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ANNEX 11

REVENUE POTENTIAL OF FTT AND FAT

1 PRELIMINARY REMARKS

Before presenting the available data and methodology, a general remark on tax revenue estimates for new tax instruments should be made. Estimating revenue changes when reforming existing taxes is already a difficult task since behavioural changes due to tax rate or base changes are often difficult to predict. Estimating revenue for taxes which would be newly introduced and which have the goal to change market behaviour and structure significantly is not feasible without a high degree of uncertainty. This is especially the case for the taxation of derivatives where no data on potential reactions when taxing the notional value is available.

The FAT is more similar to some existing taxes and revenue estimates are more meaningful for this tax. Therefore, the results of the revenue estimates presented below should be interpreted with great caution and can perhaps serve to give some order of magnitude, but even this is not. Moreover, notwithstanding the often substantial projected receipts, the consequences of governments increasing their reliance on this relatively volatile sector for their revenues should be considered carefully.

2 ESTIMATES FOR REVENUES FROM FTT

2.1. Methodology and recent revenue estimates

The revenue potential of an FTT is considered to be substantial.[1] Schulmeister (2011) estimates that Europe (including Norway and Switzerland) could raise around EUR 310 billion (1.8% of GDP of the countries involved) in 2010 with a tax rate of 0.05%. This is based on the assumption that trade volumes decrease by 3.8% in spot markets, by 69.2% in exchange traded derivatives and by 68.6% in OTC derivative markets. Despite the reductions in volumes, the derivatives markets generate the major part of revenues in these estimates (95%) due to the taxation of the notional value which constitutes a very large tax base. The largest share of these revenues (62%) is collected in the UK. McCulloch and Pacillo (2011) give an extensive review of the literature on revenue estimates as well as the underlying data on transactions costs. They also present an estimate of the revenue of an FTT at global level to be between USD 147 and 577 billion without OTC contracts and USD 482 to 1,631 billion including OTC markets. They define the tax rate in terms of the percent increase in transaction costs of products and assume increases of 10%, 20%, and 50%. Data on FX markets as well as OTC derivative trading is usually retrieved from the BIS.

[1] Not all studies see the FTT as a revenue raiser and a corrective device. In a study requested by the European Parliament's Committee on Economic and Monetary Affairs, von Weizsäcker and Darvas (2010) argue for a very small tax rate for an FTT to reach some regulatory objectives but are sceptical with regard to the FTT as a revenue raising instrument. They conclude: "*The case for a tax on financial transactions simply to raise more revenue from the financial sector to pay for the cost of the crisis is not particularly strong. Better alternatives to tax the financial sector are likely to be available*."

Other studies have taken different approaches to determine the revenue potential. Jetin and Denys (2005) proposed a specific formula for estimating transactions tax revenues. The authors base their approach on a study on currency transaction taxes by the French Ministry of Finance published in 2000. The formula is similar to assuming an arbitrary decrease of trade volume. Since the underlying structural model to explain the precise reaction of all market segments is not known, this formula should be interpreted as an educative guess of an estimate and as a tool to visualize relevant parameters. It is not an actual description of behavioural changes. A variant of this formula was also used by McCulloch and Pacillo (2011) and is also used here for different market segments. The assumption is that tax revenue R can be calculated as

$$R = \tau \cdot V \cdot E \cdot \left(1 + \frac{\tau}{c}\right)^{\varepsilon}$$

where τ is the tax rate, V the annual transaction volume, and E which is interpreted here as relocation and fiscal evasion. The variable c describes the transaction costs in percent of the transaction volume and ε is an elasticity which describes the effect of a tax increase on the transaction volume, i.e. the tax base.[2] The elasticities ε considered fort he formula range from zero (no reaction except for relocation and evasion E) to -2.

The elasticity values are based on results of Annex 9. Note that the elasticities found in the empirical literature are point estimates. This means that they have been calculated for specific trade volume, for a specific increase in transaction costs and for a specific institutional setting. It can also be interpreted as the transaction cost elasticity of the transaction volume since a tax increases the transaction costs in the case of a transaction tax. Note that the last term in brackets describes the volume reaction of markets due to an increase in transaction costs only. The relocation and evasion is captured directly by E. It is important to understand that the main difference between the estimates discussed in the policy debate recently and the figures presented here is the assumption about the strength of the relocation effect E, notably with regards to derivatives.

In order to understand better how the tax revenue depends on the tax rate in the formula chosen above it is useful to look at the first derivative of the function with respect to τ. The resulting expression shows under which condition the derivative is positive. In this case tax revenue R increase in τ. Since E and V are constant in this formulation assume for simplicity that they are both 1:

[2] In general, an elasticity is defined as the relative change in the dependent variable (here the transaction volume) to a relative change in the independent variable (here the tax rate). In other words, the elasticity measures the percentage change of the tax base if the tax rate changes by one percent.

$$R = \tau \cdot \left(1 + \frac{\tau}{c}\right)^{\varepsilon}$$

$$\frac{\partial R}{\partial \tau} = \left(1 + \frac{\tau}{c}\right)^{\varepsilon} + \tau \cdot \varepsilon \cdot \left(1 + \frac{\tau}{c}\right)^{\varepsilon - 1} \cdot \frac{1}{c}$$

$$= \left(1 + \frac{\tau}{c}\right)^{\varepsilon} \cdot \left(1 + \varepsilon \frac{\frac{\tau}{c}}{1 + \frac{\tau}{c}}\right)$$

The first term in the last line of the equation above is always positive since tax rate and transaction costs are positive. The elasticity ε takes values from 0 to -2 in the estimates below. The derivative will only be negative if ε is larger than 1 in absolute terms. For elasticities between 0 and -1 revenue will always increase in the tax rate (see figure 1a). Only for values larger than 1 there is a Laffer-curve effect where revenue could decrease in tax rates (see figure 1b). This is the standard case.

Figure (1a) Revenue as a function of the tax rate, tax rate range (0 to 1%), transaction cost 0.03%, Elasticity -1 transaction volume normalized to 1.

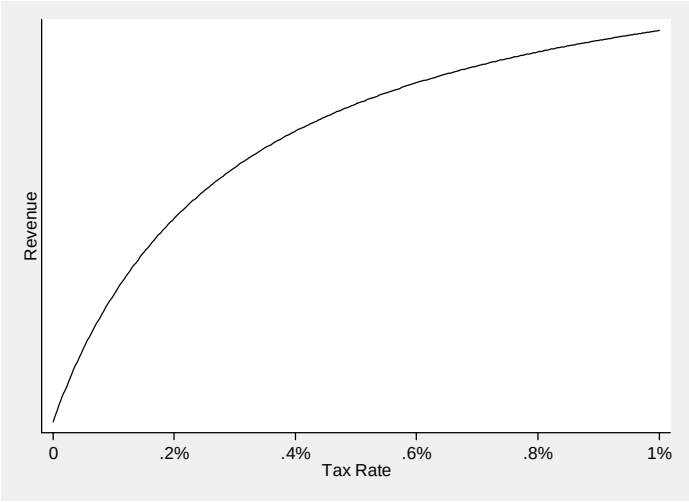
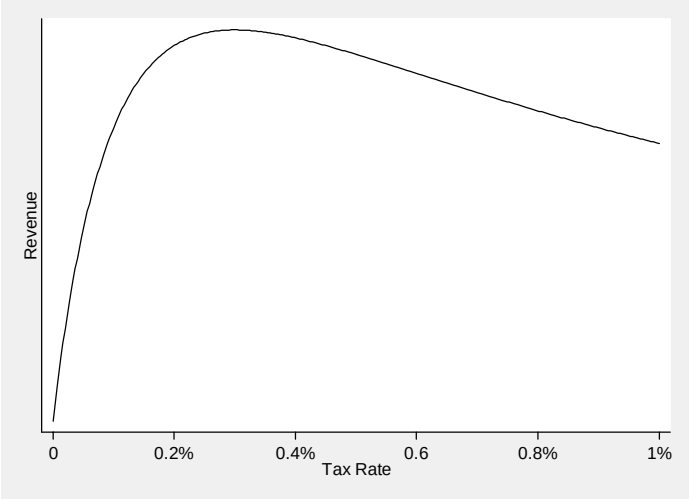


Figure (1b) Revenue as a function of the tax rate, tax rate range (0 to 1%), transaction cost 0.03%, Elasticity -2 transaction volume normalized to 1.



For the range of values of transaction costs, tax rates and elasticities used for the estimates below, the derivative is almost always positive. This means that in the tax rate range discussed here there is in general an increase of revenues in the tax rate. The only exception are estimates for the CTT since the transaction costs are very low which leads to an earlier Laffer-curve effect.

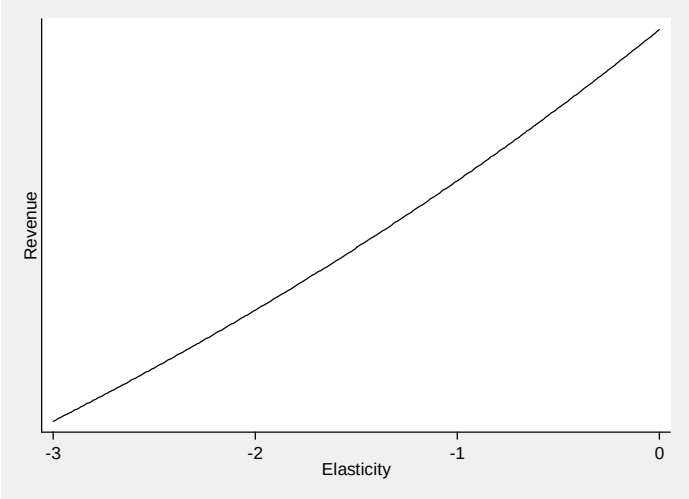
With regard to the elasticity, the first derivative is

$$R = \tau \cdot \left(1 + \frac{\tau}{c}\right)^{\varepsilon}$$

$$\frac{\partial R}{\partial \varepsilon} = \varepsilon \left(1 + \frac{\tau}{c}\right)^{\varepsilon - 1} < 0$$

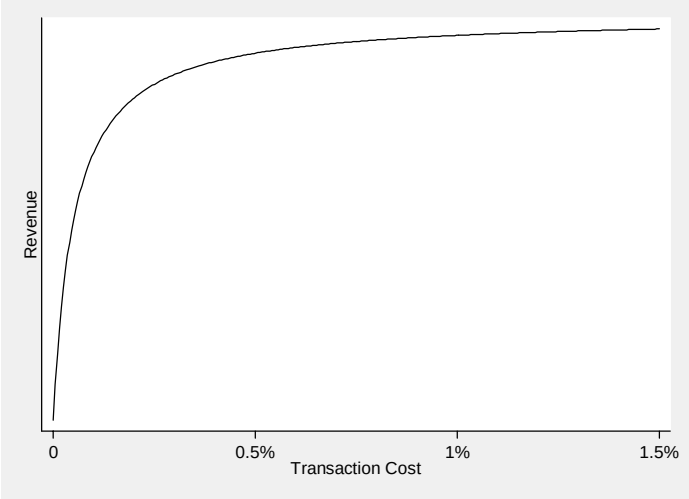
In this case it is straight forward to see that the derivative is negative as long as the elasticity is negative. Figure (2) illustrates the effect of the elasticity on the tax revenue given a tax rate of 0.05% and transaction costs of 0.03%.

