The Digital Services Tax: EU Harmonisation and Unilateral Measures [1]

Francesca Gastaldi
Italian Parliamentary Budget Office and University of Rome 'Sapienza'

Alberto Zanardi
Italian Parliamentary Budget Office and University of Bologna

1. Introduction

Italy's recent decision to unilaterally introduce a digital services tax consistent with the taxation scheme proposed by the European Commission raises a number of interesting matters. These matters are related to the peculiar nature of this levy, which taxes total revenues collected from multinationals but apportions the corresponding tax yield among single member states according to the domestic share of digital users.

The central purpose of this work is to analyse what possible configuration the EU digital services taxation system could take in the wake of the unilateral measure taken by Italy and of the reactions by other EU countries. In particular, this work points out that a critical element for the possible tax strategies to be adopted by national tax authorities is the joint consideration of two geographical allocations: digital service sales and digital users.

The rest of the work is organised as follows. Section 2 discusses issues in taxing the digital economy and illustrates the more recent policy initiatives proposed, or implemented, at international and national level, to cope with these problems. In

---

particular, the proposal of a digital services tax (DST) put forward by the European Commission is described together with the specific DST that will unilaterally be applied by Italy, starting from 2019. Section 3 presents a simplified general framework, useful for highlighting the main elements of the DST scheme and of the possible strategies that could be adopted by single countries to tax the digital economy. In Section 4 we try to empirically apply the predictions derived from the general framework, by using data about online advertising markets in different European countries. Section 5 concludes.

2. Tax policy options

Technological innovation and internet growth have greatly affected trade relations, production processes and products, as well as company organisation. The digital economy is characterised by some key elements, such as: the massive expansion of intangible assets; the intensive use of data (especially personal data) and the widespread adoption of multi-sided business models which exploit the value of externality from free assets. This implies that the digital economy moves along two perspectives: dematerialisation of operations and fragmentation of economic functions, assets and risks, thus excluding permanent establishment.

In a tax competition regime, the digital economy exacerbates the problem of tax base erosion, offering opportunities for elusive practices above those already exploited by the traditional economy. For digital multinationals, tax competition has produced a race to the bottom with their implicit tax rates being close to zero.

Moreover, because of these peculiarities, the digital economy raises significant problems for tax design, in particular regarding tax base apportionment, qualification of the values to be taxed, and withdrawal arrangements.

At international level, direct taxation is based on both residence and source criteria. For a long time, a widespread system of bilateral and multilateral conventional agreement has guaranteed a tax base distribution between the residence and the source countries, avoiding double taxation and conflicts related to the taxing rights.

When the digital economy is at stake, these conventional models are no longer effective. A new international tax conflict may arise. Problems can be identified both in the country of residence of the companies, mainly the US and China, and in the destination countries of digital goods and services, mainly Europe and the rest of the world.

In the first case, the problem lies in preventing taxes on corporate income from being evaded by exploiting transfer mechanisms and the shifting of taxable bases to countries with favourable tax regimes. Then, the US claims worldwide extra profit taxation, given that the digital multinationals are the exclusive owners of intangibles.

In the second case, the digital multinationals trade without a permanent establishment in destination countries, completely avoiding profit taxation by source criteria. The line between "trade with" (export) and "trade in" (production) is no more clearly defined. Nevertheless, destination countries of digital goods and services claim value and profit creation. In particular, users of digital platforms and networks are central because of their contributions, either active or passive and mostly free, to value creation.

In this context, national and international institutions (the OECD and the EU) stressed the need for a coordinated effort. However, cooperation and coordination actions are in contrast to individual taxation autonomy and are conditioned by the length of international decision-making. The OECD Base Erosion and Profit Shifting (BEPS) project has contributed to the debate on digital economy taxation, even if it does not recommend ad hoc taxation for digital enterprises. On the other hand, the OECD considers the possible introduction of a new criterion for the permanent establishment, based on the so-called significant economic presence in the jurisdiction.

The international debate on solutions for taxing digitalised businesses focuses predominantly on revenue taxes, which are easier to reconcile with the current international tax framework. Almost all unilateral taxes which have already been introduced, or which are being planned, are revenue taxes.

In order to be implemented within a reasonable time span, any feasible solution first needs to respect the boundaries set by national and international legal framework, notably the EU treaties, the rules implied by membership of the World Trade Organisation, and other international commitments - for example through the Inclusive Framework or the OECD multilateral instrument, double tax treaties, and EU rules for VAT.

Pending the decisions at international level, at the end of 2017 the Trump Reform introduced a new model to tax revenues related to intangible assets, regardless of the actual "repatriation" of such revenues to the US (GILTI, Global Intangible Low Tax Income). This implies a possible double taxation when source countries levy any tax on the returns of multinational investments.

As a reaction, in March 2018 the European Commission (EC) presented a two-step proposal for EU-wide taxation of the digital economy: a long-term solution integrated

into the current corporate tax system and an *ad interim* solution introducing a tax on digital services (DST) to curb harmful unilateral initiatives by member states.

The DST would be harmonised across Member States and provides for a 3 per cent tax rate on the global gross revenues from transactions relating to specific digital services, such as online advertising, social networks and the transmission of data collected from users. Nevertheless, the DST has a narrow scope and it would be applied to those business models where user contribution plays a central role, in the sense that the service would not exist if the user did not contribute to it (e.g. the advertising model and marketplaces/intermediary platforms). The DST is applied on large groups with a consolidated turnover of at least €750 million, and revenues in the EU market of at least €50 million. This is a peculiar levy, as it is based on the total revenues collected by multinationals, but the tax yield is assigned to each Member State according to their domestic share of global digital users.

