

# PROPOSED EU COMMISSION FINANCIAL TRANSACTION TAX IMPACT ANALYSIS ON FOREIGN EXCHANGE MARKETS

JANUARY 2012

## AUTHORS

Michael Wagner, Partner

Benjamin Smith, Senior Manager

Christopher Rigby, Manager

## REPORT QUALIFICATIONS/ASSUMPTIONS & LIMITING CONDITIONS

Oliver Wyman was commissioned by GFMA's<sup>1</sup> Global FX Division<sup>2</sup> to evaluate the impact of the European Union's proposed FTT on European FX markets, estimating its impact on FX cash and derivatives users.

Oliver Wyman shall not have any liability to any third party in respect of this report or any actions taken or decisions made as a consequence of the results, advice or recommendations set forth herein.

The opinions expressed herein are valid only for the purpose stated herein and as of the date hereof. Information furnished by others, upon which all or portions of this report are based, is believed to be reliable but has not been verified. No warranty is given as to the accuracy of such information. Public information and industry and statistical data are from sources Oliver Wyman deems to be reliable; however, Oliver Wyman makes no representation as to the accuracy or completeness of such information and has accepted the information without further verification. No responsibility is taken for changes in market conditions or laws or regulations and no obligation is assumed to revise this report to reflect changes, events or conditions, which occur subsequent to the date hereof.

1. The Global Financial Markets Association (GFMA) joins together some of the world's largest financial trade associations to develop strategies for global policy issues in the financial markets, and promote coordinated advocacy efforts. The member trade associations count the world's largest financial markets participants as their members. GFMA currently has three members: the Association for Financial Markets in Europe (AFME), the Asia Securities Industry & Financial Markets Association (ASIFMA), and, in North America, the Securities Industry and Financial Markets Association (SIFMA). For more information, visit <http://www.gfma.org>.
2. The Global Foreign Exchange (FX) Division of the GFMA, was formed in co-operation with the Association for Financial Markets in Europe (AFME), the Securities Industry and Financial Markets Association (SIFMA) and the Asia Securities Industry and Financial Markets Association (ASIFMA). Its members comprise 22 global FX market participants, collectively representing more than 90% of the FX market.

# Contents

1. Executive summary	1
2. Introduction	3
3. Introduction of a European Financial Transaction Tax (FTT)	5
3.1. Overview of the proposed tax	5
3.2. EU impact assessment	6
4. Primary Impact Assessment	7
4.1. Overview	7
4.2. Direct impact on transaction costs	7
4.3. Impact on trading behaviour	9
4.4. Relocation	9
4.5. Substitution	12
4.6. Reduction in short term speculative trading	12
4.7. Results of impact assessment	13
5. Indirect and Secondary Impact Analysis	15
5.1. Secondary impacts of increased transaction costs	15
5.2. Secondary impacts of reduced liquidity in EU markets	15
6. Conclusions	17
Appendix A. Data	19
Appendix B. References	21



# 1. EXECUTIVE SUMMARY

On 28th September 2011 European Commission President José Manuel Barroso unveiled the EU Commission's proposal for an EU wide Financial Transaction Tax (FTT) which would take effect from 1<sup>st</sup> January 2014<sup>1</sup>. The tax would be levied on all securities and derivative transactions executed within the EU. For Foreign Exchange (FX) instruments spot has been exempted from taxation, however cash (defined as FX forwards and swaps) and derivatives (defined as options) have been included.

The purpose of this paper is to evaluate the impact of the proposed EU Financial Transaction Tax on European FX markets. We aim to quantify the impacts of the FTT on FX cash and derivative markets, both in terms of the transaction costs and the effects on the participants in these markets. Previous studies<sup>2</sup> have shown that introducing an FTT results in the primary impacts of an increase in the cost to transact, geographic relocation of trading, substitution and a general reduction in notional turnover. In addition, the secondary impacts are a reduction in liquidity and increased market inefficiencies. This can lead to an increase in short-term price volatility and widening bid/ask spreads. Our research suggests that the implementation of the proposed financial transaction tax will:

- Directly increase transaction cost for all transactions by 3-7x and by up to 18x for the most liquid part of the market (FX swaps with maturity less than 1 week account for over 50% of the tax eligible FX cash and derivatives market)
- Cause a relocation of volumes that could reduce liquidity and thereby increase indirect transaction costs by up to a further 110%

- Predominantly hit the real economy (pension funds, asset managers, insurance companies and corporates) as both direct and indirect costs will largely be passed on to the end users; these end users will be the least able to move transactions to jurisdictions not subject to the tax
- Have limited impact on speculative trading as this activity will most likely relocate outside the EU tax jurisdiction
- Inefficiently tax the economy, as raising €1 of tax will likely cost the economy >€1 given the indirect costs associated with reduced volume and more fragmented liquidity

## **The proposed tax will significantly increase direct and indirect transaction costs**

- We estimate the total direct cost to transact in eligible FX products will increase by 3-7x and by up to 18x for the most liquid part of the market; the absolute levy is equal across all products, however, in the most liquid products (i.e. those with the tightest bid/ask spreads), there will be a significantly higher relative cost increase (see Table 1)
- An example of the most liquid swap product is the EUR/USD 1 week swap with a notional of €25,000,000. The current cost to transact to the end user is €279; the additional taxation of this transaction at 0.01% is €2,500 to the dealer as well as an additional €2,500 to a Financial Institution (FI) counterparty or €0 to an exempt counterparty (e.g. corporates) resulting in a total cost of €2,779-€5,279 or an increase of ~9-18x (see Table 1). Swaps of this nature with a maturity less than 1 week, account for over 50% of the tax eligible cash and derivative markets and therefore will see a significant increase in transaction costs

1 European Commission COM(2011) 594 final Proposal for a COUNCIL DIRECTIVE on a common system of financial transaction tax and amending Directive 2008/7/EC

2 Matheson, T. (2011), "Taxing Financial Transactions: Issues and Evidence". Working Paper no. 11/54. International Monetary Fund.

- The total increase in transaction costs is likely to be greater than the direct tax charge. We estimate ~70-75% of all eligible FX volumes will migrate outside the EU tax jurisdiction. This volume could be fully separated from EU executed transactions thereby increasing fragmentation and reducing liquidity in the EU. Of the remaining EU volumes we expect a 6% reduction in total executed volumes involving at least one EU counterparty. Research suggests that this fragmentation and reduction of liquidity could widen bid/ask spreads, which we estimate could be by as much as 110% (see Figures 2 and 3)

### **Real economy participants will bear a greater share of the costs**

- Corporates and other FIs (e.g. pension funds, insurers, and asset managers) are less able to relocate volumes outside of the EU than banks or hedge funds. We estimate that the introduction of an FTT will result in ~70-75% of tax eligible volumes migrating outside the EU tax jurisdiction. The majority of those volumes will rest in highly mobile counterparties such as bank dealing desks and hedge funds, whereas corporates and other FIs may only be able to relocate ~30-40% of their FX volumes due to their reduced ability to run treasury functions outside their home locations
- For taxed transactions it is likely that all or most of the tax levied will be passed on to end users. Prior studies<sup>3,4</sup> have shown that as much as 90% of the additional tax burden on FIs is generally passed on to end users. In the case of the EU FTT proposal, given the direct costs increase by ~1-18x what the broker-dealer actually earns on the transaction, the costs cannot be absorbed by the banks
- We note in addition that Non-bank FIs such as pension funds, insurers and asset managers are particularly hit as they bear a direct tax levy as well as any portion passed through by the dealer, potentially doubling the tax burden for these users

