EVIDENCE AGAINST THE UNDERTAXATION OF DIGITAL COMPANIES FROM THE WEIGHTED EFFECTIVE TAX RATE METHOD ANALYSIS

PAVEL PETERKA, DOMINIK STROUKAL

Abstract:

This study scrutinizes the prevalent belief that traditional companies face a more substantial taxation burden compared to digital firms. Our research delves into the effective corporate tax rate (ECTR) for an extensive sample of 463 global companies, encompassing 217 digital and 246 traditional entities, over the period from 2010 to 2020. Utilizing a unique dataset, our analysis reveals that the effective tax rates for digital and traditional companies do not significantly diverge. Contrary to common perceptions, in certain years, digital companies shouldered a heavier tax burden. This finding suggests that to achieve parity in taxation between digital and traditional firms, digital entities would have warranted tax relief, particularly between 2012 and 2015 when their tax rates were demonstrably higher. Furthermore, our models highlight a gradual increase in the effective corporate tax rate for digital companies over time, reflecting their growth and stabilization in the market. Throughout the entire period under study, including each individual year from 2010 to 2020, the difference in the effective tax rate between digital and traditional companies did not exceed an average of three percentage points across the selected countries. This threshold of three percent is notably the same as the digital tax proposed by the European Commission as a provisional measure. Since the observed difference consistently fell below this margin, imposing an additional 3% tax on digital services would, in effect, impose a disproportionately higher tax burden on digital firms than on their traditional counterparts.

Keywords:

Digital services tax, digital economy, tax policy, weighted effective tax rate

JEL Classification: H21, H26, E61

Authors:

PAVEL PETERKA, Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic, Email: ppeterka15@gmail.com
DOMINIK STROUKAL, Metropolitan University Prague, Czech Republic, Email: dominik@stroukal.cz

Citation:

1   Introduction

In March 2018, the European Commission (2018a) introduced the proposal for a Digital Services Tax, marking the commencement of a noteworthy journey for this new fiscal instrument. Despite initial resistance from several member states in 2019, the unfolding of the COVID-19 pandemic in 2020 compelled the European Commission to advocate for the establishment of the EU Recovery Fund within a wider context of regional development and funds stabilization in all EU member countries (Rezabek, et al. 2022). Within this context, a tax on digital services across the EU is envisaged to serve as a significant source of revenue.

The prospect of a Digital Services Tax is once again emerging in policy discussions as a viable means of generating additional revenue to support the expanding European Funds. The urgency of this matter is expected to escalate, driven by the European Commission's intensified efforts to implement the tax and ensure its uniform application across all EU Member States. Consequently, a detailed examination of the proposed digital tax rates and their potential impact on the revenue of member states' national budgets becomes imperative.

The findings from this analysis are poised to furnish policymakers with enhanced understanding and justification for the digital services tax. This paper endeavors to evaluate the hypothesis that only a nominal or zero tax rate would yield the anticipated beneficial outcomes, particularly considering the extensive range of adverse consequences typically associated with sector-specific taxes. The Digital Services Tax, being a novel instance of such taxes, merits thorough investigation. This article aims to enrich the discussion surrounding the adoption or rejection of this tax, providing economic insights and evidence to inform the debate.

The European Commission argues that providers of digital services are undertaxed. Thus, a new tax must be imposed and harmonized in EU member states to prevent tax optimizing behavior by the taxed companies. Opponents argue that digital service companies are not undertaxed and that their high effective tax rates are comparable to traditional businesses. Consequently, the main goal of this paper is to calculate the effective rate of taxation for digital companies in selected EU countries and to compare it with the effective rate of taxation of traditional businesses. To do so we used unique data collected by the authors of the text. The level of taxation of digital companies is a key area of research, especially in the context of the development of digital taxes in many countries around the world.

The effective tax rate can be defined as the difference between the pre-tax and after-tax profit rates as:

$$ECTR = \frac{T}{EBIT} \qquad\qquad (1)$$

Where T represents income taxes paid and EBIT stands for earnings before interest and taxes.

Calculating the ECTR using weighted values will reveal the differences in the average effective tax rates of digital and traditional companies. Based on these results, the difference in weighted ECTR between digital and traditional companies will be determined and thus will contribute to the debate on the introduction of a separate digital tax that aims to wipe out any differences in tax burden between the two (Bauer, 2018; Bauer, 2019).

Hypothesis is that digital companies are not undertaxed. The paper is showing it using the weighted ECTR and comparing the results to the proposal of the European Commission.

2   Why digital tax: literature review

Digital businesses have brought a number of challenges to the tax systems that have been set up towards companies with a physical presence or corporate in each country (Srivastava et al, 2022). The development of modern technology and digital business models has led to the emergence of a number of companies that have users and customers in countries where they do not have a physical or corporate presence but nevertheless generate profits there (Lemes Bausch et al., 2021; Jiang, 2020; Güngördü Belbağ, 2021). However, they do have a corporate presence somewhere, where they are taxed.

Significant part of the tax system still accounts for the physical or corporate presence of these companies, and thus according to European Commission companies are not taxed in these markets because digital companies are better equipped for profit and tax shifting and thus the assumption is that such companies are more effective in tax optimization (Cui, 2018; European Commission, 2018b). OECD shows examples of opportunities for tax base erosion and profit shifting in the digital economy (OECD, 2015). Even from the title of this OECD document it is clear that base erosion and profit shifting are one of the main drivers of new digital taxes. Olbert and Spengel (2017) advocate for the adjustment of current tax system and tax treaties to address specifics of digital economy and digital business such as the revision of the concept of permanent establishment and clarification of cross-border digital transaction taxation.

Devereux and Vella (2014) argue that such changes significantly expanded possibilities of profit shifting, erosion of tax bases and various other tax optimization strategies to minimize tax liabilities through intangible assets, remote sales and data driven business models typical for digital businesses.

Johannesen, Tørsløv, and Wier (2020) highlight the existence of profit shifting and tax optimization practices among multinational corporations, regardless of their engagement in digital activities. Their findings show that such firms tend to declare lower profits in countries with higher level of taxation levels and conversely they declare higher profits in countries where level of taxation is lower. Similarly, Riedel (2018) also points out that while findings across various studies and research papers differ, they suggest that multinational corporations engage in extensive tax planning to reduce their tax obligations. Based on these findings, it would be quite difficult to advocate for addressing profit shifting through the introduction of a digital service tax specific only to digital companies and just because of the creation of unequal conditions in both local and global markets.

The phenomenon of digitization of global economy will likely gain momentum and be one of the fundamental changes in global tax systems, global tax governance and tax cooperation in years to come (Christensen & Hearson, 2019).

The debate on the taxation of digital services is very similar to the debate on any introduction of new taxes and increases in existing ones, namely to raise additional resources for state budgets (European Commission, 2018a; Plečnik & Wang, 2021).