Figure (2) Revenue as a function of the assumed elasticity, elasticity range (-3 to 0), transaction cost 0.03%, tax rate 0.05%, transaction volume normalized to 1



The transaction costs also influence the revenue collection. The basic idea is that lower transaction costs lead ceteris paribus to lower revenues. the reason is that the tax increases transaction costs relatively stronger when the latter are low. If transaction costs are very large, a small increase due to taxation does not have a strong effect.

Figure (3) Revenue as a function of the assumed pre-tax transaction costs in % of transaction volume, range (0 to 1.5%), tax rate 0.05%, elasticity 1, transaction volume normalized to 1



It is important to understand that the main difference between the estimates discussed in the policy debate recently and the figures presented here is the assumption about the strength of the relocation effect *E*. For reasons outlined in more detail below the estimates presented here differ from others mainly with regard to derivative taxation. The differences in estimates for spot market transactions are negligible. In fact, we rely otherwise on similar values with regard to transactions costs *c* like for example McCulloch and Pacillo (2011). Here the values used are however slightly lower to what they suggest for mainly one reason. The data they use is based on transaction cost estimates from the years 1980 to 1997 (except for the FX market). The assumption made here is that in the last 15 years transaction costs have been further

reduced due to IT developments. For this reason lower transaction costs for most product categories are assumed. They are summarized in Table (1). In the following, the formula presented above is used to calculate some rough revenue estimates.

Table (1) Assumptions about Transaction costs

Market Segment	Pre-tax transaction cost in % of transaction volume
Equity	0.06%
Bond	0.06%
Exchange Derivatives	0.03%
OTC Derivatives	0.07%
FX Spot Market	0.024%

It should be noted that the formula is fully based on assumptions. There is currently no structural model for the functional form of a revenue function for the different products taxed under a transaction tax. This should be taken in mind when interpreting the results.

2.2 Data sources

A. Federation of European Stock Exchanges

FESE collects data on exchange traded instruments in three categories: equities, fixed interest instruments (bonds) and exchange traded derivatives.

The FESE data is more comprehensive compared to other data sources like the World Federation of Exchanges (WfE) data which were used recently for similar estimates. 36 European Exchanges are covered in the data. Note that this entails also Non-EU countries since some exchanges are cross-border exchanges. The most important is the EUREX which is a Swiss and German exchange. Table (2) gives an overview of the exchanges available. Note that non-EU exchanges have been dropped from the sample unless a cross-border exchange contains at least one EU Member State.

The time period covered for all exchanges in the list is 2005 to 2009. For some exchanges the data is also available for a longer period; however for the purposes of this estimation a balanced panel is necessary to derive meaningful and comparable results for the EU-27. For this reason the years, where the not all changes are covered, have been dropped from the sample.

With regards to exchange traded products, the data covers three categories of products: Equities, Bonds and Derivatives. The data on equities admitted to trading on regulated markets can be divided in to four groups. Equities traded on Regulated Markets (RM), on Multilateral Trading Facilities (MTF) and Systematic Internalizers (SI) and Equity traded OTC. Not covered in the FESE is the equity trading in OTC markets. Assumptions about the

share of the latter vary widely and reported values range from 16 % to 38 %.[3] The reason for the differences in estimates is the different assumption about the degree of double counting in these transactions. For the purpose of this study the data will therefore not be used. Keep in mind that if all equity trading in OTC could also be taxed, tax revenues might be higher depending on the true share of OTC trading in all equity trading.

Table (2) Exchanges covered by FESE data

Exchange	**Countries**
Athens Exchange	GR
Athex Derivatives Market	GR
Austrian Derivatives Market	AT
Bratislava Stock Exchange	SK
Bucharest Stock Exchange	RO
Budapest CEESEG	HU
Bulgarian Stock Exchange	BG
Copenhagen NASDAQ OMX Nordic	DK
Copenhagen OMX Stock Exchange	DK
Cyprus Stock Exchange	CY
Deutsche Börse	DE
EUREX	DE, SW
Euronext Liffe	UK, FR, NL, BE, PT
Helsinki NASDAQ OMX Nordic	FI
Helsinki OMX Stock Exchange	FI
Iceland NASDAQ OMX Nordic	IS
Irish Stock Exchange	IE
Istanbul Exchange	TR
Italiana Borsa	IT
Ljubljana CEESEG	SI
London Stock Exchange	UK

[3] afme (2011) reports a value of 16 % while FESE (2011) estimates the value to be 38 %.

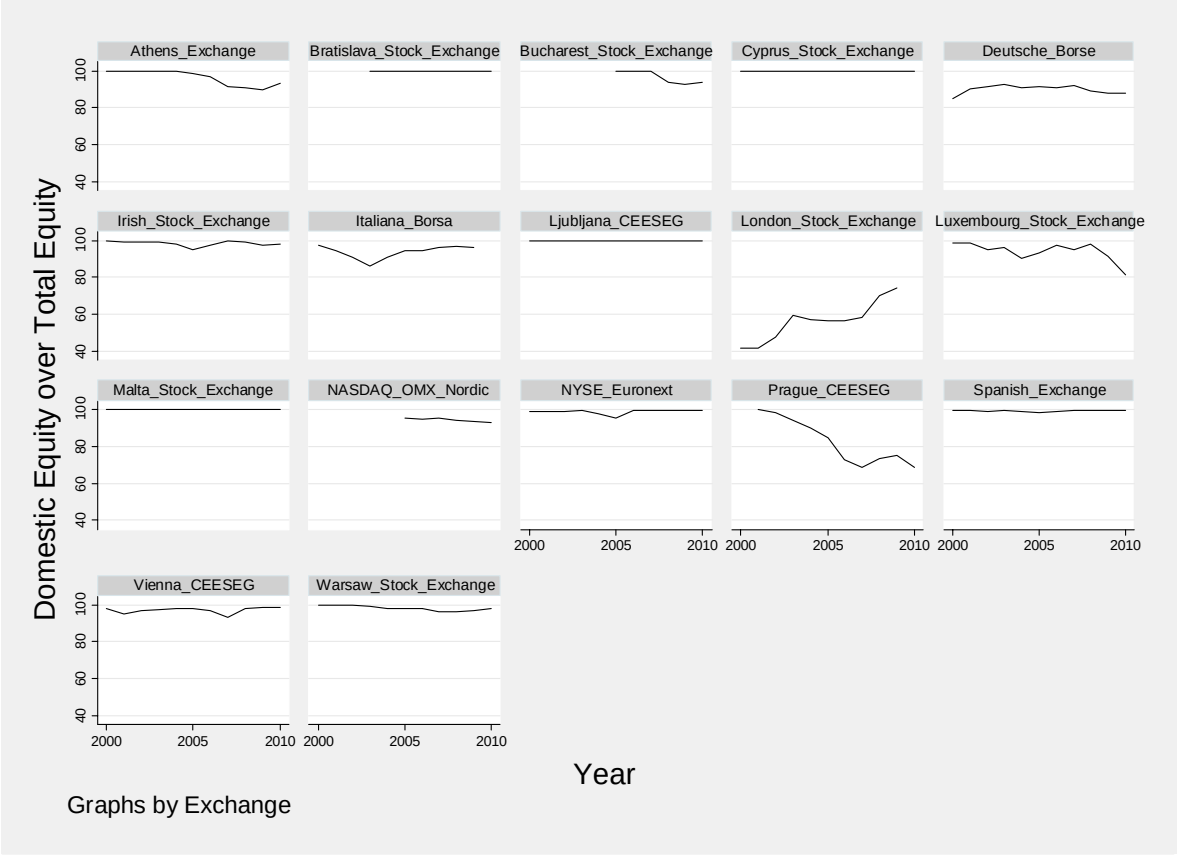
Luxembourg Stock Exchange	LU
Malta Stock Exchange	MT
NASDAQ OMX Nordic	DK, EE, FI, IS, LT, LV, SE
NYSE Euronext	BE, FR, NL, PT
OMX Nordic Exchange	DK, SE, FI, IS
Oslo Bors	NO
Prague CEESEG	CZ
SIX Swiss Exchange	SW
Spanish Exchange	ES
Stockholm NASDAQ OMX Nordic	SE
Stockholm OMX Stock Exchange	SE
Stuttgart Börse	DE
Vienna CEESEG	AT
Vilnius NASDAQ OMX Nordic	LT
Warsaw Stock Exchange	PL

For equities not admitted to regulated markets data is only available for those securities traded on an MTF. There is no information on privately placed equities or an estimation of their share.

The available data on equities is split in four categories of which only two are used, namely Electronic Order Book Transactions and Off-Electronic Order Book Transactions. Dark Pool Transactions and Reporting Transactions are not used due to the low number of observations. The latter two categories are not considered since too many observations are missing. Therefore, for exchange traded instruments (equities, bonds and derivatives) Electronic Order Book Transactions and Off - Electronic Order Book Transactions turnover volumes will be used in the tax base.

The FESE data also allows differentiating between trading in domestic and foreign equities: the share of domestic traded equity is in general very large in most Member states. Figure (4) shows the ratio for selected exchanges. The smallest share of domestic equities trading is executed at the London Stock Exchange. Note that foreign equities are exempted from the UK stamp duty (domestic issuance principle). Recently, Prague has increased the share of foreign equities trading significantly. However, most exchanges in new Member States have around 100% domestic equity trading.

Figure (4) Share of Domestic Trading in % of total trading.



B. BIS data

The revenues for foreign exchange (FX or Forex) markets and OTC derivatives were estimated using the data from the Bank for International Settlement (BIS). More specifically, all the figures for the FX and OTC markets are taken from the annual report by the Triennial Central Bank Survey (covering the years 2010, 2007, 2004 and 2001). The survey collects data from central banks and monetary authorities from all BIS members analysed.

In the statistics used the total foreign exchange markets turnover covers such instruments as: spot transactions, outright forwards, foreign exchange swaps, currency swaps and options. Furthermore, the turnover is defined as the absolute gross value of all new deals entered into during the month of April 2010/2007/2004/2001, and is measured in terms of nominal or notional amount of the contracts. In addition, transactions were reported to the BIS in US dollar equivalents, with non-dollar amounts converted into US dollars using the exchange rate prevailing on the date of the trade; in statistical tables the turnover is presented as a daily average. Finally, for turnover data, the basis for reporting was the location of the sales desk of any trade, even if deals entered into in different locations were booked in a central location.

In the turnover part, the instrument breakdown distinguishes between spot transactions, forwards, swaps, options and other foreign exchange products. The counterparty breakdown distinguishes between transactions with reporting dealers, with other financial institutions and with non-financial customers. Moreover, the currency breakdown includes separate reporting of all reporting countries' currencies, while the maturity breakdown distinguishes between

transactions with original maturity up to seven days, over seven days and up to one year, and over one year. As in the turnover part of the survey, data for the OTC foreign exchange instruments are broken down by counterparty, currency, and instruments (FRAs, swaps, and options).

List of statistical tables used:

- Global foreign exchange market turnover by instrument, counterparty and maturity
- Global foreign exchange market turnover by currency pair
- Global OTC interest rate market turnover by instrument, counterparty
- Global OTC interest rate derivatives turnover by currency
- Geographical distribution of global foreign exchange market turnover
- Geographical distribution of global interest rate derivatives turnover
- Foreign exchange turnover/ Spot foreign exchange turnover/ Outright forward foreign exchange turnover/ Foreign exchange swap turnover/ Currency swap turnover/ Options turnover by country

With regard to derivatives, it should be noted that it is important to separate turnover data from data on notional amounts outstanding. The BIS gathers statistics from the central banks of its members. For the second half of 2009 an amount of USD 349 billion was reported in notional amounts outstanding in interest rate swaps. These figures seem extremely high at first glance. However, it is important to understand that this is the total stock or inventory of interest rate swaps globally across all currencies and all maturities. This inventory has grown over years and does not represent turnover or activity in trading for a certain period. In fact, there are many swaps that actually extend out to 50 years and are listed in this inventory.