The DST proposed by the EC is currently under discussion by the EU finance ministers. EU governments agree that tax rules should be changed to increase levies on digital services that are currently under-taxed, but are at odds over the process to reach this target. On the one hand, smaller states with lower tax rates, such as Luxembourg and Ireland, which host large US multinationals, want the EU changes to come together with a global reform of digital taxation. On the other hand, larger states, such as France and Italy, which claim to suffer large tax losses due to digital companies shifting profits to lower-tax countries, are pushing for a quick solution.

While waiting for a global deal, Italy has recently decided to act unilaterally by passing (Budget Law 2019) a DST to be applied from 2019. The Italian DST is closely modelled on the EC *interim* proposal (in terms of the nature of the tax, the definition of tax base, the identification of taxpayers, etc.) and can be viewed as a single building block of the new harmonised tax proposed by the EC.

In general, the DST aims to tax revenues of digital businesses that are considered to derive significant value from the participation of their users. In Italy, it is applied on specific digital services, such as online advertising, intermediation services and sales of data. A company will only become taxable if it generates more than 750 million euros in global annual revenues and more than 5.5 million from domestic digital activities. A 3 per cent tax rate is applied on the domestic share of the global revenue of a resident and non-resident multinational (social media, search engine and intermediary platform). The domestic share is given by the share of domestic users (defined as logged to the internet sites by the domestic device/IP) on worldwide users.

This new tax regime for Italy brings up the issue for other Member States of how to

react to this unilateral action, taking account of the peculiar design of the DST. Other countries have recently announced and planned the introduction of a tax on digital economy. In particular, Spain envisages a very similar tax to the Italian one, but with a lower threshold for the activity at the national level, set at 3 million euros. Austria, on the other hand, is planning a tax only on revenues from digital advertising, but it is not clear what apportionment criterion will be applied. France is considering a 5% levy on revenues, but the design of the tax has not yet been defined. The United Kingdom will apply a 2% DST to revenues generated from the provision of business activities related to search engines, social media platforms and online marketplaces.

As a significant number of digital companies are active in more than one jurisdiction, an increasing number of unilateral and country specific measures increase competitive distortions, compliance burden and double taxation disputes. Furthermore, it will get more difficult to harmonise the variety of taxes or agree on comprehensive solutions in the future.


3. The DST solution: a general framework

As pointed out before, the DST proposed by the EC implies a sort of triangulation among different subjects involved: national tax authorities, digital companies (taxpayers) providing services, customers purchasing such services, digital users who, by providing data consciously or unconsciously, are the source of value added and reference for tax yield apportionment across EU member countries. All those subjects can be located in different countries.

An example (Fig. 1) can help to understand how the DST would work in practice (European Commission 2018). This refers to digital services which make advertising space available online, but analogous examples can be shown with reference to digital intermediary activities which allow users to interact and to the sale of data generated from user-provided information.

In Figure 1 we presume that a digital company located in a non-Member State (a third country) sells online advertising space for 1000 euros to a customer located in the same country (but analogously we can think about the case where the customer is located in the Member State 1 or 2). The service targets users both in non-Member and Member States. The revenues obtained from the supply of the advertising service are paid by the customer in the third country but, since the targeted users are located in the Member State 1 and 2 (as well as in the third country), DST is due in those Member States. The DST is apportioned between Member States 1 and 2 according to

the number of the times an advertisement has been displayed or, by simplicity assuming one display for each user, according to the number of users. The tax base will be 500 and 250 for Member State 1 and 2, respectively. The users in the third country are taken into account for the computation of each Member State share of apportionment.

Fig. 1 - An example of DST applied to online advertising sales
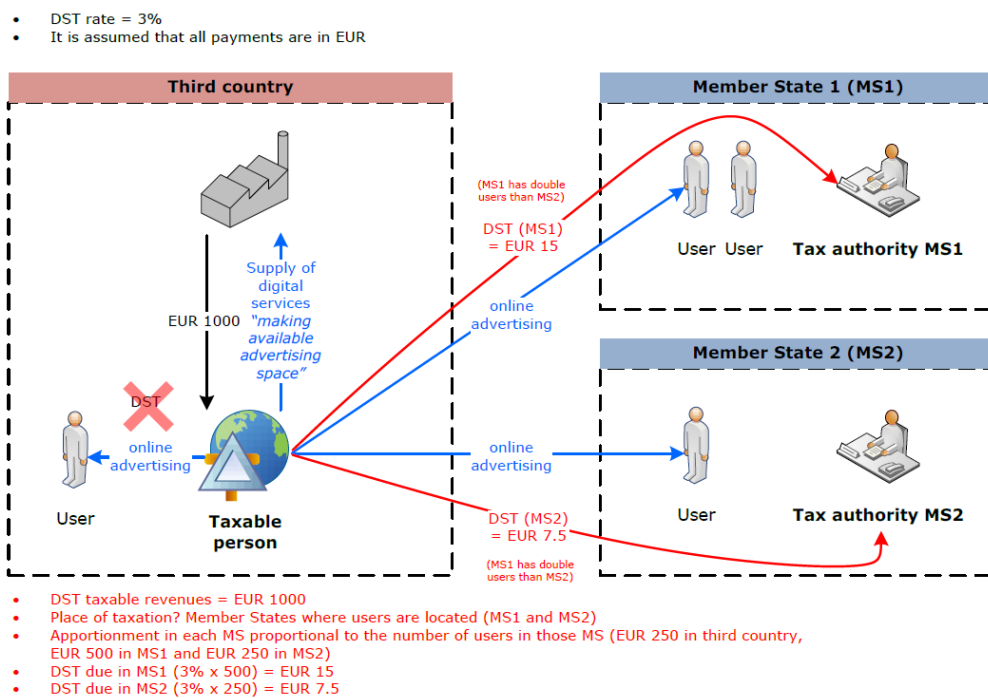
Source: European Commission (2018).