The Digital Services Tax (DST) is primarily directed at large multinational corporations offering digital services. The acronyms GAFA and GAFA tax have been adopted by French media to describe the DST, drawing attention to four of the most prominent and influential companies in the digital economy: Google, Amazon, Facebook, and Apple. This nomenclature reflects the significant role these companies play in the digital services landscape, though the applicability of DST extends beyond just these entities. (Avi-Yonah & Fishbien, 2020)

Today's dynamic and large-scale digital transformation is associated with a number of very important socio-economic impacts. The main subject of the debate in this context is the fact that the international tax rules were developed several decades ago and do not correspond to current digital trends and developments in the modern global economy (Bloch & Demange, 2017). It must be stressed, however, that there is a risk that the European Commission might be biased regarding the taxation of digital services because of the conflict of interest in the issue of raising tax revenues for the public budgets of the Member States and, in the future, possibly the EU central government budget. Büttner and Thiemann (2017) further develop this claim as they highlight the issue of politicization of expertise in international tax through increasing role of politics, interest groups and various other stakeholders from different areas including both governments and multinational companies with different interests. However, there is not a broad consensus among the experts and academists that the digital economy and digital services are undertaxed.

According to the European Commission, the digital tax is intended to close the perceived gaps in the current global tax system. Two fundamental questions thus arise based on the two pillars of the current tax system, which are:

1. Where should taxes be paid?
2. What is the appropriate tax fate for traditional digital firms?[1]

However, if there is to be a fundamental change in the rules of the global tax system, then these changes should be supported by evidence-based arguments. Pomeranz and Vila-Belda (2019) underscore the importance of evidence-based policymaking and customization of possible changes or interventions so they align with specific context and taxpayers groups. This paper will address question number two, meaning the level of effective tax rate and the difference in the effective taxation of digital and traditional companies around the world. The goal is to find out whether there is a difference between the level of taxation and tax burden of digital and traditional companies and, if so, how big this difference that the original tax framework is alleged to be incapable of addressing is.

We aim to identify the presence and magnitude of the difference in taxation between digital companies and traditional companies that the original tax framework is alleged to be incapable of addressing.

2.1   Model of digital tax presented by European Commission

Digital services that are to be a subject to the digital tax are services that are delivered via the internet or other digital networks. Such services also are automated, require minimal human intervention, and are impossible to ensure in the absence of information technology, particularly (European Commission, 2018a):

1. digitised products such as software;
2. websites and webpages;
3. generated automated services based on specific data input by the consumer;

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[1] We could ask a third fundamental question, namely how the proponent of the digital tax wants to justify the different approach to taxing traditional and digital companies. Up to this point, the design of the tax system has been sufficient. In particular, these principles have led to a certain degree of legal and tax certainty and have thus helped to avoid possible double taxation, thereby helping to stimulate international trade (Rod, 2021).

4. online markets with electronic systems where consumers can make their bids;

5. and Internet Service Packages.

The proposal introduced a definition of "significant digital presence" status in a particular Member State to establish a taxable nexus as an addition to the existing tax system. The new rules should be based on three key criteria that are centred around revenues from supplying digital services, the number of users of those digital services, or the number of contracts for a digital service.

As it is standard in accounting, by revenues we mean the total sales of a business within a reporting period, this is the value of all sales of goods and services recognized by a company in a period.

According to the three criteria, companies that fulfil one of the following should be subject to the tax:

1. income exceeding EUR 7 million in the jurisdiction of a Member State concerned in a single tax period;

2. more than 100,000 users per year in a Member State concerned in a single tax period;

3. and more than 3,000 online contracts with other businesses.

The goal of abovementioned thresholds is to exclude small and medium-sized businesses from the digital tax scheme, which is expected to be associated with significant compliance costs. Businesses that reach at least one of the three thresholds listed above are to be taxed by the individual Member States b that would collect all the information and the payment of the DST on behalf of other Member States where the DST is due using a single contact point. Income derived from a substantial digital presence is defined in short as "income that would be earned by an independent company taking the same steps as a multinational company under the same conditions". (European Commission, 2018b). According to the European Commission (2018c) "the proposal will have no implications for the EU budget." The tax revenues should stay in the Member States.

2.2   Provisional digital tax proposal presented by the European Commission

Since the negotiations on setting a single tax on digital services and the search for a consensus take a lot of time, the European Commission (2018b) came up with a proposal for an interim proposal for a digital tax. Unlike the first part, this proposal was openly trying to achieve higher tax revenues. Specifically, revenues where users of digital services play a significant role, such as:

1. income from the sale of online advertising;

2. income from digital intermediary activities, i.e. activities enabling users to interact with other users, to aggregate and sell services and goods;

3. and revenue from the sale of data collected from users.

Under the proposal, the revenue was to be taxed where the users of the services listed above were based. Companies with worldwide revenues of over EUR 750 million and EU revenues of over EUR 50 million would be subjected to the tax. The European Commission projects that this tax, levied at 3% on total digital activity revenues, would yield approximately EUR 5 billion annually, though it omits the calculation methodology.

2.3   OECD presents a two-pillar solution to the tax challenges of the digitalisation of the economy

Given the nature of the challenges in the tax system associated with the digitalisation of the economy and the digital economy itself, the OECD has concluded that the solution to the situation lies in the creation of a comprehensive system based on a consensus of the individual countries of the world on an international tax system for digital and traditional companies. The current proposal is presented by the OECD using two pillars (OECD, 2022).[2]

The first pillar deals with the re-allocation of taxing rights. It sets out new rules on in which jurisdictions should be the tax paid and also sets out a new way of sharing tax revenues between countries. It is intended to reallocate some tax rights over a portion of profits of the largest and most profitable multinational companies from their home countries to the markets where they do business and make profits, regardless of whether the companies have a physical or corporate presence in that market jurisdiction. The design of the first pillar should further ensure the elimination of double taxation and the simplicity of the process. Initial estimates suggest that something in the order of a hundred of the world's largest corporations would be affected by the Pillar 1 rules. (OECD, 2022).

Several key pieces of information can be obtained from the current proposals. The first pillar will only apply to global companies with consolidated revenues exceeding EUR 20 billion and a revenue to profit before tax ratio (margin) of at least ten per cent. In order to be taxable in a given country, such a company must have revenues of at least EUR 1 million in that country. For smaller countries, the threshold is lower at EUR 250,000. At the same time, the company must make a positive profit. In order to avoid double taxation, part of the profits and taxes paid in other countries will be exempted and, where applicable, counted as taxes paid (OECD, 2022).

The second pillar creates the Global anti-base erosion mechanism, which introduces a global minimum corporate tax rate of 15%, regardless of the jurisdiction in which the company is based. The second pillar of the proposal would apply to around two thousand international corporations. To be subject to the second pillar rules, a corporation must have a consolidated revenue of at least EUR 750 million. The expected additional tax revenues of the second pillar are around USD 150 billion. The method of calculation of the expected return is not clear at the time of writing. The aim of the second pillar is to prevent the shifting of profits to jurisdictions with a relatively lower or zero corporate tax rate (OECD, 2022b).

2.4   Countries that introduced some form of digital tax

The wave of proposals and the introduction of a digital tax in number of countries has risen particularly during the pandemic years 2020 and 2021, when many public sector representatives in numerous countries around the world have been looking for a way to raise tax revenues to fund large government packages to boost the economy.

The level of introduced or proposed digital taxes ranges between 1,5% and 7,5% of the taxable base for digital services. The definition of the taxable base naturally varies between jurisdictions. However, from a review of the proposals of different countries, it is clear that the taxable base proposals of different jurisdictions intersect in and agree on the taxation of digital advertising income, data sales income, and digital marketplace income (Asen & Bunn, 2021) (KPMG, 2022).

