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Implementation of a General Financial Transactions Tax

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Implementation of a General Financial Transactions Tax^{*)}

0. Executive summary

A general financial transactions tax (FTT) tracks two main targets: First, mitigating the fluctuations of the most important asset prices like stock prices, exchange rates, and commodity prices, and second, providing substantial revenues for governments.

The essential features of a general FTT are as follows:

- The FTT is levied on all transactions involving buying/selling of spot and derivative assets. These instruments are traded either on organized exchanges or over the counter (i.e., bilateral OTC transactions, exclusively carried out by professional market participants).
- The tax base is the value of the underlying asset, in the case of derivatives their notional value (e. g., the value of a futures contract at the current futures price, the notional principle of a swap, the spot value of the underlying asset in the case of options).
- The tax rate should be low so that only very "fast" (= speculative) trading with high leverage ratios will become more costly due to the FTT (in the present study a rate of 0.05% is assumed).
- The FTT does not tax "real-world-transactions" like payments related to the goods and labour markets, to initial public offerings of stocks and bonds as well as foreign exchange transactions which stem from international trade or direct investment.
- The tax burden is divided between the buyer and the seller, hence, each side of a financial transaction would just pay 0.025% of the asset value (2.5 basis points).

This concept ensures the following: The more short-term oriented a transaction is (the faster open positions are changed) and the riskier it is (the higher the leverage ratio is), the more will the FTT increase transactions costs. At the same time, holding a financial asset (including hedging) will not be burdened by the FTT.

The main arguments against a general FTT as put forward by the International Monetary Fund (IMF) and the European Commission (EC) are as follows. An FTT would raise the costs of capital, it would reduce market liquidity and thereby hamper the price discovery process. In addition, an FTT would produce tax distortionary effects and it would increase the costs of

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hedging. If the tax is not implemented at the global level, the relocation of trading activities would be substantial.

These arguments are derived from theoretical models which are based on a specific set of assumptions which have become "assumptions as usual" over the past decades like market efficiency, rational expectations and utility maximizing behaviour. However, a careful exploration and evaluation of expectations formation and trading behaviour in practice reveals that these assumptions do not hold. In particular, expectations are formed predominantly only in a directional manner ("Will an asset price go up or down over the coming seconds or minutes?") and trading decisions are to a large extent based on "technical analysis", i.e., in many cases exclusively driven by computer algorithms (e. g., high frequency trading).

These practices generate excessive liquidity, i.e., trading activities which produce persistent price movements over the short run. Over the long run, short-term trends accumulate to long-term trends ("bull markets" and "bear markets", respectively). The sequence of these trends brings about the phenomenon of "long swings" of asset prices. Hence, overshooting of stock prices, exchange rates and commodity prices is rather the rule than the exception.

Based on the empirical evidence, it is shown that a general FTT is much better suited for stabilizing asset prices and generating tax revenues ("double dividend") as compared to the alternative measures favoured by the IMF and the EC, namely, a bank levy and/or a financial activities tax.

There are two fundamentally different ways of how an FTT could be implemented:

- With the centralized approach, the tax is collected at point of settlement, either from the electronic settlement systems at exchanges, or from Central Counterparty Platforms (CCPs) in the case of OTC transactions, respectively.
- With the decentralized approach, the tax is deducted by the banks and brokerage firms which transmit an order to an exchange (on behalf of a customer or as part of proprietary trading) or which carry out an OTC transaction.

Centralized tax deduction would be the optimal form of an FTT implementation. At the same time, however, this approach is difficult to realize in practice because it necessitates a broad consensus to introduce an FTT and to force OTC transactions to be settled via CCPs. Such a consensus has to be achieved at least among all important countries in a trading time zone. Otherwise substantial shifts in market shares of financial centres would occur. E. g., if Germany would introduce an FTT together with some other member countries but the United Kingdom would not, then many transactions would "migrate" from Frankfurt to London.

In addition, there is the issue of how to distribute FTT receipts. Due to the concentration of trading on the exchanges in London and Frankfurt, roughly three quarters of revenues would stem from transactions on the London market place and one quarter from transactions in Frankfurt. However, the tax will effectively be paid by all counterparties who make use of these exchanges (e. g., 85% of all trades made at Eurex in Frankfurt stem from non-German

traders). For this reason it is recommended that part of the revenues should go to the countries from which the transactions on organized exchanges originate. Of course, for providing the EU as a whole with such efficient market places as London and Frankfurt, the UK and Germany should get some fixed share of tax revenues.

These considerations suggest that the FTT revenues from exchange transactions should be divided into three parts if all EU countries agree to implement a common FTT. One part should go to the home country of the exchange, one part should go to the countries from which the transactions on exchanges originate, and the third part should/could go to supranational institutions like the EU or to supranational projects like development aid.

As regards OTC transactions, a major prerequisite for the centralized solution is the central mandatory clearance of all OTC transactions (standard and non-standard) through Central Counterparty Platforms (CCPs). If such a consensus could be reached, then it would be easy to legally force all banks and other financial institutions to centrally clear their OTC transactions. In this case counterparties from countries outside the EU would also be obliged to use the CCPs if they want to do business with financial institutions from EU countries.

However, a central collection through currently wholly private settlement institutions requires a high degree of tax coordination and cooperation as well as the harmonization and further integration of the clearing and settlement processes.

Since the CCPs represent just an electronic clearing system, their efficiency does not depend on network externalities of financial centres (as with organized exchanges). Hence, the FTT proceeds should be divided between the countries from which the transactions originate, and the EU institutions.

A centralized FTT implementation necessitates also the creation of a "Standard Classification of Financial Transactions" (SCFT). Such a classification (similar to the SITC as regards international trade) is also a prerequisite for an efficient supervision and regulation of financial markets (including restrictions to tax fraud as well as to terrorist activities).

The essential difference between the centralized and the decentralized approach to FTT implementation is as follows (taking transactions on exchanges as example). According to the centralized approach, any exchange situated in a country where an FTT applies (FTT-country) has to deduct the FTT for all transactions ("territorial or destination principle"). According to the decentralized approach, all orders of actors from an FTT country are subject to the tax, irrespective at which exchanges – domestic or abroad - these orders are carried out ("personal or origin principle"). The tax is deducted by the bank or broker which places the respective order to the exchange ("taxing at the source").

A concrete example: If Germany would introduce an FTT, then only all German residents placing orders for transactions on exchanges - at home or abroad - are liable to pay the FTT. At the same time, all transactions stemming from residents of non-FTT countries at German exchanges would not be taxed. In this way, German exchanges would not be discriminated

relative to exchanges abroad as long as those who place the order would not move from an FTT country to a non-FTT country.

However, some hedge funds and investment banks might shift their (very) short-term transactions (even more) from Frankfurt to London. The same might be true for some amateur "day traders" who would process their orders through brokers at London. The extent of this emigration of trading could be restricted by introducing an FTT substitute levy (FTTSL). The FTTSL would be charged on any transfer of funds from a bank account in an FTT country to a brokerage firm or hedge fund in a non-FTT country. The size of the FTTSL should be several times higher than the FTT. With an FTT of 0.05% the FTTSL could be 2% or even higher. If it were 2% it would be the equivalent of 40 "round trip transactions". The FTTSL can be considered some kind of "security deposit". If the actor documents that the value of exchange transactions carried out abroad by himself or by his fund is smaller than the original deposit he gets part of the FTTSL reimbursed.

As regards OTC transactions, any bank, other financial institutions or non-financial customers of an FTT country are the debtors of an FTT. If both parties of the transaction are residents of an FTT country, then their fiscal authorities receive an FTT payment at the full rate (0.05%), if one partner is resident of a non-FTT country, then the FTT country gets only half of it (0.025%).

In executing OTC transactions, a bank is always involved, either trading on its own account (proprietary trading) or as the intermediary of two customers trading with each other. In any case, the bank has to deduct the FTT and transfer the proceeds to the tax authorities.

The decentralized approach takes into account the different political and institutional conditions among the advanced economies. In a pragmatic way, it would enable a group of EU or euro countries to start with the implementation of an FTT. Based on the experiences of the "forerunner countries", the introduction of a general FTT could then be enlarged to other countries in a stepwise process. However, one has to be aware that a substantial part of short-term trading would be shifted to non-FTT countries. For the economy of FTT countries as a whole such an emigration need not be harmful.

1. Introduction: Scope and structure of the study

The idea of introducing a general financial transactions tax (FTT) has recently attracted rising attention, most recently by the International Monetary Fund (IMF) and the European Commission (EC). There are three reasons for this interest. First, the economic crisis was deepened by the instability of stock prices, exchange rates and commodity prices. This instability might be dampened by such a tax. Second, as a consequence of the crisis, the need for fiscal consolidation has tremendously increased. An FTT would provide governments with substantial revenues. Third, the dampening effects of an FTT on the real economy would be much smaller as compared to other tax measures like increasing the value-added tax (VAT). Over the medium and long run, the stabilization of asset prices might even strengthen the real economy.

Some typical tendencies in the long-term development of advanced economies and their (potentially) detrimental effects also have contributed to re-igniting the debate of the pros and cons of transaction taxes: Over the past 30 years, financial innovations, in particular derivative instruments of all kinds, have enabled a spectacular rise in turnover in all asset markets. At the same time, exchange rates, stock prices, and commodity prices have undergone wide swings.

These developments together with the strong acceleration of the boom of financial transactions since 2000 motivated the Austrian Institute of Economic Research to investigate the stabilization and revenue potential of a general and uniform FTT even before the outbreak of the current financial and economic crisis (*Schulmeister – Schratzenstaller – Picek, 2008*). Such a tax would be imposed on transactions of all kinds of financial assets, and, hence, would not be restricted to specific markets as proposed by Keynes (1936) for the stock market or *Tobin* (1978) for the foreign exchange market.

The main scope of the present paper is to investigate how a general FTT could be implemented in practice. As basis for this investigation I shall at first describe the concept of a general FTT and summarize the conditions under which such a tax would yield a double dividend, namely stabilizing asset markets and providing substantial revenues for governments (chapter 2).

Chapter 3 documents the expansion of financial transactions and the (related) volatility of the most important asset prices like exchange rates, commodity prices and stock prices. It is shown that the conditions under which an FTT is a reasonable instrument of economic policy are to a large extent fulfilled in practice. Against this background, chapter 4 critically evaluates recent studies of the International Monetary Fund (*IMF, 2010*) and of the European Commission (*EC, 2010A; 2010B*) regarding possible contributions of the financial sector to the costs of the crisis.

Chapter 5 documents the hypothetical revenues of an FTT of 0.05% based on transactions data for 2010.

In the main part of the study, I discuss at first the different theoretical options for the implementation of an FTT. In particular, I distinguish between an "ideal" implementation where the FTT would be deducted at electronically organized exchanges and central counterparty platforms (CCPs), and a "pragmatic" approach where the FTT is deducted by banks and brokerage firms in the single participating countries (chapter 6).

Chapter 7 describes three approaches how an FTT could be implemented in practice, a centralized ("ideal") approach, a decentralized ("pragmatic") approach, and a mixed approach. Whereas the centralized approach could only be realized if the most important countries (as regards financial markets) are willing to introduce an FTT together, the decentralized approach would allow a single country or a country group to begin with the introduction of an FTT (without significantly negative consequences for their own financial markets and institutions). Chapter 8 discusses the institutional and political aspects of the three options for an FTT implementation. Chapter 9 presents the conclusions.

Table 1: Financial markets and assets/instruments

Types of market	Main instruments	Main sources of transactions data
Money market		
Spot market		
OTC	Money market instruments (e.g., short-term bank deposits - not subject to an FTT)	N.A.
Derivatives market		
Exchanges	Futures and options on short-term bank deposits (up to 3 month)	WFE, BIS ¹⁾
OTC	Forward rate agreements Interest rate swaps Interest rate options (including interest rate caps, floors, collars, corridors and swaptations)	BIS
Credit market		
Spot market		
	Bank credit (not subject to an FTT)	
Derivatives market		
OTC	Credit default swaps, credit spread forwards, total return swaps, credit spread options	DTCC
Capital market		
Spot market		
Exchanges	Stocks and bonds	WFE
OTC	Stocks and bonds	N.A.
Derivatives market		
Exchanges	Stock (index) futures and options Long-term interest rate futures and options	WFE, BIS ¹⁾
OTC	Forward rate agreements Interest rate swaps and options with maturities longer than 3 months Interest rate options	BIS
Foreign exchange market		
Spot market		
OTC	Outright exchange of foreign currencies	BIS
Derivatives market		
Exchanges	Foreign exchange futures and options	WFE, BIS ¹⁾
OTC	Foreign exchange forwards, swaps, currency swaps, options	
Commodities market		
Spot market		
	-	-
Derivatives market		
Exchanges	Commodity futures and options	WFE, BIS
OTC	Commodity forwards, swaps, options	

1) Aggregate data for the following regions: Europe, North America, Asia and Pacific, other.

2. Concept of a general financial transactions tax

The essential features of a general FTT which aims at mitigating very short-term and destabilizing speculation (i.e., unrelated to fundamentals) are as follows:¹⁾

- The FTT is levied on all transactions involving buying/selling of financial assets (instruments) of all kinds.
- Financial assets are defined as all instruments traded in spot markets ("genuine" stocks, interest rate securities and foreign exchange) as well as derivative instruments (contracts) like futures, options and swaps related to stocks or stock indices, interest rates, foreign exchange, commodities or credits. Spot and derivative instruments are traded either on organized exchanges or "over the counter" (i.e., bilateral OTC transactions). Table 1 provides an overview over the different types of financial assets/instruments.
- The tax base is the value of the asset, in the case of derivatives their notional value (e. g., the value of a futures contract at the current futures price, the notional principle of a swap, the spot value of the underlying asset in the case of options). This concept ensures that the FTT will impact the more upon the costs of derivatives trading the higher is the notional value relative to the cash requirement (margin, premium), i.e., the higher is the leverage ratio.
- The tax rate should be low so that only very "fast" and speculative trading activities with high leverage ratios will become significantly more costly due to the FTT. The WIFO study investigated three rates, namely, 0.1%, 0.05% and 0.01%, respectively. In this study, a rate of 0.05% is assumed when giving concrete examples or presenting the revenue estimates based on 2010 transactions data (the original WIFO study covered only data up to 2006).
- The FTT does not tax those transactions which are the financial equivalent to "real-world-transactions" like payments related to the goods and labour markets. For a similar reason, providing a bank credit to households and enterprises is not considered a financial transaction. Also initial public offerings of stocks and bonds are exempt from the FTT. The same is true for those foreign exchange transactions which directly stem from international trade or direct investment.
- The tax burden is divided between the buyer and the seller, hence, each side of a financial transaction would just pay 0.025% of the asset value (2.5 basis points).
- If a specific order induces a chain of transactions, the FTT is levied only once. E. g., if a private person gives an order to her bank (broker) to buy or sell a stock or a futures contract on an organized exchange, the FTT will be deducted only one time. If the FTT is implemented according to the centralized approach (section 6.1.1), the tax is deducted

¹⁾ This section is based on the more comprehensive WIFO study on the potential of general FTT (*Schulmeister – Schratzenstaller – Picek, 2008*). This study builds upon previous research on (currency) transactions taxes like *Arestis – Sawyer (1998)*, *Baker et al. (2009)*, *Baker (2008, 2011)*, *Eichengreen – Tobin – Wyplosz (1995)*, *Haq – Kaul – Grunberg (1996)*, *Jetin – Denys (2005)*, *Pollin – Baker – Schaberg (2003)*, *Schmidt (2008)*, *Spratt (2006)*, *Stiglitz (1989)*, *Spahn (2002)*, *Summers – Summers (1989)*.

at the (electronic) trading platform of the exchange. If the decentralized implementation is realized (section 6.1.2) the tax would be deducted by that bank which processes the order. The same would be the case if the bank trades on its own account (proprietary trading).