This example suggests that a critical element for the possible tax strategies to be adopted by national tax authorities could be the joint consideration of two territorial allocations: digital services sales and digital users. This point can be made clear by means of a simplified framework useful to highlight the main elements of the DST scheme and of the possible strategies in taxing digital economy.

Let us consider two countries (i = 1, 2) where two digital companies (j = 1, 2) operate by selling digital services to their customers located in those countries. Moreover, assume that the tax on digital economy (whatever form it assumes) applied by the tax authorities of country i is (entirely or partially) shifted by the taxpayers (digital companies) to their customers by raising the price of marketed digital services.

Let:

- T_{ij} the tax yield imposed by the tax authorities of country i on company j

- B_{ij} the burden which falls on company j's customers established in i as a result of tax shift enacted by the same company.

The tax on digital economy can be applied by the tax authorities of country i according to two different schemes:

1) the Digital Services Tax (DST) scheme (EC Option - C). In this case:

- $$T_i^C = T_{i1}^C + T_{i2}^C = t_i^C \frac{U_{i1}}{\sum_i U_{i1}} \sum_i G_{i1} + t_i^C \frac{U_{i2}}{\sum_i U_{i2}} \sum_i G_{i2} \qquad (1)$$

  where:

  t_i^C is DST tax rate set by country i

  U_{ij} is the number of digital users of company j located in i

  G_{ij} are the sales of company j to its customers located in i

- $$B_i^C = B_{i1}^C + B_{i2}^C = \alpha_{i1} t_i^C \frac{U_{i1}}{\sum_i U_{i1}} G_{i1} + \alpha_{i2} t_i^C \frac{U_{i2}}{\sum_i U_{i2}} G_{i2} + \alpha_{i1} t_{\neq i}^C \frac{U_{\neq i1}}{\sum_i U_{i1}} G_{i1} +$$
  $$\alpha_{i2} t_{\neq i}^C \frac{U_{\neq i2}}{\sum_i U_{i2}} G_{i2} \qquad (2)$$

  where α_{ij} denotes the rate of tax shift enacted by company j on its customers located in country i. We assume that the rate of tax shift can be differentiated by company and by digital services markets (that is where the company's customers are located) but not by the tax authorities imposing the tax.

  The two former terms denote the burden of the tax levied by tax authority of country i on the two companies' customers located in its jurisdiction whereas the two latter terms denote the corresponding burden but imposed by the tax levied by country j.

2) A withholding tax on sales referring to customers in country i (Deviation Option - D). In this case:

- $$T_i^D = T_{i1}^D + T_{i2}^D = t_i^D G_{i1} + t_i^D G_{i2} \qquad (3)$$

- $$B_i^D = B_{i1}^D + B_{i2}^D = \alpha_{i1} t_i^D G_{i1} + \alpha_{i2} t_i^D G_{i2} \qquad (4)$$

  where:

  t_i^D is withholding tax rate set by country i.

The tax authorities of each country choose how to tax digital economy in a way as to maximise the objective function (assumed to be additive by simplicity):

$$W_i = w_i^T T_i - w_i^B B_i \qquad (5)$$

and w_i^T, w_i^B are the social weights of tax yield (public resources collected by country i) and tax burden respectively with $w_i^T > w_i^B$ in order to make public intervention socially desirable.

From the standpoint of the strategy of country i, what is relevant on first approximation is the total tax yield that can be collected by using different taxes, regardless which company is levied on, to be compared with the tax burden that single companies impose on customers established in i as a result of their specific tax shift behaviours.

Therefore in equation (5) T_i can be simplified starting from respectively (1) and (3) as:

- $T_i^C = t_i^C \frac{U_i}{\sum_i U_i} \sum_i G_i$ in the case of DST $\qquad (6)$

- $T_i^D = t_i^D G_i$ in the case of the withholding tax $\qquad (7)$

where: $U_i = U_{i1} + U_{i2}$ and $G_i = G_{i1} + G_{i2}$

whereas as for B_i :

- B_i^C = (2) in the case of DST $\qquad (8)$

- B_i^D = (4) in the case of the withholding tax. $\qquad (9)$

Starting from this general framework, we can derive the possible tax strategies that could be adopted by the countries involved. Two main results can be achieved. First of all, we can look at the tax strategy of each country in isolation. Secondly, the two countries can be jointly considered and the analysis focuses on the reactions of each country to the action of the other one.

3.1 Tax strategy of each country

Assume that country 1 chooses how to tax digital economy first (leader L) (the same holds if country 2 moves first). This means that at this stage country 2 has not yet applied any tax.

The objective function of 1 is:

$$W_1^L = w_1^T T_1^L - w_1^B B_1^L \qquad (10)$$

where:

$T_1^L = T_1^{LC}$ = (6) and $B_1^L = B_1^{LC}$ = (2) in the case that country 1 applies the DST[2]

$T_1^L = T_1^{LD}$ = (7) and $B_1^L = B_1^{LD}$ = (4) in the case that country 1 applies a withholding tax.

In the case $w^T > w^B$, Option C turns out to be dominated by Option D, that is:

$$w^T T_1^{LC} - w^B B_1^{LC} < w^T T_1^{LD} - w^B B_1^{LD} \tag{11}$$

depending on the value of $\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i}\right]$.