The BIS data on derivatives can be divided in two major categories:

1. Exchange-traded derivatives

Quarterly data on turnover and open interest measured in terms of both notional amounts (US dollars) and number of contracts. Data on notional amounts are only available for the main financial derivatives contracts, i.e. FX, IR, and equity index contracts. Note that for the single equity and the for commodity derivatives contracts only the data in terms of number of contracts is available (table 23B). http://www.bis.org/statistics/extderiv.htm

2. OTC derivatives

2a. Amounts outstanding (Semi-annual Survey)

Semi-annual data on amounts outstanding at end-June and at end-December, i.e. stocks measured in terms of gross notional and gross market values. These data are broken down by market risk category (FX, IR, equity linked, commodity and credit), instrument, counterparty, maturity, currency, etc.

- Statistical tables 19-22C: http://www.bis.org/statistics/derstats.htm
- Detailed tables: http://www.bis.org/statistics/derdetailed.htm

2b. Turnover (Triennial Survey)

Turnover data measured in terms of gross notional values and covering only FX and IR derivatives instruments, i.e. forwards, swaps and options. Note that all these aggregates are expressed in terms of daily averages.

- 2010: http://www.bis.org/publ/rpfxf10t.pdf#page=42
- 2007: http://www.bis.org/publ/rpfxf07a.pdf
- 2004: http://www.bis.org/publ/rpfx05a.pdf
- 2001: http://www.bis.org/publ/rpfx02a.pdf
- 1998: http://www.bis.org/publ/r_fx98statanx.pdf
- 1995: http://www.bis.org/publ/r_fx96.pdf

Table (3) summarizes the transactions volumes from the two data sources for 2010 and the large contribution from the derivative markets to the trading volume which is mainly based on the fact that the notional values is used as the measurement basis. Note that in the following it is implicitly assumed that the source principle is applied. The reason is that the current collection of transaction data follows is similar to the tax base according to the source principle.

Table (3): Volumes exchanged in Notional Amounts (2010) – EUR billions

Equity Trading	Bonds Trading	Exchange Traded derivatives	OTC derivatives	FX spot	FX Swaps	FX Outright forward	Sum
7,237.2	13,432.7	468,171.1	312,926.7	162,186.4	225,170.7	53,532.6	1,242,667

Source: FESE, BIS

2.3 Revenue estimates

Policy Option 1A: Currency Transaction Tax (CTT)

The revenue effects of a (global) Currency Transaction Tax have been studied extensively over the last years and there are numerous papers from different organisations and researchers on the potential revenue. As with all other transaction taxes, the figures should be interpreted

with caution due to the degree of uncertainty with regard to the behavioural effects. It should be noted that this option raises significant legal issues as explained in Annex 7.

A CTT would target currency conversions only; a levy based on this principle was recently proposed by the Committee of Experts to the Task Force on International Financial Transactions and Development. The report notes that the levy is - contrary to other proposals on FTT - not designed to change market behaviour as such. The study argues that the proposed very low rate of 0.005% would lead to only negligible effects on markets. It is designed as a pure revenue raiser. This is based on the CTT discussion in Schmidt (2008) who also presents an estimate for the potential CTT revenue. He finds that a tax rate of this size should not affect fundamental market behaviour. Using this tax rate (0.005%) with data on average spreads for different currencies until 2006 as well as BIS data on turnover in FX markets he finds that taxing the Euro against all other currencies could generate revenue of around 9 billion Euro in 2007 (0.07 % of GDP). If the tax is levied also on Pound Sterling this could raise an additional EUR 3.1 billion according to these estimates.[4]

Before presenting the results for the tax rate range considered here, the revenue potential of the proposal by the Committee of Experts to the Task Force on International Financial Transactions and Development (2010) is estimated. Levying a tax of 0.005% on FX spot market turnover within the EU-27 for 2010 (source principle) revenue estimates are around EUR 7 billion for 2010 assuming that fiscal evasion is only 5% given the very low tax rate. The elasticity is assumed to be -1. The transaction costs are chosen to be 0.024% which is in line with McCulloch and Pacillo (2011).

If a tax rate of 0.05% is applied the revenue increases to EUR 15.8 billion. Note that the assumed reduction of the tax base is lower compared to other estimates. The reason is that King and Rime (2010) show that the share of algorithmic trading in FX markets was 45%. In line with other authors we assume that this trading will largely disappear even at very low tax rates. Note that 80% of spot transactions take place in the UK. In line with Schmidt (2008) the estimates here consider only the spot market.

Table (3) Hypothetical revenue from taxing spot transactions, EU-27 in EUR b

FX Spot market

	Tax rate 0.1%				Tax rate 0.05%				Tax rate 0.01%			
Year	ε 0	ε -0.5	ε -1	ε -1.5	ε 0	ε -0.5	ε -1	ε -1.5	ε 0	ε -0.5	ε -1	ε -1.5
2001	39.2	17.3	7.6	3.3	19.6	11.2	6.4	3.6	3.9	3.3	2.8	2.3
2004	40.9	18.0	7.9	3.5	20.4	11.6	6.6	3.8	4.1	3.4	2.9	2.4
2007	52.4	23.0	10.1	4.5	26.2	14.9	8.5	4.8	5.2	4.4	3.7	3.1
2010	97.3	42.8	18.8	8.3	48.7	27.7	15.8	9.0	9.7	8.2	6.9	5.8

[4] Applying the approach taken by Schmidt to the EU-27 currency spot markets (i.e. the FX turnover by geographical distribution as reported by the BIS) a tax at this rate levied on spot markets would generate around EUR 7.2 billion in the EU-27. Note that the tax base chosen here is different since the transactions are based on where the currency trade took place while Schmidt (2008) looked at different currency pairs.

Assumption: Transaction Costs 0.024%, Relocation and Evasion 40%, Elasticity is ε.

Source: BIS and own calculations

The potential values for other derivative FX markets (Swaps and Outright forwards) are reported for information below in tables (4) and (5). The estimates have not been reported in the main text. The assumptions on relocation and evasion are the same as for other derivative markets.

Table (4) Hypothetical revenue from taxing FX swaps, EU-27 in EUR b

FX swaps

	Tax rate 0.1%				Tax rate 0.05%				Tax rate 0.01%			
Year	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2
2001	13.7	2.6	1.2	0.5	6.8	2.2	1.3	0.7	1.4	1.0	0.8	0.7
2004	14.0	2.7	1.2	0.5	7.0	2.3	1.3	0.7	1.4	1.0	0.8	0.7
2007	23.3	4.5	2.0	0.9	11.6	3.8	2.2	1.2	2.3	1.6	1.4	1.2
2010	22.5	4.4	1.9	0.8	11.3	3.7	2.1	1.2	2.3	1.6	1.3	1.1

Assumption: Transaction Costs 0.024%, Relocation and Evasion 90%, Elasticity is ε.

Source: BIS and own calculations.

Table (5) Hypothetical revenue from taxing FX Outright Forwards, EU-27 in EUR b

FX Outright Forwards												
	Tax rate 0.1%				Tax rate 0.05%				Tax rate 0.01%			
Year	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2
2001	2.1	0.4	0.2	0.1	1.1	0.3	0.2	0.1	0.2	0.2	0.1	0.1
2004	2.7	0.5	0.2	0.1	1.3	0.4	0.2	0.1	0.3	0.2	0.2	0.1
2007	3.5	0.7	0.3	0.1	1.8	0.6	0.3	0.2	0.4	0.3	0.2	0.2
2010	5.4	1.0	0.5	0.2	2.7	0.9	0.5	0.3	0.5	0.4	0.3	0.3

Assumption: Transaction Costs 0.024%, Relocation and Evasion 90%, Elasticity is ε.

Source: BIS and own calculations.

In summary, a currency transaction tax on spot transactions as proposed by the Committee of Experts to the Task Force on International Financial Transactions and Development (2010) could generate around EUR 7 billion per year in the EU-27 with a tax rate of 0.005% (not in the table). If the tax rate is increased to 0.05%, revenue estimates increase to EUR 27.7 billion.

Policy Option 1B: Securities Transaction without derivatives and currency transactions (STT with a narrow base)

This policy options corresponds to the "narrow-based" FTT as described in European Commission (2010f). The data for the equity calculations is based on figures available from the Federation of European Securities Exchanges (FESE). The data contain information on equity trades in regulated exchanges. There are no data on turnover on private exchanges like exchange systems of some large banks (for example Sigma X by Goldman Sachs) and on private placement of shares.

Unfortunately, equity trading in OTC markets is not covered in the FESE data. Assumptions about the share of the latter are disputed and vary widely. Reported values range from 16% to 38%.[5] If these OTC transactions were also part of the tax base, the revenues could increase accordingly. With regard to the elasticities the estimates rely on information from a study by Copenhagen Economics (2011) in Annex 9 on the tax elasticities of financial products. For equity the study report long-run elasticities of around 1.5 which is the baseline scenario chosen here. The estimates also show revenue estimates for elasticities smaller (1) and larger (2) than the baseline, as well as a scenario of inelasticity of the base (0). It should be noted that short-run elasticities are lower than the long-run elasticities. The estimates below do not

[5] afme (2011) reports a valu7e of 16 % while FESE (2011) estimates the value to be 38 %.

cover this dynamic effect which reduces the tax base over time. Table (6) shows the estimates for equity markets.

Table (6) Hypothetical revenue from taxing equity transactions for the EU-27 in EUR b

Revenue Equity Trading

	Tax rate 0.1%				Tax rate 0.05%				Tax rate 0.01%			
Year	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2
2000	11.2	9.6	8.9	8.3	5.6	5.2	5.0	4.8	1.1	1.1	1.1	1.1
2001	10.0	8.6	8.0	7.4	5.0	4.6	4.4	4.3	1.0	1.0	1.0	1.0
2002	8.6	7.4	6.8	6.3	4.3	4.0	3.8	3.7	0.9	0.8	0.8	0.8
2003	7.3	6.3	5.8	5.4	3.7	3.4	3.2	3.1	0.7	0.7	0.7	0.7
2004	8.9	7.6	7.1	6.5	4.4	4.1	3.9	3.8	0.9	0.9	0.9	0.9
2005	10.6	9.1	8.4	7.8	5.3	4.9	4.7	4.5	1.1	1.0	1.0	1.0
2006	13.8	11.8	11.0	10.2	6.9	6.4	6.1	5.9	1.4	1.4	1.3	1.3
2007	18.4	15.7	14.6	13.5	9.2	8.5	8.1	7.8	1.8	1.8	1.8	1.8
2008	13.1	11.3	10.4	9.6	6.6	6.1	5.8	5.6	1.3	1.3	1.3	1.3
2009	6.8	5.8	5.4	5.0	3.4	3.1	3.0	2.9	0.7	0.7	0.7	0.7
2010	6.5	5.6	5.2	4.8	3.3	3.0	2.9	2.8	0.7	0.6	0.6	0.6

Assumption for French Formula: Transaction Costs 0.6%, Fiscal Evasion 10%, Elasticity is ε.