This concept ensures that all transactions aimed at holding a financial asset (including hedging) will not be affected in a noticeable manner by the FTT. At the same time, the costs of those speculative transactions which are unrelated to market fundamentals would be significantly increased in the following systematic way: The more short term-oriented a transaction is (the faster open positions are changed) and the riskier a transaction is (the higher the leverage ratio is), the more will the FTT increase the costs of the transaction.

Some examples shall illustrate this proposition:

- Example 1: A corporation raises € 10 million in capital through an IPO (initial public offering) of stocks. No FTT has to be paid. The same holds true if the government (or a corporation) raises capital through a bond issue.
- Example 2: A company earns (pays) € 10 million from (for) an export (import) of goods. Also in this case no FTT has to be paid.
- Example 3: A private person (a pension fund) buys stocks in the spot market with a market value of € 10,000 (€ 10 million). In this case the FTT amounts to € 2.5 (€ 2,500) to be paid by the respective person (pension fund).
- Example 4: A "day trader" tries to exploit extremely short-term price runs of the DAX future. Its base (notional) value is 25 times the number of index points. At a DAX index level of 6000 the future has a value of € 150,000. If the trader expects an upward run, he will buy a contract for which he has only to deposit € 7,500 as margin (we assume for simplicity a margin rate of 5%). If the DAX increases by 0.2%, then the trader cashes in € 300 (0.2% of € 150,000), this is 4% of his cash investment (€ 7,500). At a tax rate of 0.05%, the FTT would amount to € 75.1, roughly 25% of the speculative profit (0,025% of € 150,000 plus 0.025% of € 150,300).
- Example 5: An airline hedges future kerosene costs by opening a long position in the oil futures market, e. g., by buying futures contracts with a notional value of € 5 million. Additional hedging costs: 0.05% of € 5 million, i.e., € 2,500 (0.025% for opening the long position and 0.025% for closing it when the kerosene is delivered).
- Example 6: A hedge fund ("trend-follower") uses a "fast" automated trading system based on high frequency data. This system changes open positions of € 10 million on average 50 times a day, involving 100 transactions (one for closing the former position and one for opening a new one). His daily transaction volume based on the notional value is € 1 billion, hence, the FTT would increase transaction costs by € 250,000. At a margin of 5% (€ 500,000) the cash requirement would rise by 50%, reducing the profitability of this kind of "gambling" significantly or making it even unprofitable.

Under which conditions prevailing in modern financial markets would the introduction of a general FTT yield a double dividend, namely, mitigating the fluctuations of the most important asset prices and providing substantial revenues? In which ways would an FTT stabilize stock prices, exchange rates and commodity prices? How would an FTT fit into the overall structure of the tax system? The main propositions (PP) underlying the concept of a general FTT can be summarized as follows:

- Proposition 1: There is excessive trading activity (= liquidity) in modern asset markets due to the predominance of short-term speculation (the overall global volume of financial transactions is roughly 67 times higher than world GDP).
- Proposition 2: The ever "faster" trading activities destabilize exchange rates, commodity prices, interest rates and stock prices over the short term as well as over the long term. This is so because short-term price runs, strengthened by the use of (automated) trading systems, accumulate to long-term trends, i.e., bull markets and bear markets.
- Proposition 3: The overshooting of the most important prices (i.e., those which link the real and the financial sphere of the economy in space and time like exchange rates and interest rates) favours rent-seeking activities of financial investors/speculators and impedes entrepreneurial activities in the real economy.
- Proposition 4: The detrimental effects of asset prices overshooting are particularly pronounced as regards the development of financial crises:
 - Example 1: From 2003 onwards, the simultaneous boom of stock prices, commodity prices and house prices built up the potential for their simultaneous collapse, causing the US mortgage crisis to develop into a global economic crisis in 2008/2009.
 - Example 2: From 2009 onwards, financial investors were able to make significant profits by driving up the premia of credit default swaps (CDS) and, hence, interest rates on government bonds of highly indebted countries (from Greece to Spain).
- Proposition 5: A small FTT of, e. g., 0.05% (shared by the buyer and the seller) would not affect transactions aimed at *holding* a financial asset (including hedging).
- Proposition 6: An FTT would specifically increase the costs of those speculative transactions which are unrelated to market fundamentals. This is so because the more short-term oriented a trading activity is and the higher its leverage is (in the case of derivatives), the more will the FTT raise transaction costs (e. g., high frequency trading would become unprofitable).
- Proposition 7: An FTT would levy substantial contributions on those actors whose activities had significantly contributed to the development of the financial crisis in 2008/2009 and of the euro crisis in 2010/2011. At the same time, those financial actors who (still) focus on servicing the real economy ("boring banking") would not be burdened (in contrast to a general bank levy or a financial activities tax).
- Proposition 8: An FTT would compensate the distortionary effect caused by the exemption of most financial services from the value-added tax (VAT).

scales. E. g., there occur trends based on tick or minute data as well as trends based on daily data (figures 1 to 7).

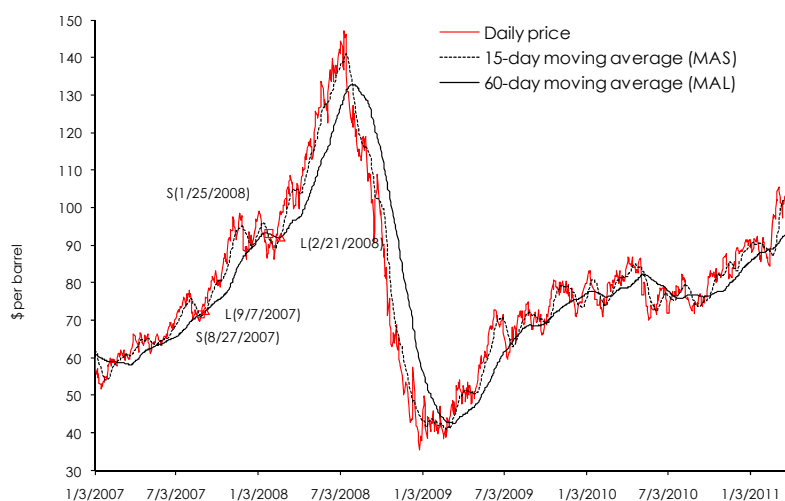
- Observation 2: Technical trading aims at exploiting the trending of asset prices (Menkhof – Taylor, 2007). In the case of moving average models, e. g., a trader would open a long position (buy) when the current price crosses the MA (moving average) line from below and sells when the opposite occurs (figures 1 and 3). If a model uses two moving averages, then their crossing indicates a trading signal (figure 2).
- Observation 3: Technical models are applied to price data of almost any frequency, ranging from daily data to 5-minute or tick data (figures 1, 2, 3). Due to the increasing use of intraday data, technical trading has become the most important driver of financial transactions (Schulmeister, 2009C; even fund managers rely increasingly on technical analysis as documented by Menkhoff, 2010). The "fastest" type of algorithm trading is high frequency trading which produces buy and sell signals within milliseconds (Clark, 2010; see boxes also 1 to 3).
- Observation 4: There operates an interaction between the "trending" of asset prices and the use of technical models in practice. On the one hand, individual traders use different models, trying to exploit asset price runs, on the other hand, the aggregate behaviour of all models strengthen and lengthen the price runs (Schulmeister, 2006; 2009B). Since all types of algorithm trading (from traditional models of technical analysis to high frequency systems) disregard market fundamentals (they process only information on past prices and trading/order volumes), their use necessarily destabilizes asset prices.
- Observation 5: Very short-term price runs (i.e., monotonic movements) accumulate to long-term trends in the following way. When an optimistic ("bullish") market mood prevails, upward runs last for an extended period of time longer than downward runs, when the market is "bearish", the opposite is the case (figures 2, 3 and 4; see also Schulmeister 2009A; 2009E; 2010).
- Observation 6: Exchange rates, stock prices or commodity prices fluctuate in a sequence of upward trends ("bull markets") and downward trends ("bear markets"), each lasting several years in most cases. Hence, all important asset prices fluctuate in irregular cycles ("long swings") around their fundamental equilibrium without any tendency to converge towards this level (figures 3, 4, and 5).

These observations on asset price dynamics could be explained by the following interaction between the reactions of traders to new information, price movements and trading strategies.

Price runs are usually triggered by news. In order to reduce the complexity of trading decisions under extreme time pressure, traders form only qualitative expectations in reaction to news, i.e., expectations about the direction of the imminent price move (but not to which level and at which speed the price might rise or fall). Subsequent to an initial upward (downward) price movement triggered by news follows a "cascade" of buy (sell) signals

stemming from trend-following technical trading systems. At first, the most price-sensitive models based on high frequency data ("fast models") produce signals, at last the slowest models based on hourly or daily data.

Figure 2: Technical trading of oil futures 2007 - 2011



Source: NYMEX, WIFO.

Most of the time there prevails an expectational bias in the market, in favor of or against an asset. Such a bias reflects the - optimistic or pessimistic - state of the "market mood" which practitioners call "bullishness" or "bearishness". News in line with the prevailing expectational bias get higher recognition and reaction than news which contradict the "market mood". Hence, traders put more money into an open position and hold it longer if the current run is in line with "bullish" or "bearish" sentiment than in the case of a run against the "market mood".

This behaviour causes price runs in line with the "market mood" to last longer than counter-movements. In such a way, short-term runs accumulate to long-term trends, i.e., "bull markets" and "bear markets". The sequence of these trends then constitutes the pattern in long-term asset price dynamics: Prices develop in irregular cycles around the fundamental equilibrium without converging towards this level.

The most important observations concerning transactions dynamics are as follows²⁾:

²⁾ The transactions data base comprises all important types of transactions ("flows") with financial assets with one exception, namely, trading of credit default swaps (CDS). This is so for two reasons. First, data on CDS trading are only available since 2008 from the repository of the Trade Information Warehouse of the Depository Trust & Clearing Corporation (DTCC), second, the DTCC data are not complete (even though the majority of CDS transactions are covered by the DTCC repository). In 2010, overall trading volume amounted to 21.5% of world GDP according to DDTC data. The data on the values of outstanding OTC contracts ("stocks") are based on BIS data and include CDS (BIS does not report CDS transactions).

- Observation 7: The volume of financial transactions in the global economy was 67.4 times higher than nominal world GDP in 2010, in 1990 this ratio amounted to "only" 15.3 (the financial crises caused trading volume to decline for the first time since the 1970s). The overall increase in financial trading is exclusively due to the spectacular boom of the derivatives markets (figure 8).
- Observation 8: Futures and options trading on exchanges have expanded much stronger since 2000 than derivatives transactions in OTC markets. In 2010, the transaction volume of exchange-traded derivatives was 33.3 times higher than world GDP, the respective ratio of OTC transactions was 24.7 (figure 8).
- Observation 9: The value of outstanding OTC contracts was on average roughly 10 times higher than world GDP whereas the value of exchange-traded derivatives was only by a factor of 1.2 higher (figure 9 compares the relative values of the most important contracts between exchange-traded and OTC derivatives). The extremely different importance of exchange-traded versus OTC derivatives when based on transactions as compared to outstanding values reflects the essential difference between both types of markets.³⁾
- Observation 10: Financial market activities are highly concentrated on the most advanced economies. Hence, in Europe the volume of financial transactions is roughly 115 times higher than nominal GDP, in North America it is 90 times higher.

These observations suggest that financial markets are characterized by excessive liquidity ("overtrading") and by excessive volatility of prices over the short run as well as over the long run. In other words: Strong and persistent deviations of asset prices from their fundamental equilibria ("overshooting") are rather the rule than the exception.

4. Objections of the International Monetary Fund and the European Commission to a general FTT

Both the International Monetary Fund (IMF) and the European Commission (EC) have recently published papers on the possible contributions of the financial sector to cover the costs of (future) financial crises (IMF, 2010; EC, 2010A and 2010B). Both institutions reject the concept of a general FTT. Instead, they propose two alternative measures, a bank levy on certain balance sheet positions (called "Financial Stability Contribution" by the IMF and "stability levy" by the EC, respectively) and a "financial activities tax" (FAT) on the value added of financial institutions. The main arguments and conclusions of both institutions are similar:

- The IMF states that "an FTT does not appear well suited to the specific purposes set out in the mandate from G-20 leaders", according to the IMF (2010, p. 17). The EC asserts that

³⁾ Derivatives traded on exchanges are standardized instruments (futures and options) which are traded at an ever rising speed due to the progress of information technology and the related use of computer-driven trading systems. By contrast, most OTC contracts are tailored to the specific needs of the two parties involved and are therefore mostly held until expiration. This is in particular true for interest rates swaps and forward rates agreements.

an FTT "would affect the price finding mechanism and could have negative effects on the allocative efficiency of financial markets" (EC, 2010A, p. 52).

- An FTT "is not focused on core sources of financial instability" (IMF, 2010, p. 17). In addition, "its real burden may fall largely on final consumers" (IMF, 2010, p. 18) or "the burden might be shifted to consumers and companies using services of the financial sector" (EC, 2010A, p. 20).
- In addition, according to the IMF, "an FTT would also increase the cost of capital" (IMF, 2010, p. 20). The EC judgment is similar: "the tax poses also a risk of increasing the cost of capital for business and the cost of financial risk distribution" (EC, 2010A, p. 24), particularly if the notional value of derivatives is taken as a tax base (this would increase hedging costs).
- If the FTT "is not introduced on the global scale it has the potential to divert economic activity Therefore,the tax has to be as comprehensive as possible" (EC, 2010A, p. 24). In other words, the EC is of the opinion that only a global FTT would be feasible.
- According to IMF and EC, the bank levy should be paid by financial institutions, mainly by the banks. The tax base could consist of all liabilities other than equity and (savings) deposits covered by a deposit insurance. The main argument is that these balance sheet items can be considered the basis for the banks' leverage.
- The EC estimates that a bank levy would raise € 50 billion for the EU 27 if a tax rate of 0.15% is applied to all banks. By contrast, an FTT would yield only € 20 billion "using realistic assumptions" (EC, 2010A, p. 46), i.e., when only spot transactions but no derivatives are subject to an FTT.
- "Any further contribution from the financial sector that is desired should be raised by a 'Financial Activities Tax' (FAT) levied on the sum of the profits and remuneration of financial institutions and paid to the general revenue." (IMF, 2010, p. 3). Depending on the concrete design of the FAT, it could simply serve as a tax on value added (if all incomes are taxed) or on rent seeking or excessive risk-taking (if only high levels of remuneration or of profits are subject to the tax – IMF, 2010, p. 20; EC, 2010B, p. 20).

I shall at first discuss the main objections to a general FTT and then the (alternative) proposals of IMF and EC, i.e., the bank levy and the FAT.

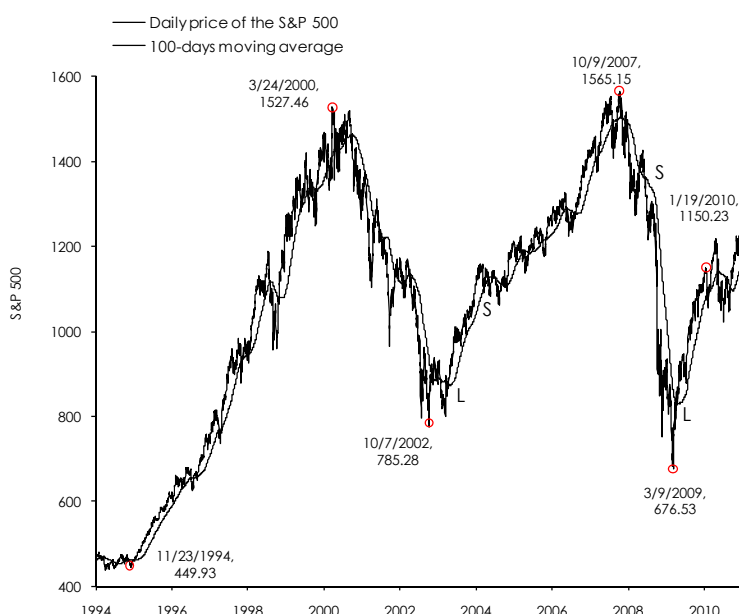
4.1 FTT and the cost of capital

The IMF and the EC believe that an FTT would increase the cost of capital. However, it is not explained how and why this should happen. This issue is explored in more detail in a background document published by the IMF (Matheson, 2010). The conclusion that an FTT will increase capital costs is derived from a theoretical model in the following way.