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[2] It should be noted that the current proposals are almost certainly not final and the OECD envisages several rounds of revisions.

In the absence of a multilateral consensus on the form of a digital service tax (DST) unilateral tax policies may cross or even contradict each other, leading to uncertainty and possibly double taxation. In this sense, if there has to be a DST, a broad agreement on DST is definitely desirable. The vast majority of countries analyzed have decided to wait for a global solution and have thus temporarily suspended or completely abolished their current proposals (KPMG, 2022). Of course, there are exceptions.

Countries that have introduced some form of tax on digital services include the UK, France, Italy, Spain, Austria, Portugal, Turkey, Kenya, Tanzania, Nepal, Kyrgyzstan, and India. However, in October 2021, these European countries agreed with the US in a joint declaration that their unilateral digital taxation measures would be transitional and in place until the global mechanism would be implemented (Asen & Bunn, 2021; Borders et al., 2023).

Among countries that have announced their intention to introduce digital service tax (DST) are Japan, Norway, Israel, New Zealand, and Latvia. These countries are willing to wait for a global solution for the time being, and most of them have not yet presented their unilateral proposal, but plan to implement it in the absence of a global agreement (Asen & Bunn, 2021; KPMG, 2022).

There are also countries waiting for the introduction of DST or at least a proposed form of DST. Countries that are currently drafting legislation and planning to implement it include Canada, Slovakia, and the Czech Republic. For the latter, negotiations on the proposal have been halted mainly due to the change in the government after the elections in 2021 (Asen & Bunn, 2021; KPMG, 2022).

2.5   Current discussion on digital tax

The discourse surrounding the adoption of a digital tax has intensified significantly in recent years. This surge in attention naturally results in a proliferation of perspectives for and against the imposition of an ancillary tax on digital services, emanating from academic circles, public discourse, and the private sector.

A primary contention supporting the enactment of an ancillary tax on digital services hinges on the sweeping digital transformation permeating every sector of the economy. The argument posits that existing taxation frameworks fail to encapsulate this evolution, thereby lacking the agility to adapt (Bloch et al., 2017). Critique primarily targets the disparity in tax burdens borne by digital versus traditional enterprises, alongside issues surrounding tax domicile—specifically, the practice of taxing corporate profits in the jurisdiction of establishment rather than where profits are accrued. This critique presupposes that digital enterprises, unlike their traditional counterparts, can generate revenue and profits in jurisdictions without maintaining a physical presence, attributed to the accelerated dematerialization of economic assets. Such dynamics ostensibly facilitate the migration of these entities to jurisdictions offering more tax-advantageous conditions. While it's acknowledged that traditional firms and multinational corporations also engage in market activities absent a significant physical or corporate footprint, digital-centric companies arguably possess greater latitude for such practices and tax optimization strategies (Agrawal & Fox, 2021; Klein et al., 2022; Cui, 2018). This paper endeavors to scrutinize this claim through an extensive analysis of tax contributions from a representative sample of the world's leading digital and traditional companies operating within the European Union.

Another frequently used argument in favour of global common system of taxation of digital services stands on the potential problems that unilateral tax rules might discriminate against the largest market players or foreign competition. A common system should make sure that the rules

preventing double taxation would be the same in all the countries that join the system. A global system should also reduce the risk of trade wars between individual countries that could be a result of unilateral tax rules (Christensen & Hearson, 2019). There is still a risk that if, for example, one economic region such as the EU was to introduce its own form of digital tax without the participation of the US (where the largest number of digital companies are based) and other major global players, then representatives of excluded regions could be motivated to introduce retaliatory measures aimed, in this case, at European businesses (Klein et al., 2022; Russo, 2019; Cui, 2018; Kim, 2020). This argument compares the introduction of a global scheme to the introduction of unilateral rules and not the global DST to no DST scheme at all.

Moreover, there's a prevalent argument associated with the introduction of any new tax, which centers on the necessity to augment state budget revenues. This rationale has become increasingly pertinent and critical from 2020 onwards, attributed to the imperative for numerous countries to bolster government expenditure designed to sustain the economy amid the pandemic. It's plausible to speculate that, independent of the pandemic's impact, various national governments would have invariably pursued novel revenue streams to either bolster their national budgets or fund ambitious initiatives, such as Green deal or social programs (Grzebyk et al, 2022; Hromada et al, 2023). Such initiatives might include the transition towards a more sustainable economy with reduced greenhouse gas emissions or other environmentally protective measures (Rod, 2021; Blanchard, 2019).

General arguments against excessive corporate taxation stand on the expected negative effects in the short, medium, and long term, such as reduced incentives to save, invest, innovate, negative effects on economic growth, promotion of tax avoidance, and many others (Vella, 2019; Jha & Gozgor, 2019). Introducing a special discriminatory corporate tax on digital firms would lead to the negative impacts mentioned above in sectors selected on the basis of shaky economic arguments. Burdening a selected sector with an additional not-neutral tax could distort the level playing field in the market.

In the case of an emerging sectors of economy in a digital environment, combined with the perceptible effects of the pandemic on the performance of the global economy, these arguments may become more relevant because these new sectors need a significant inflow of investments and the easiest possible environment for development and entrepreneurship. That is if we want to fulfil the potential of this phenomenon in the EU and worldwide.

There are also arguments against the introduction of a single global tax rate, which would prevent any possibility of tax competition between countries participating in the system. It can be assumed that without such a market control of the level of the tax on digital services, the tendency of the tax rate will be rather upward, which might suit governments all around the world as the fiscal effect of such development will be ceteris paribus positive.[3] However, the inability to compete in the tax rate will then fall most heavily on smaller economies that use tax competition principles to attract businesses and foreign investment (Parchet, 2019; Gugl & Zodrow, 2018). Smaller economies have relatively little influence on the final shape of any changes to the global tax system. When changes are made in an unfavourable direction, smaller economies will have to choose whether to comply with the new laws or ignore them and face the consequences.

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[3] It should be noted that it cannot be easily concluded that the regions with higher tax revenues have economic advantage over the countries with lower tax revenues. In fact, there is growing evidence that lower corporate taxes are advantageous (Ljungqvist & Smolyansky, 2018; Alinaghi & Reed, 2021).

3   Data and methods

One of the main objectives of this paper was to calculate the level of effective taxation of traditional companies and companies operating in the digital environment. One of the main reasons for considering additional taxation of digital services worldwide is the assumption that digital companies are taxed at a lower effective tax rate than traditional companies, mostly because digital services are assumed to be generally undertaxed. The digital tax is posited to mitigate the presumed variances in effective tax rates, thereby equalizing the competitive environment in the market. Therefore, this section of the paper focuses on calculating the effective corporate tax rate for digital companies and traditional companies in order to provide an informed answer to this question. The decision to use the ECTR method for comparing the tax burdens of digital and traditional companies was driven by its widespread recognition and utilization in both academic research and practical business application as it is a robust indicator of corporate tax liability. Our decision is in alignment with several studies in the field of taxation of digital companies. Jánský (2022) highlights that backward-looking Effective Tax Rates of multinational corporations have been used more frequently due to enhanced data availability. Furthermore, Jánský underscores their growing relevance amid the global corporate tax reform debates. Sokolovska and Belozyorov (2019) used ECTR method in their research of relationship between profitability of digital corporations and their effective tax liabilities. Similarly Bauer examines the tax contributions of digital companies employing the method of ECTR (Bauer, 2018, 2019). By using the ECTR method for our analysis, our paper contributes to the ongoing academic dialogue concerning taxation of multinational companies both digital and traditional. We used unique data collected by the authors of the text to calculate the effective corporate tax rate.

