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Proposal for a Council Directive

on a common system of financial transaction tax and amending Directive 2008/7/EC

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ANNEX 16

EFFICIENCY ASPECTS

1. Concepts.

One can define tax efficiency in several ways.

A first concept of tax efficiency can be defined as a measure of the extent to which tax authorities avoid, when imposing a tax, disturbing the equilibrium - in terms of prices and quantities - that would have been achieved in the absence of taxation. It is difficult to think about any (positive) tax that could achieve full efficiency under this definition.

A second definition of tax efficiency is the extent to which taxes will not distort the equality between the marginal rate of substitution (MRS) and the marginal rate of transformation (MRT) that characterized (absent of tax) equilibriums on private goods markets[1].

In the absence of taxes, at equilibrium, the MRS between two private goods (A and B) equals the MRT between these two goods and both equal the relative prices of the goods P_B/P_A. A tax t on the good B will create a wedge between these two measures and we will have the following inequality[2]:

$$(1)\ MRS_{AB} = \frac{(1+t)P_B}{P_A} > \frac{P_B}{P_A}$$

A relatively simple way of measuring this distortion is to calculate the deadweight loss (also called Harberger triangle, excess burden or allocative inefficiency) created by the tax[3]. The

[1] Equilibriums for pure Public Goods are characterized by equality between the marginal rate of transformation and the sum of the marginal rates of substitution.

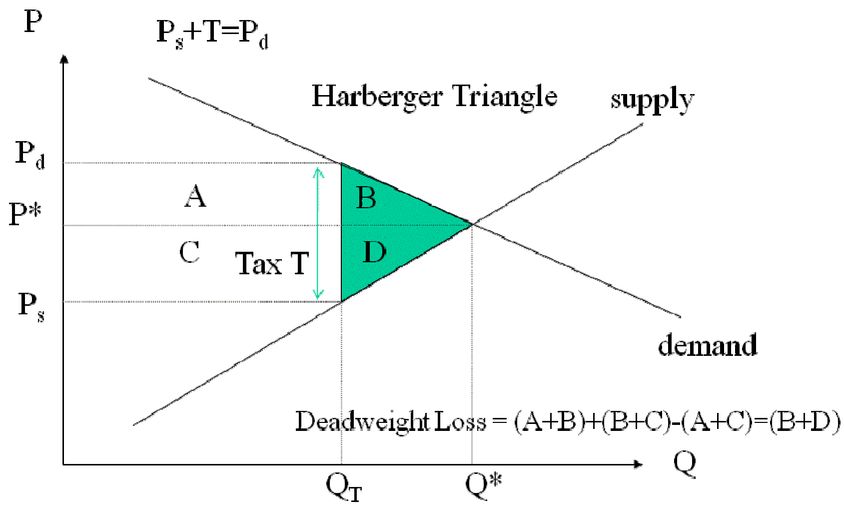
[2] Note that a lump-sum tax (i.e. a tax in the form of a fixed amount, independent of quantities consumed) would not distort this equality. The same could be true if the same tax rate would be applied to good A, in which case, the terms (1-t) would appear on both the numerator and the denominator, and would cancel out. This shows for example that differentiated tax rates on different goods distort the relative choices of consumers while applying the same uniform rate would not. However, this shall be true for any ‘good’ A and B that consumers shall choose. A classical example is the choice between working (i.e. choosing good A) and not working (i.e. choosing good B, leisure). In such case, it is difficult to think of a way of directly taxing leisure. In other words, an uniform tax rate on all possible goods (any physical good, service, labor, leisure, etc) could mimic the effects of a lump-sum tax and avoid distortions between the MRS and the MRT, but in practice, it is impossible to achieve.

[3] The concept was introduced by Harberger (1971). Several authors have refined it (e.g. Hausman, 1981; Willig, 1976). The consumer surplus – a concept introduced in 1844 by Jules Dupuit - is in general a good approximation of welfare (under specific technical conditions such as differentiability and monotony of the indirect utility function), even though the concepts of compensating variation and equivalent variation are more rigorous measures. It can be shown that the measure of consumer surplus lies between these two other measures. It shall also be stressed with Dixit and Weller (1976) that the consumer surplus is only an approximation for small changes and that if the revenue effect is large, one of the other two measures shall be used.

deadweight loss can be seen as a measure of the economic value of the loss in economic activity created by the tax (because e.g. there is less consumption or less working hours). In the figure hereunder, the equilibrium between demand and supply of a good is set at quantities Q* (horizontal axis) and price P* (vertical axis). At this equilibrium, the consumer enjoys a surplus equals to the difference between what she was willing to pay for each quantity (the demand curve) and what she actually pays P*, that is the area between the demand curve and the horizontal line set at P*. The producer also enjoys a surplus equals to the difference between the price P* she receives and the price at which she was willing to sell for each quantity (the supply curve), that is the area between the horizontal line set at P* and the supply curve.