Since an FTT burdens futures transactions with additional tax payments, the effect of taxing financial transactions is the same as taxing future dividends. As a consequence, the present (discounted) value of an asset will decline in reaction to the introduction of an FTT: To

compensate for the future tax burden, investors will demand a higher return and therefore a lower asset price. At a given discount rate, the devaluation effect rises with the FTT rate and falls with the length of the holding period of an asset. The paper presents some numerical results: "For very short holding periods (e.g., one day), an STT⁴) at even the very low rate of one basis point reduces securities value by almost a half. For very long holding periods (e.g., 10 years), the drop in value from even a 50 basis point STT is quite small (1.4 percent)." (Matheson, 2010, p. 154).

Figure 3: "Bulls" and "bears" in the US stock market and technical trading signals



Source: NYSE, WIFO.

The assumptions of the model do not match with the basic characteristic of the FTT, namely, that it does not burden the asset as such but only the trading of that asset. More specifically: The assumption that an FTT has the same effect as a tax on dividends is misleading because the latter would affect any stock, whereas the FTT would address only those stocks which are (frequently) traded.

A simple example might clarify this point: Let us assume that 50% of the stocks of a company are held by a pension fund. The other 50% are traded frequently, the average holding period is one day. A tax of one basis point is introduced and levied on each transaction. According to the model, the value of the stocks traded every day should fall by almost a half, whereas the value of the stocks held by the pension fund would not be affected. This does not seem to make sense (contradiction to the law of one price).

4) The term "securities transactions tax" (STT) is used for what is mostly called an FTT.

A more realistic model of asset markets should distinguish between the role of an asset as an instrument for *holding* a (partial) ownership and its role as an instrument for *trading*. Actors who focus on the ownership role of an asset ("investors") form expectations over a (comparatively) long time horizon. They evaluate the innovative power of the companies in question, their organizational strength, etc. By contrast, actors who focus on the trading vehicle role of an asset ("speculators") form expectations only over a (very) short run, and mainly regarding the direction of imminent price movements.

It follows from these differences in expectations formation that an FTT does affect neither the fundamental value of an asset nor its market value. In short-term trading, a speculator does not consider the discounted value of future FTT payments of other traders as this is not relevant for his expected profit from the next trade. What matters is the FTT he will have to pay for the imminent trades. At the same time, a long-term investor would disregard future FTT payments as he intends to *hold* the asset (he implicitly expects to pay an FTT at best once in the future, i. e., when he sells the asset).

The same result is obtained when looking at trading as a redistribution process. Speculators trade assets that already exist. The differences between buying prices and selling prices represent profits for the winners and losses for the losers (a redistribution of wealth). They have nothing to do with values added (apart from that small part that goes to "the organizers of the game"). Hence, this trading and its taxation cannot affect the fundamental value of the assets concerned.

The above objections to the IMF and the EC assertion that an FTT will raise the costs of capital are primarily due to the theoretical foundation of that argument. As regards the empirical relevance of the capital-cost-argument, the IMF paper concludes (*Matheson*, p. 155): "The overall impact of a low-rate (5 basis points or less) STT on the corporate cost of capital is thus likely to be quite modest" (even if the model used was adequate).

In any case, the extension of the (flawed) capital-cost-argument to the financial costs for governments and their negative impact on the overall economy – as done in the EC paper – seems somewhat exaggerated ("The tax can thus generate adverse effects on investment and the level of economic activity and this may impact on the collection of other taxes." – *EC, 2010A*, p. 24).

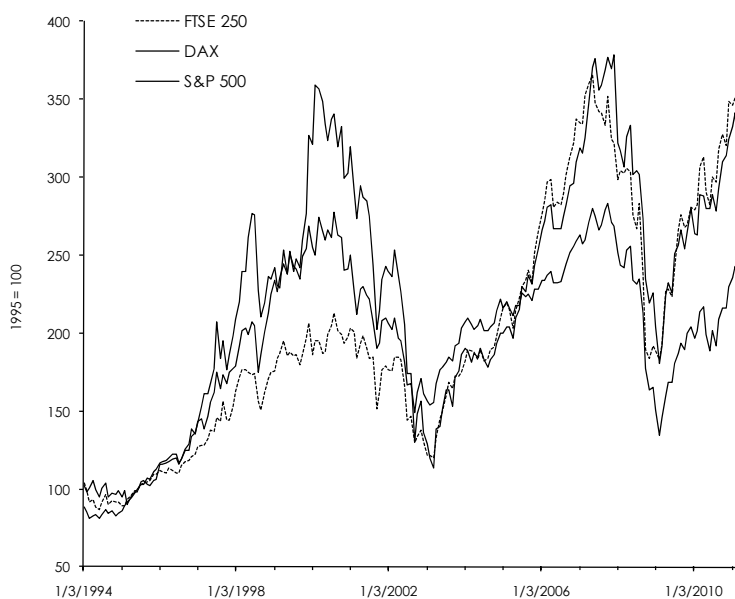
4.2 FTT and price discovery or price distortion processes

Even though the trading of financial assets does not impact their fundamental equilibrium value (which is determined by variables such as future profits, relative price levels and interest differentials), trading does of course affect market prices. This can happen in two different ways which correspond with the two different perceptions of "financial worlds".

In "world 1", trading reflects and supports the (fundamental) price discovery process. This process moves market prices towards their fundamental equilibrium (i.e., speculation is seen as stabilizing). In this world, trading fulfills an important economic and social function and

should therefore not be hampered by an FTT. The lower the transactions costs and the higher the level of transactions (liquidity), the better will the price discovery process work and the more efficient will the asset market be. This is the world of Milton Friedman and his followers, the adherents of market efficiency and rational expectations (destabilizing speculators cannot survive).

Figure 4: Stock prices in Germany, the UK and the USA



Source: Yahoo finance: <http://finance.yahoo.com/>

In "world 2", trading produces price trends at different data frequencies (from tick data to monthly data), which accumulate to long-term trends ("bulls" and "bears"), so that asset prices move in long swings around their fundamental equilibrium without any tendency of convergence. In this "world", smart traders (professionals) exploit the phenomenon of asset price trending in two ways. Trend-followers buy (sell) during the early stage of an upward (downward) trend, contrarians sell (buy) during the late stage of an upward (downward) trend (both strategies are carried out by using computer-driven technical trading systems). Their counterparts are less skillful (these are mostly amateurs, from "dentist and doctors" to managers of pension funds).

The IMF and EC papers implicitly assume that the real world corresponds with the "world 1" model. Even though both papers discuss the phenomenon of short-term "noise trading" and its potentially detrimental effects on asset price formation they do not consider these effects to be so important as to justify an increase in the transaction costs of (ultra)fast trading through an FTT. Hence, it is implicitly assumed that the stabilizing forces of rational traders are stronger than the destabilizing forces of short-term speculators so that reducing trading activities through an FTT would have more drawbacks than benefits.

Box 1: High-frequency trading

From an article by Carol L. Clark, Controlling risk in a lightening-speed trading environment, Chicago Fed Letter, March 2010:

"High-frequency algorithmic trading strategies rely on computerized quantitative models that identify which type of financial instruments to buy or sell (e.g., stocks, options, or futures), as well as the quantity, price, timing, and location of the trades.....

The TABB Group, a financial markets research firm, estimates that algorithmic trading in the U.S. equities markets grew from 30 percent of total volume in 2005 to about 70 percent in 2009 and that 2 percent of the 20,000 trading firms in the U.S. initiate these transactions. These firms made about \$ 21 billion in profits during 2008.....

A main goal of high-frequency trading strategies is to reduce latency, or delays, in placing, filling, and confirming or cancelling orders.....

Latency is measured in microseconds (millionths of a second) and has various components, including speed at which market data and signals from the marketplace are processed and geographical distance and response time from the exchange matching engine.....

By reducing latency, high-frequency traders are able to send their buy and sell orders to the exchange matching engine at breakneck speeds in the hopes of getting their trades executed first.....

Another development in reducing latency is related to how close a trading firm's server is to the exchange matching engine. It is estimated that for each 100 miles the server is located away from the matching engine, 1 millisecond (thousandth of a second) of delay is added. To reduce this latency, many exchanges now offer co-location services, which allow trading firms to place their servers close to the exchange matching engine.....

Co-location services are offered by numerous exchanges, including NYSE (New York Stock Exchange) Euronext, Eurex, Intercontinental Exchange (ICE), and the Chicago Mercantile Exchange.....

The high-frequency trading environment has the potential to generate errors and losses at a speed and magnitude far greater than that in a floor or screen-based trading environment..."

The hypothesis of the "world 2" is not taken into consideration in the IMF and EC papers. Thus, the empirical literature on the profitability and price effects of technical trading systems is not mentioned (see the survey by *Menkhoff – Taylor, 2007*, for an introduction). The same is true for the most "fashionable" form of technical trading, i.e., the high-frequency algorithm trading (the latter is dealt with in *Matheson, 2010*, however, it is not discussed how an asset market like the US stock market could be efficient when "in 2009, algorithm trading accounted for at least 60% of U.S. equity trading volume" – *Matheson, 2010*, p. 160).

The bias of the IMF and the EC towards market efficiency is understandable insofar as it represents the paradigm which has been prevailing in economics and politics for the past decades. At the same time, the market efficiency bias is remarkable for at least three reasons. Firstly, a clear coincidence between the deregulation of financial markets and the rising financial instability over the past three decades can be observed. Secondly, the phenomenon of "bulls" and "bears" in stock markets, currency markets and commodity

derivatives markets have become progressively more pronounced over this period. Thirdly, the use of trading systems which process only information contained in past prices has increased tremendously. This implies that either the traders do not act rationally (if the systems are unprofitable) or the markets are not even weakly efficient (if the systems are profitable).

The market efficiency bias represented by the IMF and EC papers might also explain why the following phenomenon is neglected: The more transactions are carried out and the higher the speed of trading, the less does the trading support the price discovery process. The reason is simple: Traders do not have enough time to form rational expectations of market fundamentals. Upon the arrival of a piece of news there is at most one second to form directional expectations of the directional expectations of the majority of traders (Keynes' "beauty contest" problem, reduced to the direction of imminent price movements: up or down).

Nowadays, the speed of transactions and price movements has become so high that an ever increasing number of trading decisions are met by computers (in the US stock market already up to 70% - *Clark, 2010; Matheson, 2010*). Hence, the algorithms of high-frequency trading systems attempt to tackle the "beauty contest" problem. They process information of price movements, order flows and trading volume, but they disregard any kind of information on market fundamentals (boxes 1 to 3).⁵⁾

This development points to an essential contradiction: On the one hand, the increase in transaction volumes should enhance the price discovery process. On the other hand, the increasing trading speed makes it progressively difficult and unrewarding to find out the fundamental value of an asset. The conventional theory ("world 1") disregards this contradiction and simply assumes that the following equation holds: More transactions/liquidity = better discovery process of the fundamental equilibrium price = more efficiency. This equation might (asymptotically) hold up to a certain level of financial transactions, but beyond that level the ever increasing speed of trading makes it necessary to reduce the complexity of trading decisions. This is done by progressively disregarding the market fundamentals.

⁵⁾ The results of the Triennial Central Bank Survey organized by the Bank for International Settlements suggest that the strong increase in currency transactions between 2007 and 2010 (by 20% in spite of the crisis) was to a substantial extent due to the rise in high-frequency trading (*King – Rime, 2010*).

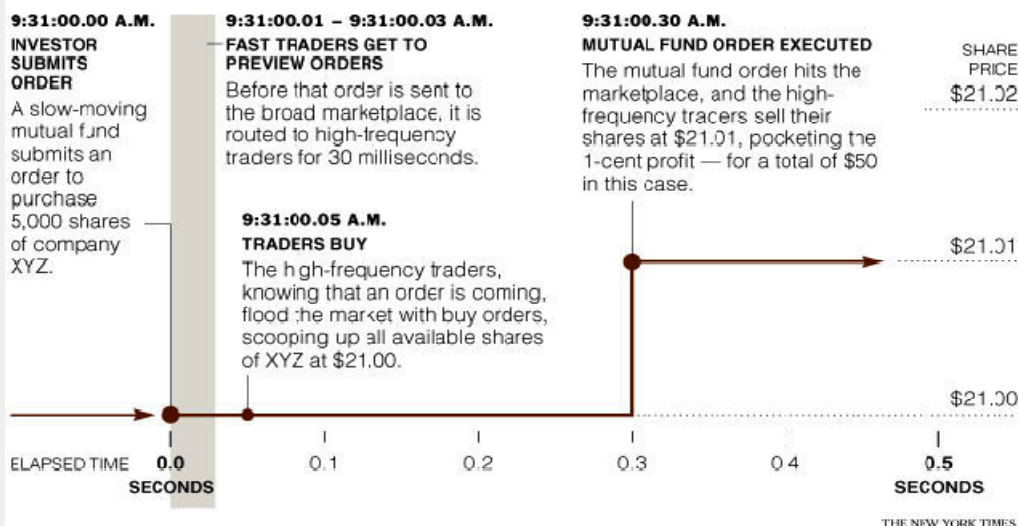
Box 2: High-frequency flash trading

One popular form of high-frequency trading involves so called flash orders. In flash orders, stock exchanges allow some customers, for a fee, to get a brief look at orders before they are placed. With this short time advantage and the use of computerized trading some traders can place a stock order ahead of the other orders and thereby influence the market to their advantage.

In high-frequency trading, computers buy and sell stocks very fast. Some marketplaces allow traders to see orders for 30 milliseconds before they are shown to everyone else. This allows traders to profit by very quickly trading shares they know will soon be in high demand. Each trade earns cents, sometimes million times a day as shown in the figure below.

The Thirty-Millisecond Advantage

In high-frequency trading, computers buy and sell stocks lightning fast. Some marketplaces, like Nasdaq, often offer such traders a peek at orders for 30 milliseconds — 0.03 seconds — before they are shown to everyone else. This allows traders to profit by very quickly trading shares they know will soon be in high demand. Each trade earns pennies, sometimes millions of times a day.



Source: New York Times (2009), Stock Traders Find Speed Pays, in Milliseconds
<http://www.nytimes.com/2009/07/24/business/24trading.html>

An example of this contradiction is the increasing use of technical trading systems based on high-frequency data. The trend-exploiting and trend-reinforcing "behavior" of computers exerts a growing influence on asset price dynamics (by trends I mean any kind of persistent price movements, even if they last only for a few seconds when based on ultra-high-frequency data). The trend-following algorithms strengthen upward (downward) trends by producing buy (sell) signals in their early stage. The contrarian algorithms contribute to a tilt of the trends by producing sell (buy) signals in their late stage. This interaction strengthens the persistence of asset price movements, at the same time it prevents trends from developing

into bubbles.⁶⁾ However, since an optimistic (pessimistic) market mood prevails most of the time, upward (downward) runs last longer – for several months or even years – than counter-movements, bringing about bull (bear) markets in a stepwise process.