Source: FESE and own calculations.

With regards to bond trading it should be noted that according to FESE only 5% of total bond trading is executed in exchanges. The biggest share of bonds, e.g. around 95% are traded in OTC markets. Assuming that these transactions would be fully taxable the revenue from bond trading would be significantly higher. There are no elasticities for fixed income securities but reactions in Sweden measured in semi-elasticities were dramatic: the introduction of a tax of 2 basis points triggered reductions in traded volumes ranging from 28-85% on fixed income securities. Nevertheless, for the purpose of this study the same elasticities as for equity trading are used since it is often argued that the Swedish example is not representative because of inadequate implementation of the tax. Table (7) shows the results of these estimates. Note that the data on bond trading are only fully available from 2003 onwards. For this reason tables (7) and (8) report only the values for the period from 2003 to 2010.

Table (7) Hypothetical revenue from taxing bond transactions for the EU-27 in EUR b

Revenue Bond Trading

	Tax rate 0.1%	Tax rate 0.05%	Tax rate 0.01%

Year	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2
2003	8.0	6.9	6.3	5.9	4.0	3.7	3.5	3.4	0.8	0.8	0.8	0.8
2004	7.3	6.2	5.8	5.3	3.6	3.3	3.2	3.1	0.7	0.7	0.7	0.7
2005	8.0	6.9	6.3	5.9	4.0	3.7	3.5	3.4	0.8	0.8	0.8	0.8
2006	8.6	7.4	6.8	6.3	4.3	4.0	3.8	3.7	0.9	0.8	0.8	0.8
2007	8.5	7.3	6.8	6.3	4.3	3.9	3.8	3.6	0.9	0.8	0.8	0.8
2008	10.4	8.9	8.2	7.6	5.2	4.8	4.6	4.4	1.0	1.0	1.0	1.0
2009	12.1	10.4	9.6	8.9	6.1	5.6	5.4	5.2	1.2	1.2	1.2	1.2
2010	12.1	10.4	9.6	8.9	6.0	5.6	5.4	5.2	1.2	1.2	1.2	1.2

Assumption for French Formula: Transaction Costs 0.6%, Relocation and Evasion 10%, Elasticity is ε.

Source: FESE and own calculations

The sum of the two revenue sources is displayed in table (8). The revenue figures are closely connected to the business cycle mainly because the values of assets increase in upturns and decreases in downswings.

Table (8) Hypothetical revenue from taxing bond and equity transactions for the EU-27 in EUR b

Total Revenue Equity and Bond Trading

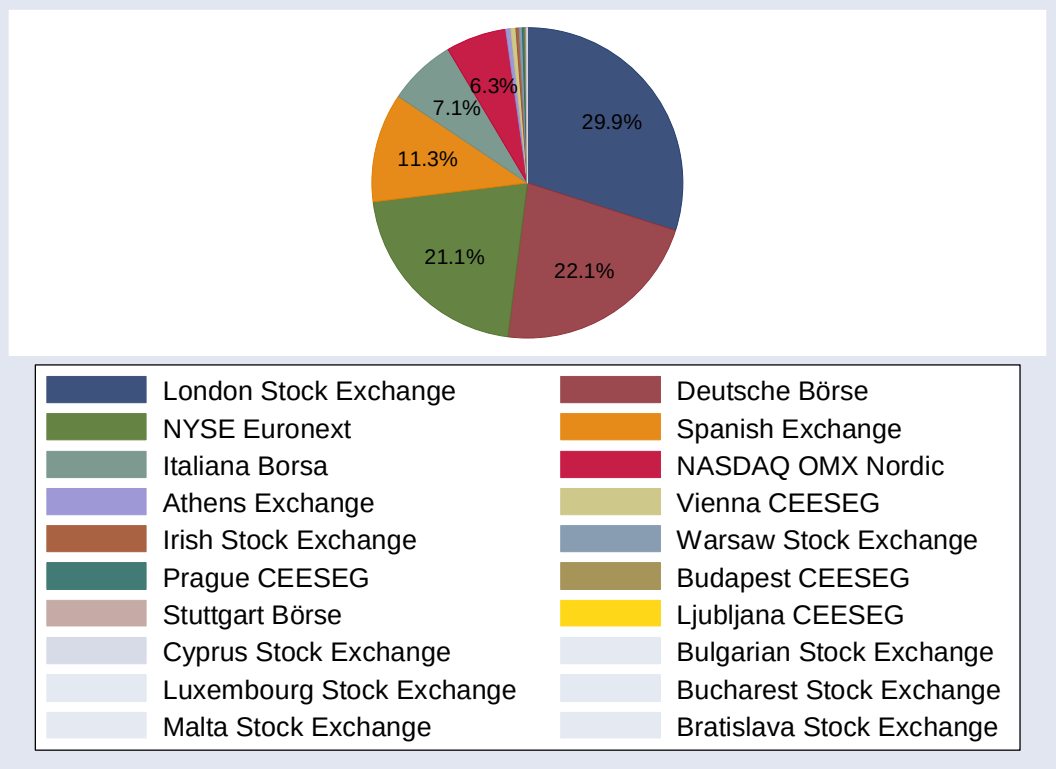
	Tax rate 0.1%				Tax rate 0.05%				Tax rate 0.01%			
Year	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2	ε 0	ε -1	ε -1.5	ε -2
2003	15.3	13.1	12.2	11.3	7.7	7.1	6.8	6.5	1.5	1.5	1.5	1.5
2004	16.2	13.8	12.8	11.9	8.1	7.5	7.2	6.9	1.6	1.6	1.6	1.6
2005	18.6	15.9	14.8	13.7	9.3	8.6	8.3	7.9	1.9	1.8	1.8	1.8
2006	22.4	19.2	17.8	16.5	11.2	10.3	9.9	9.5	2.2	2.2	2.2	2.2
2007	26.9	23.1	21.4	19.8	13.5	12.4	11.9	11.5	2.7	2.6	2.6	2.6
2008	23.5	20.2	18.7	17.3	11.8	10.9	10.4	10.0	2.4	2.3	2.3	2.3
2009	19.0	16.2	15.0	13.9	9.5	8.7	8.4	8.1	1.9	1.9	1.8	1.8
2010	18.6	15.9	14.8	13.7	9.3	8.6	8.2	7.9	1.9	1.8	1.8	1.8

Assumption: Transaction Costs 0.6%, Relocation and Evasion 10%, Elasticity is ε.

Source: FESE and own calculations.

In terms of GDP, the revenue in 2010 corresponds to 0.07% of GDP for a tax rate of 0.05% and an elasticity of 1.5 (baseline scenario marked in grey). The peak in terms of revenue was reached in 2007 reaching 0.10% of GDP. The tax revenue is distributed unevenly across countries. Figure (5) shows the shares in equity trading volumes for the EU exchanges in the dataset. The revenue from the taxation of equities would be distributed accordingly.

Figure (5) Share of EU-27 equity trading on regulated exchanges in 2008



Policy Option 1D: Financial Transaction Tax (FTT)

The main difference between policy option 1c and options 1a and 1b is the inclusion of derivatives in the tax base.[6] The assumptions about reaction of derivative markets are also the main difference between recent revenue estimates discussed in the popular debate and the approach taken by the Commission in recent publications, notably the Staff Working Documents "Innovative Finance at global level" (European Commission (2010e)) and "Taxation of the Financial Sector" (European Commission (2010f)) no estimates for these markets were given.

This document here will also take a very cautious approach to the estimation of revenue from derivative transactions based on the notional value. The assumption is that large parts of the markets as well as the resulting tax base will largely disappear. The reason for this rather conservative approach is the high degree of uncertainty with regard to the taxation of derivatives based on notional values. Note that this does not mean that such a tax would not

[6] Note that policy option 1C (taxation of derivatives only) presented in the main document is not explicitly modelled here but part of option 1D.

be feasible at all. On the contrary, section 5 has explicitly mentioned the notional value as preferred tax base despite the expected reactions. The main reason is that the notional is easy to observe. In addition to this, the CTT part of the FTT raises significant legal issued which need to be addressed. Taken together, the expected effects on these market segments are such that revenue estimates used as a basis for an informed policy decision should highlight the uncertainties with regard to potential revenues.

An alternative would be to use differentiated tax rates for these products as proposed by Pollin et al. (2002) and discussed in section 5.2.3.2. The reason this avenue is not taken here is that differentiated tax rates would create other problems notably with regard to substitution and evasion effects. In summary, the main difference between the studies by Schulmeister (2011) and McCulloch and Pacillo (2011) and the approach taken here is the assumption about the reaction of derivative markets. In order to show the large variety of hypothetical revenue

The following arguments should be borne in mind when revenue estimates are used in evaluating the costs and benefits of taxing derivatives:

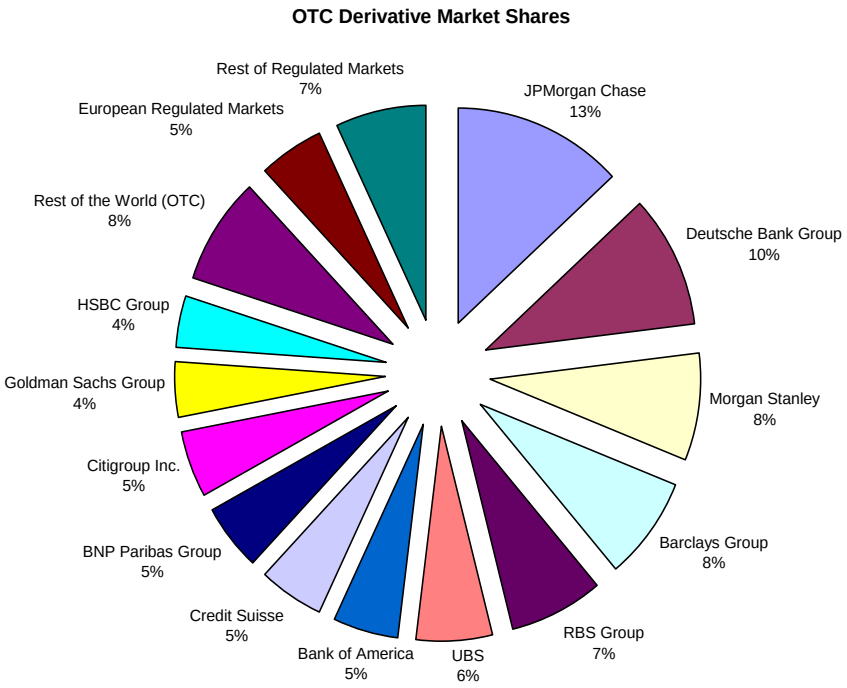
(1) The notional value is not a measure of the economic value of contracts

The turnover in terms of notional values and the notional amounts outstanding reported by the Bank for International Settlement (BIS) are proxies to measure the market activity in OTC derivatives market. The sum of notional values can become bigger than GDP or other economic aggregates since the assets underlying the derivative contracts can be involved in more than one contract. Since the market value of a derivative depends on the price changes of the underlying in the spot market it is constantly changing. The notional value is therefore used as an educated guess about the activity in these markets in the absence of better data. However, this does not imply that the economic activity behind these contracts is as big as the notional or underlying values. In fact, the BIS data show for 2004 and 2007 that the gross market value of the contracts is only a small fraction of the notional. In 2004, this share was 2.9%. In 2007, the gross market value accounted only for 2.5% of the notional values outstanding. A tax levied on the notional seems to target a very large tax base. But when this base is put into perspective with the economic values it is significantly smaller. Given this large difference it is reasonable to expect that the market size could shrink dramatically and the tax base accordingly.