If the government introduces a proportional tax t on the good (amounting to revenue per unit T), the impact of the tax will be split between the consumer and the supplier in proportions that depend on the slopes of demand and supply (i.e. their elasticities). The price for consumers will increase from P* to P_d and the price received by suppliers will decrease from P* to P_s (with the difference between P_d and P_s being the tax $T=tP_s$). Quantities exchanges will decrease from Q* to Q_T. The government will collect a tax T times the quantities exchanged, which corresponds to areas A+C on the graph. In practice, a tax burden A falls on the consumer and a tax burden B falls on the supplier. Because prices for consumers and suppliers have changed, so have the consumer's surplus and the producer's surplus. The consumer's surplus has decreased by the areas A+B and the producer's surplus has decreased by the areas C+D.

In sum, the losses for economic actors are (A+B) + (C+D) and the gains for the government is (A+C), possibly given back to economic actors. The balance is the triangle represented by (B+D), which is the deadweight loss of the tax.



If we assume linear supply and demand, the deadweight loss can be approximated by the formula (Rosen, 1992, p. 316):

$$(2)\ DWL = \frac{P^*Q^*}{2\left(\frac{1}{\varepsilon_D} + \frac{1}{\varepsilon_S}\right)} t^2$$

Where P* and Q* are the quantities without tax, t the marginal tax rate and ε_D and ε_S are respectively the price elasticity of demand and supply. Assuming an infinitely elastic supply, it can be simplified to

$$(3)\ DWL = \frac{P^*Q^*\varepsilon_D t^2}{2}$$

This term can also be expressed in terms of semi-elasticity by considering the relationship that the elasticity is the semi-elasticity times the average price.

Now, the price elasticity is not necessarily equals to the tax elasticity. The price elasticity can be defined as $\varepsilon_D = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}}$, while the tax semi-elasticity is $\varepsilon^{semi}{}_t = \frac{\frac{\Delta Q}{Q}}{\Delta t} = \frac{\frac{\Delta Q}{Q}}{t}$ when the starting tax rate is zero. Hence, it is easy to show that in this case $\varepsilon_D = \varepsilon^{semi}{}_t$.

A third definition of tax efficiency is the marginal cost of public funds (MCPF) introduced by Browning (1976), which is the loss incurred by society in raising additional revenues to finance government spending. It can be, for example, measured by the loss in GDP per unit of tax revenue raised (Dahlby, 2008).

A fourth definition of tax efficiency relates to the corrective (Pigouvian) aspects of taxation, that is to what extent they are efficient at correcting externalities, preventing undesired behaviors or incentivizing desired actions.

2. The Deadweight loss of the tax.

In this section, we look at the deadweight loss created by both the FAT and the FTT, applying the second formula above. The deadweight loss created by the FAT would be zero in case of an absence of relocation and elasticity effects. When more dramatic assumptions are assumed, the deadweight loss of the FAT in percentage of tax collected varies between 11.6% and 26.0% depending on the variant. This is to be compared with a ratio of about 5% for CIT. The deadweight loss of a FTT is much higher. While for spot equity and bonds transactions, it would be only about 5%, it jumps to 33% for spot FX and to 120% for derivative transactions. The level is also very large in absolute terms. For a broad-based FTT, the efficiency loss amounts to EUR 200 billion.

Tax	Scenario Elasticity	Estimated Revenue collected	Total DWL (EUR)	DWL in % tax collected

CIT	0.45[4]			5.3%[5]
FAT1	Combined semi-elasticity of -3.77[6]	EUR 24.6 billion	EUR 2.86 billion[7]	11.6 %
FAT2	Combined semi-elasticity of -6.85[8]	EUR 12.4 billion	EUR 3.24 billion[9]	26.0%
FAT3	Combined semi-elasticity of -6.85[10]	EUR 9.3 billion	EUR 2.12 billion[11]	22.7%
FTT – spot equity and bonds	Combined semi-elasticity of -200[12]	EUR 9.3 billion	EUR 0.52 billion[13]	5.56%
FTT – spot fx	Combined semi-elasticity of -800[14]	EUR 48.7 billion	EUR 16.22 billion[15]	33.3%
FTT – exchange traded derivatives	Combined semi-elasticity of -1,400[16]	EUR 70.2 billion	EUR 85.08 billion[17]	121.2%
FTT – Broad base total	Combined semi-elasticity of -1,302[18]	EUR 216.9 billion	EUR 202.24 billion[19]	93.2%