### **The tax is unlikely to materially change speculative trading behaviour**

- The majority of high frequency trading activity in the currency markets is in spot. We estimate that only ~10% of total notional turnover in the cash and derivative markets relates to high frequency strategies
- Hedge funds are responsible for the majority of this high frequency trading, however they are highly mobile and can relocate transactions outside the EU tax jurisdiction. We estimate ~80% relocation of hedge fund related volumes involving at least one EU domiciled counterparty (up to 70% of EU based funds and 100% of Non-EU domiciled funds)
- Of the high frequency cash and derivative trading that remains we anticipate a significant reduction given the lower liquidity left in EU markets and the increased costs. We estimate that ~50% of speculative trading volumes that cannot move will either disappear or the equivalent activity will migrate into the spot markets. This is equivalent to ~6% of tax eligible volumes and ~1% of total global volumes

### **The FTT is not an efficient tax mechanism from a microstructure perspective**

- Unlike some taxes, in order to gain €1 in tax income from the FTT it is likely that the economy will have to bear >€1 of cost, because as well as the direct costs associated with the transaction tax there will be additional indirect costs. These indirect costs result from reduced and more fragmented liquidity resulting in wider bid/ask spreads
- While this is difficult to estimate, studies conducted in other markets<sup>5</sup> and our analysis of spreads versus turnover imply that the additional increase in spreads due to the scale of volume deterioration within the EU tax jurisdiction could be as much as 110%

3 Albertazzi, U. and Gambacorta, L. (2006), "Bank Profitability and Taxation". *Computing in Economics and Finance* 2006 364. Society for Computational Economics

4 Huizinga, H., Voget, J. and Wagner, W. (2011), "International Taxation and Cross-Border Banking". Discussion Paper 2011-066. Tillburg University, Center for Economic Research.

5 Green, C. J., Maggioni, P. and Murinde, V. (2000), "Regulatory Lessons for Emerging Stock Markets from a Century of Evidence on Transactions Costs and Share Price Volatility in the London Stock Exchange", *Journal of Banking & Finance*, vol. 24, no.4, pp. 577-601.

## 2. INTRODUCTION

On 28th September 2011 European Commission President José Manuel Barroso, unveiled the EU Commission's proposal for an EU wide financial transaction tax (FTT) which would take effect from 1<sup>st</sup> January 2014<sup>6</sup>. Under the current proposal securities transactions are to be charged 0.1% on the purchase price. Derivative transactions are to be charged at a minimum rate of 0.01% of the notional value traded.

A transaction tax is not a new phenomenon. There are several examples in recent history and in place today: the UK Stamp Duty, the Swedish transaction tax in the 1980s, etc. However this is the most extensive transaction tax proposed within Europe both in terms of regulatory jurisdictions as well as products covered.

It is widely accepted (not least by the EU Commission<sup>7</sup>) that introducing the FTT in the EU will result in a high degree of relocation, product substitution, and a general reduction in notional turnover. The EU estimates up to ~90% of all tax eligible transactions could migrate outside the Union though this number may vary widely at the product level. In addition to turnover and volume relocation and reduction there are a series of secondary impacts that could result from the implementation of an FTT: i) a reduction in liquidity of the affected products and widening bid/ask spreads, and ii) limited market access if some products move fully outside the jurisdiction of the tax.

Oliver Wyman has been asked by the Global FX Division of GFMA<sup>8</sup> to conduct an independent review of the effects of the FTT within the EU on FX markets. FX is unique as an asset class given its importance in the real economy in both trade and financial flows. Where possible this study has quantified the extent to which the proposed tax as it stands today will impact direct transaction costs. We have also analysed how a reduction in liquidity caused by the above direct impacts could lead to indirect costs such as a widening of bid/ask spreads. Taking these together we have quantified the total additional direct and indirect costs imposed by the FTT and the effects on the different users of FX products.

Due to uncertainty around the extraterritorial scope of the FTT we have not attempted to estimate the potential tax revenue that could be raised in this study.

6 European Commission COM(2011) 594 final Proposal for a COUNCIL DIRECTIVE on a common system of financial transaction tax and amending Directive 2008/7/EC

7 European Commission SEC(2011) 1103/3 COMMISSION STAFF WORKING PAPER EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT Accompanying the document Proposal for a Council Directive on a common system of financial transaction tax and amending Directive 2008/7/EC

8 The Global Financial Markets Association (GFMA) joins together some of the world's largest financial trade associations to develop strategies for global policy issues in the financial markets, and promote coordinated advocacy efforts. The member trade associations count the world's largest financial markets participants as their members. GFMA currently has three members: the Association for Financial Markets in Europe (AFME), the Asia Securities Industry & Financial Markets Association (ASIFMA), and, in North America, the Securities Industry and Financial Markets Association (SIFMA).





# 3. INTRODUCTION OF A EUROPEAN FINANCIAL TRANSACTION TAX (FTT)

## 3.1. OVERVIEW OF THE PROPOSED TAX<sup>9</sup>

Proposed tax:

- European Union wide and applicable to all member states
- Minimum rates set forth:
  - Securities transactions to be charged a minimum rate of 0.1% on purchase price
  - Derivatives transactions to be charged a minimum rate of 0.01% of the notional

*N.B. Member States are free to change the effective tax rates subject to the EU minimum. Member State rates are not to be set as to incentivise relocations of transactions within the EU*

FX products eligible for taxation (under current proposal):

- OTC FX cash products (forwards and swaps)
- OTC FX derivatives (options)
- Listed FX futures and options

*N.B. FX spot transactions have been exempted*

Definition of applicability:

- The tax shall apply to all Member States of the European Union. “In order for a financial transaction to be taxable in the EU, one of the parties to the transaction needs to be established in the territory of a Member State” (COM(2011)594)
- “A financial institution shall be deemed to be established in the territory of a Member State where any of the following conditions are fulfilled:
  - A. it has been authorized by the authorities of that Member State to act as such, in respect of transactions covered by that authorisation;
  - B. it has a registered seat within that Member State;
  - C. its permanent address or usual residence is located in that Member State;
  - D. it has a branch within that Member State, in respect of transactions carried out by that branch;
  - E. it is party, acting either for its own account or for the account of another person, or is acting in the name of a party to the transaction, to a financial transaction with another financial institution established in that Member State pursuant to points (A), (B), (C) or (D), or with a party established in the territory of that Member State and which is not a financial institution” (COM(2011)594)
- Taxation will take place in the Member State in the territory of which the establishment of a financial institution is located

<sup>9</sup> European Commission COM(2011) 594 final Proposal for a COUNCIL DIRECTIVE on a common system of financial transaction tax and amending Directive 2008/7/EC

- The FTT should be chargeable at the instant the transaction occurs in order to minimise tax avoidance (COM(2011)594)
- “Where transactions are carried out on trade venues outside the EU, they will be subject to tax if at least one of the establishments carrying out or intervening in the transaction is located in the EU” (COM(2011)594)

Assumptions for the purpose of our analysis:

- At least one of the entities transacting must be located in the EU in order for the tax to apply to the transaction
- The minimum tax rate of 0.01% is applied on notional for derivatives
- Listed FX futures and options have been excluded. Oliver Wyman estimates listed contracts account for <5% of total notional traded in the EU