As a matter of fact:

$$w^T \left[t_1^C \frac{U_1}{\sum_i U_i} \sum_i G_i\right] - w^B \left[\alpha_{i1} t_i^C \frac{U_{i1}}{\sum_i U_{i1}} G_{i1} + \alpha_{i2} t_i^C \frac{U_{i2}}{\sum_i U_{i2}} G_{i2}\right] < w^T [t_1^D G_1] - w^B [\alpha_{11} t_1^D G_{11} + \alpha_{12} t_1^D G_{12}] \tag{12}$$

That is:

$$w^T \left[t_1^C \frac{U_1}{\sum_i U_i} \sum_i G_i - t_1^D \frac{G_1}{\sum_i G_i} \sum_i G_i\right] < w^B \left[\alpha_{11} \left(t_1^C \frac{U_{11}}{\sum_i U_{i1}} G_{11} - t_1^D G_{11}\right) + \alpha_{12} \left(t_1^C \frac{U_{12}}{\sum_i U_{i2}} G_{12} - t_1^D G_{12}\right)\right] \tag{13}$$

If we set $t_1^C = t_1^D = t$ in order to make the different tax regimes comparable:

$$w^T t \sum_i G_i \left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i}\right] < w^B t \left[\alpha_{11} G_{11} \left(\frac{U_{11}}{\sum_i U_{i1}} - 1\right) + \alpha_{12} G_{12} \left(\frac{U_{12}}{\sum_i U_{i2}} - 1\right)\right] \tag{14}$$

Since $\left[\frac{U_{11}}{\sum_i U_{i1}} - 1\right] < 0$ and $\left[\frac{U_{12}}{\sum_i U_{i2}} - 1\right] < 0$, we can derive that:

if $\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i}\right] > 0$, that is $\frac{U_1}{\sum_i U_i} > \frac{G_1}{\sum_i G_i}$, Option C is never dominated by Option D

if $\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i}\right] < 0$, that is $\frac{G_1}{\sum_i G_i} > \frac{U_1}{\sum_i U_i}$, Option C is dominated by Option D if:

$$\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i}\right] < \frac{w^B \left[\alpha_{11} G_{11} \left(\frac{U_{11}}{\sum_i U_{i1}} - 1\right) + \alpha_{12} G_{12} \left(\frac{U_{12}}{\sum_i U_{i2}} - 1\right)\right]}{w^T \sum_i G_i} < 0$$

So the choice between Option C and Option D of country 1 depends on the sign and the value of the difference between the share of users and the share of sales in country 1 on respective worldwide totals.

If we denote this threshold as $\frac{w^B \left[\alpha_{11} G_{11} \left(\frac{U_{11}}{\sum_i U_{i1}} - 1\right) + \alpha_{12} G_{12} \left(\frac{U_{12}}{\sum_i U_{i2}} - 1\right)\right]}{w^T \sum_i G_i} = Z_1$, we can represent these results as follows:

---

[2] The two latter terms in equation (2) are omitted here since they refer to the burden imposed by the tax levied by country 2, which at this stage does not have yet reacted.

$$\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i}\right]$$

Z_1 0

$D \succ C$ $C \succ D$ $C \succ D$
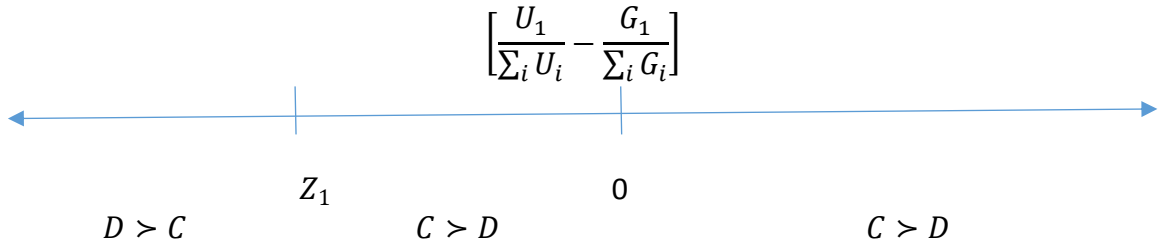
The position of Z_1 depends on the values of w^B, w^T, α_{11} and α_{12}. The greater the value of w^T with respect to w^B and the smaller the rates of tax shift of company 1 and/or company 2 the less negative will be the value of the threshold Z_1, and therefore the greater will be the probability that Option D is preferred to Option C.

In a nutshell, country 1 will prefer Option C rather than Option D if its share of users is greater than its share of sales or if the former is not much smaller than the latter.

3.1 Tax strategies of all countries

Given country 1's choice, country 2 (follower F) reacts by choosing one of these three different options: Option C, Option D and the additional option of not applying any taxation to the digital economy (No taxation Option - 0).

If Country 1 chooses Option D, country 2 would choose Option D or Option C but never Option 0. As a matter of fact, some sort of taxation (and, as a consequence, of public expenditure) is always desirable in terms of social welfare given that $w^T > w^B$.

All the more reason this is true if Country 1 chooses Option C since in this case that choice would impose a burden on customers in country 2 given by:

$\alpha_{21} t_1^C \frac{U_{11}}{\sum_i U_{i1}} G_{21} + \alpha_{22} t_1^C \frac{U_{12}}{\sum_i U_{i2}} G_{22}$ (tax exporting from country 1 to country 2)

without any benefit for country 2 in terms of additional tax yield.

As for the choice between Option C and Option D, country 2, analogously to country 1, chooses how to tax digital economy by comparing social welfare levels corresponding to each choice:

$$w^T T_2^{FC} - w^B B_2^{FC} < w^T T_2^{FD} - w^B B_2^{FD} \tag{15}$$

where in the case country 1 has chosen option C:

$T_2^{FC} = $ (6) and $B_2^{FC} = $ (2)