At the end we want to compare the effective tax rate (ECTR) for digital firms with ECTRs for traditional companies and compare the difference, if any, with the DTS proposal of the European Commission. This helps us to see if the digital companies are really undertaxed or not.

To compare the effective tax rate of digital and traditional companies, we collected data on the Effective Corporate Tax Rate, defined as

$$ECTR_{it} = \frac{T_{it}}{EBIT_{it}} \qquad (2)$$

where *ECTR* is Effective Corporate Tax Rate, *T* is a sum of paid taxes and *EBIT* is Earnings Before Taxes. Then *i* is the index for each company and *t* is the index for the year. This data was collected by us in early 2022 from publicly available sources of audited financial statements.

For the calculation, it is necessary to work with the Effective Corporate Tax Rate and not the Statutory Corporate Tax Rate[4] because 1) the goal is not to compare statutory measures but to compare actual tax paid and 2) to see how much the *additional* digital tax can theoretically yield.

The total dataset contains 246 traditional companies and 217 digital companies. The number of companies surveyed varies slightly from year to year; the figure above is the total for all years. Overall, however, there are some cases where companies did not previously exist or later went out

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[4] The effective tax rate is the rate of income tax that is actually paid after all tax deductions, exemptions, tax breaks etc. The statutory tax rate is the percentage defined by law (without all tax deductions etc.).

of business.[5] Data on T, EBIT, revenues and ad hoc other data such as the share of total revenues in Europe was collected from the financial statements of all 463 companies in total.[6]

Digital companies were defined as companies from the MSCI digital companies index, which "includes companies from the parent universe which are determined to have high exposure to business activities such as - digital payments, robotics, cyber security, e-commerce, sharing economy, social media and cloud computing," (MSCI, 2022), and the MSCI software companies index with an analogous definition.

Traditional companies were selected from European companies that traded on the largest European exchanges within the Euro Stoxx 50, DAX 30, CAC 40, IBEX 35, WIG 20, FTSE 100 and PX indices, i.e. the overall European, German, French, Spanish, Polish, UK, and Czech indices. The data was collected for the years 2010 to 2020.

The data was compiled in local currencies and converted into USD through the average exchange rates of the given years.

To compare the ECTR of traditional and digital companies, it was necessary to deal with negative results for taxes and earnings. In other words, the formula above for ECTR leads to a certain number of companies with negative ECTR[7], both for traditional and digital companies. We have excluded these companies from the comparison and the comparison is therefore a comparison of the ECTR of traditional and digital companies with positive EBIT and positive taxes paid. Thus, to be included in the dataset, all three conditions must hold

$$ECTR_{it} > 0; \ T_{it} > 0; \ EBIT > 0 \qquad (3)$$

The share of excluded companies also allows for an additional comparison that shows how much of the traditional market is negative compared to the digital sector. It can be assumed that this figure will be significantly higher for digital companies.

It is not possible to compare the effective taxation of companies using a simple arithmetic average of individual ECTRs. Small companies with an extremely high ECTR or, conversely, an ECTR close to zero cannot be compared together.[8] Thus we use

$$wECTR_{it} = \frac{\sum(T_{it} \times EBIT_{it})}{\sum EBIT_{it}} \qquad (4)$$

where *wECTR* is the weighted average of the companies ECTRs, with the weight being the relative size of their EBITs. The other variables are identical to the previous method.

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[5] In total, there were 126 to 173 digital companies, and this number grew continuously during the period studied, while traditional companies grew from 217 to 243, and in the last year studied, 2020, the number dropped by one.

[6] The data was collected at the beginning of 2022, so the last financial statements for all companies were for 2020.

[7] The combination of negative EBIT and negative taxes paid is also considered to be negative ECTR, even though in purely mathematical terms the proportion of these figures is positive.

[8] Mainly because we want to eliminate the impact of outliers, small companies with extremely small or high ECTR, which would overshadow the real impact of companies such as Google or Microsoft. Also, EBIT is the most stable value which shows how large the firm is, with ECTR having much larger volatility (for example because of high investment in one year). Finally, in the original proposal by European Commission it is revenues that should be taxed.

Estimating the impact of the introduction of a digital tax is virtually impossible without knowing what it should look like. Proposals vary from country to country and the amount of tax proposed often varies. Above all, it is impossible to estimate the reaction of companies to such measures as there is always some scope for tax optimization, market exit, or pass-through of the tax to the end-customer price. Too many unknown variables create room for calculating a single number, i.e. the maximum possible tax collection if the tax would not change the behaviour of taxed companies. But this is an unrealistic assumption.

We therefore took a different route and looked at how high the tax would have to be to make ECTR equal between traditional and digital companies. To do this, we took wECTR of digital and traditional companies and estimate how high digital taxes should be in order to make these two equal. In other words, by comparing wECTR of traditional and digital companies we can not only show the estimated rate of fair digital tax but by doing that we can also show that digital companies are not undertaxed. Comparing wECTRs helps us also to put a number on it, hypothesize about the fair additional tax rate and compare its size with the EU and with the local proposals.

Firms may engage in tax avoidance strategies; nevertheless, quantifying the elasticity of a novel tax in the absence of empirical data remains a challenge. However, analogous investigations into corporate tax elasticity suggest figures ranging between 0.7 and 0.8, with a consensus around 0.8 prevailing within the scholarly discourse. (Gravelle, 2016; Dowd et al., 2017) To elucidate, the implementation of a 10% digital tax could precipitate an 8% reduction in pre-tax earnings. For instance, in a scenario where a country levies a 10% digital tax on USD 100,000, it would forego USD 8,000 in pre-tax earnings. Consequently, the actual tax revenue garnered would be less than the nominal rate of 10%. Specifically, in this context, the revenue collected would amount to USD 9,200, representing an effective rate of 9.2%.

The goal of the main estimation is to start from the difference in the weighed effective tax rate of traditional and digital companies and estimate the effective digital tax rate if the goal of the tax was to actually compare the weighed effective tax rate. This can be done through raising the tax rate on profits or an additional tax on revenues.