## 3.2. EU IMPACT ASSESSMENT<sup>10</sup>

The EU Commission has estimated the introduction of an FTT with a tax rate of 0.1% on equity and bonds, and a 0.01% on notional for derivatives could lead to:

- 70-90% relocation/fiscal avoidance of derivatives transactions in terms of notional traded volumes
- Further 0-2% reduction in transaction volume as market participants exit

<sup>10</sup> European Commission SEC(2011) 1103/3 COMMISSION STAFF WORKING PAPER EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT Accompanying the document Proposal for a Council Directive on a common system of financial transaction tax and amending Directive 2008/7/EC

# 4. PRIMARY IMPACT ASSESSMENT

## 4.1. OVERVIEW

Adopting the FTT tax will introduce additional costs to FX cash (e.g. forwards and swaps) and derivatives (e.g. options) transactions. We have analysed the scale of that cost versus the cost to transact the same FX product under current conditions. Furthermore, we have analysed the impact on overall market structure following the introduction of the FTT on FX transactions and quantified the impact for FX product users.

## 4.2. DIRECT IMPACT ON TRANSACTION COSTS

We have used examples to show the overall cost impact on transaction costs. Today the cost to transact is realised through the bid/ask spread for the product at the time of execution.

The relative increase in transaction cost as a result of the FTT is entirely dependent on the average spread. For more liquid currency pairs with a tighter bid/ask spread, the transaction tax will increase the relative transaction cost more than for less liquid pairs with wider bid/ask spreads.

Based on our worked example (Table 1), for a EUR/USD 1 week swap traded between a dealer and an FI counterparty a tax rate of 0.01% on notional would increase transaction costs by ~1790%. However for a EUR/USD 6 month swap, a tax rate of 0.01% on notional would increase transaction costs by ~270%. Though the total tax paid is equal the relative impact on highly liquid and highly traded products is higher.

It is important to note that the majority (75%) of the FX swap market is at the highly liquid, short dated end of the market (Table 2). Particularly for products with a maturity less than 1 week, spreads are tightest and thus the relative increase in transaction costs as a result of the tax is largest. FX swaps also form the bulk of the FX market (Table 4) at 45% of the total FX market and ~70% of the tax eligible FX market.

Considering the entire tax eligible FX cash and derivatives market, including products of all durations we estimate the weighted average increase in transaction costs to be 3-7x.

**TABLE 1: INCREASE IN TRANSACTION COSTS FOR FX SWAP TRANSACTIONS**

Pre FTT							
	Contract type	EUR/USD 1 Week Swap	EUR/USD 1 M Swap	EUR/USD 6 M Swap	EUR/GBP 1 Week Swap	EUR/GBP 1 M Swap	EUR/GBP 6 M Swap
	End User	FI	FI	FI	Corporate	Corporate	Corporate
Client trade:	Notional	EUR 25 MM	EUR 25 MM	EUR 25 MM	EUR 25 MM	EUR 25 MM	EUR 25 MM
	Dealer buys	EUR 25 MM	EUR 25 MM	EUR 25 MM	EUR 25 MM	EUR 25 MM	EUR 25 MM
	End User buys	USD 34 MM	USD 34 MM	USD 34 MM	GBP 22 MM	GBP 22 MM	GBP 22 MM
	Effective FX rate	1.3427 <sup>1</sup> EUR/ USD	1.3427 <sup>1</sup> EUR/ USD	1.3427 <sup>1</sup> EUR/ USD	1.14 <sup>1</sup> GBP/ EUR	1.14 <sup>1</sup> GBP/ EUR	1.14 <sup>1</sup> GBP/ EUR
End-user trx cost:	Avg. spread in FX points	0.000015 <sup>2</sup>	0.00003 <sup>2</sup>	0.0001 <sup>2</sup>	0.000015 <sup>2</sup>	0.00003 <sup>2</sup>	0.0001 <sup>2</sup>
	Trx cost base currency	USD 375 <sup>3</sup>	USD 750 <sup>3</sup>	USD 2,500 <sup>3</sup>	GBP 375 <sup>3</sup>	GBP 750 <sup>3</sup>	GBP 2500 <sup>3</sup>
	Trx cost EUR	EUR 279	EUR 559	EUR 1,862	EUR 428	EUR 857	EUR 2,856
		+	+	+	+	+	+
Post FTT							
1. End-user transaction tax:	FTT tax rate	0.01%	0.01%	0.01%	N/A	N/A	N/A
	Tax	EUR 2,500	EUR 2,500	EUR 2,500	EUR 0	EUR 0	EUR 0
		+	+	+	+	+	+
2. Dealer transaction tax:	FTT tax rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
	Tax	EUR 2,500	EUR 2,500	EUR 2,500	EUR 2,500	EUR 2,500	EUR 2,500
New transaction cost (incl. tax):	New transaction cost	EUR 5,279	EUR 5,559	EUR 6,862	EUR 2,928	EUR 3,357	EUR 5,356
		(+1790%)	(+900%)	(+270%)	(+580%)	(+290%)	(+90%)

Source: Oliver Wyman

<sup>1</sup> April average FX rate

<sup>2</sup> Proxy average spread in FX points by indicated contract

<sup>3</sup> FX points charged on base currency

**TABLE 2: MATURITY OF FX CASH AND DERIVATIVE PRODUCTS**

	< 1 week	1 wk – 1m	1m – 6m	6m – 1yr	> 1yr
FX Forwards	46%	19%	28%	4%	2%
FX Swaps	75%	9%	13%	2%	1%
FX Options	16%	23%	42%	12%	7%

Source: Bank for International Settlements (2010), "Triennial Central Bank Survey – Foreign Exchange and Derivatives Market Activity in April 2010". Basel: Bank for International Settlements

### 4.3. IMPACT ON TRADING BEHAVIOUR

The immediate impact on FX transactions will be increased transaction costs. The EU has confirmed that it expects transaction costs to rise with the introduction of a tax<sup>11</sup>. Further to an increase in transaction costs empirical studies have shown that applying a tax in a non-uniform manner, whereby the tax is applied in a single trading location (FX being a truly global marketplace) and where different products receive different tax rates, will have three additional impacts:

**Relocation:** If not all major jurisdictions in which a product is able to trade are included within the scope of the tax, a significant relocation of trades from the geographies where the tax is levied to other more favourable tax jurisdictions is to be expected (particularly in a global market such as the FX market<sup>12</sup>)

**Substitution:** If alternative products exist that are not taxed at the same rate, there may be a substitution in products from those that are highly taxed to those that receive a lower/no tax charge<sup>13</sup>. In the FX market this may involve substitution of short term (less than 7 day) forwards to spot

**Reduction in speculative trading:** There may be a reduction in short-term speculative trading<sup>14</sup>

### 4.4. RELOCATION

If a transaction tax is imposed in a non-uniform geographic manner there will be a relocation of trades from the jurisdiction where the tax is levied to jurisdictions where the tax rate is lower. Umlauf<sup>8</sup> showed that following the extension of the Swedish transaction tax on stocks in 1986, 60% of the traded volume of the 11 most actively traded Swedish share classes migrated to London.