In addition, the taxation of the notional will create high effective tax burdens. The argument is related to the one above: the notional value does not contain a large amount of economic information. An example for taxing the notional value of a derivative is the following. An EU-based company has to pay a bill of USD 11million in 3 months and fears a devaluation of the Euro. The company wants to hedge the risk that the Euro falls below USD 1.10. It acquires an option to buy USD at an exchange rate of 1.10 USD per Euro in 3 months. The price for this option is EUR 30,000. The value of the underlying is USD 11 million = EUR 10 million EUR. Assuming a very low tax rate of 0.01%, the tax payment would be EUR 1,000. Now compare the tax payment (EUR 1,000) to the price (EUR 30,000). If we define the tax payment in relation to the real cash-flow of buying the option as an effective tax rate, the effective rate is 3.3% in this example. Now assume that the company wants to hedge the extreme case that the Euro drops below parity with the USD. The price would be only 5,000 EUR in this case given the low risk that this case will occur in the next three month. In this case, the tax base is USD 11 million = EUR 11 million. The tax payment would be EUR

1,100. This leads to an effective tax rate of 22% when relating the tax paid with the actual price paid. For the taxation of derivatives, the effective tax rate as defined above will therefore be different and depend on the characteristics of the contract.

Figure (6) Shares of different actors in OTC derivative markets



Source: FESE

(2) The market for OTC derivatives is global and highly mobile

The OTC market is dominated by a dozen large global banks mainly based in London. Most of these banks are headquartered in the US; all of them are active on a global scale. Figure (6) illustrates the market shares in OTC derivatives markets as well as the main players. This market is fully globalized and, while there might be new regulations in the future to trace OTC transactions within the EU, the application of the tax in this highly mobile market will be difficult and reduce the taxable base significantly. Note that the question here is not whether such derivatives are useful for the economy and whether their disappearance would hurt the European economy. The point made here is that the tax base could largely disappear leaving no substantial revenue, but rather high uncertainty with regard to the economic effects.

(3) The data basis and netting effects

The data provided by the BIS does not account for the fact that many derivative contracts cancel out economically. A tax on the notional value will lead to the netting of contracts. This netted value of contracts is expected to be as low as a few percentage points for some market

segments. This is not necessarily a negative effect but again will reduce the tax base significantly. This highlights in addition to the arguments in 1. and 2. that the notional value cannot be considered as a stable tax base to finance government revenue.

(4) Empirical Evidence

The transaction tax experience from Sweden shows that derivative markets are very sensitive to taxation. Sweden levied a tax on transaction also for some fixed-income securities and related derivatives, notably futures on bonds. The rates were between 0.002% and 0.015% and therefore within the range of currently discussed tax rates. The trading in futures on bonds fell by 98% within the first week of the application of the tax.[7]

(5) Structural break

Some recent estimations assume that trading volumes in derivative markets decreases smoothly (monotonically) with the tax rate. While this assumption seems reasonable for spot market trades, the reactions in other market segments might be different. The reasons are the different micro-market structures in different segments. Given that taxing the notional creates a high tax leverage compared to the real cash flows it can be assumed that the reaction in the market is not only a reduction of the activity concerned but rather a change in the way business is conducted. The way such a structural break could take form is described by Honohan and Yoder (2010) for FX markets. They argue that the mechanisms of risk sharing in this market could change due to strong transaction cost increases. For example, King and Rime (2010) show that the transaction costs (the bid-ask spread) for the EUR/USD pair is currently one pip (0.0001). Applying a tax of, say 0.01% would represent a multiple of this margin. This could reduce the taxable base more than one would expect from a simple (linear or exponential) decrease of current trade volumes due to structural effects.

(6) Conflict with regulation

One objective of current regulation is to shift more transactions into central clearing platforms. At the same time there is consensus that this will not be possible for all forms of contracts since central platforms can only work for contracts with a certain degree of standardization. If a tax is levied in central systems, the incentive to standardize products and move to the CCP is reduced. This could hamper the regulatory goals envisaged.

In summary, the inclusion of the notional value of derivatives in the tax base creates a high degree of uncertainty with regard to the FTT. The notional value has so far been used for estimates mostly because it is the only data available for derivatives since it is easier to observe compared to other values in derivatives contracts. However, the notional value is not a measure of the economic value, the contracts under consideration or the risk exposure related to the contracts. For this reason the estimates for OTC interest rate derivatives as well as for exchange traded derivatives make the assumption that trade volumes decline by 90% due to evasion, netting, structural breaks and the fact that economic values behind these values are only a fraction of the notional amount – which is defined as the base for taxation. This assumption is larger than Schulmeister (2011) assumed a 60% to 70% decline in volumes of derivative contracts in a scenario with medium market reactions. In order to present the wide range of current estimates two summary tables with revenue figures for the

[7] See Campbell and Froot (1994) for a full description of the Swedish and other country experiences.

year 2010 are presented below. One table (11a) (scenario 1) assumes a reduction in derivative trading of 90%, the second table (11b) (scenario 2) a decline of 70%.

Before turning to the summary tables, the two derivative markets segments (exchange traded and OTC) are presented using the assumptions underlying scenario 1. For exchange traded derivatives table (9) below gives some revenue estimates for exchange traded derivatives, notably Single Stock Futures, Stock Index Options, Stock Index Futures, Bond Options and Bond Futures. The by far largest share of these instruments is traded in EURONEXT LIFFE, e.g. 95% of the Bond Future Trading took place here in 2008. The baseline scenario is marked in grey in table (9).

Table (9): Hypothetical revenue from taxing exchange traded derivatives turnover for EU-27 in billion EUR

Total Revenue Derivative Trading in Exchanges

	Tax rate 0.1%				Tax rate 0.05%				Tax rate 0.01%			
Year	ε 0	ε 1	ε 1.5	ε 2	ε 0	ε 1	ε 1.5	ε 2	ε 0	ε 1	ε 1.5	ε 2
2000	3.8	3.7	2.5	2.2	1.9	1.6	1.5	1.4	0.4	0.4	0.4	0.4
2001	5.3	5.1	3.4	3.0	2.6	2.3	2.1	1.9	0.5	0.5	0.5	0.5
2002	5.8	5.6	3.7	3.2	2.9	2.5	2.3	2.1	0.6	0.6	0.5	0.5
2003	32.5	31.4	21.1	18.3	16.2	13.9	12.9	11.9	3.2	3.1	3.1	3.0
2004	36.0	34.8	23.4	20.2	18.0	15.4	14.3	13.2	3.6	3.5	3.4	3.4
2005	39.9	38.6	25.9	22.4	20.0	17.1	15.8	14.7	4.0	3.9	3.8	3.7
2006	47.3	45.8	30.8	26.6	23.7	20.3	18.8	17.4	4.7	4.6	4.5	4.4
2007	58.3	56.4	37.9	32.8	29.1	25.0	23.1	21.4	5.8	5.6	5.6	5.5
2008	56.4	54.6	36.7	31.7	28.2	24.2	22.4	20.7	5.6	5.5	5.4	5.3
2009	49.3	47.7	32.0	27.7	24.6	21.1	19.6	18.1	4.9	4.8	4.7	4.6
2010	46.8	45.3	30.4	26.3	23.4	20.1	18.6	17.2	4.7	4.5	4.5	4.4

Assumption: Transaction Costs 0.3%, Relocation and Evasion 90%, Elasticity is ε.

Source: FESE and own calculations.

For OTC market the estimates concentrate on the largest product group namely interest rate derivatives for which turnover in notional values are collected by the BIS every three years. The data contains Forward Rate Agreements, Swaps, and Options and other products. The data is taken from BIS (2010) Again the assumption is a stronger reaction of markets compared to the studies mentioned above due to the expectation that a tax of this size will have structural effects on markets.

Table (10): Hypothetical revenue from taxing OTC interest rate contracts in EU-27 in EUR b

OTC interest rate derivatives

	Tax rate 0.1%				Tax rate 0.05%				Tax rate 0.01%			
Year	ε 0	ε 1	ε 1.5	ε 2	ε 0	ε 1	ε 1.5	ε 2	ε 0	ε 1	ε 1.5	ε 2
2001	14.1	12.3	11.5	10.8	7.0	6.6	6.3	6.1	1.4	1.4	1.4	1.4
2004	18.3	16.0	15.0	14.0	9.2	8.5	8.3	8.0	1.8	1.8	1.8	1.8
2007	24.9	21.8	20.4	19.1	12.4	11.6	11.2	10.8	2.5	2.5	2.4	2.4
2010	31.3	27.4	25.6	24.0	15.6	14.6	14.1	13.6	3.1	3.1	3.1	3.0

Assumption: Transaction Costs 0.7%, Fiscal Evasion 90%, Elasticity is ε.

Source: BIS and own calculations.

In summary, the revenue estimates for a general FTT as well as for its subsets can raise significant amounts of revenue. The difficulties in interpreting these figures have been outlined above. Market reactions are highly uncertain and taxing derivatives might create strong incentives. Also, the revenue generated has to be put into perspective with the loss in GDP from taxation. The revenue figures for 2010 for policy option 1 are summarized in table 11a (Scenario 1) and table 11b (Scenario 2). The tables show that depending on which assumption is chosen for tax rates, revenue and evasion and relocation revenue figures between EUR 16.4 billion (90% reduction, elasticity of 2) to more than EUR 400 billion (70% reduction, elasticity of 0) can be generated with the underlying data. The baseline with a tax rate of 0.05% and an elasticity of 1.5 generates EUR 59 billion (or 0.48% of GDP) in scenario 1 and EUR 130 billion (1.06% of GDP) in scenario 2.

Table (11a): Hypothetical revenue from taxing transactions and contracts, EU-27 in EUR b for 2010, scenario 1 assuming 90% decrease in derivative trading.

Elasticity 0	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT	125.2	1.02%	62.6	0.51%	12.5	0.10%
STT equity and bond	18.6	0.15%	9.3	0.08%	1.9	0.02%
OTC Interest Rate Derivatives	31.3	0.26%	15.6	0.13%	3.1	0.03%
Exchanges Derivatives	46.8	0.38%	23.4	0.19%	4.7	0.04%
FTT (Sum of all revenues)	221.9	1.81%	110.9	0.91%	22.2	0.18%
FTT (without CTT)	96.7	0.79%	48.4	0.39%	9.7	0.08%

Elasticity 1	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT*	48.2	0.39%	32.2	0.26%	10.1	0.08%
STT equity and bond	15.9	0.13%	8.6	0.07%	1.8	0.01%
OTC Interest Rate Derivatives	27.4	0.22%	14.6	0.12%	3.1	0.03%
Exchanges Derivatives	45.3	0.37%	20.1	0.16%	4.5	0.04%
FTT (Sum of all revenues)	136.8	1.12%	75.5	0.62%	19.6	0.16%
FTT (without CTT)	88.6	0.72%	43.3	0.35%	9.4	0.08%

Elasticity 1.5	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT*	21.2	0.17%	18.4	0.15%	8.5	0.07%
STT equity and bond	14.8	0.12%	8.2	0.07%	1.8	0.01%
OTC Interest Rate Derivatives	25.6	0.21%	14.1	0.12%	3.1	0.03%
Exchanges Derivatives	30.4	0.25%	18.6	0.15%	4.5	0.04%
FTT (Sum of all revenues)	92.0	0.75%	59.3	0.48%	17.9	0.15%
FTT (without CTT)	70.8	0.58%	40.9	0.33%	9.3	0.08%

Elasticity 2	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT*	9.3	0.08%	10.5	0.09%	7.2	0.06%
STT equity and bond	13.7	0.11%	7.9	0.06%	1.8	0.01%
OTC Interest Rate Derivatives	24.0	0.20%	13.6	0.11%	3.0	0.02%
Exchanges Derivatives	26.3	0.22%	17.2	0.14%	4.4	0.04%
FTT (Sum of all revenues)	73.3	0.60%	49.2	0.40%	16.4	0.13%
FTT (without CTT)	64.0	0.52%	38.8	0.32%	9.2	0.08%

** Elasticities on FX spot markets are assumed to be 0.5 lower compared to other options in line with the findings in Annex 9 on tax elasticities.*

Note that the CTT raises legal issues. The FTT revenue is also reported without the CTT.