$T_2^{FD} = $ (7) and $B_2^{FC} = \alpha_{21} t_2^D G_{21} + \alpha_{22} t_2^D G_{22} + \alpha_{21} t_{\neq 2}^C \frac{U_{\neq 21}}{\sum_i U_{i1}} G_{21} + \alpha_{22} t_{\neq 2}^C \frac{U_{\neq 22}}{\sum_i U_{i2}} G_{22}$

whereas in the case country 1 has chosen option D:

$$T_2^{FC} = (6) \text{ and } B_2^{FC} = \alpha_{21} t_2^C \frac{U_{21}}{\sum_i U_{i1}} G_{21} + \alpha_{22} t_2^C \frac{U_{22}}{\sum_i U_{i2}} G_{22}$$

$$T_2^{FD} = (7) \text{ and } B_2^{FD} = (4).$$

Analogously to country 1, we can derive that, in the case of $w^T > w^B$, Option C is dominated by Option D depending on the value of $\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i} \right]$. As a matter of fact, if we denote $\dfrac{w^B \left[\alpha_{21} G_{21} \left(\frac{U_{21}}{\sum_i U_{i1}} - 1 \right) + \alpha_{22} G_{22} \left(\frac{U_{22}}{\sum_i U_{i2}} - 1 \right) \right]}{w^T \sum_i G_i} = Z_2 < 0$, it occurs that:

if $\left[\frac{U_2}{\sum_i U_i} - \frac{G_2}{\sum_i G_i} \right] > Z_2$, Option C dominates Option D

if $\left[\frac{U_2}{\sum_i U_i} - \frac{G_2}{\sum_i G_i} \right] < Z_2$, Option D dominates Option C

whatever choice country 1 made. In other words, tax choices of country 1 and country 2 are actually independent.

In brief, the choices of countries 1 and 2 can be jointly represented as follows:

			Country 2 - F		
			Option 0	Option C	Option D
Country 1 - L	Option C	$\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i} \right] > Z_1$	never (loss)	$\left[\frac{U_2}{\sum_i U_i} - \frac{G_2}{\sum_i G_i} \right] > Z_2$	$\left[\frac{U_2}{\sum_i U_i} - \frac{G_2}{\sum_i G_i} \right] < Z_2$
	Option D	$\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i} \right] < Z_1$	never	$\left[\frac{U_2}{\sum_i U_i} - \frac{G_2}{\sum_i G_i} \right] > Z_2$	$\left[\frac{U_2}{\sum_i U_i} - \frac{G_2}{\sum_i G_i} \right] < Z_2$

Overall, DST (Option C) will be adopted by all countries (harmonised DST will be applied between EU countries as supported by the EC) if for all countries the share of users is quite similar to the share of sales. On the contrary, if in one country (or in few countries) the digital market is characterised by a much smaller share of users than the share of sales (so that the difference is smaller than Z_i), that country will deviate from the DST, by adopting an alternative scheme to tax digital economy. The final result will, therefore, be that in that case, the digital services tax harmonised between EU countries, as supported by the EC, will not actually be implemented.

4. Empirical evidence

Starting from this general reference framework, this paper discusses, on the empirical ground, the possible scenarios of the EU proposal implementation. We focus the analysis on the online advertising sector that represents an exemplary case for its quantitative relevance and strong growth in recent years.

Total spending reached over 165 billion euros in 2017. Moreover, the online advertising market is heavily concentrated. Based on 2017 data, Alphabet and Facebook are the two largest players in terms of net operating revenues (the difference between total revenues and the cost of traffic acquisition), accounting for over 50 per cent of the total online advertising spending (58.5 billion and 24.9 billion, respectively).[3]

Limitations on the availability of data by company restricts at this stage our analysis to consider solely data by country. In terms of the model, this means that to define for any country:

$$U_i = U_{i1} + U_{i2} \tag{16}$$

$$G_i = G_{i1} + G_{i2} \tag{17}$$

$$\alpha_i = \alpha_{i1} = \alpha_{i2} \tag{18}$$

Therefore, for example in the case of country 1, we can derive:

$$\left[\frac{U_1}{\sum_i U_i} - \frac{G_1}{\sum_i G_i}\right] \tag{18}$$

$$Z_1 = \frac{w^B \alpha_1 G_1 \left[\frac{U_1}{\sum_i U_i} - 1\right]}{w^T \sum_i G_i} \tag{19}$$

To test the tax choices of different countries, we refer to 2017 data by country of the total online advertisement spending (IAB data) as a proxy for sales revenues and of

---

[3] Business in online advertising is typically characterised by the presence of a digital platform that provides Internet services around the world (for example, a search engine, like Google, or a social network, like Facebook). Most of these online services are offered free of charge to network users, which, in their use, allow the company to collect a variety of data: location of the subject on the site, preferences and /or browsing interests on the web, personal data for which the user also authorises their use for commercial purposes. Over time, the digital platform, thanks to software capable of processing and analysing collected data, is able to offer an online advertising service with customised advertisements tailored to the needs and preferences of the user. Advertising is therefore the main activity of the group, which draws most of the profits.

total internet users (WorldStat data) assuming equal user distribution for each internet platform.

Figure 2 shows available data for main European countries, the rest of Europe and the rest of the world. In terms of worldwide totals, Europe shows a higher share of advertising spending (29%) than of internet users (11.2%). Europe also displays a higher digitalisation rate, given the lower share of total world population (6.7%).

Focusing on the European market, selected countries show strongly concentrated advertising spending: the UK represents 9.6 per cent of the worldwide total and 33 per cent of the total European advertising spending. As expected, digital and total population are more correlated across countries.

The difference between the share of users and the share of sales defines different incentives in designing the digital taxation. Without a cooperative solution, unilateral taxation could lead to a deviation from the DST, depending on the value of the share difference and the thresholds Z_i.