4 Huizinga and Laeven (2008) estimate the elasticity of the corporate tax base to the rate at 0.45.

5 In 2008, the average corporate tax rate is 23.6%. The DWL in % of revenue collected is computed via the formula $\varepsilon t / 2$. See Nicodeme (2008).

6 The decrease profit due to relocation is estimated to be proportional to the decrease in total assets, that is the difference between columns (A) and (D) in table (9) of the main document, or 1.80%. This is the total decrease in the wage part of the FAT (elasticity of wages on remaining companies is estimated to be zero from Annex 8). Next, there is a 35% decrease in reported profit on the remaining 98.2% companies (semi-elasticity of -7 from Annex 8). That is 36.17% decrease in the profit part in total. All these changes for a 5 percentage point increase in the tax rate. For FAT1, the drop in the FAT tax base is (comparing tables (8) and (9)) 18.83%. Hence we have a semi-elasticity of -18.83/5 = -3.77.

7 The tax base (P*Q*) is EUR 606.194 billion. The tax rate is 5%. The semi-elasticity is 3.77. Hence, the DWL is 606.194 x 3.77 x $(0.05)^2/2$.

8 The drop is the tax base under the same assumptions as FAT1 is 34.25% (tables 8 and 9 of IA). Hence, we have a semi-elasticity of 34.25/5=6.85.

9 The tax base (P*Q*) is EUR 378.034 billion. The tax rate is 5%. The semi-elasticity is 6.85. Hence, the DWL is 378.034 x 6.85 x $(0.05)^2/2$.

10 The drop is the tax base under the same assumptions as FAT1 is 31.24% (Tables 8 and 9 of IA). Hence, we have a semi-elasticity of 31.25/5=6.25.

11 The tax base (P*Q*) is EUR 271.396 billion. The tax rate is 5%. The semi-elasticity is 6.25. Hence, the DWL is 271.396 x 6.25 x $(0.05)^2/2$.

12 -10% relocation divided by tax rate of 0.01%.

13 The tax base (P*Q*) is EUR 20,670 billion. The tax rate is 0.05%. The semi-elasticity is 200. Hence, the DWL is 20,670*200*$(0.0005)^2/2$.

14 -40% relocation divided by tax rate of 0.05%

15 The tax base (P*Q*) is EUR 162,186 billion. The tax rate is 0.05%. The semi-elasticity is 800. Hence, the DWL is 162,186*800*$(0.0005)^2/2$.

16 -70% relocation divided by tax rate of 0.05%.

17 The tax base (P*Q*) is EUR 486,171 billion. The tax rate is 0.05%. The semi-elasticity is 1,400. Hence, the DWL is 486,171*1,400*$(0.0005)^2/2$.

Note: for the FTT, the chosen elasticity is 0 and the rate 0.01%. Relocation for equity and bonds is 10%, it is 40% for FX spots and 70% for derivatives instruments, and elasticity on remaining transactions is zero, which is the most optimistic scenario for the relocation.

3. The Marginal Cost of Public Funds.

An estimate of the loss in GDP per EUR of tax collected can be found in the various simulations in Annex 15. The marginal cost of public funds for the FAT is in the range of 0.6 to 2.4, which is lower than CIT (4.7) and much lower than a FTT which is in the range of 20.

Tax	GDP Loss (%)	Amount raised in % GDP	MCPF
CIT	-0.98	0.21	4.7
FAT1 – ST baseline	-0.12	0.18	0.6
FAT1 – LT baseline	-0.50	0.21	2.4
FAT1 – LT – high fixed L	-0.28	0.17	1.6
FAT1 and levy– LT	-0.53	0.28	1.9
FTT 0.01%	-0.17	0.01	17.0
FTT 0.1%	-1.76	0.08	22.0
FTT 0.2%	-3.43	0.16	21.4

4. Specific properties.

4.1. Cash-Flow taxation under a FAT.

As portrayed by Devereux and Sorensen (2006), cash-flow taxation possesses interesting efficiency characteristics. Cash-flow FAT could potentially be designed as Source-based cash-flow FAT, whose base would consist of domestic and foreign sales minus domestic and foreign purchases minus labour costs for the profit part, as Full destination-based cash-flow FAT whose base would consist of domestic sales minus cash and labour expenses for production of domestic sales for its profit part and of labour cost embedded in domestic sales for the labour part, or as VAT-type destination-based FAT whose base would be domestic sales minus domestic purchases and minus labour cost for the profit part. This last version would, as for VAT, zero-tax exports and tax imports instead.