Box 3: High-frequency trading in practice: The case of Broadcom

On July 14th, 2009, Intel had reported an increase of earnings which motivated some investors to buy shares of the semiconductor company Broadcom. When the stock exchange opened, shares of Broadcom started changing hands at \$ 26.20.

The investors began issuing buy orders. But rather than being shown to all potential sellers at the same time, some of those orders were routed to high frequency traders. Their computers began buying up Broadcom shares and then reselling them to the slower investors at higher prices. As an effect of the high-frequency trades, the overall price of Broadcom started to rise. Automatic programs began issuing and cancelling tiny orders within milliseconds to determine how much the slower investors were willing to pay. The computers quickly determined that some investors' upper limit was \$ 26.40. As a result, the stock price went up to \$ 26.39 and then high frequency traders began to flood the market with sell orders.

In the end, the slower moving investors paid \$ 1,400,000 for about 56,000 shares or \$ 7,800 more than without the transactions of the high frequency traders (they cashed in the \$ 7,800).

Source: New York Times (2009): Stock Traders Find Speed Pays, in Milliseconds.
<http://www.nytimes.com/2009/07/24/business/24trading.html>

The empirical evidence supports this hypothesis. Trading in financial markets has almost exploded over the past 25 years. At the same time also the volatility of stock prices, exchange rates and commodity prices has dramatically increased, both over the very short run and over the very long run. This indicates the existence of a large amount of excessive trading which is unrelated to market fundamentals and therefore *destabilizes* asset prices. This type of excessive (destabilizing) liquidity would be considerably reduced by implementing an FTT.

There are two reasons why a general FTT would *specifically* affect destabilizing transactions. Firstly, the FTT makes trading the more costly the more frequently a speculative position is changed (this concerns any kind of "day trading", in particular high-frequency trading – see boxes 1 to 3). Secondly, the FTT dampens specifically derivatives trading since the tax rate

⁶⁾ The IMF papers (IMF, 2010; Matheson, 2010) point out that not all short-term trading is trend-following, implying that only the first would be destabilizing. In reality, both types of speculation complement each other in bringing about sequences of persistent upward and downward price movements which can be exploited at the expense of "latecoming bandwagonists". Trend-following strategies strengthen a price run in its early stage, contrarian strategies open positions against a run in its late stage, thereby contributing to its tilting into a new counter-run. Contrarian trading could only be considered stabilizing if one assumes that bubbles in the sense of economic theory (i.e., a non-fundamental equilibrium path) do occur in practice. This is not the case because practitioners always know that trends are finite (for terminological clarity, economists should use terms like "boom" or "bull market" if they mean longer-term trends in the "real world" so as to preserve the term "bubble" for the theoretically exploding price path).

refers to the notional/contract value so that the tax burden relative to the margin (cash) requirement rises with the leverage ratio.⁷⁾

For these reasons, the assertion in the IMF and the EC papers that "the transactions tax does not differentiate between different segments of the market" (EC, 2000, p. 23) or that an FTT cannot "discriminate between discouraging stabilizing and destabilizing trading activity" (Matheson, p. 161) does not seem well founded (there is a clear tendency that transactions are the more destabilizing the "faster" they are and the higher is their leverage).

4.3 FTT and distortionary effects

The IMF argues that the distortionary effects of an FTT will be higher than those of other kinds of taxes, in particular of a VAT, because the FTT is a turnover tax which burdens transactions between businesses several times. "The argument that an FTT would cause little distortion because it would be levied at a very low rate on a very broad base is not persuasive: it is a central principle of public finance that if the sole policy objective is to raise revenue then taxing transactions between businesses (which many financial transactions are) is unwise: distorting business decisions reduces total output, so that more could be raised by taxing that output directly. A tax levied on transactions at one stage 'cascades' into prices at all further stages of production. This is why, for instance, most countries have found the VAT - which effectively excludes transactions between businesses - to be a more efficient revenue-raiser than turnover taxes" (IMF, 2010, p 19).

This reasoning suggests that financial transactions between banks, hedge funds, other financial institutions (e.g., insurance companies) and non-financial corporations can be perceived as intermediate inputs and outputs, respectively, as in the case of an ordinary production process in the real economy. Due to the different degree of specialization, goods and services are produced in different stages. At each stage, some changes in the product are made and, hence, some value is added. Only this additional value should be taxed. If the gross value would be burdened by a turnover tax, then the specialization and the incentive structure of business would be distorted.

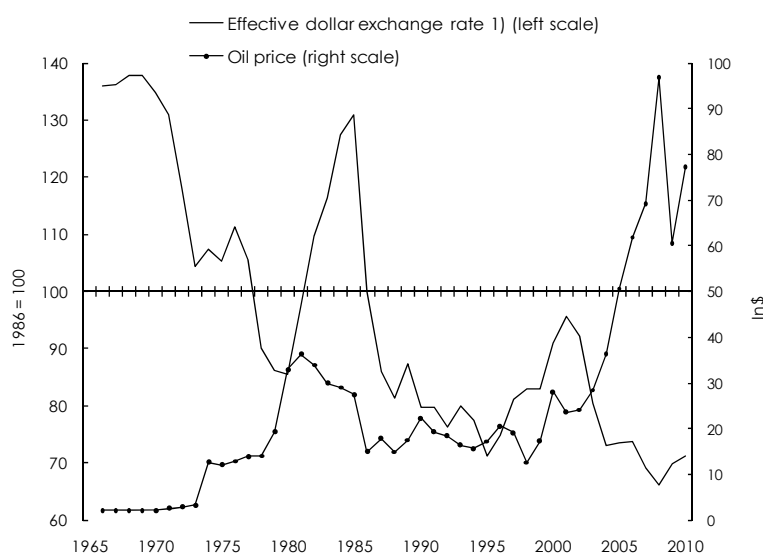
This reasoning is correct, however, the analogy between the trading of financial assets and the different stages of the production process is misleading. Buying an asset does not represent an (intermediate) input and selling an asset does not represent an (intermediate) output. In the case of spot market transactions, buying and selling only means the change in ownership without any change in the product. In the case of derivatives, any transaction

⁷⁾ As the IMF rejects an FTT as a tool for market stabilization, it suggests: "If the aim is to discourage particular short-term transactions, regulation or targeted taxes are more effective" (IMF, 2010, p. 18). Matheson (2010) complements this point with respect to derivatives: "...to discourage excessive leverage at the level of securities transactions, increased collateral or margin requirements could be used." (Matheson, 2010, p. 167). As both measures would not increase transactions costs, their effect will be much smaller and less specific as compared to an FTT. Raising margin requirements could even be counterproductive. If, e. g., margins would be doubled a trading algorithm might react by doubling the amount (value) of open positions.

simply is equivalent to a bet on the subsequent asset price movement (if the derivative is used for hedging purposes, there exists a "counter-bet", i.e., an open position in the market of the underlying asset).

A more precise analogy to an FTT would be taxes on gambling where any bet/transaction is usually taxed (without considering these taxes as having "cascading" effects as sales taxes relative to VAT).

Figure 5: Dollar exchange rate and oil price fluctuation



Source: IMF, WIFO.

Since a low FTT will only affect (very) short-term trading with high leverage it will – at least in part – compensate for negative externalities stemming from such activities. This is due to the fact that not all taxes cause distortions of incentives, distribution and production. If a tax reduces the social costs of the economic activities in question, then it increases overall welfare. This argument - originally put forward by Pigou – does not only hold for environmental taxes (in order to reduce, e. g., the emission of greenhouse gases), but also for a low FTT (to reduce, e.g., the price-distorting effects of high-frequency trading – for a discussion of the FTT as a Pigouvian tax see *European Parliament/EP*, 2010).

The IMF and EC papers do not deal with the negative externalities caused by short-term speculation in asset markets and its effects on asset prices. This is particularly true for the impact of financial instability on the real economy. Over the past 35 years, the sequences of "bulls" and "bears" of exchange rates, commodity prices, interest rates and stock prices, have shaped economic development. These wide fluctuations have rather hampered than fostered activities in the real sphere of the economy, in particular by increasing uncertainty, by producing waves of positive and negative wealth effects, by inflating and deflating balance sheets and by redistributing trade earnings between consumers and producers of

commodities. Dampening the fluctuations of these prices would make an important contribution to a sustainable recovery of the real economy.

As regards tax incidence, IMF and EC argue that the real burden of an FTT "might fall largely on final consumers rather than, as often seems to be supposed, earnings in the financial sector." (IMF, 2010, p. 18). These statements seem to hold much better for the two measures proposed by the IMF and the EC, namely, the bank levy and the FAT, than for the FTT. The main reason is the following.

The bank levy and the FAT do not tax specific activities (irrespective from who carries them out) but burden in a very general manner balance sheet positions or (components of) the value added of banks (irrespective from which activities wages and profits stem). As a consequence, banks could/would easily shift the tax burden on their clients.

By contrast, the FTT would burden certain activities irrespectively of who carries them out. Banks which do not engage in proprietary trading would pay no FTT at all (but they would be burdened by a bank levy and/or an FAT). If banks carry out the order of a customer, the latter pays the tax. Big corporations which engage in short-term speculation would have to pay the FTT (however, they would not be affected by an FAT). Hedge funds which use trading systems based on high frequency data would be subject to the FTT (but not to a bank levy and probably also not to an FAT). However, hedge funds would shift the tax burden on their clients. Amateur speculators (there are millions in advanced economies nowadays) would pay the tax, their (internet) brokers would not (because they also will shift the tax burden on their clients).

4.4 FTT and the costs of hedging

The EC papers (2010A and 2010B) argue that one should not tax derivatives transactions, at least not based on their notional value, because this could significantly increase hedging costs for the business sector. For two reasons this argument does not seem very convincing. First, one could and should exempt hedging transactions from the FTT. Second, even if this is not done, the size of additional hedging costs due to an FTT is negligible because a hedger is *holding an asset*, not *trading* it.

If a system of a "Standard Classification of Financial Transactions" (SCFT) is developed in connection with the FTT implementation so that any transaction is assigned a specific code, it would be easy to exempt from the FTT hedging of counter-positions in the real economy as well as all financial transactions which constitute an equivalent to "real-economy-transactions" (e. g., foreign exchange transactions stemming from international trade or direct investment). In a similar manner, the "Standard International Trade Classification" (SITC) had been developed decades ago to manage the system of tariffs. A similar system for financial transactions would also help to improve the supervision of financial market developments (see also section 6.1.2).

But even in the case that hedging transactions are taxed by an FTT, these costs are negligible because a hedger is *holding* an asset, not *trading* it. As a consequence, the additional production costs due to introduction of an FTT are always the tax rate multiplied by the value of the underlying asset to be hedged (if hedging is done using futures or options). E. g., if an airline hedges its total kerosene costs (accounting for roughly 30% of overall costs) by buying oil futures and selling them when the kerosene is paid for, then the additional costs due to an FTT of 0.05% is exactly 0.015% of overall costs ($0.05 * 0.3$).

In one EC paper (EC, 2010B, footnote 35) an example is given which suggests that an FTT will increase hedging costs to a much higher extent. It is assumed that an EU-based company has to pay a bill of \$ 11 million in 3 months from now (the current exchange rate is \$ 1.18) and hedges the risk that the euro falls below \$ 1.10 by then (this is no strict hedge because there is no insurance against an euro depreciation down to \$ 1.10). The company buys a call option on the dollar with a strike price of \$ 1.10 per euro. Since the option is out of the money, the premium is relatively small (€ 30.000). Of course, in relation to this premium an FTT of 0.01% on the notional value of € 10 million (= \$ 11 million), i.e., € 1000, would be substantial (3.3%). However, relative to the value of the underlying, the additional costs due to an FTT are just 0.01% (if the option is exercised – otherwise the costs are just 0.005%).

4.5 FTT and the relocation of trading

It is argued that the introduction of an FTT will lead to a considerable relocation of trading activities to non-taxed jurisdictions, in particular to offshore markets.

This is, however, already the case today. Many funds operate from offshore places since these jurisdictions serve as tax havens (i.e., for reasons of income tax circumvention). Many/most of them engage in short-term trading ("trend-followers") which is almost exclusively done on organized derivatives exchanges all around the world. To the extent that they (have to) trade on exchanges in FTT countries (Eurex in Frankfurt, Euronext in London), they will have to pay the FTT at the exchanges.

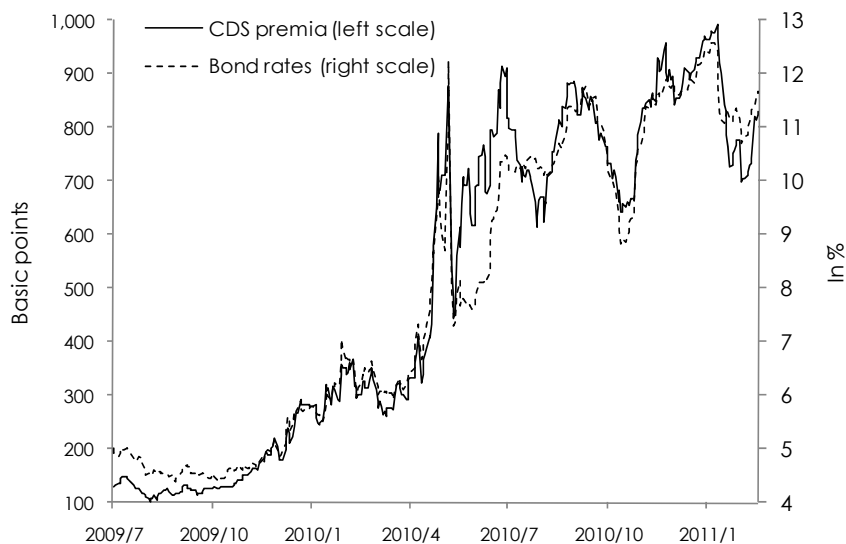
The high-frequency traders cannot move offshore for their computer servers need to be located as close as possible to the servers of the exchanges in order to minimize the time span between the trading signal generation and the execution of the trade.

To the extent that offshore hedge funds trade in over-the-counter markets they would/could be forced to clear and settle their trades through Central Counterparty Platforms (CCPs) or Central Securities Depositories (CSDs). This is so because the G20 and the EU are determined to take legal steps to force all financial institutions to centrally clear their OTC transactions. In this case counterparties from countries outside of the EU would also be obliged to use the CCPs if they want to do business with financial institutions in EU countries.

To tone down migration of trading, one could introduce a FTT-substitute-levy (FTTSL) in FTT-countries. The FTTSL would be charged for any transfer of funds from a bank account in an FTT-country to a brokerage firm or hedge fund in a non-FTT country. The size of the FTTSL must

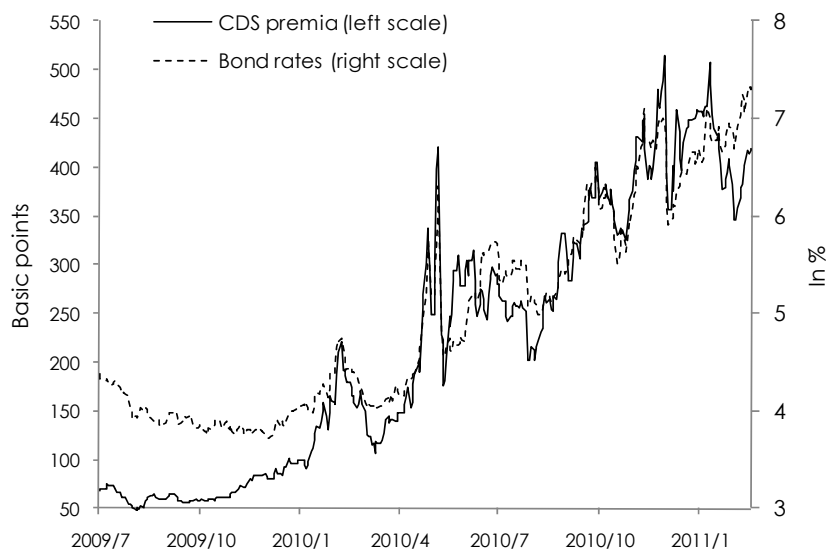
be several times higher than the FTT. For an FTT of 0.05%, the FTSL could be 2% or even higher. Being 2% it would be the equivalent of 40 "round-trip-transactions". The FTSL can be considered some kind of "security deposit" in case the FTT is not paid due to the transactions carried out abroad (see also section 6.1.2).