Fig. 2 - Internet users and digital advertising spending, worldwide % (2017)
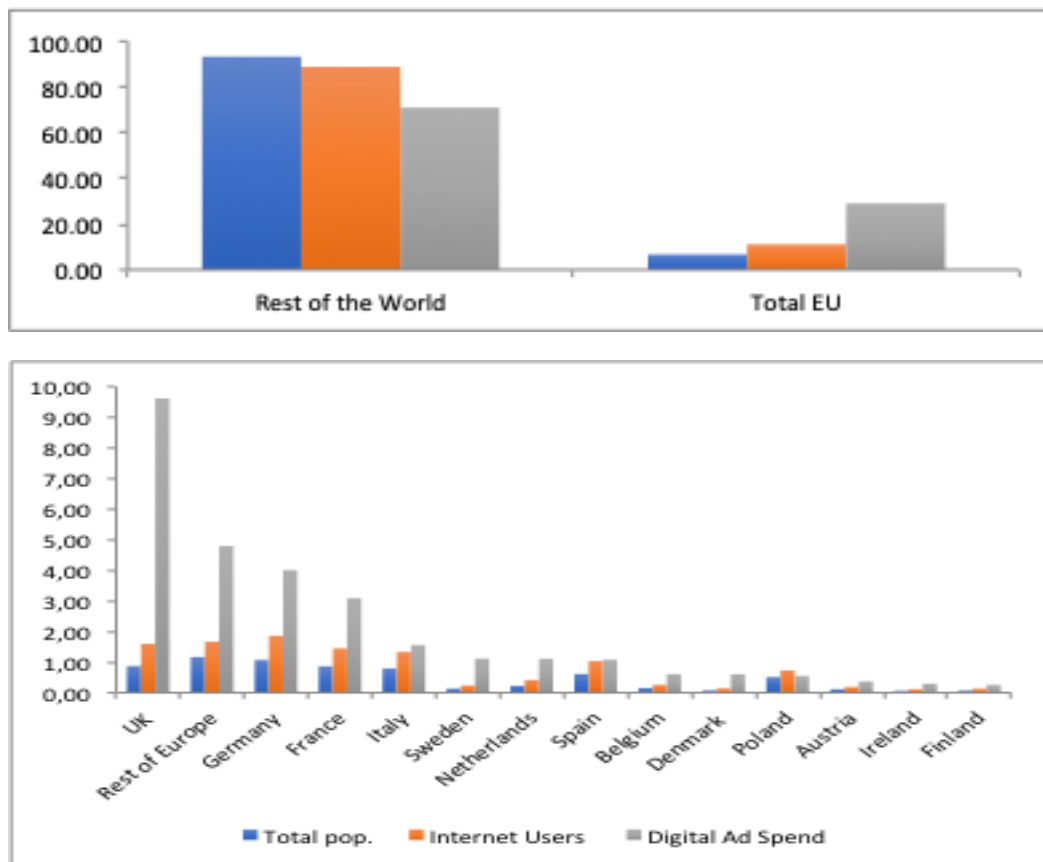
Source: IAB (2018); WorldStat (2019).

Given the available data, in Table 1, the value of the difference (18) and the value of the threshold (19) are calculated for each country, using welfare weights equal to 1.5 and 1 for tax revenue and tax burden, respectively and under a complete tax shift assumption (α=1). In all European countries (except Poland) the share of sales is larger than the share of users; the opposite holds for the rest of the world. Column 5 shows the distance between the difference (18) and the threshold (19) for each country. For almost all the European countries the distance show positive values and therefore those countries would prefer C option to D. Negative values for the UK, Sweden and Denmark suggest a preference for the D option. On the one hand, Italy shows the highest positive negative value and therefore a strong preference for the C option, on the other hand the UK supports the opposite strategy. However, for many countries the outcome is not very sharp: the distance is almost equal to zero and this suggests just a weak preference for either a tax option or the other one.
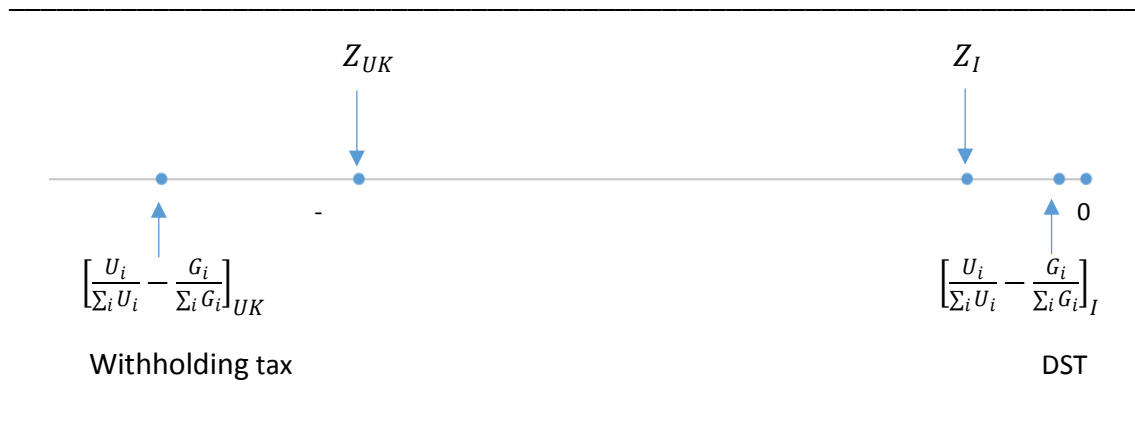
Tab. 1 - Online advertising: users and sales, threshold and C/D option for digital tax main EU countries, 2017 (Hypothesis: w^T=1.5; w^B=1; α=1)

	$U_i/\Sigma_i U_i$	$G_i/\Sigma_i G_i$	$\frac{U_1}{\Sigma_i U_i}-\frac{G_1}{\Sigma_i G_i}$	Z_i	(a)-(b)	C/D
			(a)	(b)		
Austria	0.002	0.004	-0.002	-0.002	0.001	C
Belgium	0.003	0.006	-0.004	-0.004	0.001	C
Denmark	0.001	0.006	-0.005	-0.004	-0.001	D
Finland	0.001	0.003	-0.001	-0.002	0.000	C
France	0.015	0.031	-0.016	-0.020	0.004	C
Germany	0.019	0.040	-0.021	-0.026	0.005	C
Ireland	0.001	0.003	-0.002	-0.002	0.000	C
Italy	0.013	0.016	-0.002	-0.010	0.008	C
Netherlands	0.004	0.011	-0.007	-0.007	0.000	C
Poland	0.007	0.006	0.002	-0.004	0.005	C
Spain	0.010	0.011	0.000	-0.007	0.007	C
Sweden	0.002	0.011	-0.009	-0.007	-0.001	D
United Kingdom	0.016	0.096	-0.080	-0.063	-0.017	D
Rest of Europe	0.017	0.048	-0.031	-0.031	0.000	C
Total Europe	0.112	0.291	-0.179	-0.172	-0.007	D
Rest of the World	0.888	0.709	0.179	-0.053	0.232	C

Source: own elaborations on IAB (2018) and World Stat (2019)

Figure 3 focuses on the relative positions of Italy and the UK in terms of their share distance and specific threshold.