Table (11b): Hypothetical revenue from taxing transactions and contracts, EU-27 in EUR b for 2010, scenario 2 assuming 70% decrease in derivative trading.

Elasticity 0	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT	180.9	1.48%	90.5	0.74%	18.1	0.15%
STT equity and bond	18.6	0.15%	9.3	0.08%	1.9	0.02%
OTC Interest Rate Derivatives	93.9	0.77%	46.9	0.38%	9.4	0.08%
Exchanges Derivatives	140.5	1.15%	70.2	0.57%	14.0	0.11%
FTT (Sum of all revenues)	433.9	3.54%	216.9	1.77%	43.4	0.35%
FTT (without CTT)	252.9	2.07%	126.5	1.03%	25.3	0.21%

Elasticity 1	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT*	59.0	0.48%	41.3	0.34%	14.1	0.11%
STT equity and bond	15.9	0.13%	8.6	0.07%	1.8	0.01%
OTC Interest Rate Derivatives	82.1	0.67%	43.8	0.36%	9.3	0.08%
Exchanges Derivatives	135.9	1.11%	60.2	0.49%	13.6	0.11%
FTT (Sum of all revenues)	293.0	2.39%	153.9	1.26%	38.8	0.32%
FTT (without CTT)	234.0	1.91%	112.6	0.92%	24.7	0.20%

Elasticity 1.5	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT*	26.0	0.21%	23.5	0.19%	11.8	0.10%
STT equity and bond	14.8	0.12%	8.2	0.07%	1.8	0.01%
OTC Interest Rate Derivatives	76.8	0.63%	42.3	0.35%	9.2	0.08%
Exchanges Derivatives	91.2	0.74%	55.7	0.46%	13.4	0.11%
FTT (Sum of all revenues)	208.8	1.70%	129.8	1.06%	36.2	0.30%
FTT (without CTT)	182.8	1.49%	106.3	0.87%	24.4	0.20%

Elasticity 2	Tax rate 0.1		Tax rate 0.05		Tax rate 0.01%	
	Revenue	% of GDP	Revenue	% of GDP	Revenue	% of GDP
CTT*	11.4	0.09%	13.4	0.11%	9.9	0.08%
STT equity and bond	13.7	0.11%	7.9	0.06%	1.8	0.01%
OTC Interest Rate Derivatives	71.9	0.59%	40.9	0.33%	9.1	0.07%
Exchanges Derivatives	79.0	0.65%	51.6	0.42%	13.2	0.11%
FTT (Sum of all revenues)	176.0	1.44%	113.8	0.93%	34.0	0.28%
FTT (without CTT)	164.5	1.34%	100.4	0.82%	24.1	0.20%

** Elasticities on FX spot markets are assumed to be 0.5 lower compared to other options in line with the findings in Annex 9 on tax elasticities.*

Note that the CTT raises legal issues. The FTT revenue is also reported without the CTT.

2.4 Further tax base considerations

(a) Share of transactions within the financial sector.

A possible policy proposal would be to exempt transactions by non-financial actors. The share of these transactions is difficult to estimate with precision.

The Bank for International Settlement (BIS) data splits transactions volumes between three categories: (a) "reporting dealers" are institutions that are actively buying and selling currency and OTC derivatives both for their own account and/or to meet customer demand, (b) “Other financial institutions” are defined as those financial institutions that are not classified as reporting dealers. Thus, they mainly cover all other financial institutions, such as smaller commercial banks, investment banks and securities houses, and in addition mutual funds, pension funds, hedge funds, currency funds, money market funds, building societies, leasing companies, insurance companies, financial subsidiaries of corporate firms and central banks, and (c) “Non-financial customers” are defined as any counterparty other than those described above, i.e. mainly non-financial end users, such as corporations and governments.

The reporting population of the Triennial Survey is constituted by the so called "reporting dealers", i.e. banks and securities houses that participate in the Survey. Therefore, if the bank

is a reporting dealer (i.e. it belongs to the reporting population of the Survey) any transaction carried out by this bank will be captured by the Survey and allocated to the appropriate counterparty category:

1) With reporting dealers: if the counterparty is another participating institution. These deals will be divided by 2 in order to correct for inter-dealer double-counting.

2) Other financial institutions: if the counterparty is a financial institution (banks, edge funds, etc) that does not participate in the Survey. In this case no adjustment for inter-dealer double-counting is needed, as these contracts are reported only once, i.e. by the reporting dealer.

3) Non-financial customers: If the counterpart is a non-financial customer, e.g. governments, corporations, etc.

The split only exists for two categories of products: (a) foreign exchange markets and (b) OTC interest rate markets. We consider only the last category of counterparty (i.e. non-financial customers). Its share in the total for foreign exchanges has varied over years between 13% (2010) and 18% (2007). Its share in OTC interest rate markets has varied between 5% (2001) and 11% (2010).

Given this variation, we make the assumption that globally the financial sector share is about 85% of the total volume.

(b) Primary versus secondary markets.

The size of primary market (i.e. securities issued for the first time) is estimated here to be 3.3% of the secondary market for shares and 1.6% of the secondary market for bonds.[8]

(c) Notional versus Gross Market Value.

[8] These figures are broad estimates. For shares, we refer to the World Bank data, comparing stock market turnover to GDP with equity issues to GDP. The data is for 1980-1995. For DE, the respective figures are 18% and 0.6% while for the US, they are 1% and 34% respectively. So, the ratio is about 3.3%. http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20696167~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html
For bonds, we refer to data quoted in http://en.wikipedia.org/wiki/Bond_market . In this source, total outstanding amount (note, not trading) is USD 95 trillion while issuance is USD 1.5 trillion.

As indicated above, the economic value of derivative contracts is a few percentage points of their notional. Data for December 2010 is available and reveals that this share is about 3.7% for exchange-traded derivatives, 3.4% for OTC derivatives, 6.4% for currency swaps, and 3.1% for currency outright forward.[9]

(d) Netting

Currently, financial transactions are carried out using many intermediaries. For example, a private person that sells a financial asset may contact her bank, which in turn may contact an investment bank that will contact a broker. This broker may in turn contact another broker to whom it will sell the asset. This broker may sell it to an investment bank that will sell it to a commercial bank that will sell it to an interested private investor. This leads to many separate transactions. Would each transaction be subject to a financial transaction tax, there is an incentive to limit the number of them and to integrate intermediaries.

In addition, as stated above, many contracts also cancel out as there is a practice to close a contract simply by creating a new one that goes in the opposite direction.

These two examples are part of a process that is called the netting. While there are no official data, the netted value of contracts is expected to be as low as a few percentage points for some market segments

(e) High-Frequency Trading.

The share of high frequency trading is estimated to be between 20 to 40% of the total, depending on financial markets.[10]

(f) Government bonds.

[9] BIS Quarterly Review June 2011, table 19 for notional amounts outstanding/market values, the share of each category in December 2010 on total without foreign exchange contracts

[10] AFM, 2010, Authority For the Financial Markets, High frequency trading: The application of advanced trading technology in the European marketplace.
http://www.afm.nl/layouts/afm/default.aspx~/media/files/rapport/2010/hft-report-engels.ashx
See also Peter Gomber, Björn Arndt, Marco Lutat, Tim Uhle (2011), High Frequency Trading, http://ssrn.com/abstract=1858626

The share of government bonds in the total trading of bonds can be estimated at 42.5%. This is computed in the following way: (a) we assume that the share of government bonds in the total trading is equivalent to its share in stocks expressed in outstanding amounts.[11] We therefore use BIS data on Securities Markets and look at the ratios of government debt to the total for domestic and international debt securities[12]. They are respectively 55.8% and 11.5%. (b) Next, the international debt market represents 30% of the total.[13]

Hence the share of government bonds into the total is estimated at 0.3*11.5 + 0.7*55.8 = 42.5%.

3 THE ESTIMATES FOR REVENUES FROM FAT

Because the Financial Activities Tax is a relatively recent proposal, the only estimations of its potential revenues so far were the one done by the IMF (2010) and its extrapolation to the EU27 in the Commission's staff working document of October 2010. The IMF (2010) looked at the potential tax base in percentage of GDP for 22 OECD countries (of which 15 Member States) and for the 3 types of FAT. The IMF's computations used the aggregate national account data for the financial sector of OECD countries for the year 2006. FAT1 is defined as a R+F cash-flow base (as gross operating profits less gross fixed capital outlays in the financial intermediation sector) and wage costs (labour costs in the financial intermediation sector). For FAT2, the 'surplus' wage is set as 12% of total wage costs[14]. For FAT3, the profit part is the excess of after-tax net income in the banking sector over benchmark return on equity (ROE) of 15 percent.

The Staff Working Document of the European Commission extrapolated the tax base from the 15 Member States to the EU27 by applying the GDP-weighted average tax base in percentage of GDP to the missing Member States[15]. Applying a low FAT rate of 5% (corresponding to the minimum reduced VAT rate) and extrapolating the results from the sample of 15 Member States collected by the IMF (2010) – and representing 91% of EU27 GDP – to the EU27 for the three methods provides broad orders or magnitude for static tax revenues of respectively EUR 25.9 billion, EUR 11.1 billion and EUR 4.9 billion for 2008. These estimates are static in the sense that they do not include the tax elasticity of the FAT base.

[11] Clearly, this assumption has to be made because of a lack of reliable data on trading volumes per category of products. It is possible that government bonds are less frequently exchanged than other products in which case its share in trading would be overestimated.

[12] BIS (2011). BIS Quarterly Review, June 2011. Annex pages A111 and followings. Tables 12A, 12D, and 16A.

[13] The City UK (2011). Bond Markets. Financial markets Series, July 2011, page 1.

[14] Calculated as 40% of the wage differential between the top 25% earners in the financial sector and the top 25% in the wider economy.

[15] The sample's GDP-weighted average is 4.14% of GDP. For the Rent-taxing FAT and the Risk-taxing FAT, the GDP-weighted average would be 1.78% and 0.79% of GDP.