One possible consideration of taxation is to compare tax rates by size, i.e. through public goods use theory. In the context of digital companies, the OECD argues that the main purpose of tax collection is to finance public goods, and raises the question of neutrality of taxes, meaning "that the same principles of taxation should apply to all forms of business". (OECD, 2015, p. 20)

It is, of course, a question of whether revenues or profits are the best proxy for the amount of public goods used. It may be a combination of both or, probably, none of them. The neutrality principle does not require any measurement of public goods footprint. However, it is a good starting point to uncover if digital companies really are undertaxed or not. For the sake of a comparison let us assume for now that there should be proportionality in the relative amount of taxes paid by the digital and the traditional sectors. Our reasoning for the formulas below was as follows. We used a positive weighted average ECTR because we believe that loss-making companies do not appear to use public goods to enrich themselves.[9] We will start with a tax on profits, not on revenues, which we will develop later. It should therefore be

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[9] And it is hardly tenable, though not impossible, to defend the idea that companies optimize for a negative ECTR in order to minimize hypothetical future additional taxation, even given the magnitude of that taxation, as will be seen below. In other words, companies are certainly optimizing and trying to lower their ECTR, but that is precisely why additional DTE does not change this behaviour, it should just account for it. Moreover, the European Commission has

$$\Sigma\left[EBIT_{it}^T\left(\text{wECTR}_{it}^T - \text{wECTR}_{it}^D\right)\right] = \frac{\Sigma R_{it}^T}{\Sigma R_{it}^D} \times \Sigma(\text{DTE} \times e \times EBIT_{it}^D) \qquad (5)$$

where *T* is the index for traditional companies, *D* is the index for digital companies, *DTE* is the amount of digital tax on profits (EBIT), e is the tax elasticity, and R is revenues.

And either (6) without or (7) with the condition, that digital companies are taxed such that the ECTR of digital companies is never less than the ECTR of traditional companies, while it may be higher, in other words, digital companies should not pay less, then

$$\text{wECTR}_{it}^D = \text{wECTR}_{it}^T \qquad (6)$$

$$\text{wECTR}_{it}^D > \text{wECTR}_{it}^T \qquad (7)$$

while the condition that the calculation applies only to companies with a positive ECTR, defined as

$$ECTR_{it} > 0; \ T_{it} > 0; \ EBIT > 0 \qquad (8)$$

Thus, under the above conditions, in the case of (1) a DTE such that

$$\Sigma\left[EBIT_{it}^T \times \text{wECTR}_{it}^T\right] = \Sigma\left[EBIT_{it}^T \times (\text{DTE} \times e + \text{wECTR}_{it}^D)\right] \qquad (9)$$

so

$$\text{DTE} = \frac{\Sigma R_{it}^D \times \left[\frac{\Sigma\left(EBIT_{it}^T \times \text{wECTR}_{it}^T\right)}{\Sigma EBIT_{it}^T} - \text{wECTR}_{it}^D\right]}{e \times \Sigma R_{it}^T} \qquad (10)$$

Since the DTE is different in each year for different parameter levels, the DTE derived from the period between 2010 and 2020 should be weighted by the total revenues in the sum of the digital and traditional markets, in other words, the increasing size of both markets. In the extreme case, without this, the DTE in the small market could overwhelm the DTE in the bigger market later, with the goal of having a DTE of one that is applicable to the future. In our case, the estimated revenues in 2020 are three times higher than they were in 2010. Thus, the resulting DTE in 2010 should have three times less weight than the one in 2020. Understandably, we do not know the future data, so it is still the case that the estimate of the ideal DTE is an estimate based on the past with the assumption that the future will evolve as the past did. This is of course an assumption that cannot be met in reality, but we have no better way of estimating the future.

Having made this estimate of effective taxation in the form of a standard corporate tax on profits, it is then possible to estimate the effective taxation of revenues. It is possible to tax revenues for all companies above a certain size, or only for those that have a positive EBIT. The proposals described above such as EU or OECD proposals, generally assume the first option, although it is economically difficult to defend. Mentioned reason for it is usually lower bureaucratic costs but it is also possible to look at it as on a way how to increase tax revenues without losing electoral support, or both. Fortunately, it does not change anything to the method we use, it is only about the data to

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long been working on taxing revenues where companies would not benefit from a negative ECTR because it is not profits what is taxed but revenues.

use. Thus, we want to compare the effective taxation of traditional companies with digital companies,

$$\text{wECTR}_{it}^{T} = \text{wECTR}_{it}^{D} + \frac{\text{DTR}_{it} \times e \times \Sigma \text{R}_{it}^{D}}{\Sigma EBIT_{it}^{D}} \qquad (11)$$

from which follows that

$$\text{DTR}_{it} = \frac{(\text{wECTR}_{it}^{T} - \text{wECTR}_{it}^{D}) \times \Sigma EBIT_{it}^{D}}{e \times \Sigma \text{R}_{it}^{D}} \qquad (12)$$

where *DTR* is the digital tax on revenues and the other variables are the same as above. In other words, we need to make up for the difference between the weighted ECTR of digital and traditional companies with the volume of digital tax even after accounting for elasticities.

Again, it is useful to convert DTR to weighted DTR as in the previous calculation so that the less significant years do not have the same weight as years where the importance of the potential tax was higher. Since the later years in the sample tend to be those where the ECTR of traditional companies is higher than the ECTR of digital companies, the weights of the resulting DTRs increase in this method:

$$\text{wDTR} = \frac{\Sigma[\text{DTR}_{it} \times (\text{R}_{it}^{D} + \text{R}_{it}^{T})]}{\Sigma(\text{R}_{it}^{D} + \text{R}_{it}^{T})} \qquad (13)$$

where *wDTR* is DTR weighted over the sum of R of traditional and digital companies. Finally, if we consider only the part of the territory over which digital companies make revenues, in our case the European Union, the final result will be

$$\text{wDTR}^{E} = \text{wDTR} \, \frac{1}{\text{SR}^{E}} \qquad (14)$$

where *E* is the index for Europe and SR is share of revenues.

The main objective of this paper is to estimate fair wDTR^{E} and to compare this estimate with the proposal of the European Commission and individual countries that have considered and are still considering a digital tax of between 1.5 (Poland) and 7.5 (Hungary) percent. Based on the previous theory and knowledge of other studies, we expect the resulting wDTR^{E} to be less than the European Commission and individual country proposals, i.e., less than 1.5 percent. It follows, that the digital sector is not undertaxed, or at least not as much as even the lowest proposal assumes.

4   Comparison and results

Our analysis commenced with the delineation of the proportion of companies exhibiting negative Effective Corporate Tax Rates (ECTR) within the dataset previously outlined. The ensuing chart delineates the trajectory of companies excluded from our comparative analysis due to their negative ECTR from 2010 to 2020.

Throughout the timeframe in question, there was a notable escalation in the proportion of companies with negative ECTR across both digital and traditional sectors. The data unequivocally underscores a pandemic-induced anomaly in 2020, where the incidence of negative ECTR surged among traditional companies, whereas it remained stable within digital enterprises. This observation serves as a compelling testament to the resilience and adaptive capabilities of certain

digital companies, which not only sustained their economic viability but also expanded their customer base and market reach amid the pandemic.

Furthermore, it is intriguing to note that, consistently throughout the study period, the share of traditional companies with negative ECTRs was invariably lower than that of their digital counterparts. Particularly striking is the period between 2016 and 2019, during which the disparity in negative ECTR between digital and traditional companies widened significantly compared to the early 2010s. This trend highlights a notable differentiation in the tax profiles of digital versus traditional companies and underscores the complex dynamics influencing corporate taxation in the digital era. The difference was highest in 2017, when it was three times higher for digital companies[10].