The ability of counterparties to trade in different locations is dependent on the characteristics of the counterparty as well as the traded asset. Global dealer flows are relatively portable across jurisdictions given their legal entity structures. We expect that where possible dealers will book transactions outside the EU tax jurisdiction rather than a taxable booking location, to decrease transaction costs both internally as well as for clients. Financial counterparties, particularly hedge funds, are also more easily able to port transactions given their legal structures. However not all counterparties are able to port transactions outside the EU tax jurisdiction. Pensions, insurers, asset managers, and corporates are less mobile due to the limited location and focus of operations and businesses.

We have differentiated volumes by dealer location, counterparty location and counterparty type to assess the portability of different transactions (Table 3).

11 European Commission SEC(2011) 1103/3 COMMISSION STAFF WORKING PAPER EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT Accompanying the document Proposal for a Council Directive on a common system of financial transaction tax and amending Directive 2008/7/EC

12 Umlauf, S. R. (1993), "Transaction Taxes and the Behaviour of the Swedish Stock Market", *Journal of Financial Economics*, vol. 33, no.2, pp.227-240.

13 Garber, P. and Taylor, M. P. (1995), "Sand in the Wheels of Foreign Exchange Markets: A Sceptical Note", *The Economic Journal*, vol. 105, no. 428, pp.173-180.

14 Summers, L. H. and Summers, V. P. (1989), "When Financial Markets Work Too Well: A Cautious Case for a Securities Transactions Tax", *Journal of Financial Services Research*, vol.3, no.2-3, pp.261-286.

#### 4.4.1. DEALER TO DEALER

Dealer to dealer transactions comprise 40% of total FX transactions in tax eligible products (e.g. cash and derivatives) by notional turnover. Defined as institutions that are actively buying and selling currency and OTC cash and derivative products both for their own account and/or to service client flows, dealers are typically global investment banks and securities houses. Dealers are global by definition with legal entities across multiple jurisdictions allowing for portability of some transactions to non-taxed jurisdictions.

The primary constraint on dealer volume relocation is in-country balance sheet and capital requirements requiring local hedging for capital relief. It is the residual position following the netting of client trades which requires a dealer to dealer transaction for portfolio hedging/rebalancing. To the extent this is located within a taxable jurisdiction, a dealer will be liable for the tax on any rebalancing transactions. Where the dealer can port its own portfolio management transactions to a non-taxed jurisdiction we have assumed it will.

In order to estimate the portability of dealer to dealer transactions, we have estimated the minimum volume of FX trades required to rebalance the residual dealer portfolio after customer trades have been netted. To calculate this we:

1. Estimate the volume of dealer to customer trades that remain in the EU after relocation (see below for methodology)
2. On this turnover base up to 70% of the dealer to client FX portfolio will typically net, however we conservatively estimate that 50% of a dealer's dealer to client portfolio will net, leaving the remaining 50% as the dealers residual unhedged position
3. We estimate an EU dealer must therefore transact turnover equal to 50% of its turnover with EU client counterparties as hedging/rebalancing trades

Our conclusion is that an estimated 60-80% of transactions involving an EU dealer are portable to tax jurisdictions outside the EU.

#### 4.4.2. DEALER TO HEDGE FUND

Dealer to hedge fund transactions comprise 12% of total eligible FX transactions by turnover. Overall we estimate that up to 70% of transactions involving an EU hedge fund are portable. To estimate the portability of hedge fund transactions:

1. We first considered the domicile of hedge funds versus their country of management and find that typically 70% of hedge funds are located offshore<sup>15</sup>
2. That said, the offshore domicile of the hedge fund differs according to the management office
  - UK based hedge funds tend to be domiciled in Non-EU locations such as the Channel Islands, Cayman Islands etc, therefore we estimate that 70% of transactions will move away from the EU on the introduction of an FTT
  - Non-UK EU based hedge funds tend to be domiciled in Luxembourg or Ireland and therefore their transactions will still be susceptible to the EU-wide FTT. We estimate that 0% of transactions will be portable to locations outside of the scope of the FTT

<sup>15</sup> Hedge Fund Research (2010), "HFR Global Hedge Fund Industry Report". Chicago: Hedge Fund Research.

### 4.4.3. DEALER TO OTHER FINANCIAL INSTITUTION

For other FIs representing ~35% of total applicable FX volumes (e.g. asset managers, pension funds, and insurers) the ability to conduct trades out of a location that does not come within the scope of the FTT is largely dependent on the location of the entity's subsidiaries. We have asset-weighted the number of EU Financial Institutions with subsidiaries outside of the EU and found that only 30-35% of EU financial company transactions could move to Non-EU jurisdictions. Transactions will primarily relocate from the UK, Germany and France, which together account for 60-65% of other FI FX spend using total assets as a proxy. The UK accounts for 25-30% of EU FI assets considering all other FIs with total assets greater than €100 MM. German and French Other FIs have between 10-15% and 15-20% respectively.

### 4.4.4. DEALER TO CORPORATE

Dealer to corporate transactions comprise 13% of total transactions by notional turnover. To determine the portability of corporate transactions we have used a similar methodology as for FIs. That is, we have asset weighted the number of companies with subsidiaries outside of the EU to estimate the portability of corporate transactions. Here we estimate that only 30-35% of EU corporate transactions could move to Non-EU jurisdictions. Transactions will primarily relocate from the UK, Germany, France and Netherlands which together account for 65-70% of corporate FX turnover, using total assets as a proxy. The UK accounts for 30-35% of EU corporate assets considering all companies with total assets greater than €100 MM. Germany, France and the Netherlands have between 10-15% of EU corporate assets each.

**TABLE 3: PORTABILITY STATISTICS BY TRANSACTION TYPE**  
% RELOCATION OF TURNOVER OUTSIDE OF THE EU (NEGATIVE % INDICATES INCREASE IN TURNOVER)

		DEALER			HF			OTHER FIS			NON-FI COUNTERPARTY		
		EU	UK	Non-EU	EU	UK	Non-EU	EU	UK	Non-EU	EU	UK	Non-EU
FORWARDS	EU Dealer	19%	19%	100%	0%	70%	100%	32%	32%	100%	33%	33%	100%
	UK Dealer	0%	0%	100%	0%	70%	100%	32%	32%	100%	33%	33%	100%
	Non-EU Dealer	73%	73%	(120%)	0%	70%	(149%)	32%	32%	(111%)	33%	33%	(67%)
SWAPS	EU Dealer	78%	78%	100%	0%	70%	100%	32%	32%	100%	33%	33%	100%
	UK Dealer	64%	64%	100%	0%	70%	100%	32%	32%	100%	33%	33%	100%
	Non-EU Dealer	83%	83%	(166%)	0%	70%	(133%)	32%	32%	(103%)	33%	33%	(99%)
OPTIONS	EU Dealer	70%	70%	100%	0%	70%	100%	32%	32%	100%	33%	33%	100%
	UK Dealer	13%	13%	100%	0%	70%	100%	32%	32%	100%	33%	33%	100%
	Non-EU Dealer	73%	73%	(264%)	0%	70%	(386%)	32%	32%	(163%)	33%	33%	(57%)

**Note:** A negative percentage indicates an increase in turnover  
**Source:** BIS, Oliver Wyman proprietary analysis

## 4.5. SUBSTITUTION

Previous studies have shown that on the introduction of an FTT, counterparties may substitute a taxed product for a product or combination of products with lower transaction costs<sup>16, 17, 18</sup>. Whilst derivatives are charged 0.01% on notional, spot FX transactions are exempt from the FTT. We hypothesise therefore that there is a potential for users to substitute spot FX for short-dated forwards to minimise transaction costs versus the potential cost of an unhedged position.