Table (12): Revenue estimates for the various forms of FAT (based on 2008 GDPs), tax rate 5%

Country	Addition method FAT			Rent-taxing FAT			Risk-taxing FAT		
	Tax base % GDP	Tax revenue % GDP	Tax revenue m EUR	Tax base % GDP	Tax revenue % GDP	Tax revenue m EUR	Tax base % GDP	Tax revenue % GDP	Tax revenue m EUR
BE	4.2	0.2	724	1.8	0.1	310	1.5	0.1	259
BG	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
CZ	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
DK	4.0	0.2	466	1.8	0.1	210	0.7	0.0	82
DE	3.6	0.2	4,492	1.5	0.1	1,872	0.5	0.0	624
EE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
IE	8.4	0.4	764	5.7	0.3	518	1.8	0.1	164
EL	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
ES	3.5	0.2	1,905	1.7	0.1	925	0.9	0.0	490
FR	3.3	0.2	3,215	0.9	0.0	877	0.8	0.0	779
IT	3.6	0.2	2,822	1.6	0.1	1,254	0.4	0.0	314
CY	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
LV	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
LT	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
LU	23.2	1.2	456	15.3	0.8	301	5.7	0.3	112
HU	3.6	0.2	190	2.0	0.1	106	0.9	0.0	47
MT	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NL	4.9	0.2	1,460	2.0	0.1	596	0.6	0.0	179
OE	4.0	0.2	564	1.7	0.1	240	1.8	0.1	254
PL	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
PT	4.8	0.2	413	2.6	0.1	223	0.5	0.0	43
RO	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
SI	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
SK	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
FI	1.9	0.1	175	0.9.	0.0	83	0.2	0.0	18
SE	2.5	0.1	418	0.9	0.0	150	0.7	0.0	117
UK	6.1	0.3	5,537	2.7	0.1	2,451	1.1	0.1	998
Sample	4.14	0.21	23,600.9	1.78	0.09	10,116,1	0.79	0.04	4,479.4
EU27			25,920.7			11,110.5			4,919.7

Source: IMF (2010), Financial Sector taxation. The IMF's Report to the G-20 and background material. Editors: S. Claessens, M. Keen and C. Pazarbasioglu. and own calculations. The estimates assume no behavioural response. For the rent-taxing and the risk-taxing FAT, the IMF takes 40% of the wage differential between the top 25% earners in the financial sector and the top 25% earners in other sectors. This 'surplus' is 12% of wage costs. For the risk-taxing FAT, the benchmark for the return on average

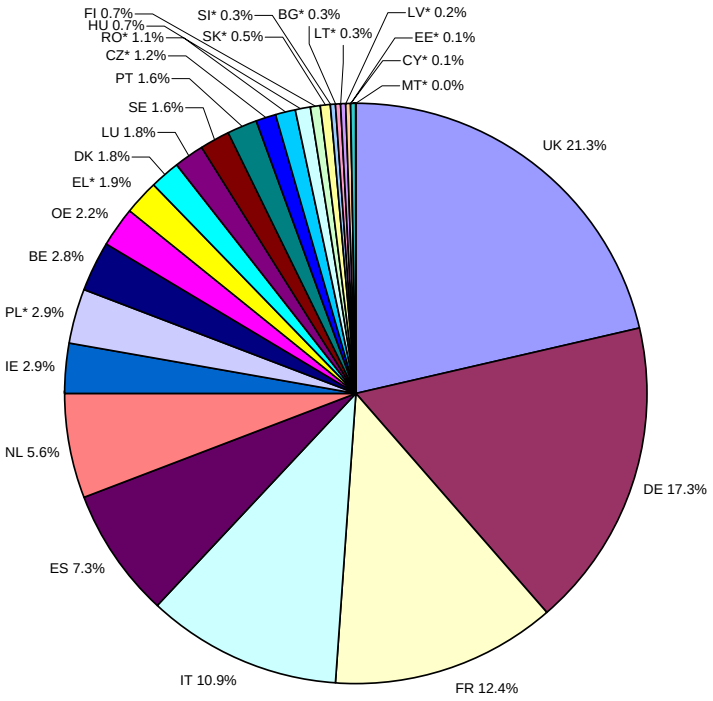
equity above which profit would be taxed is 15%. See IMF (2010) for other assumptions and details. Note that the IMF applies an R+F base by subtracting capital formation from profit. The EU27 figures are retrieved by taking the GDP-weighted average values of the sample for the tax base and applying them to EU-27 GDP for 2008.

For the 22 developed economies – representing about 62% of world GDP – considered in the IMF report to the G-20, a 5% rate of the addition-method FAT would create revenue corresponding to an arithmetic average of 0.28% of GDP.[16] Using the country level estimates for the share in GDP to calculate absolute figures, this would translate into total revenue for the 22 countries of roughly EUR 75 billion for the addition-method FAT.[17]

In terms of their geographical distribution, the potential tax revenues would - by and large - mirror the share of Member States in the activities of the financial sector (which is more diversified than their share in trading places).

Figures (7), (8) and (9) respectively present the distribution for the addition-method, rent-taxing and risk-taxing FAT. For Member States for which data is missing in table (12) are assumed to raise tax revenues in percentage of GDP in the same proportion as the sample's GDP average. The sign (*) indicates the countries concerned.

Figure (7): Share in tax revenue of EU Member States (Addition-method FAT)



[16] IMF (2010). Financial Sector taxation. The IMF's Report to the G-20 and background material. Eds. S. Claessens, M. Keen and C. Pazarbasioglu.

[17] The revenue for other FAT versions would be EUR 35 billion for the rent-taxing FAT and EUR 10 billion for the risk-taxing FAT.

Figure (8): Share in tax revenue of EU Member States (Rent-taxing FAT)

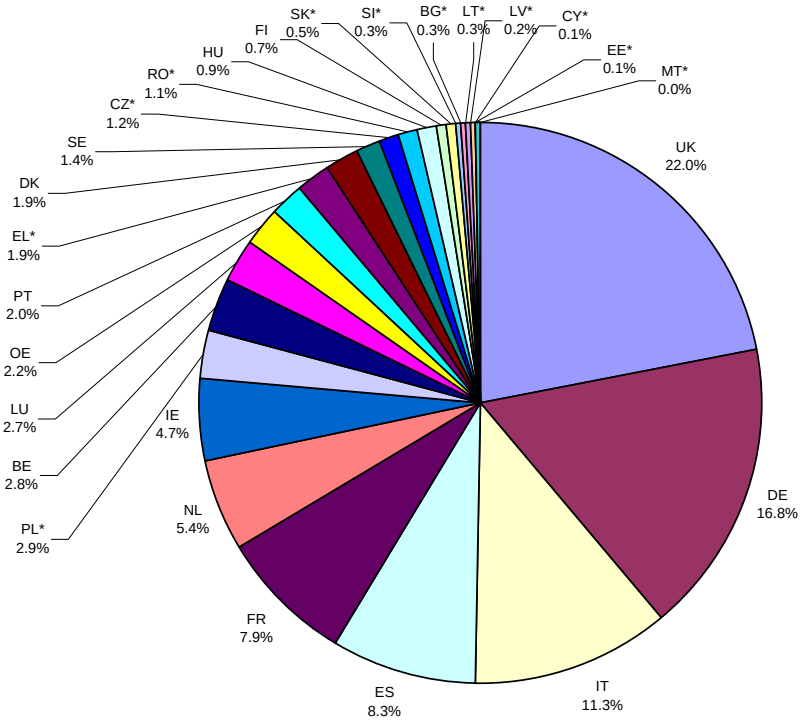
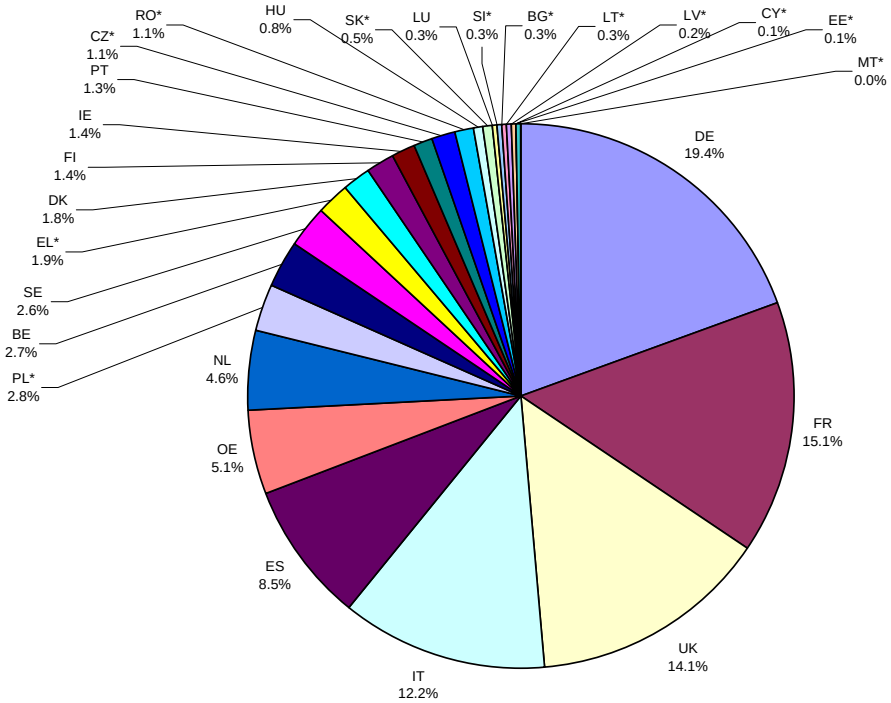


Figure (9): Share in tax revenue of EU Member States (Risk-taxing FAT)



An alternative method is to work from financial statements of the banking sector[18]. To achieve this, we take a sample of 3,008 banks in the EU for which enough financial information in an unconsolidated basis is available in ORBIS[19]. The profit part of the FAT base is computed as a R+F base by adapting accounting profit to cash-flow profit[20]. The labour costs part is the costs of personnel. As for the IMF's computation, the addition-method FAT is the sum of these two parts, the rent-taxing FAT takes the same cash-flow profit definition and 12% of labour costs and the risk-taxing part limits the cash-flow profit to what excesses 15% of total equity and adds it to 12% of the labour costs. It is important to note that the first two methods allow a loss-relief between the profit and the labour parts of the base, while the last method essentially put a ceiling of zero on the profit part. Hence, the base of a risk-taxing FAT could in theory be larger than the base for the other two methods.

In all cases, an illustrative rate of 5% is applied to the base for 2009 and the revenue estimates are extrapolated from the sample to the population of domestic banks[21].

The results are presented in table (13). For several Member States, the estimates are based on a very small sample of domestic banks. Hence, the results shall be taken as illustrative and with due caution. Second, the data is for 2009, which may not be a representative year because of the effect of the financial crisis, which could underestimate the results22. Third, the sample can be biased toward larger banks, which could overestimate FAT2 and FAT3 in particular when extrapolating. Taking these caveats into account, the estimates for the addition-method FAT, the Rent-Taxing FAT and the Risk-Taxing FAT at a rate of 5% for EU27 are respectively EUR 30.3 billion, EUR 18.9 billion and EUR 13.6 billion.

[18] Hence, the results do not include other companies from the financial sector, notably insurance companies.

[19] Orbis is a database on financial statements of companies published by Bureau Van Dijk. Note that the sample can be biased towards large banks as financial information could be harder to obtain for smaller banks. Our version of Orbis contains 7,343 banks and 3,609 insurance companies for the EU27 (not of all with exploitable financial information). For many banks, several variables necessary to compute FAT revenues are missing. In this case, they are estimated in the following way: for companies for which consolidated statements are available in Orbis, the missing variable of interest is replaced by the one from the consolidated statements, adjusted by the ratio of total assets between unconsolidated and consolidated statements. If the information is still missing, the same procedure is applied using country-level information on banking structures from the ECB publication "EU Banking Sector Stability" of September 2010.