Figure 1: Share of companies with negative ECTR
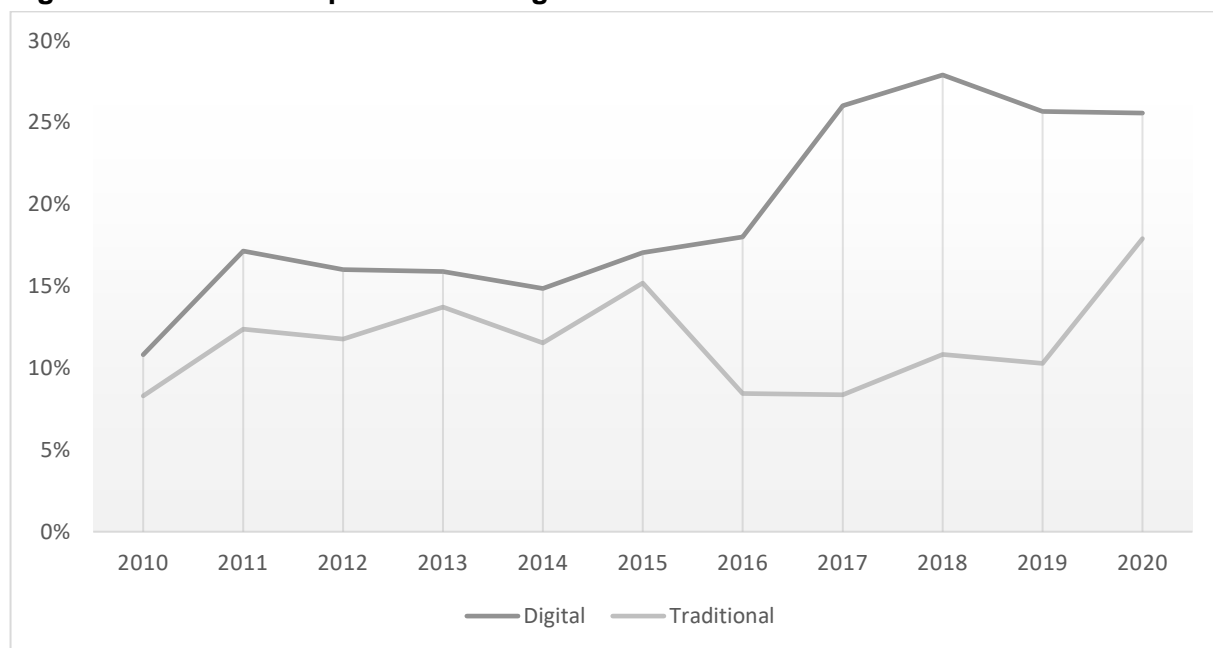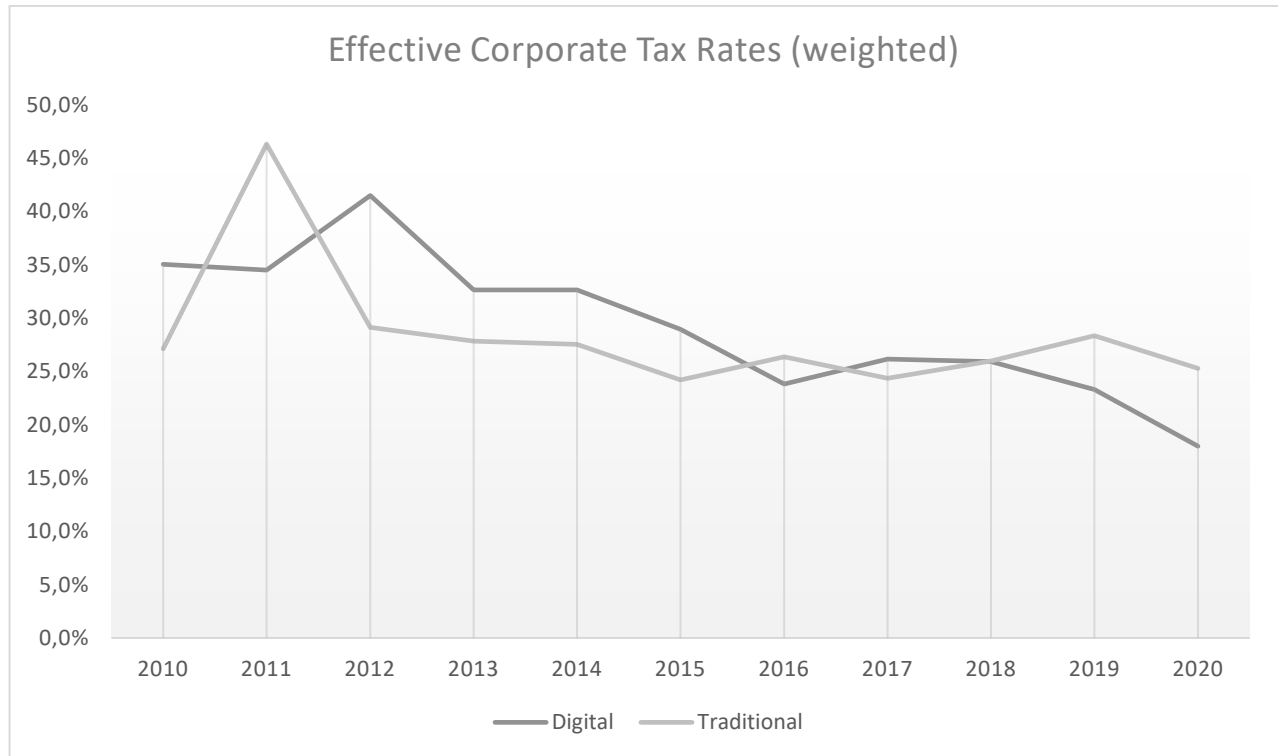

Source: Own adjustment based on audited financial statements.

We have now proceeded to estimate weighted effective corporate tax rates (wECTR). The simple average estimate is not telling, mainly because of the increasing size of both traditional and digital companies. If we take it *ad absurdum,* we do not want to have a situation with only two companies, one small company and one digital giant, where the ECTR would be by 50% determined by the small one which can have easily very high ECTR and thus change the results even though it is economically irrelevant compared to the giant.

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[10] It may be interesting to study why it is so. It could be that the digital industry is generally riskier and therefore companies are more likely to go bankrupt, especially those with a shorter history.

Figure 2: Effective Corporate Tax Rates (weighted)

Source: Own adjustment based on audited financial statements.

For the weighted average of ECTR, it is not possible to clearly determine whether the traditional sector or the new digital sector is taxed more. Of the 11 years we examined, traditional companies were taxed more than digital companies in 4 cases. In six cases, traditional companies were taxed less and in 2018 ECTRs were about the same. Using a weighted average of ECTRs, it was found that

$$\Sigma[EBIT_{it}^{T} \times \text{wECTR}_{it}^{T}] > \Sigma[EBIT_{it}^{T} \times \text{wECTR}_{it}^{D}] \tag{15}$$

Thus, traditional companies, after accounting for size, paid more in taxes between 2010 and 2020 than digital companies. However, it is also necessary to take into account the larger share of non-earning (negative ECTR) companies, which is much higher among digital companies than traditional companies. Thus, the simple average comes out significantly different.