The implications of using spot versus a forward is that end-clients would bear the FX risk for the duration of the exposure. Given that ~46% of forwards (see Table 2) are 7 days or less in duration, spot could offer an alternative to a taxable hedge. In order to empirically evaluate the cost of holding FX risk over a short-time period we quantified the 1 day FX volatility of the EUR/USD currency pair. The mean 1 day price volatility over the last 3 years of the EUR/USD FX rate is 0.6%, greater than the 0.01% tax rate that would be applied to the notional of an outright forward. We therefore conclude that the cost of FX volatility is greater than that of the transaction tax. We have estimated no substitution of forwards for spot given the implied costs.

## 4.6. REDUCTION IN SHORT TERM SPECULATIVE TRADING

One of the stated aims of introducing the EU financial transaction tax is to reduce the volume of short-term speculative trading. The effect has been shown through a number of academic studies. By increasing the transaction cost of short-term transactions it alters the risk/reward profile such that it may no longer be profitable to arbitrage small price differences between different currency pairs or to take advantage of other price mismatches between different products such as spot versus cash and derivative prices. Short-term speculative trading in the FX market accounts for between 10-40% of FX turnover, primarily spot transactions<sup>19, 20, 21</sup>. However, in tax eligible products we estimate that only ~10% of trading would fall under short term speculative trading conducted by hedge funds and the proprietary trading desks of banks.

After considering the relocation of trading outside of the EU, we have conservatively estimated that 50% of speculative trading activity will become unprofitable if the FTT were introduced (accounting primarily for arbitrage trading). This would therefore result in a 1% reduction in global FX cash and derivative turnover, and a 6% reduction in FX cash and derivative turnover involving at least one EU counterparty. Previous studies have put the reduction in turnover to be between 1-30% when a 0.01% transaction tax is introduced or when the tax base is increased<sup>22</sup>. The EU Commission Impact Assessment estimated the reduction in turnover to be between 0 and 2%<sup>23</sup>.

16 Brondolo, J. D. (2011), "Taxing Financial Transactions: An Assessment of Administrative Feasibility". Working Paper no. 11/185. International Monetary Fund.  
17 Campbell, J. Y. and Froot, K. A. (1993), "International Experiences with Securities Transaction Taxes". Working Paper no. 4587. National Bureau of Economic Research.  
18 Garber, P. and Taylor, M. P. (1995), "Sand in the Wheels of Foreign Exchange Markets: A Sceptical Note", *The Economic Journal*, vol. 105, no. 428, pp.173-180.

19 Bank for International Settlements (2010), "Triennial Central Bank Survey – Foreign Exchange and Derivatives Market Activity in April 2010". Basel: Bank for International Settlements.  
20 Matheson, T. (2011), "Taxing Financial Transactions: Issues and Evidence". Working Paper no. 11/54. International Monetary Fund.  
21 Reuters (2009), "High Frequency Trading Surges Across the Globe". New York: Reuters. Available: [www.reuters.com/article/2009/12/02/us-highfrequency-frontiers-idUSTRE5B110520091202](http://www.reuters.com/article/2009/12/02/us-highfrequency-frontiers-idUSTRE5B110520091202).  
22 Copenhagen Economics (2011), "Tax Elasticities of Financial Instruments, Profits and Remuneration". Copenhagen: Copenhagen Economics.  
23 European Commission SEC(2011) 1103/3 COMMISSION STAFF WORKING PAPER EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT Accompanying the document Proposal for a Council Directive on a common system of financial transaction tax and amending Directive 2008/7/EC



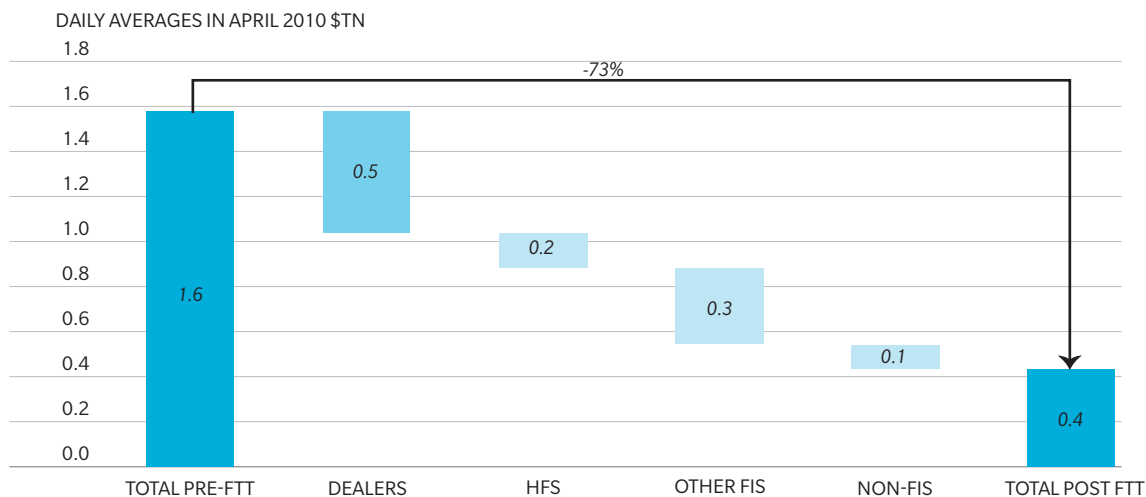
## 4.7. RESULTS OF IMPACT ASSESSMENT

We estimate that the introduction of an EU (including the UK) FTT could reduce notional turnover in FX cash and derivatives in Europe by 70-75% across all counterparties due to relocation of trading to other areas out of the EU, and a reduction in short term speculative trading activity. The change in notional turnover is different by user type. Figure 1 illustrates the overall (~\$1.6-0.4TN) change in average daily volume (ADV) involving at least one EU counterparty following the implementation of the FTT within the EU.

### 4.7.1. DEALER TO DEALER

- 80% relocation and reduction in turnover of transactions involving at least one EU dealer
- 60% relocation and reduction in turnover of EU dealer to EU dealer as EU dealers only transact with EU dealers for hedging and portfolio rebalancing. Relocation and reduction in turnover represents minimum turnover required to rebalance portfolio assuming 50% netting of the client portfolio
- 100% relocation in EU dealer to Non-EU dealer, as Non-EU dealers move transactions to Non-EU dealers out of scope of the tax
- 80% relocation and reduction in Non-EU dealer to EU dealer, as Non-EU dealers reduce trading with EU counterparties and transact only with EU dealers for EU dealers to rebalance portfolios
- 165% increase in Non-EU dealer to Non-EU dealer, as volumes move outside the tax jurisdiction and are not in scope for the FTT

FIGURE 1: POST FTT RELOCATION AND REDUCTION OF AVERAGE DAILY VOLUME OF FX PRODUCTS BY COUNTERPARTY TYPE (EUROPEAN TAX ZONE)



Source: BIS, Oliver Wyman proprietary analysis  
 NB detailed results in Appendix