Figure 6: CDS trading and interest rate movements: Greek government bonds



Source: Thomas Reuters.

Figure 7: CDS trading and interest rate movements: Portuguese government bonds



Source: Thomas Reuters.

The extreme concentration of transactions on relatively few market places clearly shows that network externalities of financial centers are the most important factor for their success. This in turn implies that an FTT of 0.05% or even only 0.01% will not induce any considerable "emigration" of transactions to places outside the EU as these are either not attractive (if in the same trading time zone like market places in Africa) or outside the European trading time zone.

There is an additional reason for this presumption (this refers also to relocations within the EU, in particular from Germany to the UK). The most important "blue chip stocks" of German (and British) corporations will always be traded at their "home" stock exchange, and so will derivatives related to these stocks (this argument applies also to derivatives instruments related to "national" stock indices like DAX or FTSE).

The same reasoning holds true for standard derivatives instruments related to interest rate securities like the Euro Schatz future, the Euro BOBL future and the Euro BUND future in the case of Germany.

Finally, one should keep in mind that the emigration of activities which are detrimental for the real economy is not per se a negative development. The dampening effects of short-term trading are not only due to the destabilization of exchange rates, commodity prices, interest rates and stock prices (which would continue to exist if transactions are relocated), but are also due to diverting the striving for profits from (productive) entrepreneurial activities to (unproductive) "redistribution games".

4.6 FTT, long swings of asset prices and the financial crisis

The IMF and EC papers present some relationships and draw conclusions concerning short-term trading, asset price bubbles, the recent crisis and the effects of an FTT. Hereby, they follow the following steps (here arranged in a "stylized manner"):

- The increase in short-term trading is caused by the decline in transactions costs.
- Both developments will not (necessarily) cause asset price swings (...it is not clear "that lower transactions costs intensify cyclical market price swings", *IMF*, 2010, p. 18).
- One piece of evidence supporting this view stems from the fact that "asset bubbles arise even in markets with very high transactions costs, such as real estate." (*IMF*, 2010, p. 18).
- "This suggests that a low-rate STT will not prevent asset bubbles." (*Matheson*, 2010, p. 162).
- Even though higher transactions costs might dampen short-term trading, "there is, however, no evidence that the recent crisis was triggered by excess transactions." (*EC*, 2010A, p. 24).

This reasoning does not seem convincing. The proponents of an FTT do not claim that such a tax would prevent asset price booms for example in the real estate market. They simply point out that trading in modern financial markets is characterized by two tendencies:

- Firstly, trading aims at exploiting ever shorter price trends and therefore increasingly disregards market fundamentals. This tendency is strengthened through low transaction costs but also by the development of computer-driven trading systems.
- Secondly, asset prices move in a sequence of long-term trends ("bulls" and "bears"), and, hence, in long swings as can be seen from the development of stock prices, exchange rates and commodity futures prices over the last 40 years.

In order to explore the relationship between these two tendencies, the path of asset prices was measured across different time scales (from 1-minute data to daily data), in particular with respect to the relationship between short-term runs (i.e., monotonic price movements) and long-term trends (for the most detailed study see *Schulmeister, 2009D*). The main results are as follows:

- Long-term asset price trends ("bulls" and "bears") are brought about by upward (downward) runs lasting longer than counter-movements over several months or years.
- This phenomenon is present in the most important types of asset markets (*Schulmeister, 2010*, summarizes the empirical evidence for exchange rates, commodity futures prices and stock prices).
- This result provides a link between the increasingly short-term oriented trading (which tries to exploit price runs) and the rise in the amplitude of long asset price swings.
- By making the speculative exploitation of (very) short-term runs more costly, an FTT could also dampen the "long swings" of exchange rates, commodity prices and stock prices.

As regards the possible effects of an FTT, it cannot be concluded from this that such a tax would necessarily prevent booms and busts of financial asset prices. What an FTT would most probably do, however, is to alter the process in which booms and busts develop (e. g. by shifting technical trading back to data of lower frequencies). It would probably also even out the asset prices swings.

As regards the recent crisis, it is certainly clear that it was not triggered by short-term trading. However, the latter has contributed to the severity of the crisis. This is due to the fact that the impact of the real estate crisis in the US (as well as in the UK, Ireland and Spain) on the global economy would have been much lower if the mortgage crisis had not triggered a worldwide fall of stock prices and commodity prices. The potential for these "bear markets" was "built-up" during the preceding "bull markets" between 2003 and 2008. According to the research sketched above, short-term trading, which to a great extent is based on technical systems, will have strengthened the extent of both long-term trends, the booms up to 2008 as well as the subsequent busts.

4.7 Shortcomings of the concept of a bank levy

The tax base of a bank levy consists necessarily of selected balance sheet positions ("stocks"). Hence, by its construction the bank levy is not apt to increase the costs of risky/detrimental activities ("flows"). A bank levy can at best comprise the *holding* of risky assets by the taxed

financial market actors (whereby the taxed financial market actors are not necessarily those undertaking the most risky activities on financial markets).

A bank levy would also increase the costs of financing *real investment*. If, e.g., a bank consortium intends to finance a large project in the real economy and would raise capital through a bond issue this would be considered as a risky leveraging and be taxed through the bank levy. This is so because financing such a project would increase the tax base of a bank levy, i.e., the bank's liabilities minus savings deposits. In other words, a bank levy cannot differentiate between essentially different types of leverages and risk, and hence different types of banking businesses.

Below I give some examples of detrimental activities which would remain unaffected by a bank levy since these activities would not necessarily impact upon the base of a bank levy, i.e., on the size of balance sheet components (a bank levy taxes the holding of assets/liabilities, not their – frequent – turnover):

- Example 1: Before the mortgage crisis broke out, Deutsche Bank together with Goldman Sachs, Morgan Stanley etc. ("finance alchemy banks" – FABs) created a new derivative, the ABX index contract, and used this instrument to speculate for a decline in the value of mortgage backed securities (MBSs). At the same time, FABs earned billions in fees from securitizing and selling MBSs.
- Example 2: Between September 2007 and June 2008, FABs together with "trend-following hedge funds" drove commodity prices up by heavily opening long positions in derivatives markets. When the "bull market" tilted into a "bear market", shorting derivatives positions strengthened the fall in commodity prices (figure 2).
- Example 3: In the same way, these actors strengthened both, the booms and the busts of stock prices (figures 3 and 4). In particular, opening short positions in stock (index) futures and options after the collapse of Lehman accelerated the fall of stock prices.
- Example 4: Through trading credit default swaps (CDSs) FABs and hedge funds engage increasingly in speculating against certain debtors governments. By doing so, risk premiums are driven up, which in turn raises the value of the CDSs.
- Example 5: High-frequency (flash) trading has almost exploded over recent years (boxes 1 to 3). These strategies are based on algorithms which completely neglect market fundamentals and, hence, necessarily destabilize asset prices.

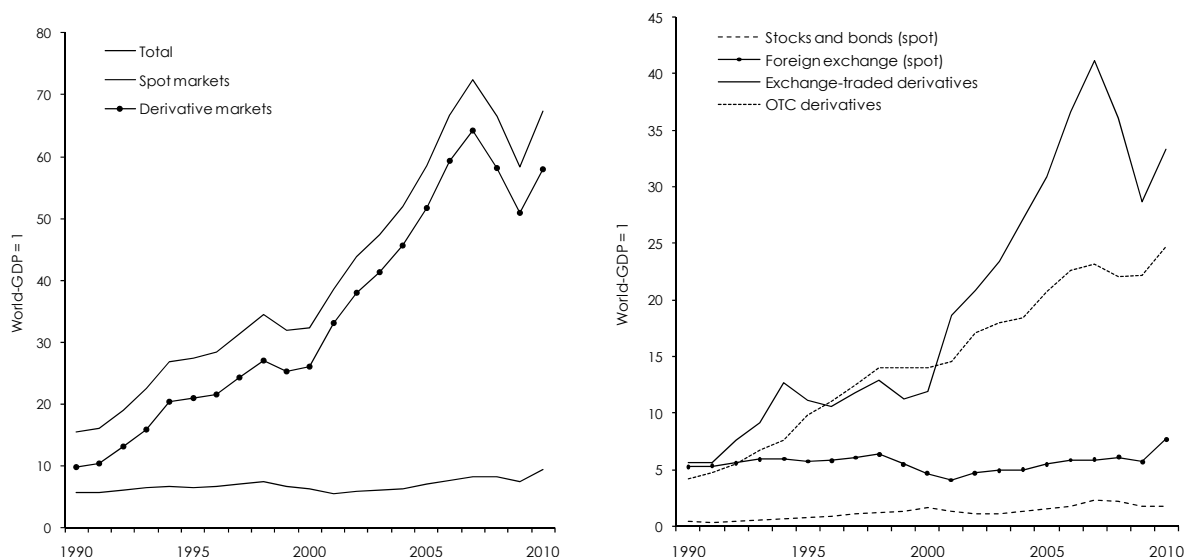
All activities mentioned above cannot be tackled by a bank levy due to its construction, i.e., due to the fact that it is based on balance sheet positions ("stocks"). In addition, the authors of the IMF and EC papers do not seem to have considered the following fact: Exactly those smart banks (the FABs) which most successfully speculate in assets markets do not hold risky assets for an extended period of time (their main profits stem from short-term *trading* and from selling risky assets to less smart banks like the German "Landesbanken".....).

4.8 Shortcomings of the concept of financial activities taxes

According to the IMF and the EC, financial activities taxes (FATs) would serve the purpose of making the financial sector contribute to the costs of the crisis much better than an FTT (Keen – Krelove – Norregaard, 2010; EC, 2010B; IMF, 2010). In this regard, three types of FATs are distinguished:

- A broad FAT (FAT1) which would tax the total sum of profits and wages (value added) as a substitute of a VAT (most financial services are exempt from the VAT).
- A FAT which aims at taxing the rents of financial institutions (FAT2), i.e., those parts of profits and wages (including bonus payments) which exceed the "normal" level.
- A FAT which aims at taxing "excessive" returns stemming from unduly risky activities (FAT3). The tax base is the same as in the case of the rent-taxing FAT, however, the threshold of "excessive" income would be higher.

Figure 8: Financial transactions in the world economy



Source: BIS, WFE, WIFO.

The fundamental difference between the FATs and the FTT is the following: The FATs tax income components of financial institutions (i.e., their performance), irrespective of the kind of activities these incomes stem from, whereas the FTT taxes specific activities (i.e., short-term trading of financial assets, in particular derivatives), irrespective of who carries out these activities. The term "financial activities tax" is therefore a misnomer and should be renamed "special tax on income components of financial institutions". At the same, the FTT is a truly "activities tax" since it charges transactions independent from the institution/person which/who carries them out.

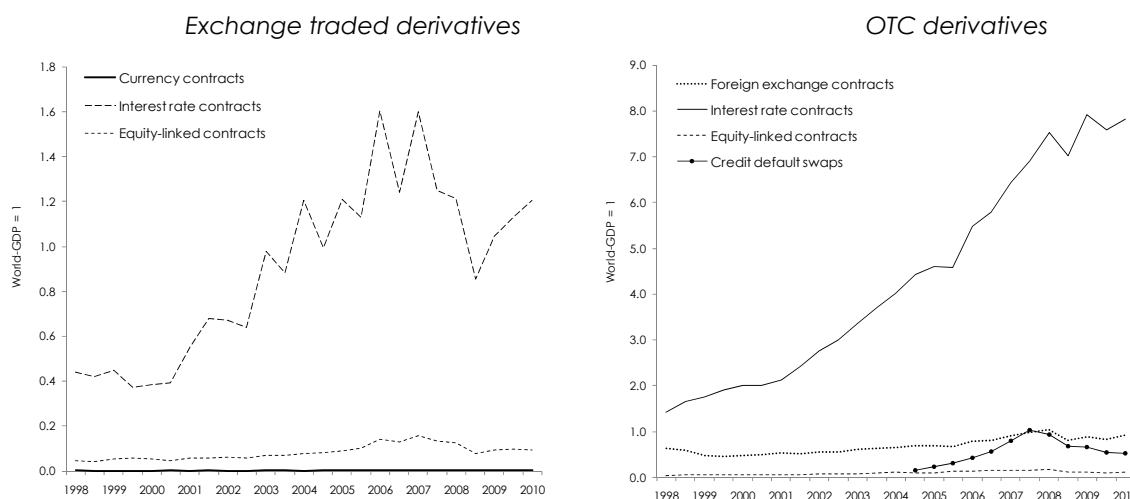
It seems impossible to distinguish between "normal income", "excessive income due to rent-seeking" and "excessive income due to risk-taking". This is an important short-coming in

addition to the fact that the FATs focus on institutions and not on activities. These shortcomings would lead to several distortions:

- In the case of FAT1, income of banks serving the real economy like (small) savings banks ("boring banking") would be taxed in the same way as the income of "finance alchemy banks" like Goldman Sachs or Deutsche Bank.
- If a bank serving the real economy is very successful/profitable, e. g., in providing venture capital to innovative firms, then it would pay FAT2 and/or FAT3 in the same way as the "finance alchemy banks".
- Moreover, these internationally operating "masters of trading" would easily be able to transfer their profits to countries without an FAT as compared to, e. g., venture capital banks.
- Hedge funds can easily avoid the FATs by moving to offshore places.
- All short-term speculative transactions carried out by non-financial corporations would remain untaxed (in particular multinationals are much engaged in financial "investments", SIEMENS is just one example).
- The same is true for trading activities of amateurs (their number has tremendously risen over the last 15 years).

Finally, the tax base of an FIT would be roughly 2500 times higher than that of FATs (in industrial countries, transactions volume is roughly 100 times GDP on average, the tax base for the broad FAT1 is estimated at 4% of GDP).

Figure 9: Notional value of outstanding contracts



Source: BIS, WFE, WIFO.

5. Hypothetical FTT revenues based on 2010 data

In this section, I shall present the estimates of FTT revenues based on transactions data for 2010 at a uniform tax rate of 0.05%. The estimation method is the same as in the original WIFO study (*Schulmeister – Schratzenstaller – Picek, 2008*). The calculation assumes that the tax base is the notional value of the respective transaction. This design implies that the tax burden, relative to the cash invested to acquire a certain instrument, is the higher the lower are transaction costs (before tax) and the higher is the leverage effect. An FTT will therefore hamper specifically fast derivatives trading involving high leverage.

The revenue estimates are based on the assumption that transaction volumes will be reduced by the introduction of an FTT. The size of this reduction effect depends on the tax rate, the pre-tax transaction costs and the leverage in the case of derivatives instruments. For each tax rate and each of type of instrument (19 different classes of transactions are specified), a low, medium and high "transactions-reduction-scenario" (TRS) is assumed. It is important to note that the TRSs account for the reduction of trading due to the introduction of an FTT as such but not due to relocation of trading (this issue is dealt with in chapter 7 of this study).

