the PBT as a direct tax is generally not deducted from PBT for accounting purposes. However, the DST is deductible for CIT purposes and is therefore to be deducted from PBT. The profit margin of an affected firm qualifying the DST as a direct tax is therefore:

$$Profit\ Margin_{after\ DST} = \frac{PBT_{before\ DST} * (1 - \tau_{CIT})}{Sales} - x_{DST} * \tau_{DST} * (1 - \tau_{CIT})$$

with: $x_{DST} = \frac{Sales_{DST}}{Total\ Sales}$.

In *Scenario 4)*, the DST is fully passed-on to customers. There is no effect on the formulas for *Scenario 2* and *Scenario 3* as the DST increases sales and therefore PBT in both cases. However, using the formula for *Scenario 3* the effect on the profit margin could be rewritten as follows:

$$Profit\ Margin_{after\ DST} =$$
$$\frac{[(PBT_{without\ DST} + x_{DST} * Sales * \tau_{DST}) * (1 - \tau_{CIT})]}{(Sales + x_{DST} * Sales * \tau_{DST})} - x_{DST} * \tau_{DST} * (1 - \tau_{CIT})$$

with: $x_{DST} = \frac{Sales_{DST}}{Total\ Sales}$.

Generally, the impact of DST in the context of more diversified groups can be estimated to be significantly lower, since the proportion of sales subject to DST (= $x_{DST} = \frac{Sales_{DST}}{Total\ Sales}$) will be lower in relative terms, and thus also the tax impact on the profit margin and the ETR (see below).

3. ETR

In *Scenario 1*, the ETR of non-affected firms states as follows:

$$ETR_{before\ DST} = \frac{Tax\ Expense}{PBT} = \frac{PBT * \tau_{CIT}}{PBT} = \tau_{CIT}$$

In *Scenario 2*, the DST is qualified as an indirect tax. The DST is therefore deducted as other tax expense in the calculation of the PBT for accounting purposes and the DST is deductible for CIT purposes. As a result, the ETR corresponds to the ETR of *Scenario 1*.

In *Scenario 3*, the DST is qualified as a direct tax. Therefore, the ETR is composed of the following:

$$ETR_{after\ DST} = ETR_{CIT} + ETR_{DST}$$

The effective DST rate (ETR_{DST}) is a dependent of the profit margin and is relatively higher for firms with high in-scope revenues than for firms with high profit margins. As a result, the effect of the DST on the ETR is higher for low margin firms. The effective DST rate can be expressed as:

$$ETR_{DST} = \frac{x_{DST} * Sales * \tau_{DST}}{PBT} = \frac{x_{DST} * \tau_{DST}}{Profit\ Margin_{before\ DST}}$$

Therefore, the ETR after the implementation of the DST is as follows

$$ETR_{after\ DST} = \tau_{CIT} + \frac{x_{DST} * \tau_{DST}}{Profit\ Margin_{before\ DST}} * (1 - \tau_{CIT})$$

with: $x_{DST} = \frac{Sales_{DST}}{Total\ Sales}$

In *Scenario 4*, the DST is fully passed-on to customers. There is no effect on the formulas for *Scenario 2* and *Scenario 3* as the DST increases Sales and therefore PBT in both cases. However, using the formula for *Scenario 3* the effect on the ETR could be rewritten as follows:

$$ETR_{after\ DST} = \tau_{CIT} + \frac{x_{DST} * (Sales + x_{DST} * Sales * \tau_{DST}) * \tau_{DST}}{(PBT + x_{DST} * Sales * \tau_{DST})} * (1 - \tau_{CIT})$$

In MNE groups only a few firms should provide the in-scope DST services. The DST liability should therefore not be distributed evenly among the firms. As a result, the effect of a DST on the firms bearing the DST should be observable. In turn, the effect of the DST on the ETR of an affected group of MNE instead fundamentally depends on the ratio of in-scope (taxable) revenues to total revenues (x_{DST}) on a consolidated basis, i.e., the higher / lower the ratio the higher / smaller the effect. This means that there might only be a small effect on ETR of a group of MNE if the group provides only a small amount of taxable revenues compared to total revenues in a DST country.