#### 4.7.2. DEALER TO HEDGE FUND

- 90% relocation and reduction in turnover of transactions involving at least one EU counterparty
- 85% relocation and reduction in turnover of EU dealer to EU hedge fund, as UK hedge funds move FX trading outside the EU tax jurisdiction
- 100% relocation in EU dealer to Non-EU hedge fund, as Non-EU hedge funds move transactions to Non-EU dealers out of scope of the tax
- 80% relocation and reduction in Non-EU dealer to EU hedge funds
- 150% increase in Non-EU dealer to Non-EU hedge funds as volumes move outside the EU tax jurisdiction to avoid the FTT

#### 4.7.3. DEALER TO OTHER FINANCIAL INSTITUTION

- 65% relocation in turnover of transactions involving at least one EU counterparty
- 30% relocation in turnover of EU dealer to EU Other FIs, as EU FIs shift their treasury functions to more favourable tax locations
- 100% relocation in EU dealer to Non-EU Other FIs, as Non-EU FIs move transactions to Non-EU dealers out of scope of the tax
- 30% relocation in Non-EU dealer to EU Other FIs
- 110% increase in Non-EU dealer to Non-EU Other FIs as volumes move outside the EU tax jurisdiction to avoid the FTT

#### 4.7.4. DEALER TO CORPORATE

- 60% relocation in turnover of transactions involving at least one EU counterparty
- 35% relocation in turnover of EU dealer to EU corporate as EU corporates with subsidiaries outside of the EU, shift their Treasury Functions to more tax favourable locations
- 100% relocation in EU dealer to Non-EU corporate, as Non-EU corporates move transactions to Non-EU dealers out of scope of the tax
- 35% relocation in Non-EU dealer to EU corporate
- 80% increase in Non-EU dealer to Non-EU corporate as volumes move outside the EU tax jurisdiction to avoid the FTT

# 5. INDIRECT AND SECONDARY IMPACT ANALYSIS

In addition to the direct cost and primary impacts of an FTT there are several indirect and secondary impacts that should be considered in any discussion regarding the introduction of an FTT.

## 5.1. SECONDARY IMPACTS OF INCREASED TRANSACTION COSTS

Several studies have illustrated that increased transaction costs lead to increased short-term price volatility<sup>24</sup>. Specifically in the FX market, Lanne and Vesala<sup>25</sup> empirically showed that increased transaction costs lead to increased price volatility. Additional studies indicate that:

- Reduced activity of “noise traders” (i.e. short term speculative trading & market makers) could reduce liquidity<sup>26</sup> and price discovery, and thereby arguably increase price volatility
- An FTT may in addition reduce activity by informed traders thereby hindering or delaying prices from reaching their fundamental values<sup>27, 28</sup>

24 Green, C. J., Maggioni, P. and Murinde, V. (2000), “Regulatory Lessons for Emerging Stock Markets from a Century of Evidence on Transactions Costs and Share Price Volatility in the London Stock Exchange”, *Journal of Banking & Finance*, vol. 24, no.4, pp. 577-601.

25 Lanne, M. and Vesala, T. (2006), “The Effect of a Transaction Tax on Exchange Rate Volatility”. Bank of Finland Research Discussion Papers 11. Bank of Finland.

26 Bloomfield, R., O'Hara, M. and Saar, G. (2009), “How Noise Trading Affects Markets: An Experimental Analysis”, *Review of Financial Studies*, vol. 22, no.6, pp. 2275-2302.

27 De Long, B., Schleifer, A., Summers, L. and Waldmann, R. (1990), “Noise Trader Risk in Financial Markets”, *Journal of Political Economy*, vol. 98, no.4, pp.703-738.

28 Matheson, T. (2011), “Taxing Financial Transactions: Issues and Evidence”. Working Paper no. 11/54. International Monetary Fund.

## 5.2. SECONDARY IMPACTS OF REDUCED LIQUIDITY IN EU MARKETS

A reduction in liquidity will likely lead to a widening of bid/ask spreads. Oliver Wyman has analysed the impact of widening spreads on the cost to transact to quantify the indirect impact of the FTT on transacting eligible FX products. Transaction bid/ask spreads are dependent on:

- Order processing costs
- Inventory or price risks
- Information asymmetry

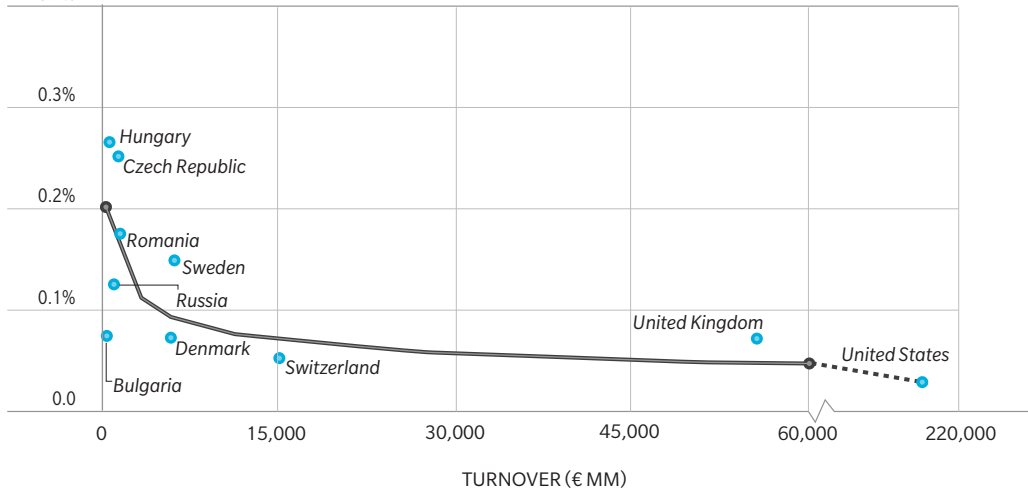
Each may be impacted by an FTT thus leading to widening bid/ask spreads. However the extent to which spreads widen is dependent on the liquidity of the individual products traded and the starting liquidity/depth of a market.

Figures 2 and 3 illustrate the relationship of bid/ask spreads to total turnover for 1 week and 12 month FX forwards. We analysed the bid/ask spread (as a percentage of the FX rate) for Euro versus other currency 1 week and 12 month forwards. BIS data on all derivative turnover in Euro versus other currency is used as a proxy for turnover in 1 week and 12 month forwards. Bid/ask spreads are negatively correlated with turnover; as turnover increases, bid/ask spreads reduce. With respect to 1 week forwards, the relationship between turnover and bid/ask spreads is given by a bid/ask spread =  $0.0114 \times \text{Turnover}^{-0.2900}$ . For the 12 month forwards the same relationship is given by the bid/ask spread =  $0.2548 \times \text{Turnover}^{-0.5425}$ .

For example, the EUR/USD 1 week forward is highly liquid, such that a 70% reduction in turnover would have an impact of a 110% widening of the bid/ask spread. For a less liquid product such as the EUR/DDK 12 month forward, we estimate a 70% reduction in turnover would leave a significantly less deep market, and spreads might be expected to widen by up to 200%.