Table 2: Effective reduction of trading in % due to an FTT

2010 data

Reduction intransaction volume	Tax rate		
	0.10%	0.05%	0.01%
	Spot transaction on exchanges		
Low	3.8	2.4	1.4
Medium	7.0	3.8	2.8
High	12.0	6.8	3.8
	Derivatives on exchanges		
Low	69.2	59.2	19.2
Medium	79.2	69.2	29.2
High	89.2	83.8	39.2
	All transactions		
Low	68.6	58.7	19.4
Medium	78.5	68.6	29.2
High	88.4	83.3	39.1

Table 2 shows the implied reduction in trading due to different tax rates and TRSs. At a tax rate of 0.05%, e. g., spot transactions on exchanges would decline by 2.4% in the low TRS, and by 6.8% in the high TRS. Derivatives transactions would decline much stronger since transaction costs are extremely low so that even a small FTT of 0.05% would increase them substantially. Hence, the revenue estimates imply that derivatives trading on exchanges

would be reduced by 59.2% in the low TRS, and by 83.4% in the high TRS. The implied assumptions are similar for most OTC transactions. Since the share of spot transactions on exchanges in overall trading volume is small (figure 8), the calculation of FTT revenues implies a substantial reduction in total transaction due to the introduction of an FTT. Under the assumptions of the medium TRS, transactions would decline by 68.6% on average if an FTT of 0.05% is implemented.

Table 3: Hypothetical transaction tax receipts in the global economy 2010

Tax rate: 0.05%

Medium transactions reduction scenario

	World		Europe		North America		Asia and Pacific	
	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$
Spot transactions								
on exchanges	0.08	48.8	0.09	15.6	0.14	22.0	0.12	9.6
Derivatives transactions								
on exchanges	0.53	315.4	0.71	122.3	0.96	154.7	0.42	32.5
OTC transactions	0.49	289.1	1.00	173.1	0.38	61.9	0.65	50.8
All transactions	1.10	653.3	1.80	310.9	1.48	238.6	1.19	92.9

The basis for the revenue estimates are all financial transactions as covered in table 1. The estimates for the global economy and for the four regions Europe, North America, Asia and Pacific, and other countries (the latter are not explicitly documented in table 3) are based on BIS data, the estimates for single countries (table 3) are complemented by data from the World Federation of Exchanges (WFE). Note that Europe includes Switzerland and Norway so that the revenues would be slightly smaller for the EU 27.

Table 3 presents the estimated revenues of a general FTT of 0.05% for the world economy as a whole under the assumptions of the medium TRS. Overall tax revenues would amount to 1.1% of nominal world GDP, in North America and Europe, tax revenues (relative to nominal GDP) would be significantly higher, lying between 1.48% and 1.80% of GDP. In absolute terms, revenues would amount to \$ 238.6 and \$ 310.9 billion, respectively (€ 179.8 and € 234.3 billion at average 2010 exchange rates).

In the UK, revenues from a general FTT would be extremely high, amounting to roughly 8.6% of GDP. This result reflects the fact that the volume of financial transactions relative to GDP is by far highest in the UK (in 2010, it was 563 times higher than GDP). This extraordinarily high ratio is due to the traditionally strong position of the London market place. The concentration of trading activities in London was markedly strengthened by the bundling of the transactions

on the (former) derivatives exchanges in Paris, Amsterdam, Brussels and Lisbon on Euronext in London.

Table 4: Hypothetical transaction tax receipts in some European countries 2010

Tax rate: 0.05%

Medium transactions reduction scenario

	Europe		Germany		France		Netherlands		Denmark		United Kingdom	
	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$	In % of GDP	In Bill. \$
Spot transactions on exchanges	0.09	15.6	0.04	1.2	0.02	0.6	0.05	0.4	1.10	3.4	0.18	4.1
Derivatives transactions on exchanges	0.71	122.3	0.63	20.9	0.00	0.0	0.00	0.0	0.00	0.0	3.28	74.0
OTC transactions	1.00	173.1	0.18	5.9	0.50	12.9	0.38	3.0	1.65	5.1	5.13	115.8
All transactions	1.80	310.9	0.84	27.9	0.52	13.5	0.43	3.4	2.76	8.6	8.59	193.9

Within the EU, the second highest FTT revenues would have accrued to Germany, namely, 0.84% of GDP or \$ 27.9 billion (€ 21.0 billion). Most of these revenues stem from transactions on the derivatives exchange EUREX (in contrast to the UK, OTC transactions are of minor importance in Germany). France would get \$ 13.5 billion (€ 10.2 billion), Denmark \$ 8.6 billion (€ 6.5 billion; relative to the size of Denmark's GDP the volume of OTC trading is extremely high) and the Netherlands would receive \$ 3.4 billion (€ 2.5 billion).

6. Options for implementing the FTT

In order to elaborate and evaluate the different ways in which the FTT could be implemented, first I shall describe the stages in which a financial transaction typically "develops". In doing so, I distinguish between two essentially different types of transactions, namely transactions carried out on organized exchanges and transactions carried out bilaterally or "over the counter".

Transactions on organized exchanges include spot transactions carried out on traditional stock exchanges (such as the New York Stock Exchange) and derivative transactions carried out on derivatives exchanges (such as the Eurex in Frankfurt and the Chicago Mercantile Exchange/CME). Both professional actors (including banks, hedge funds and pension funds) and amateur traders participate in trading on exchanges. The execution of orders, the clearing and the settlement are processed by electronic trading platforms on most exchanges.

While OTC spot transactions refer mainly to traditional foreign exchange trading, OTC derivatives transactions are conducted with forwards, futures, options and swaps related to exchange rates, interest rates, stock prices, commodity prices and credit risks. Only

professional actors – banks and other financial institutions such as hedge funds and pension funds as well as non-financial corporations – trade on OTC markets.

Until recently, most of the OTC trading was cleared and settled on a bilateral basis. At this time, OTC transactions, particularly the trading with credit default swaps (CDS), almost exploded. As a consequence, the counterparty risks increased and the transparency about the exposure of systemically relevant financial institutions was minimal. Both factors are considered as important reasons for the deepening of the recent financial crisis. Therefore, a political consensus that all OTC derivatives trades should be cleared through "central counterparty platforms" (CCP) has been achieved (this issue will be discussed more in detail in section 7; see also *Schuberth – Schulmeister, 2011*).

In the meantime, large derivatives dealers (mainly the so-called finance alchemy banks) and important exchanges like CME, ICE (Intercontinental Exchange) and Nasdaq, started to develop their own CCPs, not only to meet the demands of politicians and regulators, but also because it was in their own interest to reduce the risk for the contract party default (counterparty risk). With respect to the implementation of a general FTT one should keep in mind that all these CCPs are profit-seeking private companies (e. g., LHC.Clearnet, IDCG, ICE Trust). Hence, it might not be in their interest to facilitate or carry out the FTT deduction.

In the next step, I shall discuss how the FTT could be collected for transactions carried out on exchanges.

6.1 Deduction of the FTT concerning exchange transactions

Figure 10 sketches – in a stylized manner – the different types of order flows leading to a transaction on an organized exchange as well as the way in which they would be affected by a general FTT. I distinguish between two possible cases. In the first case, all countries implement an FTT, and in the second, only a group of countries introduce it (represented by the countries A and C), whereas others do not (represented by country B).

Before we get into the FTT implementation in detail, I will describe the most common types of order flows, irrespectively whether they are buys or sells, or whether they are related to spot or derivatives instruments (in the last case they are measured by their notional value). The order flows are represented by arrows (their different shapes relate to FTT issues and can be disregarded for the moment).

If a customer manages his asset portfolio himself, he holds a securities account with his bank or with a (internet) broker. When he gives an order, the bank or broker transfers it to the exchange. If the bank cannot trade on the exchange directly, it uses a broker as an intermediary.

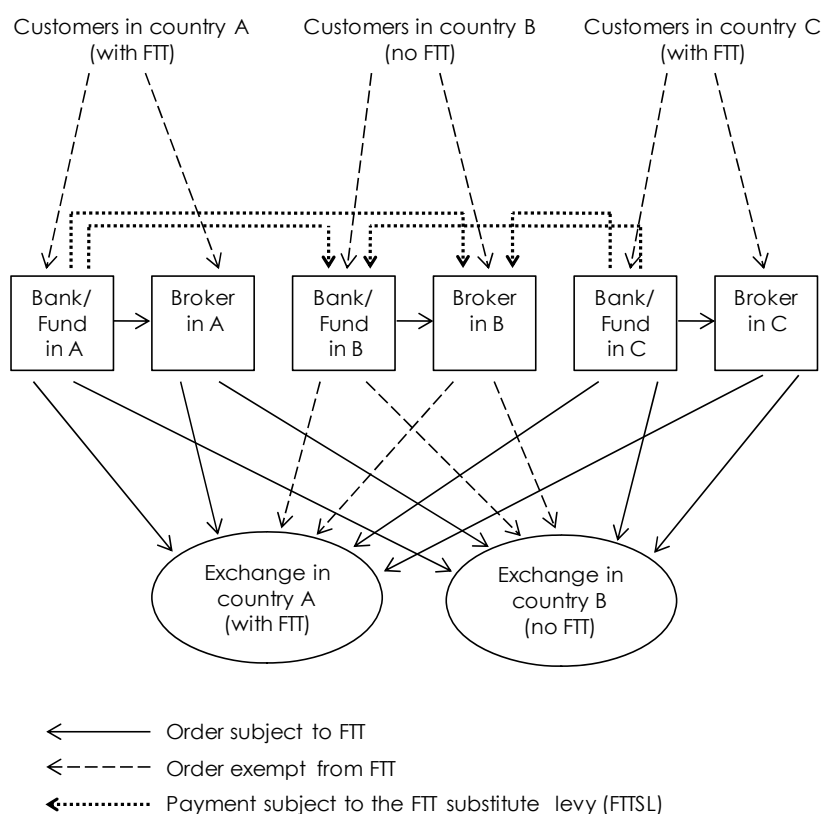
If the customer has his financial wealth managed by a fund – be it a pension fund, a hedge fund or an investment fund – then these institutions give the order to the exchange, mostly via a broker. The same applies for the proprietary trading by banks and other financial institutions (such as insurance companies).

Depending on what instrument is to be bought or sold, the orders are given to exchanges either in the home country or in a foreign country.

In any case, every transaction executed on an exchange is based on an order by a bank or a brokerage firm (in some cases also by a pension or hedge fund).

It follows from these considerations that the FTT could be deducted at two different levels, either at the exchanges themselves (the so-called centralized approach) or at the level of banks and brokers (the so-called decentralized approach).

Figure 10: Order flows and transactions on organized exchanges



6.1.1 Centralized FTT deduction by the exchanges

Technically, the easiest way to levy the FTT on exchange transactions is to oblige exchanges to deduct the tax for every transaction. This could be done automatically through electronic settlement systems in the same way as traders are charged with commissions.

However, in political terms this approach is difficult to implement. Only in the case in which all important countries within a trading time zone implement an FTT can substantial shifts in the market shares between financial centres be avoided. The fears that this could happen, prevents countries that host important exchanges to introduce an FTT in the first place (even in the case that the "in principle" support the introduction of an FTT).

Suppose, for example, that Germany would introduce a general FTT taxing all transactions on all German exchanges, but the United Kingdom would not. As a result, a large part of transactions would shift from Frankfurt to London. The anticipation that this could happen makes the financial sector in Germany to resist such a tax even more than they normally do. This resistance might get too strong to be overcome politically.

If the UK can be convinced to introduce an FTT as well – not the least because of its fiscal stance – the "prisoners' dilemma" as described above could be solved for the EU in general as the trading in Europe is heavily concentrated on these two countries. In the EU, roughly 77% of all transactions on exchanges are carried out in the UK and in Germany (mainly on the derivatives exchanges Euronext and ICE in London, and Eurex in Frankfurt).⁸⁾

Even after the successful implementation of the FTT in Germany and the UK there is still the question on how to distribute the FTT receipts. Due to the extreme concentration of derivatives trading on the exchanges in London and Frankfurt, roughly 3/4 of revenues would stem from transactions in London and 1/4 from transactions in Frankfurt. However, the tax will be paid by all actors who make use of these exchanges (only 15% of all trades done at Eurex in Frankfurt stem from German traders, for example). Hence, a part of the revenues should go to the countries from which the transactions originate.

Should these countries not get some part of the FTT revenues they might try to attract Euronext or Eurex to move (a part of) the business to their own country. Even though there are many different network externalities at the financial centers of London and Frankfurt difficult to substitute, relocating electronically organized derivatives exchanges might not be too difficult.

In any case, the UK and Germany should get a fixed share of the tax revenues (not the least also for political reasons) for providing the EU with such efficient market places as London and Frankfurt.

These considerations suggest that the FTT revenues from exchange transactions should be divided into three parts, should a political consensus on implementing a general FTT in all EU countries be reached. The first part should go to the home country of the exchange, the second to the countries from which the transactions on exchanges originate, and the third part should/could go to supranational institutions like the EU or to supranational projects as part of development cooperation.

⁸⁾ The chances that the UK becomes interested in also implementing an FTT might improve significantly if the economic situation gets worse at the global level (e. g., if the "bull market" of stock and commodity prices tilts into a "bear market"). In this case, the British economy would slide into a recession due to the coincidence of the asset devaluation and the severe austerity policy in the UK. Hence, the government would urgently need additional tax income which would not dampen the economy further. An FTT is the optimal tax in this regard. At the same time, the UK would receive the by far highest FTT earnings without risking an emigration of transactions (since also the other EU countries with important financial centres, in particular Germany, also implement an FTT).

6.1.2 Decentralized FTT deduction by banks and brokers

The decentralized approach does not require an unanimous consensus among all countries in a trading time zone like Europe in order to introduce an FTT. By contrast, the decentralized approach allows individual countries or a group of countries to introduce an FTT in such a way that the competitiveness of their own financial markets and institutions are not considerably affected. Thus, the decentralized approach allows a gradual enlargement of the scope of the application of the FTT to countries with different economic and financial traditions and political regimes (a so-called pragmatic approach).

The basic difference between the centralized and the decentralized approaches concerns the question on who is liable to pay the FTT. In the centralized approach, every exchange located in a country that applies an FTT (FTT-country) has to deduct the FTT for all its transactions ("territorial principle"). In the decentralized approach, every bank or broker in an FTT country which processes an order by a resident of an FTT country, which is to be carried out on a domestic or foreign exchange, has to deduct the FTT ("personal principle"). If a brokerage firm places the order directly at an exchange (as he is a member of that exchange) the broker has to deduct the tax. However, orders that are being placed at exchanges abroad are practically always processed by a bank.

In legal terms, the FTT could be designed in two different ways. In the first option, the bank/broker is the legal debtor for the tax, in the second option, the resident of the FTT country who places the order (in the case of proprietary trading the bank or broker itself) is the debtor. In this case, the bank/broker only deducts the tax for the fiscal authorities ("taxing at the source"). Which of these two options is chosen depends on which is better compatible with the legal framework of the EU.

A concrete example might clarify the functioning of the "pragmatic approach": If Germany introduced an FTT only German residents are liable to pay the FTT, regardless if they give orders at home or abroad. The tax is deducted by the bank or broker that transfers the order to the exchange. As regards transactions on German exchanges like Eurex, only those 15% which stem from German residents are being taxed. Also all transactions carried out by German residents on foreign exchanges are being taxed through the bank or the broker which transfers the order. This means that German exchanges would not be discriminated against foreign exchanges abroad because of the FTT.

Figure 10 sketches the most common order flows for three types of countries. Country A and country B represent large economies with internationally important exchanges (on which a major part of the trades stem from foreign orders). Country A (e. g., Germany) has introduced a general FTT, country B has not (e. g., UK). Country C represents smaller economies with comparatively small exchanges (these are left out in figure 10).