IV. Total Sample

1. Firms of the French List

No.	Firm name	Country	No.	Firm name	Country
1	Airbnb	USA	**15**	Microsoft	USA
2	Alibaba	China	**16**	Rakuten	Japan
3	Alphabet	USA	**17**	Randstad	The Netherlands
4	Amadeus	Spain	**18**	Recruit	Japan
5	Amazon	USA	**19**	Sabre	USA
6	Apple	USA	**20**	Schibsted	Norway
7	Axel Springer	Germany	**21**	Snapchat	USA
8	Booking Holdings	USA	**22**	Travelport	United Kingdom
9	Criteo	France	**23**	Twitter	USA
10	eBay	USA	**24**	Uber Technologies Inc.	USA
11	Expedia	USA	**25**	Verizon Communications	USA
12	Facebook	USA	**26**	ContextLogic Inc.	USA
13	Groupon	USA	**27**	Zalando	Germany
14	Match Group	USA	**28**	TripAdvisor	USA

2. Firms of the Forbes List

No.	Company	Country	No.	Company	Country
29	SAMSUNG	South Korea	**73**	APPLIED MATS.	USA
30	AT&T	USA	**74**	SINGTEL	Singapore
31	CHINA MOBILE	China	**75**	ADOBE (NAS)	USA
32	WALT DISNEY	USA	**76**	XIAOMI	China
33	INTEL	USA	**77**	TELSTRA	Australia
34	SOFTBANK GROUP	Japan	**78**	VMWARE	USA
35	IBM	USA	**79**	TE CONNECTIVITY	Switzerland
36	TENCENT HOLDINGS	China	**80**	SK HOLDINGS	South Korea
37	NIPPON TELG. & TEL.	Japan	**81**	Murata Manufacturing	Japan
38	CISCO SYSTEMS	USA	**82**	COGNIZANT	USA
39	ORACLE	USA	**83**	NVIDIA	USA
40	DEUTSCHE TELEKOM	Germany	**84**	TELENOR	Norway
41	TAIWAN SEMICON.SPN.	Taiwan	**85**	VODAFONE GROUP	United Kingdom
42	KDDI	Japan	**86**	SK TELECOM SUSP	South Korea
43	SAP	Germany	**87**	VIVENDI	France
44	TELEFONICA	Spain	**88**	NASPERS	South Africa
45	AMERICA MOVIL 'L'	Mexico	**89**	INFOSYS	India
46	Hon Hai Precision Industry	Taiwan	**90**	China TOWER	China
47	DELL TECHNOLOGIES	USA	**91**	SWISSCOM	Switzerland
48	ORANGE	France	**92**	CORNING	USA
49	China TELECOM	China	**93**	ROGERS COMMS.	Canada
50	SK HYNIX	South Korea	**94**	NINTENDO	Japan
51	ACCENTURE	Ireland	**95**	KYOCERA	Japan
52	BROADCOM	USA	**96**	NXP SEMICONDUCTORS	The Netherlands
53	MICRON TECHNOLOGY	USA	**97**	DISH NETWORK	USA
54	QUALCOMM	USA	**98**	ALTICE EUROPE	The Netherlands
55	PAYPAL HOLDINGS	USA	**99**	TELUS	Canada