**FIGURE 2: BID/ASK SPREAD VERSUS TURNOVER<sup>1</sup> IN EUR VERSUS OTHER CURRENCY 1 WEEK FORWARDS**

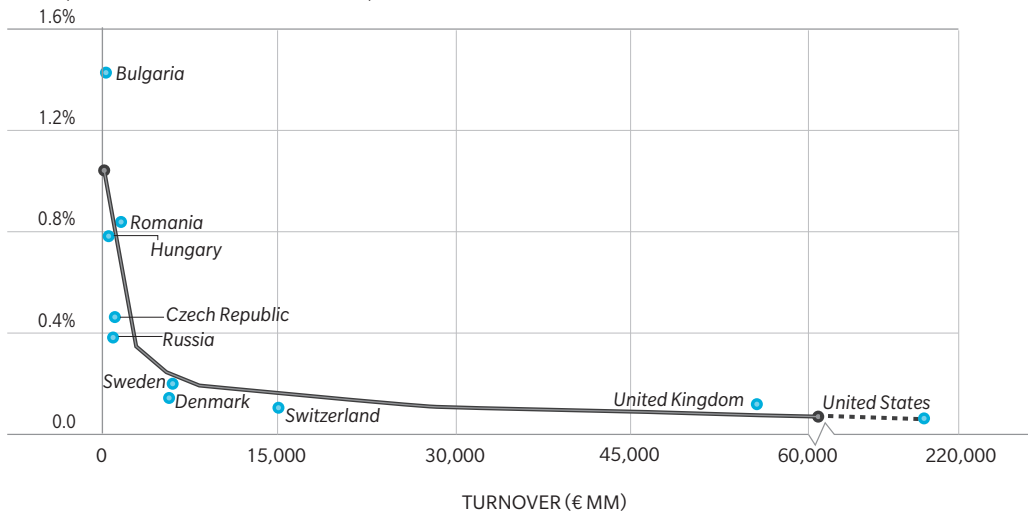
BID/ASK SPREAD AS PERCENTAGE OF PRICE (1 WEEK FORWARD CONTRACT)



<sup>1</sup> BIS data on all derivative turnover in Euro versus other currency used as a proxy for turnover in 1 week Forwards

**FIGURE 3: BID/ASK SPREAD VERSUS TURNOVER<sup>1</sup> IN EUR VERSUS OTHER CURRENCY 12 MONTH FORWARDS**

BID/ASK SPREAD AS PERCENTAGE OF PRICE (12 MONTH FORWARD CONTRACT)



<sup>1</sup> BIS data on all derivative turnover in Euro versus other currency used as a proxy for turnover in 12 month Forwards

# 6. CONCLUSIONS

1. The tax will dramatically increase the cost to transact with particular impact on the most liquid, most traded products (e.g. 1 week EUR/USD swaps)
  - The most liquid products are impacted the most due to the tight bid/ask spreads, the resulting relative increase in transaction costs will be 9-18x
  - 75% of eligible volumes in the FX swap market are <1 week in duration and so the majority of the trading volumes will see a significant increase in direct transaction costs
  - Considering the entire tax eligible FX cash and derivatives market including products of all durations, we estimate the weighted average increase in transaction costs to be 3-7x
2. The real economy (asset managers, pension funds, insurers, and corporates) may experience the largest increases in transactions costs
  - More limited ability to shift treasury operations outside the EU tax jurisdiction
  - Increased costs due to likelihood of FTT being passed on to end users, including tax exempt corporates
  - Asset managers, pension funds, and insurers doubly hit due to both responsibility for own tax liability as well as any portion passed through from the dealer
3. Speculative trading is less impacted due to portability of booking location
  - High frequency trading only accounts for ~10% of total traded tax eligible FX cash and derivative volumes conducted by hedge funds and the proprietary trading desks of banks
  - Hedge funds able to relocate ~80% of total transactions outside the EU tax jurisdiction
  - Dealers likely to shift booking of transactions to locations outside the EU tax jurisdiction; we estimate a net shift of 60-80% of volumes by dealers
  - Estimated impact of cessation of high frequency trading in the EU is ~1% of global FX cash and derivative turnover, and a 6% reduction in FX cash and derivative turnover involving at least one EU counterparty
4. The implementation of the tax costs the economy more than the tax burden
  - Versus today, there could be a 70-75% reduction of volumes due to relocation and to a lesser extent a reduction in short-term speculative activity, reducing overall market volumes and impacting liquidity within the EU
  - Volume relocation and reduction of trading within the EU tax jurisdiction could lead to a widening bid/ask spreads by up to 110% depending on currency pair and product; this leads to the overall cost of tax to the economy being greater than the tax revenue generated



# 7. APPENDIX A

## 7.1. DATA

Where possible we have opted to use publically available data sources; where no data exists we have leveraged academic studies to make our own estimates. Any estimates not directly taken from a public data source represent the expert opinion of Oliver Wyman and have been noted as such. The base input data is from the Bank for International Settlements 2010 Triennial Central Bank Survey data and can be found below.

**TABLE 4: TURNOVER BY PRODUCT (ALL FX PRODUCTS)**

Daily average turnover in April 2010 \$MM

PRODUCT	TURNOVER	%
FX Swap	1,765,210	45%
FX Spot	1,490,204	38%
FX Forward	475,008	12%
FX Option	207,264	5%

**Source:** Bank for International Settlements (2010), "Triennial Central Bank Survey – Foreign Exchange and Derivatives Market Activity in April 2010". Basel: Bank for International Settlements.

**TABLE 5: TURNOVER BY LOCATION OF DEALER (ALL FX PRODUCTS)**

Daily average turnover in April 2010 \$MM

PRODUCT	TURNOVER
EU Dealer	434,936
UK Dealer	1,539,000
Non-EU Dealer	1,963,751

**Source:** Bank for International Settlements (2010), "Triennial Central Bank Survey – Foreign Exchange and Derivatives Market Activity in April 2010". Basel: Bank for International Settlements.

**TABLE 6: TURNOVER BY COUNTERPARTY (TAX ELIGIBLE FX PRODUCTS ONLY)**

Daily average turnover in April 2010 \$MM

	LOCAL DEALER	FOREIGN DEALER	LOCAL FI COUNTERPARTY	FOREIGN FI COUNTERPARTY	LOCAL NON-FI COUNTERPARTY	FOREIGN NON-FI COUNTERPARTY
EU Dealer	23,251	148,828	26,613	87,090	22,147	16,948
UK Dealer	126,982	191,229	177,817	333,988	24,280	93,379
Non-EU Dealer	140,381	379,249	176,921	322,988	92,784	62,608
<b>TOTAL</b>	<b>290,614</b>	<b>719,306</b>	<b>381,350</b>	<b>744,066</b>	<b>139,212</b>	<b>172,934</b>

**Source:** Bank for International Settlements (2010), "Triennial Central Bank Survey – Foreign Exchange and Derivatives Market Activity in April 2010". Basel: Bank for International Settlements.