Fig.3 - The case of the UK and Italy

_____

$$Z_{UK} \qquad\qquad\qquad\qquad\qquad\qquad Z_I$$

$$\left[\frac{U_i}{\sum_i U_i} - \frac{G_i}{\sum_i G_i}\right]_{UK} \qquad\qquad\qquad\qquad\qquad \left[\frac{U_i}{\sum_i U_i} - \frac{G_i}{\sum_i G_i}\right]_I$$

Withholding tax   DST

_____

The results shown in Table 1 are conditional to specific values of the parameters which enter the equation (19), that is the welfare weights for tax yield and tax burden and the rate of tax shift. In order to test the robustness of these outcomes, we apply two different shocks to the above-mentioned parameters compared to the scenario represented in Table 1 (Base scenario). First, we depart from the case of complete tax shift (α=1) to consider a case of partial tax shift (75 per cent), keeping welfare weights unchanged (Alternative 1). In general, the size of tax shift affects tax burden and tax exporting enabled by option C. If tax shift decreases the threshold moves to the right and the preference for C falls since the scope of tax exporting decreases. Secondly, in sequence, we assume that the social evaluation of public resources collected by digital tax rises (Alternative 2): we increase the weight for tax yield W^T from 1.5. to 2, keeping all other parameters as in the Alternative 1. Starting from the extreme case when the weight of tax revenue is equal to the weight of tax burden – that implies that according to equation 5 the objective function is equal to zero in the case of D option – the greater the former becomes compared to the latter, the more the countries are incentivised to deviate from C and to adopt the D option.

The tax strategies chosen by each country corresponding to Alternative 1 and 2 are reported in Table 2. Six countries (Italy, Spain and Poland in favour of C option; the United Kingdom, Sweden and Denmark in favour of D option) confirm in the Alternative scenarios the strategies adopted in the Base scenario. So, as regards these countries we can claim that the predictions we derive about their preferred tax strategies seems to be robust with respect to different hypotheses about tax shift behaviour and social evaluation of public resources and tax burden.

In summary, our empirical analysis gives evidence of different digital tax preferences across countries. As a result, unilateral tax implementation by each country fails to implement a coordinated DST as supported by the EC.

Tab. 2 – The C/D option in main EU countries: different scenario for welfare weight and tax shifting

	Base	Alternative 1	Alternative 2
	w^T=1.5 w^B=1 a=1	w^T=1.5 w^B=1 a=0.75	w^T=2 w^B=1 a=0.75
Austria	C	C	D
Belgium	C	D	D
Denmark	D	D	D
Finland	C	C	D
France	C	D	D
Germany	C	D	D
Ireland	C	D	D
Italy	C	C	C
Netherlands	C	D	D
Poland	C	C	C
Spain	C	C	C
Sweden	D	D	D
United Kingdom	D	D	D
Rest of Europe	C	D	D

The heterogeneity of country positions is confirmed when we look at this issue from a different perspective. Table 3 displays the minimum value of tax shift required to make the C option preferable in each country when the different scenarios here considered (Base and Alternative 2) are one by one adopted. The overall result is that D option-countries (e.g. the UK, Sweden and Denmark) require rates of tax shift unrealistically high (greater than 100 per cent) in order to switch the preferred choice from D to C and these values are even greater when the weight of tax yield is increasing (from Base scenario to Alternative one).

Finally, these empirical results should be read with caution, because of using 'by country' data instead of 'by company and by country' data jointly. In fact, single digital company position on specific digital services, following the design of the DST option, can affect the weighted aggregation by company of the share distance between users and customers and then the country specific threshold Z_i.

Tab. 3 – The C option: the minimum tax shifting for different welfare weights

	w^T=1.5 w^B=1	w^T=2 w^B=1
Austria	0.75	1.00
Belgium	0.90	1.17
Denmark	1.15	1.54
Finland	0.75	0.97
France	0.82	1.08
Germany	0.83	1.10
Ireland	0.95	1.23
Italy	0.25	0.30
Netherlands	0.95	1.26
Poland	-0.40	-0.64
Spain	0.12	0.09
Sweden	1.20	1.58
United Kingdom	1.28	1.70
Rest of Europe	1.00	1.33

5. Concluding remarks

International solutions to digital taxation issues take a long time. The recent DST *ad interim* proposal of the EC has not yet achieved a unanimous consensus. The different options for taxing the digital economy focus mainly on revenue taxes, which are easier to reconcile with the current international tax framework. In a more traditional approach, as digital multinationals avoid profit tax in source countries, the taxable revenues would be related to the domestic sales and taxation could be applied as a withholding tax. The DST is more targeted at assigning taxable revenue, taking into account value indirectly produced by exploiting internet users data (as a more comprehensive nexus for taxing rights in source countries). The DST implies a sort of triangulation among different subjects involved: national tax authorities, digital companies (taxpayers) providing services, customers purchasing such services, digital users who, by providing data consciously or unconsciously, are the source of value added and reference for tax yield apportionment across EU member countries. All those subjects can be located in different countries.