56	China UNICOM	Hong Kong	**100**	CAPGEMINI	France
57	HP	USA	**101**	ACTIVISION BLIZZARD	USA
58	BCE	Canada	**102**	ANALOG DEVICES	USA
59	TATA CONSULTANCY SVS.	India	**103**	LAM RESEARCH	USA
60	AUTOMATIC DATA PROC.	USA	**104**	DXC TECHNOLOGY	USA
61	BT GROUP	United Kingdom	**105**	LEGEND HOLDINGS	China
62	MITSUBISHI ELECTRIC	Japan	**106**	LENOVO GROUP	China
63	CANON	Japan	**107**	NETEASE	China
64	SAUDI TELECOM	Saudi Arabia	**108**	TOKYO ELECTRON	Japan
65	JD COM	China	**109**	KEYENCE	Japan
66	TEXAS INSTRUMENTS	USA	**110**	PT Telekomunikasi Indonesia	Indonesia
67	NETFLIX	USA	**111**	NOKIA	Finland
68	PHILIPS KONINKLIJKE	The Netherlands	**112**	FORTIVE	USA
69	ETIHAD ETISALAT CO.	Saudi Arabia	**113**	ERICSSON	Sweden
70	BAIDU	China	**114**	FISERV	USA
71	ASML HOLDING	The Netherlands	**115**	FUJITSU	Japan
72	SALESFORCE.COM	USA	**116**	Hewlett Packard Enter.	USA

3. Industry classification

The industry classification of the Total Sample is as follows:

TR2N classification	No. of firms	Ratio of DST affected firms	Ratio of non-affected firms
Consumer Goods Conglomerates	1	0 (0 %)	1 (100 %)
Cyclical Consumer Products	1	0 (0 %)	1 (100 %)
Cyclical Consumer Services	9	6 (66.67 %)	3 (33.33 %)
Energy - Fossil Fuels	1	0 (0 %)	1 (100 %)
Healthcare Services & Equipment	1	0 (0 %)	1 (100 %)
Industrial & Commercial Services	4	1 (25 %)	3 (75 %)
Industrial Goods	5	0 (0 %)	5 (100 %)
Retailers	3	2 (66.67 %)	1 (33.33 %)
Software & IT Services	37	16 (43.24 %)	21 (56.76 %)
Technology Equipment	28	0 (0 %)	28 (100 %)
Telecommunications Services	25	1 (4 %)	24 (96 %)
NA	1	0 (0 %)	1 (100 %)
Sum	**116**	**26**	**90**

Table 8: Industry classification of the Total Sample. The table shows the industry classification of the Total Sample categorized based on the affected firms and non-affected firms according to the Thomson Reuters Refinitiv database (code TR2N) for the financial year 2020.

V. Descriptive Statistics: Financial years 2019–2020

	2019–2020 Affected firms				2019–2020 Non-affected firms				Difference between mean of affected and non-affected firms
	Mean	Standard Deviation	Median	N	Mean	Standard Deviation	Median	N	
PBT	5,691,915	11,196,537	677,969	33	4,893,263	7,161,003	2,297,333	157	798,652
Profit Margin	9.17 %	21.90 %	10.04 %	33	16.46 %	11.50 %	15.56 %	157	-7.29 %*
Employees	135,230	276,472	16,120	33	98,764	100,323	62,885	149	36,467
Revenue per Employee	480,00	355,34	384,95	33	453,01	344,54	360,50	149	26,99
Sales	40,326,071	76,891,379	7,982,000	33	32,890,635	34,560,943	18,352,170	157	7,435,436
Ratio Foreign Sales/ Total Sales	52.99 %	21.85 %	49.34 %	33	61.95 %	32.53 %	71.71 %	131	-8.96 %*
Total Assets	54,777,200	85,538,740	14,679,382	33	68,234,601	82,263,798	34,369,000	158	-13,457,400
Intangible Assets	8,978,031	11,958,761	4,391,493	33	20,113,662	36,076,156	7,486,700	157	-11,135,631***
Amortization of Intangibles	435,410	1,002,972	141,717	33	1,161,123	1,630,203	556,608	150	-725,714***
R&D Expenses	8,559,365	12,508,606	996,413	18	2,476,362	3,286,144	1,362,996	117	6,083,003*
Ratio Intangible Assets/Total Assets	29.14 %	18.05 %	27.70 %	33	27.93 %	21.92 %	23.29 %	157	1.20 %
Sales/Total Assets	71.58 %	41.72 %	58.51 %	33	60.46 %	39.59 %	49.82 %	157	11.12 %
Foreign Assets/ Total Assets	14.09 %	19.04 %	5.17 %	31	19.23 %	23.89 %	9.78 %	109	-5.14 %
International Footprint	**3.76**				**3.22**				