All of these options share several interesting efficiency properties. First, as explained in Annex 10, cash-flow taxation falls on pure rents and exempts the normal return to capital. Since the Effective Marginal Tax Rate is zero, cash-flow taxation does not distort the domestic investment

[18] This is the decrease in total volume (in percentage) divided by the change in rates (in pp).

[19] The tax base (P*Q*) is EUR 1,242,657 billion. The tax rate is 0.05%. The semi-elasticity is 1,302. Hence, the DWL is 1,242,657*1,302*(0.0005)²/2.

decisions. Next, because the present value of the cash-flows from a marginal investment is equal to the initial investment outflow (thanks to immediate expensing), the timing is irrelevant and there is no tax advantage from deferral.

Cash-flow taxes also solve two distortions: they are neutral vis-à-vis organizational choice of companies and vis-à-vis the choice between debt versus equity financing. In that sense, they share the same property as an ACE or a CBIT (See Annex 18).

The full destination-based cash-flow FAT would in addition remove tax incentives for relocation as the tax on sales to domestic markets cannot be avoided by relocation. The VAT-type destination-based version of the FAT would achieve two other objectives: first, it would well mimic VAT and, second, it would eliminate transfer pricing problems since sales to foreign customers would not be included in the base.

All versions of FAT would still retain two specific problems of cash-flow taxes. The first one is the transition to the new system as the tax would fall on cash-flows from 'old' investments and could potentially create liquidity problems if no grandfathering is put in place. The second problem is the reaction to anticipated tax changes which can generate windfall profit or losses and disrupt the timing of investment. In addition, it is uncertain that cash-flow taxes would be necessarily recognized by third countries as eligible for foreign tax credits.

The source-based cash-flow version of the FAT would also retain the problems of potential profit-shifting and relocation unless intragroup transactions are included in the base. The full-destination-based cash-flow FAT would create the need to separate domestic cash-flows from foreign cash-flows. It would also create specific problems as to how to tax foreign companies serving the domestic market from abroad. This is because international tax systems only allow the taxation of firms with physical presence such as subsidiaries or permanent establishment. Finally, both the Full destination-based and the VAT-type destination-based cash-flow FAT would affect the equilibrium price in domestic and foreign markets. This is because exports would be zero-rated and imports would be taxed. Prices would need to adjust, which can create frictions under a fixed exchange rate system.

4.2. Coping with market price volatility and risk.

One element of the debate is whether any of the tax can decrease price volatility in markets. FAT3 could by design target risk. This requires however that higher profitability is correlated with risk. This is not necessarily the case. As seen in section 6.5.1, FAT1 has the best correlation of the three variants with individual contribution of banks to systemic risk (probably because both are linked to the size of the institution).

The analysis for the FTT is more complex to carry out at the level of individual firms because the FTT burden depends on trading activities of firms, for which no detailed data is available. The analysis has therefore to be done at the level of markets. Several studies have looked at the impact of transaction taxes on volatility (a review of this economic literature is provided in Hemmelgarn and Nicodème, 2011). The conclusions of this literature are:

(a) There is little evidence that the potential beneficial effects of a transaction tax outweigh the potential costs due to tax avoidance and unclear tax incidence.

(b) The evaluation of a financial transaction tax depends largely on the underlying assumptions about the functioning of the financial market and whether the potential market failure can be corrected using a transaction tax. In general, the proponents of the tax argue that the tax would reduce the number of noise traders and consequently technical trading. Furthermore, the tax would decrease price volatility and unproductive short-term speculation since investors would concentrate on the long-run return of projects. The opponents of the tax argue that it would increase transaction costs. This increase in transaction costs would reduce liquidity of markets and therefore market efficiency. It would decrease stock prices and increase the cost of capital companies leading to less investment. They also argue that such a tax would shift transactions away to other markets in countries which do not apply a financial transaction tax.

(c) The empirical finding mostly point to either no effect on price volatility or an increase in it due to a decreased number of transactions.

The empirical findings in Annex 15 show that a transaction tax would barely affect price volatility.

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