Thus, digital companies pay similar and, in some years, higher taxes than traditional companies. The economic debate about whether they should be taxed more cannot therefore be built on the simple idea that, by their very nature, digital companies pay less taxes. In fact, our study of comparative ECTRs shows no significant difference between traditional and digital sectors, provides no evidence in favour of a special digital tax and does not show that digital firms are undertaxed.

There are two other possible economic rationales for a digital tax. The first is to tax on the basis of the negative externalities[11] the products of digital companies bring in the European Union. If these were identified and we were able to estimate them, we would also have to take into account the

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[11] The most discussed are election manipulations, misinformation, security attacks on public infrastructure etc.

positive externalities they entail. It is virtually impossible to make such an estimate, and to date, to our knowledge, no one has managed to do so.

The proposition to realign the taxation framework for digital companies so that they contribute to the public goods they benefit from in the European Union raises critical considerations for economic policy. This approach is predicated on the rationale that if digital firms gain from the public infrastructure and institutional frameworks established and maintained by EU states, it stands to reason they should also share in the costs of such amenities.

Nonetheless, this line of argument necessitates a defense of the premise that the digital economy's expansion necessitates proportionately increased taxation to fund additional public goods. This would imply that an augmented presence of digital companies in the EU correlates with a heightened demand for public goods, or conversely, that a potential withdrawal of these companies from the European market could justify a reduction in public goods provision. While it is plausible that digital enterprises do indeed impose marginal costs on public goods, quantifying these costs requires further, more detailed research which falls outside the purview of our current analysis.

In essence, the debate often veers into the political realm, with governments seeking ways to bolster their tax revenues without incurring significant political backlash. However, this political dimension does not detract from our analytical approach, which is centered on demonstrating that digital companies are not, in fact, systematically undertaxed. Our findings suggest that the premise for introducing new, additional taxes based on the assumption of digital companies being undertaxed is unfounded. This insight underscores the importance of grounding tax policy in robust empirical evidence rather than presumptive narratives about the digital economy's tax contributions.

In any event, a digital tax that would equate weighted ECTRs across digital and traditional sectors (see figure below) would have to change every year (unweighted DTR) or would imply perfect knowledge of future economic activity (weighted DTR). Either prospect is a practical impossibility from a policy point of view.

Figure 3: Digital Tax Rate
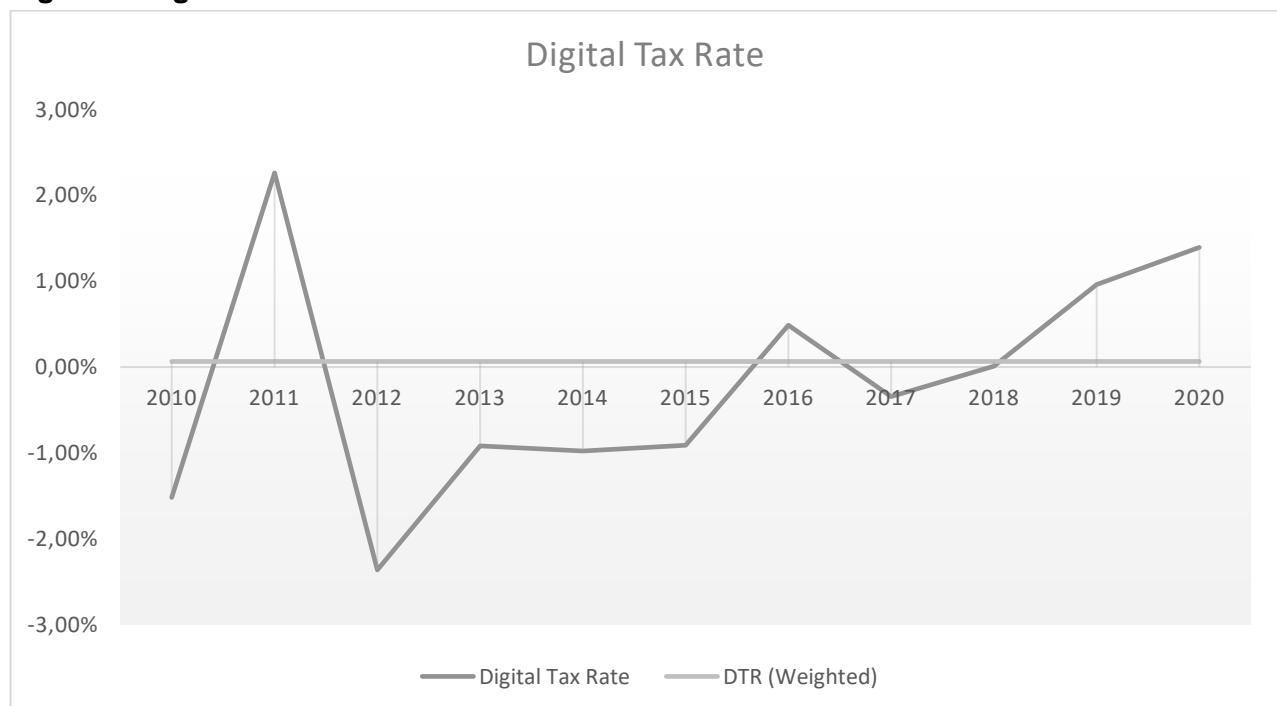
Source: Own adjustment based on audited financial statements.

The results show three important conclusions. First, it is not clear that the digital tax rate should be positive. Between 2012 and 2015, the result was consistently negative; in other words, the effective digital tax rate should be a negative digital tax rate, which is in fact a digital subsidy. The digital tax proposals implicitly assume that this entire graph should be in the positive range, or at least for a significant period of time. If the goal is to figure out if digital companies are undertaxed, the choice of period from which we draw our proposals matters and can even lead to a proposal of a digital subsidy.

Second, as of 2018, the effective digital tax rate has been steadily increasing. It is possible that this is a trend and we could look at just this part of the graph and conclude that digital companies are undertaxed. The question is whether this is a trend or whether 2020 was a pandemic outlier. The choice of the period examined no doubt has an impact on the outcome. But even if we take only the positive results, i.e. 2011, 2016, 2019, and 2020, the average effective digital tax rate would be 1.28%, significantly lower than the amounts proposed by individual countries and the European Commission. The arithmetic average of the period 2010 to 2020 even shows a negative average effective digital tax rate of -0.17%. However, it is clear that the situation in 2010 is very different to the situation in 2020 and the result needs to be weighed against the size of the market.[12] We need to do that because a simple average cannot account for the relative growth of importance of the digital sector and thus the results from the beginning of the sample are less relevant for today than the results from the last years studied.

Thirdly, in none of the years examined did the effective digital tax rate move above the 3 per cent proposed by the European Commission. But the calculation works with "global"[13] digital tax ON overall revenues of the digital companies in question.

If we weigh the result by market size, we get an effective digital tax rate of 0.065 per cent between 2010 and 2020. This is 46 times smaller than the proposed 3 percent. In the chart above, the effective digital tax rate is difficult to see.