Table 9: Comparison of mean, standard deviation, and median for the descriptive statistics for both DST-affected and non-affected firms for 2019 and 2020. All data are in thousand EUR, except those in percentages and the ratio International Footprint. In this table, I show the mean, standard deviation, and median for the outlined balance sheet and income statement items and ratios thereof for DST-affected firms and non-affected firms for the financial years 2019 until 2020. The data respective ratios are enhanced with the ratio "International Footprint" that is defined as Foreign Sales/Total Sales to Foreign Assets/Total Assets. I used a t-test to determine the significance in the difference of the means. The results of the t-test are added to the difference of means of both affected and non-affected firms. *, **, *** indicate significance at the 10 %, 5 % and 1 % level respectively. The firms are categorized as DST-affected and non-affected firms based on the statements in the financial statements and reports, as described earlier.

VI. Empirical effect of DSTs on ETR for firms qualifying DSTs as direct or indirect taxes

	2011–2014		2015–2018		2019–2020	
	Direct Tax (n = 6)	**Indirect or Other Tax (n = 5)**	**Direct Tax (n = 6)**	**Indirect or Other Tax (n = 5)**	**Direct Tax (n = 6)**	**Indirect or Other Tax (n = 5)**
GAAP ETR						
Mean	**34.36 %**	**31.31 %**	**31.34 %**	**22.95 %**	**19.88 %**	**19.54 %**
Standard Deviation	8.31 %	14.82 %	10.01 %	5.61 %	6.99 %	11.17 %
Median	34.86 %	30.24 %	33.01 %	25.76 %	20.40 %	21.56 %
Cash ETR						
Mean	**20.61 %**	**30.00 %**	**32.12 %**	**17.88 %**	**20.93 %**	**30.16 %**
Standard Deviation	17.17 %	19.58 %	5.93 %	8.94 %	7.54 %	33.50 %
Median	18.90 %	25.91 %	30.45 %	13.98 %	18.86 %	15.16 %
ETR2						
Mean	**6.70 %**	**3.91 %**	**2.84 %**	**4.12 %**	**3.39 %**	**2.48 %**
Standard Deviation	4.48 %	3.07 %	1.41 %	2.54 %	2.04 %	2.15 %
Median	5.01 %	3.44 %	3.16 %	4.05 %	3.50 %	1.95 %
ETR3						
Mean	**4.14 %**	**2.67 %**	**3.11 %**	**2.32 %**	**2.85 %**	**1.65 %**
Standard Deviation	1.69 %	1.97 %	1.93 %	0.98 %	1.89 %	1.53 %
Median	4.22 %	2.22 %	2.81 %	2.11 %	3.24 %	1.05 %

ETR4						
Mean	**75.44 %**	**84.16 %**	**81.60 %**	**74.54 %**	**80.62 %**	**70.72 %**
Standard Deviation	12.11 %	11.16 %	18.16 %	14.88 %	10.80 %	17.73 %
Median	78.83 %	85.22 %	86.15 %	74.78 %	84.01 %	73.02 %
ETR5						
Mean	**63.46 %**	**76.00 %**	**93.20 %**	**57.56 %**	**69.15 %**	**54.47 %**
Standard Deviation	52.61 %	53.26 %	53.85 %	43.68 %	47.16 %	32.85 %
Median	39.39 %	54.91 %	89.88 %	44.66 %	60.44 %	51.79 %

Table 10: Comparison of mean, standard deviation, and median of the GAAP ETR, Cash ETR, ETR2, ETR3, ETR4, and ETR5 for DST-affected firms that qualify DSTs as direct taxes and firms that qualify DSTs as indirect taxes in financial years 2011 to 2014, 2015 to 2018, and 2019 to 2020. In this table, I show a comparison of the ETR ratios, as defined hereafter for DST-affected firms that qualify the DSTs as direct taxes and firms that qualify the DSTs as indirect taxes based on the data from Thomson Reuters Refinitiv for the financial years 2011 until 2020. The data are winsorized at the 10 % level. Firms with less than two missing observations for the respective values of the ETR ratios during the respective period and firms with missing or zero values for tax expense, taxes paid, sales, total assets, SGA or CONR during the respective period are also excluded. The ratios are defined as follows:

- **GAAP ETR reported:** $GAAP\ ETR = \frac{Tax\ Expense}{Profit\ before\ Taxes}$
- **Cash ETR reported:** $Cash\ ETR = \frac{Taxes\ Paid}{PBT}$
- **ETR2:** $ETR2 = \frac{Tax\ Expense}{Sales}$
- **ETR3:** $ETR3 = \frac{Tax\ Expense}{Total\ Assets}$
- **ETR4:** $ETR4 = \frac{Tax\ Expense+SGA+Cost\ of\ Net\ Revenue}{Sales}$
- **ETR5:** $ETR5 = \frac{Tax\ Expense+SGA+Cost\ of\ Net\ Revenue}{Total\ Assets}$

VII. Empirical effect of DSTs on SGA and CONR for firms qualifying DSTs as direct or indirect taxes

	2011–2014		2015–2018		2019–2020	
	Direct Tax (n = 6)	**Indirect or Other Tax (n = 5)**	**Direct Tax (n = 6)**	**Indirect or Other Tax (n = 5)**	**Direct Tax (n = 6)**	**Indirect or Other Tax (n = 5)**
SGA1						
Mean	**31.73 %**	**48.12 %**	**45.74 %**	**41.09 %**	**34.11 %**	**45.72 %**
Standard Deviation	10.99 %	17.92 %	22.56 %	17.77 %	16.20 %	14.17 %
Median	33.08 %	43.87 %	38.73 %	39.90 %	34.23 %	40.58 %
SGA2						
Mean	**21.69 %**	**36.39 %**	**42.39 %**	**28.09 %**	**23.85 %**	**31.38 %**
Standard Deviation	9.26 %	7.25 %	13.94 %	14.89 %	13.35 %	9.68 %
Median	18.96 %	36.95 %	41.66 %	30.02 %	20.66 %	34.68 %
CONR1						
Mean	**37.01 %**	**32.13 %**	**33.02 %**	**29.33 %**	**43.12 %**	**22.51 %**
Standard Deviation	23.61 %	23.74 %	28.13 %	26.03 %	22.50 %	18.97 %
Median	36.22 %	19.75 %	34.48 %	24.12 %	48.18 %	17.94 %
CONR2						
Mean	**37.62 %**	**36.94 %**	**47.69 %**	**27.15 %**	**42.45 %**	**21.44 %**
Standard Deviation	45.75 %	50.57 %	49.49 %	34.28 %	38.79 %	25.46 %
Median	15.18 %	13.35 %	39.27 %	12.53 %	38.22 %	12.72 %

Table 11: Comparison of mean, standard deviation, and median of the SGA1, SGA2, CONR1, and CONR2 for DST-affected firms that qualify DSTs as direct taxes and firms that qualify DSTs as indirect taxes during financial years 2011 to 2014, 2015 to 2018, and 2019 to 2020. In this table, a comparison of SGA1, SGA2, CONR1, and CONR2 is presented, as defined hereafter for DST-affected firms that qualify DSTs as direct taxes and firms that qualify DSTs as indirect taxes based on the data from Thomson Reuters Refinitiv for the financial years from 2011 until 2020. The data are winsorized at the 10 % level. Firms with less than two missing observations for the respective values of the ETR ratios during the respective period and firms with missing or zero values for tax expense, taxes paid, sales, total assets, SGA or CONR during the respective period are also excluded. The ratios are defined as follows:

- **SGA1:** $SGA1 = \frac{SGA}{Sales}$
- **SGA2:** $SGA2 = \frac{SGA}{Total\ Assets}$
- **CONR1:** $CONR1 = \frac{CONR}{Sales}$
- **CONR2:** $CONR2 = \frac{CONR}{Total\ Assets}$

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