[20] This is done by starting with the profit and loss before tax and distribution, subtracting the dividends received from subsidiaries (i.e. applying an exemption to avoid double-taxation), adding the change in (non-equity) liabilities, subtracting the change in assets, except for change in cash hold and investment in subsidiaries.

[21] This is done by comparing the total assets of banks in the sample with the total assets of credit institutions in the country, excluding branches (from other EU and non-EU countries), as provided by ECB.

[22] The amount of data to be treated did not allow computation for other years. 2009 is the latest year with a mass of data that is exploitable.

Table (13). Estimates for a FAT in EU27 in 2009

Member State	Number of banks in sample	Coverage in assets	FAT1 base In % GDP	FAT1 revenue at 5% (EUR m)	FAT2 base In % GDP	FAT2 revenue at 5% (EUR m)	FAT3 base In % GDP	FAT3 revenue at 5% (EUR m)
AT	181	30.4%	4.4%	604.8	2.8%	378.0	1.9%	262.7
BE	24	82.3%	5.9%	1,000.5	4.1%	700.9	2.4%	406.1
BG	15	38.2%	2.8%	48.9	2.4%	42.0	1.7%	29.9
CY	6	41.7%	48.5%	410.6	42.4%	359.4	33.3%	282.2
CZ	13	20.7%	1.7%	119.4	1.3%	92.5	0.6%	40.9
DE	1,495	43.2%	5.3%	6,315.4	3.2%	3,821.0	2.4%	2,828.9
DK	99	70.8%	4.6%	513.2	2.3%	257.0	0.5%	53.3
EE	1	4.7%	2.0%	13.7	0.0%	0.0	0.3%	2.2
EL	15	65.2%	0.7%	78.2	0.1%	6.3	0.3%	36.2
ES	126	73.0%	3.0%	1,582.8	1.5%	799.0	0.9%	460.7
FI	9	78.4%	3.5%	298.3	2.6%	225.9	1.2%	101.9
FR	200	87.5%	6.2%	5,873.8	3.0%	2,903.9	1.9%	1,789.2
HU	11	10.1%	3.5%	163.8	3.1%	141.8	2.3%	105.7
IE	18	39.9%	1.0%	80.4	0.8%	66.9	0.6%	46.2
IT	468	81.4%	2.9%	2,186.7	0.6%	490.7	0.4%	332.4
LT	2	9.2%	0.7%	9.1	0.6%	8.3	0.7%	8.7
LU	55	65.3%	12.0%	229.2	9.8%	186.7	7.5%	143.4
LV	4	7.2%	0.5%	4.5	0.1%	1.1	0.1%	1.1
MT	10	43.8%	14.8%	43.1	10.4%	30.4	4.3%	12.6
NL	23	79.0%	11.0%	3,141.8	8.8%	2,524.3	8.0%	2,295.3
PL	24	12.1%	3.5%	549.2	2.6%	396.4	1.8%	280.6
PT	17	66.5%	1.1%	95.2	0.1%	4.4	0.3%	26.2
RO	11	21.4%	4.2%	247.1	3.9%	231.5	3.8%	222.0
SE	73	52.4%	0.6%	85.3	0.3%	40.7	0.3%	45.8

SI	8	21.6%	4.0%	69.9	3.0%	53.7	1.9%	32.8
SK	8	29.5%	0.2%	6.6	0.1%	3.3	0.1%	3.7
UK	92	58.1%	8.4%	6,538.2	6.6%	5,135.8	4.8%	3,719.1
EU27	3,008		5.1%	30,309.7	3.2%	18,901.7	2.3%	13,569.8

Source: Orbis and own calculations

This corresponds respectively to 0.26%, 0.16% and 0.12% of EU27 GDP and to 0.08%, 0.05% and 0.04% of the total assets of the EU banking sector. This is to be compared with the simulations using QUEST that find a revenue estimate of 0.21% of GDP for a 5% FAT (see annex 15).

Table (14): Evolution of FAT assuming a constant ratio of revenue to GDP (EUR billion)

	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
GDP	9,588	9,950	10,118	10,617	11,072	11,699	12,396	12,493	11,787	12,262
FAT1	24.7	25.6	26.0	27.3	28.5	30.1	31.9	32.1	30.3	31.5
FAT2	15.4	16.0	16.2	17.0	17.8	18.8	19.9	20.0	18.9	19.7
FAT3	11.0	11.5	11.6	12.2	12.7	13.5	14.3	14.4	13.6	14.1

**Estimates*

Interestingly, the FAT is a very good revenue raiser compared to the traditional CIT. The financial sector traditionally contributes to between 15% and 20% of total CIT collection (IMF, 2010, page 60). Total CIT collection in EU-27 in 2009 was EUR 228.3 billion (or 1.9% EU-27 GDP, coming from 342.1 billion in 2008 or 2.7% EU27 GDP). The share for the financial sector was therefore between EUR 34.2 billion and EUR 45.7 billion in 2009 (between EUR 51.3 billion and EUR 68.4 billion in 2008), to be compared with an estimated FAT1 collection of EUR 30.3 billion.

These estimates do not take into account a potential change in the base because of the FAT. The annex on the "Impact on Effective Tax Rates, the Cost of Capital, Interest Spreads and Capital Ratios" (See Annex 10) shall guide us to estimate this reaction. The estimated FAT here has a statutory rate of 5% (corresponding to a 3.75% EATR under specific hypothesis on return, inflation and interest rate). The tax can be seen as a tax on profit and remuneration of the sector. As a first estimate, on the profit part, the statutory rate of the FAT could be seen as an addition to the CIT. The average CIT statutory rate in 2010 in the EU27 is 23.2%. At one extreme, the FAT could therefore correspond to an increase in the rate on profit by 21.5% (i.e. 5/23.2). At the other extreme, the METR on the profit part of the FAT is zero, as shown in the above-mentioned annex.

In terms of elasticities, the review of the economic literature on "Tax Elasticities of Financial Instruments, Profits and Remuneration" by Copenhagen Economics (See Annex 9) provides (semi-)elasticities for reported profit, operating costs (including labour), profit shifting and location of financial companies to the statutory rate. To start with, the elasticity with regards to location is around -2 and the semi-elasticity is about -6. The elasticity with regards to operating costs is estimated at zero. This latter result means to the FAT would in theory have no effect on labour expenses. This seems also to be the effect reported in Denmark by Sørensen (2011). The elasticity of profit shifting is estimated at about 0.03 for domestic companies and -0.02 for foreign subsidiaries, although a recent study by IMF (2011) shows that the semi-elasticity of profit to assets to the statutory rate is between 6 and 8.5. One shall note however that all these (semi-)elasticities are estimated at country level and that a EU-level introduction of the tax would mean lower elasticities. They shall therefore be seen as upper bound.

Combined together, the various measures of the rates and the (semi-)elasticities allow drawing two scenarios. The optimistic scenario, based on the inelasticity of the labour part and a EMTR shown to be zero, is that the FAT will incur no reaction and that the static estimates are valid. The pessimistic scenario leads to a relocation of some subsidiaries of non-EU foreign financial companies by between 30% (semi-elasticity of -6 times a rate increase of 5 pp) and 43% (elasticity of -2 times the proportional increase in the rate of 21.5%). We assume here 40%. The relocation of foreign EU subsidiaries is more difficult to apprehend if the tax is introduced throughout Europe because the tax differential would be the same in absolute terms. Let's however take a pessimistic scenario of an arbitrary decrease in their assets by 5%. Based on ECB data[23], this corresponds for the EU27 in 2009 to a decrease in banks assets by 1.80% (from column (A) to (D)). Next, we apply a (high) semi-elasticity of 7 for reported profit of banks. This corresponds to a fall of 35% in the reported profit of remaining banks.

This would correspond to new revenues estimates for the FAT1, FAT2 and FAT3 of respectively EUR 24.6 billion, EUR 12.4 billion and EUR 9.3 billion for 2009. Again, these estimates assume very large effects on relocation and reported profit.

[23] ECB(2010), EU Banking Structures, September 2010, table 13.

Table (15): Estimates for a FAT in EU27 in 2009, with relocation and elasticities.

Member State (2009)	Assets from domestic credit inst., excl foreign branches but incl. foreign subs (EUR bn) (A)	Assets of subs from third countries (EUR bn) (B)	Assets of foreign subs from EU countries (EUR bn) (C)	Assets from domestic credit inst. After reloc (EUR bn) (A) -5%(B) -40%(C) =(D)	Of which purely domestic (EUR bn) (E)	FAT1 revenue at 5% after reloc and elast. (EUR Mio)	FAT2 revenue at 5% after reloc and elast. (EUR Mio)	FAT3 revenue at 5% after reloc and elast. (EUR Mio)
AT	1,025.7	48.7	141.6	999.2	835.5	479.5	248.7	182.7
BE	1,067.8	35.8	578.1	1,024.5	453.8	738.4	450.8	267.1
BG	36.3	0.8	29.3	34.5	6.2	33.4	26.2	19.2
CY	133.0	n.a.	45.5	130.7	87.5	282.3	232.0	182.7
CZ	141.5	n.a.	124.9	135.2	16.5	84.6	58.7	26.9
DE	7,241.7	53.1	563.2	7,192.4	6,625.5	5,213.6	2,561.2	1,968.7
DK	1,065.1	22.7	157.9	1,048.1	884.5	435.5	175.4	47.7
EE	15.8	0.0	14.7	15.0	1.1	14.7	0.0	2.1
EL	451.9	n.a.	65.2	448.6	386.7	105.9	4.3	34.6
ES	3,205.8	9.7	112.3	3,196.3	3,083.8	1,514.5	548.1	368.5
FI	370.7	0.0	243.2	358.6	127.6	215.4	145.4	67.7
FR	7,009.8	54.5	569.9	6,959.5	6,385.5	5,094.8	1,961.1	1,320.3
HU	118.3	n.a.	63.2	115.2	55.1	113.3	90.5	68.0
IE	1,198.3	90.4	445.1	1,139.9	662.9	94.6	42.0	39.0
IT	3,455.5	14.7	245.4	3,437.4	3,195.5	2,186.7	383.3	312.2
LT	21.6	0.0	17.2	20.7	4.4	6.0	5.2	5.7
LU	681.2	63.4	570.0	627.3	47.8	158.2	113.1	90.9
LV	26.3	1.8	15.1	24.8	9.3	5.5	0.7	1.1
MT	41.2	2.2	13.4	39.7	25.6	32.0	19.6	8.5
NL	2,153.2	41.0	14.0	2,136.8	2,099.0	2,351.6	1,649.3	1,526.4
PL	260.4	23.7	148.0	243.6	88.8	393.7	247.3	178.2

PT	486.9	4.8	82.1	480.9	400.0	133.1	3.4	25.9
RO	80.7	n.a.	60.0	77.7	20.8	161.9	145.6	141.2
SE	874.9	n.a.	4.4	874.6	870.5	100.4	27.8	44.4
SI	52.9	0.0	15.1	52.2	37.8	51.3	35.2	21.8
SK	50.7	0.0	48.6	48.3	2.1	5.5	2.2	3.2
UK	5,812.7	570.6	673.0	5,550.8	4,569.0	4,595.4	3,251.0	2,375.2
EU27	37,080.6	1,037.8	5,060.4	36,412.5	30,982.4	24,601.9	12,427.9	9,330.1

Source: ECB, Orbis and own calculations