Recently, Italy and other countries have taken action by adopting unilateral measures in order to address this problem, adopting a country specific DST consistent with Commission proposal. Considering a non-cooperative framework, this paper has

pointed out possible outcomes in terms of convergence to or deviation from the DST proposal put forward by the EC.

To this aim, firstly, we define a simplified general framework to highlight the main elements of the DST scheme and of the possible strategies to tax digital economy. We identify the distance of users and sales shares (negative or positive) and a country specific threshold (negative) as the critical elements for the choice of tax strategy by national tax authorities. We found that the DST would be preferred by all countries (harmonised DST will be applied between EU countries, as supported by the EC) if, for all countries, the share of users is quite similar to the share of sales. On the contrary, if in one country (or in few countries) the digital market is characterised by a much smaller share of users than the share of sales, so that the difference is smaller than a country specific threshold value, that country will deviate from the DST, by adopting an alternative scheme to tax digital economy. The final result will, therefore, be that in such a case, the digital services tax harmonised between EU countries as supported by the Commission will not be actually implemented.

Secondly, focusing on the online advertising sector, we empirically test the general framework and we find evidence of different digital tax preferences across European selected countries. The UK and Sweden show a preference for a withholding tax on revenues, whereas Italy does for the DST. As a consequence, the unilateral tax strategy does not seem to support a EU level harmonised DST scenario.

These empirical results can be compared with recently implemented, or just announced, tax measures by some European countries. Sweden has immediately disagreed to adopt the DST proposal proposed by the EC, raising doubts over whether the tax will be applied. In general, Ireland and Nordic countries stress the need to achieve a global agreement on a more comprehensive long-term solution. These countries show a very close share distance to the threshold and a smaller share of users than other countries. Spain and Italy are in a very similar position, implementing the DST according to the Commission scheme. France announced the introduction of a DST type taxation and our results confirm its preference for this option. Finally, the UK, since 2015, has adopted the Diverted Profit Tax (DPT), according to which the sales revenues are taxed on the basis of an imputed profit margin, when a foreign company, without a permanent establishment, makes sales to UK customers.[4] Even if it is formally designed as a profit tax, the DPT is substantially targeted on sales revenues as the withholding tax does. Moreover, the UK has announced the introduction of a DST

---

[4] DPT has been reported as targeting the digital sector, but, in fact, it applies to a very wide range of transactions across all industry sectors as an anti-abuse provision for profit shifting.

very similar to the Commission proposal. Jointly considered, DPT and DST fully exploit potential taxable revenues (domestic sales revenue and the revenue indirectly generated by domestic users). As a consequence, the overall UK digital tax strategy seems to be consistent with our empirical results, which the withholding tax to be the preferred option.

To sum up, our general framework offers some insights to assess both the digital tax strategies of EU countries and the possible scenario towards a cooperative solution. The framework could be extended to consider tax competition driven by the differing mobility of tax bases between the withholding tax and the DST.

References:

AGCOM (2017) Delibera n. 10/17/CONS, Procedure for Evaluating the Economic Dimensions of the Integrated Communications System (SIC) for the year 2015.

Collin, P., Colin, N. (2013), Tax Force on Taxation of the Digital Economy.

Crémer, J. (2015) "Taxing network externalities", in Taxation and the digital economy: A survey of theoretical models, France Stratégie.

European Commission (2014), "Report of the Commission Expert Group on Taxation of the Digital Economy".

Deverereux, M., De la Feria, R. (2014), "Designing and implementing a destination based corporate tax", Working Paper n. 1407, Oxford University Center for Business Taxation.

European Commission (2014) "Report of the Commission Expert Group on Taxation of the Digital Economy".

European Commission (2015) "Communication from the Commission to the European Parliament and the Council on a Fair and Efficient Corporate Tax System in the European Union", COM(2015) 302 final.

European Commission (2018) "Impact assessment accompanying the document Proposal for a Council Directive laying down rules relating to the corporate taxation of a significant digital presence and Proposal for a Council Directive on the common system of a digital services tax on revenues resulting from the provision of certain digital services", Commission Staff Working Document, 21.3.2018.

Gastaldi, F., Pazienza, M.G. (2005) "La tassazione delle imprese multinazionali: alcune evidenze empiriche per l'Italia", in Pedone, A. (ed.), Tassazione internazionale e concorrenza fiscale, Franco Angeli.

Gastaldi, F. (2016) "La tassazione diretta nella economia digitale", in Arachi, G., Baldini, M. (ed.), La finanza pubblica italiana, Rapporto 2016, Il Mulino.

Hongler, P., Pistone, P. (2015) "Blueprints for a new PE nexus to tax business income in the era of the digital economy", WU International Taxation Research Paper, n. 15.

Liberati, P, Polidori, P. (2005) "Regole e aspetti critici della tassazione del commercio elettronico", in A. Pedone (ed.), Tassazione internazionale e concorrenza fiscale, Franco Angeli.

OECD/G20 (2014) "Addressing the Tax Challenges of the Digital Economy", OECD.

OECD/G20 (2015) "Addressing the Tax Challenges of the Digital Economy", OECD, Action 1: Final Report.

Ufficio Parlamentare di Bilancio (2017) "Audizione informale sul DDL n. 2526 recante Misure in materia fiscale per la concorrenza nell'economia digitale", 15 marzo.

Ufficio Parlamentare di Bilancio (2017) "Interventi antielusione e imprese digitali: le misure nella recente "Manovrina"", Flash n. 5/December 2017.

Ufficio Parlamentare di Bilancio (2017) "La nuova imposta sulle transazioni digitali", Flash n. 9/December 2017.

Zhu, Y (2014) "Proposed Changes to the UN Model Tax Convention Dealing with the Cyber-based Services", Report to the Committee of Experts on International Cooperation in Tax Matters.