According to their own annual reports, Google, Meta (Facebook), and Microsoft have a long-term revenue share of around 25% in Europe.[14] So if we adjust the calculation so that we calculate the tax only on the European share of revenues, we would get about four times the effective digital tax rate, i.e. 0.26 per cent. In other words, the result is more than ten times smaller than the proposed tax. But it means that the European Commission would take it upon itself to compare the global wECTR of traditional and digital companies from a geographic area which accounts for only 25 per cent of revenues.[15]

Part of the proposals known today is that only the part of revenue that comes from digital advertising and similar sources would be taxed, which the European Commission's proposal, for example,

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[12] It is calculated as a share of digital companies on an overall revenues of all 463 firms in our sample. The sample consists of the largest indices with the largest companies operating on the EU market and shows consistent relative growth of the digital companies on the overall revenues.

[13] If the tax was global, it would actually be even lower, because we would have to change the elasticity, which assumes that part of the revenue will be shifted by companies to countries with lower taxation.

[14] In Europe, not the European Union, but for estimation purposes we will take the two terms to be the same.

[15] There has never been anything like that in the official communication of the European Commission.

included. If we were to start with Google, only 85% of revenues would be taxed (i.e. not revenues from selling hardware), so the DTR would have to be slightly higher to bring the wECTR in line. But even here, it is a percentage that varies significantly, and setting one rate for a number of years into the future on only a portion of revenues cannot make wECTR equal except by chance or by periodic, bureaucratically impractical rate updates. If we estimate such a situation, we arrive at slightly above 0.3%, slightly above one-tenth of the European Commission's proposed rate.

The question of whether an academically rigorous methodology could justify the higher digital tax rates proposed by the European Commission and various EU countries, such as 3% or even 7%, merits careful consideration. A simplistic approach might involve focusing exclusively on the years 2019 and 2020. During this period, the weighted effective digital tax rate was calculated at 1.18%. By accounting for the revenue share within Europe, this rate could ostensibly be adjusted to 4.72%, aligning closely with the 5% rate suggested by countries like Austria and the Czech Republic. However, such a method would notably overlook the dynamic and rapidly evolving nature of the digital sector.

This sector is characterized by its cyclical waves of growth and contraction, with companies frequently emerging and dissolving, making substantial investments, or entirely shifting their revenue models. Therefore, selecting only a brief and potentially atypical period to justify a new tax overlooks the broader, more turbulent financial landscape of digital enterprises.

Moreover, by proposing rates higher than those suggested by their own analyses, the European Commission implicitly positions itself as assessing the global taxation landscape of digital companies from the standpoint of a region that constitutes only a minority of these companies' revenues. This approach, while yielding a figure ostensibly close to some national proposals, may not adequately reflect the sector's global tax contributions or its economic dynamics. The choice to focus on a limited timeframe where data might support the imposition of a new tax raises questions about the broader implications of such a policy, particularly in terms of fairness, efficiency, and the potential for unintended economic consequences.

From a range of figures and previous studies, it can be concluded without a doubt that the European Commission has overestimated its proposed digital services tax.[16] 3% of revenues, not profits, could be critical for a number of the companies we have examined, i.e. the percentages chosen would be much smaller than the above. How much cannot be accurately estimated, but it is easy to assume that the collection would not be at its maximum as calculated above.

Let us assume that the European Commission is right to collect EUR 5 billion at a 3% tax on revenues, as stated in the original proposal (European Commission, 2018c). Under this assumption, if the Commission would follow our final figure of 0.26% effective digital tax on revenues, it would collect around EUR 430 million for Member States, in other words less than EUR 1 per EU citizen per year. And at that price, the European Commission would risk some services leaving Europe. At an estimate of around 0.3%, that would be around EUR 500 million, or roughly EUR 1 per EU citizen per year.

Of course, it is possible to consider the growing gap between digital taxes today and tomorrow. In other words, an argument for a disproportionately high digital tax could be based on the vision that digital services will grow rapidly and that realistically it will not be easy to adjust the level of taxes in the future. Thus, if we were to project revenue comparisons according to the estimated growth

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[16] Unfortunately, the EU calculations are not public and it is thus not possible to find where exactly the mistake is o if there really is one.

of the digital sector for, say, 2020 to 2030, then it would be possible to get to a higher percentage. However, such a consideration is nowhere to be found in the European Commission documents. And even if was, it is an extremely risky tax with minimal yield, or if the yield was high, the tax would be discouragingly high.

The introduction of a digital tax is a major intervention in the tax system. Visually, it looks like a sensible measure with a large tax yield and little distortion, but on closer inspection it is a highly distortive tax, or the tax yield with less distortion is not for today's tight government budgets. An effective tax of 0.3% would yield about EUR 500 million, which, with total combined budgets of EU Member States of EUR 5,531 billion, is about 45 minutes of the annual budgets of EU countries, less than 0.01% of total budgets. The risks and costs of such a tax are much higher.

5   Conclusion

The debate surrounding the implementation of a digital services tax is complex, compounded by the regulator's lack of transparency in disclosing the methodologies underpinning its assumptions. While the justification for such a tax is challenging, avenues exist for the European Commission to substantiate its proposition. The necessity for arguments supporting the introduction of this tax is particularly acute in the current climate, as the pandemic and subsequent recovery phase have placed immense strain on the public finances of many states, necessitating expansive fiscal policies to stabilize the economy during these turbulent times.

However, the present rationale for the tax is scarcely articulated, and its proposed magnitude appears disproportionately high. Our analysis, employing a weighted Effective Corporate Tax Rate (ECTR) across a broad spectrum of digital and traditional firms from 2010 to 2020, indicates that to align the digital tax with the effective tax rate, a figure close to 0.3% would suffice—merely a fraction of what the European Commission has suggested. At such a nominal rate, the European Union would garner approximately one euro per resident annually, albeit at the cost of significant restrictions on digital service usage by its inhabitants and other economic inefficiencies.

Our study presents several interrelated conclusions, drawing on unique data to assess the effective corporate tax rates of digital versus traditional companies. A primary finding is that digital enterprises are not systematically undertaxed; in fact, they are more likely to incur higher taxes moving forward. The disparity in effective tax rates between digital and traditional sectors is minimal, suggesting that the imposition of a digital tax might be counterproductive. This insight contradicts prevalent assumptions, including those of the OECD, which posits that digital services suffer from systemic undertaxation. Our findings challenge this view, highlighting the risk of profit and tax shifting as well as optimization strategies that could emerge as unintended consequences of such taxation policies.

The difference in effective tax rate between the digital and traditional businesses is thus not significantly high and introduction of such tax may even be counterproductive. The study suggests that digital services are not undertaxed. Moreover, evidence suggests that there is a possible risk of profit and tax shifting and optimization among multinational companies regardless of their engagement in digital activities. Given these insights it appears misguided to address these challenges solely through the imposition of a specialized tax on digital businesses, a mere segment of multinational companies and the global economy.

If tax optimization by multinational corporations is indeed the existing issue, and the proposed solution involves shifting the tax system from a focus on the company's tax domicile to the location of its customers, then implementing a sector-specific tax targeting only the digital companies seems

illogical. The future of the digital sector may indeed see an increase in the percentage of effective corporate tax rates. Unfortunately, this perspective is absent from the discourse propagated by the European Commission, leaving us to speculate about their anticipation of such developments. The proposal's higher tax rate likely reflects these considerations, underscoring the necessity of re-evaluating the foundational assumptions about the digital services' tax burden.

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