**TABLE 7: POST FTT RELOCATION OF ADV OF FX PRODUCTS BY COUNTERPARTY TYPE (TAX ELIGIBLE FX PRODUCTS ONLY)**

Daily average turnover in April 2010 \$MM

		DEALER			HF			OTHER FIS			NON-FI COUNTERPARTY		
		EU	UK	Non-EU	EU	UK	Non-EU	EU	UK	Non-EU	EU	UK	Non-EU
DERIVATIVES TURNOVER PRE- FTT	EU Dealer	47,293	50,897	73,889	43,837	7,395	62,470	27,253	547	11,295	118,383	58,840	147,654
	UK Dealer	44,812	126,982	146,417	72,184	177,817	261,804	29,071	24,280	64,308	146,067	329,079	472,529
	Non-EU Dealer	59,142	132,538	327,950	63,879	27,427	408,603	18,862	2,022	134,509	141,883	161,986	871,061
DERIVATIVES TURNOVER POST- FTT	EU Dealer	11,730	13,313	-	29,356	3,064	-	18,284	367	-	59,370	16,744	-
	UK Dealer	19,075	59,133	-	48,340	73,670	-	19,503	16,289	-	86,917	149,092	-
	Non-EU Dealer	10,038	24,069	865,332	42,778	11,363	896,401	12,654	1,356	243,692	65,470	36,789	2,005,425
PERCENTAGE REDUCTION IN DERIVATIVES TURNOVER	EU Dealer	75%	74%	100%	33%	59%	100%	33%	33%	100%	50%	72%	100%
	UK Dealer	57%	53%	100%	33%	59%	100%	33%	33%	100%	40%	55%	100%
	Non-EU Dealer	83%	82%	(164%)	33%	59%	(119%)	33%	33%	(81%)	54%	77%	(130%)

Source: Bank for International Settlements (2010), "Triennial Central Bank Survey – Foreign Exchange and Derivatives Market Activity in April 2010". Basel: Bank for International Settlements. Oliver Wyman Analysis



# 8. APPENDIX B

## 8.1. REFERENCES

Albertazzi, U. and Gambacorta, L. (2006) “Bank Profitability and Taxation”. *Computing in Economics and Finance* 2006 364. Society for Computational Economics.

Bank for International Settlements (2010), “*Triennial Central Bank Survey – Foreign Exchange and Derivatives Market Activity in April 2010*”. Basel: Bank for International Settlements.

Bloomberg, *Bloomberg Database*.

Bloomfield, R., O’Hara, M. and Saar, G. (2009), “How Noise Trading Affects Markets: An Experimental Analysis”, *Review of Financial Studies*, vol. 22, no.6, pp. 2275-2302.

Brondolo, J. D. (2011), “*Taxing Financial Transactions: An Assessment of Administrative Feasibility*”. Working Paper no. 11/185. International Monetary Fund.

Bureau Van Dijk, *Orbis*.

Campbell, J. Y. and Froot, K. A. (1993), “*International Experiences with Securities Transaction Taxes*”. Working Paper no. 4587. National Bureau of Economic Research.

CaritasData, *CharitiesDirect*.

Central Intelligence Agency, *The World Factbook*.

Comité Européen des Assurances, *European Insurance Figures*.

Copenhagen Economics (2011), “*Tax Elasticities of Financial Instruments, Profits and Remuneration*”. Copenhagen: Copenhagen Economics.

De Long, B., Schleifer, A., Summers, L. and Waldmann, R. (1990), “Noise Trader Risk in Financial Markets”, *Journal of Political Economy*, vol. 98, no.4, pp. 703-738.

European Commission COM (2011) 594 final Proposal for a COUNCIL DIRECTIVE on a common system of financial transaction tax and amending Directive 2008/7/EC

European Commission SEC(2011) 1103/3 COMMISSION STAFF WORKING PAPER EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT Accompanying the document Proposal for a Council Directive on a common system of financial transaction tax and amending Directive 2008/7/EC

European Fund and Asset Management Association, *International Statistical Release*.

Garber, P. and Taylor, M. P. (1995), “Sand in the Wheels of Foreign Exchange Markets: A Sceptical Note”, *The Economic Journal*, vol. 105, no. 428, pp. 173-180.

Green, C. J., Maggioni, P. and Murinde, V. (2000), “Regulatory Lessons for Emerging Stock Markets from a Century of Evidence on Transactions Costs and Share

Hedge Fund Research (2010), “*HFR Global Hedge Fund Industry Report*”. Chicago: Hedge Fund Research.

Huizinga, H., Voget, J. and Wagner, W. (2011), "*International Taxation and Cross-Border Banking*". Discussion Paper 2011-066. Tillburg University, Center for Economic Research.

International Monetary Fund, *World Economic Outlook*.

Lanne, M. and Vesala, T. (2006), "*The Effect of a Transaction Tax on Exchange Rate Volatility*". Bank of Finland Research Discussion Papers 11. Bank of Finland.

Matheson, T. (2011), "*Taxing Financial Transactions: Issues and Evidence*". Working Paper no. 11/54. International Monetary Fund.

Organisation for Economic Co-operation and Development, *Pension Markets Outlook*.

"Price Volatility in the London Stock Exchange", *Journal of Banking & Finance*, vol. 24, no.4, pp. 577-601.

Reuters (2009), "*High Frequency Trading Surges Across the Globe*". New York: Reuters. Available: [www.reuters.com/article/2009/12/02/us-highfrequency-frontiers-idUSTRE5B110520091202](http://www.reuters.com/article/2009/12/02/us-highfrequency-frontiers-idUSTRE5B110520091202).

Sovereign Wealth Fund Institute, *Sovereign Wealth Funds News*.

Stiglitz, J. E. (1989), "Using Tax Policy to Curb Speculative Short-Term Trading", *Journal of Financial Services Research*, vol.3, no.2-3, pp. 101-115.

Summers, L. H. and Summers, V. P. (1989), "When Financial Markets Work Too Well: A Cautious Case for a Securities Transactions Tax", *Journal of Financial Services Research*, vol.3, no. 2-3, pp. 261-286.

Thomson Reuters, *Datastream*.

Umlauf, S. R. (1993), "Transaction Taxes and the Behaviour of the Swedish Stock Market", *Journal of Financial Economics*, vol. 33, no.2, pp. 227-240.



Oliver Wyman is a leading global management consulting firm that combines deep industry knowledge with specialised expertise in strategy, operations, risk management, organisational transformation, and leadership development.

For more information please contact the marketing department by email at [info-FS@oliverwyman.com](mailto:info-FS@oliverwyman.com) or by phone at one of the following locations:

EMEA

+44 20 7333 8333

NORTH AMERICA

+1 212 541 8100

ASIA PACIFIC

+65 6510 9700

CONTACT DETAILS

[MICHAEL.WAGNER@OLIVERWYMAN.COM](mailto:MICHAEL.WAGNER@OLIVERWYMAN.COM)

[BENJAMIN.SMITH@OLIVERWYMAN.COM](mailto:BENJAMIN.SMITH@OLIVERWYMAN.COM)

[CHRISTOPHER.RIGBY@OLIVERWYMAN.COM](mailto:CHRISTOPHER.RIGBY@OLIVERWYMAN.COM)

[www.oliverwyman.com](http://www.oliverwyman.com)

Copyright © 2012 Oliver Wyman. All rights reserved. This report may not be reproduced or redistributed, in whole or in part, without the written permission of Oliver Wyman and Oliver Wyman accepts no liability whatsoever for the actions of third parties in this respect.

The information and opinions in this report were prepared by Oliver Wyman.

This report is not a substitute for tailored professional advice on how a specific financial institution should execute its strategy. This report is not investment advice and should not be relied on for such advice or as a substitute for consultation with professional accountants, tax, legal or financial advisers. Oliver Wyman has made every effort to use reliable, up-to-date and comprehensive information and analysis, but all information is provided without warranty of any kind, express or implied. Oliver Wyman disclaims any responsibility to update the information or conclusions in this report. Oliver Wyman accepts no liability for any loss arising from any action taken or refrained from as a result of information contained in this report or any reports or sources of information referred to herein, or for any consequential, special or similar damages even if advised of the possibility of such damages.

This report may not be sold without the written consent of Oliver Wyman.