For each buy or sell order given by a bank/fund or a broker in country A and country C to an exchange (either in the domestic or foreign country), the bank/fund or the broker has to deduct the FTT (e. g., 0.025%) and transfer the proceeds to the fiscal authorities' account. In

the case of a customer order, the FTT costs will be shifted to the customer, in the case of proprietary trading, the bank/fund or broker will have to carry the FTT costs themselves.

Orders stemming from a customer or a financial institution in country B will not be subject to the FTT even if the order is given to an exchange in an FTT country (for example country A). Hence, the decentralized FTT implementation would not affect the competitiveness in any of the countries, regardless if they implement the FTT or not (in sharp contrast to the centralized approach to implementing an FTT). What the decentralized FTT implementation would change, however, is the competitiveness at the bank, hedge fund and broker level. The short-term trading business of these actors would become more costly in country A and C than in country B.

One consequence of the introduction of an FTT might therefore be that "fast" trading activities (like high-frequency trading) would move from FTT countries to non-FTT-countries (long-term portfolio investments as carried out by pension funds are not affected by the FTT). Thus, hedge funds and "finance alchemy banks" (like Deutsche Bank) might shift even more of their short-term trading activities from Frankfurt to London. Given the negative incentive effects of rent-seeking through short-term speculation for entrepreneurial activities in the real economy, such a move could/would be positive for the German economy as a whole.

In addition, it is possible to minimize the emigration of short-term trading activities (and indirectly their overall volume in the global economy) by introducing an FTT-substitute-levy (FTTSL) in those countries that have introduced an FTT. Once the FTT legislation is valid in a country (A and C, respectively), all residents of this country are obliged to pay the FTT wherever they let a transaction be carried out (in the same way as a resident is obliged to pay the income tax in his home country no matter where his income stems from). This causes an incentive to a tax fraud by shifting funds and giving transaction orders to a broker in country B. To prevent such a tax circumvention – or at least to make it more costly and thus less probable – the FTTSL should be charged for any transfer of funds from a bank account in an FTT country to a brokerage firm or a hedge fund in a non-FTT-country.

The FTTSL rate must be several times of that of the FTT. At an FTT of 0.05%, for example, the FTTSL should be at least 2%. An FTTSL of 2% would be the equivalent to 40 "round-trip-transactions" (one buy and one sell constitute one "round-trip"). The FTTSL can be seen as a kind of "security withdrawal" in the case that the FTT is not being paid because transactions are carried out abroad via a foreign bank/fund/broker. If the transactions and the respective FTT are declared the FTTSL will be taken into account (in a similar way it is possible to prevent transfers of funds to income tax heavens by introducing an "income tax substitute levy" to be deducted from the bank transfer).^{?)}

The extent of FTT evasion could further be restricted by the following regulation. If a citizen of an FTT-country places an order directly with a bank abroad which is an affiliate of a domestic

^{?)} The rationale of the FTTSL is basically the same as that of „withholding taxes on certain payments to residents of countries that engage in harmful tax competition“, proposed by the OECD (1998).

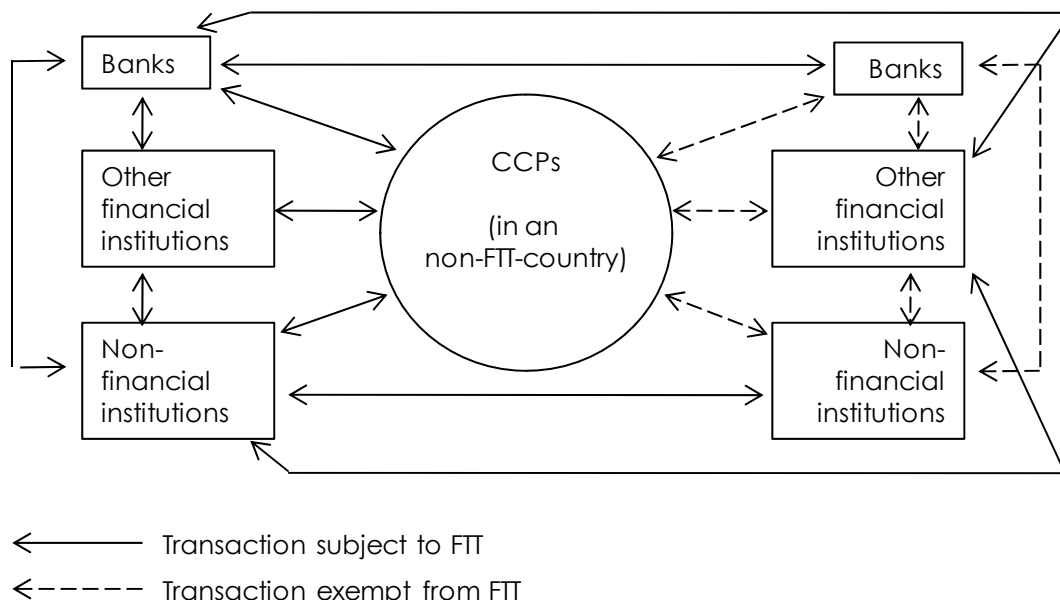
bank, the latter is responsible for deducting the FTT and transferring the proceeds to the fiscal authorities of the FTT-country.

For the purpose of this study it is sufficient to have clarified the basic principles of the decentralized approach on how to deduct the FTT in a situation in which some countries apply such a tax while others do not. Many issues still remain to be solved. E. g., there are hedge funds which collect funds from the public in an FTT-country and transfer them in a non-FTT-country. From this country, they trade on derivatives exchanges all over the world (e. g., the "Superfund"). Also in these cases the transfer of funds from the FTT-country to the non-FTT-country should be burdened by an FTTSL.

There is one prerequisite – not only for an effective implementation of the FTT but also for any kind of supervision and regulation of financial markets – namely that a standard classification system for all kinds of financial transactions has to be created. In international trade, such a classification system was introduced already decades ago, particularly in order to deal with a great variety of tariffs (Standard International Trade Classification – SITC).

In a similar way, the introduction of an FTT should contribute to the creation of a "Standard Classification of Financial Transactions" (SCFT). If every transaction is classified (i.e., assigned a SCFT code) and if authorities can access the data in case of a serious suspicion of money laundry, tax fraud or terrorist activities, then the very existence of such a data basis will yield "prophylactic" effects. In addition, such a data basis would significantly improve the existing economic statistics (one can only wonder why activities of the sector which has expanded the fastest over the past decades are that poorly documented).

Figure 11: Over-the-counter transactions



6.2 Deduction of the FTT concerning OTC transactions

Figure 11 shows in a stylized manner the transactions between banks, other financial institutions and non-financial customers in an "FTT country A" and a "non-FTT-country B" (not all "transaction lines" are displayed in the figure, e. g., transactions between banks in country A, and other financial institutions and non-financial customers in country B). As it is already the case, some OTC transactions are cleared through "Central Counterparty Platforms". It is assumed that these CCPs will be located in a non-FTT-country once such a tax is introduced only in some countries (otherwise the CCP might be obliged to provide information on transactions for tax authorities or to even deduct the FTT).

6.2.1 Centralized FTT deduction by "Global Central Counterparty Platforms"

The more short-term oriented ("fast") instruments are traded and the more the instruments are traded globally, the more efficient it becomes to clear all transactions through a unique global electronic platform. There are two reasons for this. Firstly, the more trades are cleared on a platform and the more traders use a platform, the less probable it is that the default of one participant endangers the solvency of the CCP as a whole – thus the costs of clearing (margins) also become lower. Secondly, only a truly centralized CPP can efficiently deal with the counterparty risk of having two trading partners operating in different time zones.

For these reasons, most spot transactions in a truly global foreign exchange market are cleared through only one institution, the CLS bank (a private US company owned by their users, primarily large banks). Not only for reasons of efficiency, but also for reasons of supervision and regulation (including fighting money laundry and tax evasion), it would be ideal if there existed for any type of financial instrument traded primarily over the counter, a "Global Central Counterparty Platform" (GCCP). These trading platforms would then be ideally suited for the implementation of an FTT.

In reality, however, global financial players are reluctant to take these steps. On the one hand they are interested in some kind of centralized information, clearing and settlements systems to reduce counterparty risk and to improve their risk management. On the other hand they have reservations against more comprehensive regulation and deducting an FTT.

Therefore, big market participants and important exchanges have created information systems like SWIFT and clearing platforms like the CLS bank, the Depository Trust & Clearing Corporation (DTCC) or LCG.clearing. The owner/user of these systems, the big banking corporations, in particular the dealer banks, are eager to keep them under their control. If, e. g., Belgium unilaterally introduced an FTT and demanded data for the purpose of FTT payments from SWIFT (located in Belgium), SWIFT might soon move its headquarter to another jurisdiction.

Another problem with profit-oriented CCPs is that there are several platforms for the same type of instrument, e. g., for clearing interest rate swaps. Hence, they are not truly "central" because this would mean that only one platform per instrument would exist (this is the case

with the CLS bank). Not only for reasons of the clearing efficiency, but also in order to maximise transparency as a basis for supervision and regulation, the creation of one single CCP per instrument would be preferable.

OTC dealers do not have an interest in creating one efficient platform, which might help to come closer to the realization of the "law of one price". At present, professional dealers, in particular traders of derivatives, have a considerable advantage from asymmetric information at the expense of less informed market participants. E. g., during the (ongoing) "Greek crisis" premia for the same CDS deviated markedly from each other at the same point in time.

These considerations suggest that the most efficient way to implement the FTT for OTC transactions – namely deducting the FTT at CCPs under the supervision/management of public authorities (ideally at a GCCP) – is feasible only if all countries with important financial centres within the same trading time zone implement an FTT or if they at least reach a political consensus that the CCPs operating in these countries deduct the FTT for those countries which have introduced such a tax (e. g., in the context of the EU, all CPPs should be obliged to deduct the FTT even if the CPPs lie in non-FTT countries).

If, e. g., the EU Member States reached such a consensus, then it would be easy to legally force all banks, other financial institutions as well as non-financial customers to clear their OTC transactions through a "European Central Counterparty Platform" (ECCP). In this case actors from countries outside the EU would also be obliged to use the ECCP if they want to do business with institutions from EU countries.

As an electronic clearing system, the ECCP's functioning does not depend on network externalities of financial centres. Hence, the FTT proceeds should be divided between the countries from which the transactions originate and the EU, which could use the receipts for financing its own budget and fulfilling its international obligations including climate protection and development cooperation.

6.2.2 Decentralized FTT deduction by banks

As long as there is no agreement within the EU to introduce a general FTT, the decentralized approach enables some countries to implement such a tax while other countries would remain "FTT-free". Similar to the treatment of exchange transactions, any bank in an FTT-country, which carries out an OTC transaction, either on its own account (proprietary trading), or on behalf of another financial institution or a non-financial customer, has to deduct the FTT (see figure 11 – the FTT-country is country A). If both partners of the transaction are residents of the same FTT-country their fiscal authorities receive an FTT payment at the full rate (0.05%). If one of the partners is resident of a non-FTT-country (country B in figure 9) the FTT-country gets only half of it (0.025%).

This will also be true for transactions by market participants from an FTT-country which are cleared through a CCP since the – privately owned – CCPs will most probably be located in a non-FTT-country (figure 11).

All OTC transactions, be it through CCPs or bilateral ones, are carried out by banks (in the terminology of the "Triennial Central Bank Survey", coordinated by the Bank of International Settlements/BIS, titled as "reporting dealers"). Therefore, the FTT has to be deducted by banks and transferred to an account of the fiscal authorities of an FTT-country. If the counterparty is not (another) bank but "another financial institution" or a non-financial customer (from an FTT-country) the bank has to deduct the FTT for both parties (i.e., at the overall tax rate).

This procedure ensures that it is the banking system which is responsible for the deduction and transfer of the FTT payments (as in the case of the decentralized FTT deduction concerning transactions on exchanges).

If all countries that belong to the same trading time zone and have important financial centres implemented an FTT no substantial emigration of "fast" transactions would occur. This seems plausible because this business (e. g., foreign exchange trading) is carried out by highly professional teams, mostly located in financial centres. In Europe, e. g., 67% of all OTC transactions are carried out in the UK.

Thus, some trading would move from FTT-countries to non-FTT-countries if the latter group comprises important financial centres. This would be the case, if, e. g., Germany implemented an FTT but the UK would not. However, the effect will be limited because only 3.4% of OTC transactions in Europe are carried out in Germany.

If an FTT would be introduced in the EU or the Euro area banks could be tempted to keep their trading teams in their headquarters, mainly in the financial centres, but let the trades formally be done by a daughter bank in a non-FTT-country, e. g., in Switzerland or the Ukraine. However, since it is easy to identify computers through the IP-addresses tax authorities would be able to locate these trades (knowing this will have a "prophylactic" effect).

There is also another development which strongly supports the decentralized deduction of an FTT on OTC transactions. According to the negotiations between the European Parliament (EP) and the European Commission (EC) it is already clear that "central trade repositories" will be established which collect and maintain the details of any single OTC contract (transaction). This information should be made available to tax authorities of the member countries to help avoiding any kind of tax fraud. As regards an FTT, those countries which have introduced such a tax can make use of this information to check if the banks within their jurisdiction deduct the FTT according to the respective rules.

However, as long as there are countries with important financial centres in Europe like the UK and Switzerland, which do not apply the FTT, banks and multinational corporations would shift their proprietary trading from FTT countries to their affiliates in the "FTT-free" jurisdictions which are situated in the same trading time zone and which provide the technical and social infrastructure necessary to attract (teams of) professional traders. This would not be the case

if the UK and Switzerland adjusted their existing transactions taxes to the general FTT implemented in all (other) EU countries with important financial centres.

7. Concrete steps towards an FTT implementation in the European Union

In this chapter I will discuss the concrete options for the implementation of an FTT in the EU under those legal, institutional and political conditions which prevail at present or which could realistically be in place within the coming years.

As regards the legal conditions it is assumed that those elements of the forthcoming "Regulation of the European Parliament and of the Council" about which agreement has already been reached in the negotiation between the European Parliament and the Commission, will become part of the regulation (to become valid in 2012).

As regards the political conditions, two scenarios are taken into consideration. In scenario 1, only France and Germany as well as some smaller countries like Austria, Finland and Belgium introduce an FTT. In scenario 2, all EU countries with important financial centres implement the tax.

The key issue in scenario 1 is the fact that the country with the highest share in overall transactions volume in Europe, that is, the UK, would remain "FTT-free". Whether other Euro countries like Spain or the Netherlands join the "coalition of the willing" or not would not change substantially the problems related to scenario 1 (most transactions in the Euro area take place in Germany and France). In this sense, case 1 can also be interpreted as "the Euro area FTT". In an analogous manner, scenario 2 can be interpreted as "the EU FTT".

At first, I shall discuss the implementation of an FTT on organized exchanges. In the following, I will discuss the FTT implementation for OTC transactions.

7.1 Implementation of an FTT on organized exchanges

Table 5 documents which transactions would be covered by an FTT if it were introduced in Germany, France and other Euro countries (scenario 1). Three types of an FTT implementation are distinguished: the centralized approach, the decentralized approach and the mixed approach.

7.1.1 Centralized FTT implementation on exchanges

In the centralized FTT implementation (CI), all transactions in Germany and France are burdened by the FTT whereas all transactions in non-FTT-countries like the UK or the US would remain "FTT-free".

The extent of the related relocation of trading activities from FTT-countries to non-FTT-countries depends mainly on two factors: the tax rate and the closeness of the relationship between the asset traded and the respective national economy. E. g., it is highly improbable that shares of genuine German corporations like Volkswagen would emigrate from Frankfurt.

Therefore, also derivatives related to the shares of these companies would continue to be traded at Eurex.

Table 5: Coverage of exchange transactions by an FTI according to a centralized, decentralized and combined implementation

Case 1: Only France, Germany and some other countries introduce an FTI ("coalition of the willing")

Exchanges in Origin of transactions	EU-FTI country 1 (e.g. Germany)			EU-FTI country 2 (e.g. France)			EU-Non-FTI country 3 (e.g. United Kingdom)			Non-EU-Non-FTI countries (e.g. USA)		
	CI	DCI	Comb.	CI	DCI	Comb.	CI	DCI	Comb.	CI	DCI	Comb.
EU-FTI country 1 (e.g. Germany)												
Banks	x	x	x	x	x	x	-	x	x	-	x	x
Other fin. Inst.	x	x	x	x	x	x	-	x	x	-	x	x
Non-fin. Inst.	x	x	x	x	x	x	-	x	x	-	x	x
Private investors	x	x	x	x	x	x	-	x	x	-	x	x
EU-FTI country 2 (e.g. France)												
Banks	x	x	x	x	x	x	-	x	x	-	x	x
Other fin. Inst.	x	x	x	x	x	x	-	x	x	-	x	x
Non-fin. Inst.	x	x	x	x	x	x	-	x	x	-	x	x
Private investors	x	x	x	x	x	x	-	x	x	-	x	x
EU-Non-FTI country 3 (e.g. United Kingdom)												
Banks	x	-	x	x	-	x	-	-	-	-	-	-
Other fin. Inst.	x	-	x	x	-	x	-	-	-	-	-	-
Non-fin. Inst.	x	-	x	x	-	x	-	-	-	-	-	-
Private investors	x	-	x	x	-	x	-	-	-	-	-	-
Non-EU-Non-FTI countries (e.g. USA)												
Banks	x	-	x	x	-	x	-	-	-	-	-	-
Other fin. Inst.	x	-	x	x	-	x	-	-	-	-	-	-

In addition, those derivatives which are traded mostly at Eurex are related to specific German underlying assets like the Bund, the Bobl and the Schatz contracts. All these futures and options are related to bonds or treasuries of the German government. The relocation effect in scenario 1 could be further reduced by setting the tax rate at a comparatively low level (e. g., to 0.01%).

In any case, if all exchange transactions are taxed only in some EU countries substantial relocation of trading from FTT-countries to non-FTT-countries would take place, in particular, because the countries concerned are situated in the same trading time zone (as Germany and the UK).

The following conclusions can therefore be drawn: In scenario 1 with a group of EU Member States introducing the FTT, a centralized implementation seems only be feasible if the tax rate is extremely low (0.01% or even less).

In scenario 2 with EU Member States (or at last all Member States with important exchanges like Germany and the UK) introducing a general FTT, the centralized implementation would be more appropriate than the decentralized approach. There are two main reasons for this statement. First, it is technically extremely easy to deduct the tax at the point of trading or settlement by making use of the electronic trading platforms or settlement systems. Second, relocation of transactions to exchanges outside of the EU would be limited (provided one can reach an agreement with Switzerland to cooperate) as there are no attractive financial centres within the European trading time zone.

A comparison between table 5 and table 6 shows that the deduction of the FTT on exchange transactions would become very simple if all (important) EU Member States implemented the tax (scenario 2). Under these conditions, the relocation of trading within the EU would not be an issue and a relocation to other countries would be of minor relevance as they would only concern markets in different trading time zones.

The greatest obstacles to a centralized implementation in all (important) EU Member States are therefore essentially political in nature. First, the idea of taxing financial transactions runs counter the "free market paradigm" which has been restored over the past decades. One component of the "double dividend" of an FTT is that of stabilizing asset markets. This implies that the "freest" markets are inherently unstable. Even though the financial crisis has cast some doubts on the "free market paradigm" as guideline for economic policy, it still seems improbable that all (important) EU Member States agree on a tax which stays in contradiction to this paradigm (though some forerunners might be willing to innovate).

Second, over the past decades some countries have increasingly specialized in the financial "industry". For this reason, it is widely believed in these countries that taxing financial transactions would be harmful to the economy as a whole and, hence, against to their national interests.

Third, even if a principal consensus on an EU-wide FTT were reached the issue of how to distribute the tax revenues among the EU Member States would still need to be solved politically.

7.1.2 Decentralized FTT deduction by banks or brokers

In the decentralized FTT implementation (DCI), all orders by actors from FTT-countries are subject to the tax, no matter at what exchanges – domestic or abroad - these orders are carried out. In scenario 1, transactions by German and French traders are taxed at every exchange, be it in their home country or abroad (e. g., in the UK or in the US). At the same time, transactions by actors from the UK or the US remain untaxed at German and French exchanges. In this way, market places in FTT-countries are not discriminated vis-à-vis exchanges in non-FTT-countries (table 5).

Table 6: Coverage of exchange transactions by FTT in a centralized, decentralized and combined implementation

Case 2: All EU 27-countries (with important financial markets/institutions)

Exchanges in Origin of transactions	EU-27			Non-EU 27-countries		
	CI	DCI	Comb.	CI	DCI	Comb.
EU 27						
Banks	x	x	x	-	x	x
Other fin. Inst.	x	x	x	-	x	x
Non-fin. Inst.	x	x	x	-	x	x
Private investors	x	x	x	-	x	x
Non-EU 27-countries						
Banks	x	-	x	-	-	-
Other fin. Inst.	x	-	x	-	-	-
Non-fin. Inst.	x	-	x	-	-	-
Private investors	x	-	x	-	-	-

Legally/formally the debtor of the FTT could be either the resident (institution or individual) of an FTT-country, which gives the original order for an exchange transaction to a domestic bank/broker, or the bank/broker itself (depending on which option is better in line with the EU law). In any case, the tax would be deducted by the bank/broker, which finally places the order at the respective exchange.

The legal design of the FTT implemented in a decentralized manner could be called a "bank/broker levy on processing and placing orders for exchange transactions", be it on its own account (proprietary trading) or on a customer's account. It would be the respective activity of the bank/broker operating in an FTT-country that would be subject to the tax.

It is clear that some hedge funds and investment banks will shift (even more of) their (very) short-term transactions from Frankfurt or Paris to affiliates in London. The same might apply for some amateur "day traders" in FTT-countries who process their orders through brokers at London.

To restrict the extent of relocation of trading activities to non-FTT-countries, a FTT-substitute-levy (FTTSL) could be introduced in FTT countries. The FTTSL would be charged to any transfer of funds from a bank account in an FTT country to a brokerage firm, hedge fund or investment bank in a non-FTT country. These transfers, which are carried out for reasons of financial investments, could easily be identified if every single transaction is assigned a code according to the "Standard Classification of Financial Transactions". The FTTSL does not restrict the free movement of capital but taxes the circumvention. By the same token, a similar levy to prevent the circumvention of income tax payments for capital gains made abroad would comply with the legal framework of the EU (for more details on the FTTSL see section 6.1.2).

Relocation of trading activities following the introduction of an FTT in a group of EU Member States (scenario 1) could be further restricted if the central trade repositories in the EU would cover not only OTC transactions but also transactions on exchanges. If traders are aware of the fact that their transactions are centrally documented and that the fiscal authorities have access to this data, they might abstain from moving funds to abroad.

Even though some relocation of trading from FTT-countries to non-FTT-countries will take place in scenario 1, it is clear that a substantial part of transactions in non-FTT-countries would be indirectly taxed if the FTT countries implement the tax in a decentralized manner. The fact that the revenues would flow exclusively to FTT-countries might motivate non-FTT-countries to consider implementing an FTT as well.

7.1.3 Mixed approach to an FTT deduction

In principle, one could also combine the centralized with the decentralized approach. In this case, all transactions on exchanges in an FTT country would be taxed as well as all orders of domestic residents/banks/brokers placed with exchanges abroad (table 5). However, if only some EU countries would introduce an FTT (scenario 1), adopting such a combined

implementation approach would make only sense, if the respective countries did not care about losing a (great) part of short-term derivatives trading to other countries.

Suppose, e. g., that economic policy in Germany would focus again more on promoting innovation and investment in the real sphere, thus correcting in part the development of the past 20 years when the process of "financialization" was particularly pronounced in Germany. Such a change in the general guideline of policy could be due to a process of learning from the recent crisis and its aftermath. These developments make clear that the strength of the German economy lies in the quality of its manufactures and not of its financial investments (Deutsche Bank could be taken as exemption to the rule). Based on these experiences, economic policy in Germany might concentrate its efforts on promoting long-term investment in the real economy. Restricting profit opportunities of short-term speculation would serve this purpose indirectly. However, at present such a shift in German policy seems not very probable (this will be different after the next financial crisis).

The combination of the centralized and decentralized approach of an FTT implementation would be optimal for the EU as a whole (scenario 2). If all (important) EU member countries reached a consensus to introduce such a tax within their own jurisdictions (centralized approach), they would increase the "double dividend" of an FTT by complementing the "territorial principle" by the "personal principle". In this case, all transactions on exchanges in the EU 27 would be subject to the FTT, but also all transactions of actors from member countries on the exchanges all over the world (table 6). In this way, about half of the global transactions on exchanges would be covered by the FTT implementation according to the combined approach.

Non-FTT-countries, in particular the US, might then be motivated to also introduce an FTT since otherwise the revenues from indirectly taxing transactions on their domestic exchanges would exclusively go to the EU countries.

7.1.4 A numerical example for taxing derivatives traded on exchanges in the EU

In order to show how the implementation of an FTT could work in practice, I will use transactions on derivatives exchanges, which comprise almost 50% of all financial transactions in Europe, as an example. Most of these transactions are carried out at Eurex (Frankfurt) and Euronext (London). For simplicity, I will disregard other smaller derivatives exchanges in the Euro area. In other words, it is assumed that all transactions on derivatives exchanges take place either in Frankfurt or London (22% and 78%, respectively).

The orders executed on these exchanges stem from different countries. Based on data from Eurex, it is assumed that out of the subset of transactions from EU 27 countries, 20% stem from Germany, 50% from the UK and 30% from other EU countries (table 7).

At a tax rate of 0.05%, revenues from Eurex transactions (Germany) would amount to € 15.8 billion and revenues from Euronext transactions (UK) to € 55.8 billion. (The estimates are based on 2010 data from the World Federation of Exchanges – WFE and were derived according to

the methods sketched in chapter 5). These revenues would constitute income for the German and British fiscal authorities if both implemented an FTT without wishing to share the revenues with the other EU countries, from which 30% of transactions stem (table 7, case 1 of centralized FTT implementation).

Table 7: Hypothetical FTT revenues from derivatives trading on organized exchanges at a tax rate of 0.05%

Based on 2010 data (rounded), billions of €

	Germany	United Kingdom	Other EU countries	Other euro countries	EU institutions
Share in transactions by country of origin in %					
EU 27 = 100	20	50	30	(25)	-
Euro15 = 100	40	-	-	60	-
Share in FTT revenues ¹⁾ including EU institutions in % when FTT is implemented in					
EU 27 = 100	15	37	23	-	25
Euro area	30	-	-	45	25
Centralized tax deduction					
In EU 27					
No revenue-sharing (case 1)	15.8	55.8	-	-	-
With revenue-sharing					
Among member countries (case 2)	14.7	40.8	16.1	-	-
Among member countries plus EU (case 3)	12.0	33.8	12.4	-	13.4
In Euro area					
No revenue-sharing (case 1)	9.5 ²⁾	-	-	-	-
With revenue-sharing					
Among member countries (case 2)	5.2 ²⁾	-	-	4.3	-
Among member countries plus EU (case 3)	4.5 ²⁾	-	-	3.2	1.8
Decentralized tax deduction (no revenue sharing)					
Euro countries	11.5 ³⁾	-	-	14.3 ⁴⁾	-
Germany	11.5 ³⁾	-	-	-	-

1) After Germany (UK) got 25% of the revenues stemming from transactions at Eurex (Euronext). - 2) Assumption: 40% of transactions emigrate. - 3) Plus FTT revenues from German trades on exchanges outside of the EU. - 4) Plus FTT from trades on exchanges outside of the EU.

However, in this case the other EU countries might attempt to attract electronic derivatives exchange transactions by not introducing an FTT. An EU-wide consensus to prevent such a development could be as follows (case 2):

- Germany and the UK get 25% of the revenues stemming from the transactions at Eurex and Euronext respectively. This can be interpreted as remuneration for providing the EU with highly developed market places.
- The remaining 75% of the revenues are divided among the remaining EU countries according to their share in transactions (i.e., as regards the origin of the orders). Hence, Germany would get 20%, the UK 50% and the rest of the EU countries 30% of the remaining 75%.

In case 2 (centralized FTT implementation), the total revenues from taxing transactions on derivatives exchanges amount to € 14.7 billion for Germany, € 40.8 billion for the UK, and € 16.1 billion for the other EU countries (table 7). These figures are derived as follows, taking Germany as example:

- Germany receives 25% of € 15.8 billion (€ 4.0 billion) as a market place provider.
- In addition, it also receives 20% according to its share in transactions by the origin ($71.6 * 0.75 * 0.2 = 10.7$). Both revenue components sum up to FTT revenues of € 14.7 billion.

In case 3, the EU institutions would get 25% of the remaining 75% (after Germany and the UK got their "special" share as provider of the market place), i.e., € 13.4 billion ($= 71.6 * 0.75 * 0.25$). Germany, the UK and the EU countries would get proportionately less, namely, € 12.0 billion, € 33.8 billion and € 12.4 billion, respectively (table 7).

If only the Euro countries implemented an FTT (scenario 2 with centralized FTT implementation) the overall revenues are much lower (€ 9.5 billion). This is mainly due to the fact that transactions in the UK are not included, but also because it is assumed that 40% of trading volume "emigrates" from Frankfurt to London ($9.5 = 15.8 * 0.6$). These revenues could be divided among the Euro countries (and the EU institutions) according to the same rules as described above (cases 1 to 3). In case of Germany, it would get between € 9.5 billion (case 1) and € 4.5 billion (case 3). Please note that to a large extent these revenues would stem from transactions carried out by UK traders at Eurex in Frankfurt.

All the cases described above concern a centralized FTT implementation. If only few Euro countries would be willing to introduce an FTT (or even just one) then the decentralized approach is easier to implement. I shall first discuss the extreme case when only one country (e. g., Germany) would introduce an FTT, after that it is assumed that all Euro countries would adopt an FTT (or a group of them like Germany, France, Austria, Finland and Belgium). Both cases belong to scenario 1 with a decentralized FTT implementation.

If only Germany implemented an FTT the transactions of German traders would constitute the (hypothetical) tax base, i.e., 20% of German trades at home as well as abroad. For simplicity, here I disregard the transactions of German traders outside of the EU (which would lead to an increase of the FTT revenues) as well as the transactions of non-EU-traders on derivatives exchanges in the EU (which would lead to a reduction of the estimated FTT earnings of Germany since the share of German trades in transactions at Eurex and Euronext would be less than 20%). However, under these circumstances, large banks and corporations would move their proprietary trading to their affiliates in London. As the respective fund transfers from Germany to the UK would only in part be dampened by the FTTSL, I assume (technically) that the relocation of placing orders of domestic banks/brokers would mean that the tax base would be reduced by 20%. Under these assumptions, the German government would raise € 11.5 billion ($= 71.6 * 0.2 * 0.8$) from transactions of German actors at Eurex and Euronext (table 7).

If not only Germany but also further Euro countries introduced an FTT in a decentralized manner these "other Euro countries" (as listed in table 7) would raise € 14.3 billion. This result is derived under the assumption that most of the trading at Eurex and Euronext, which originates from EU countries other than Germany and the UK, stems from these "other Euro countries" (table 7). When estimating their share in trading at Eurex and Euronext at 25% as in table 7 it is assumed that all Euro countries introduce an FTT. If, e. g., only France, Austria, Belgium and Finland implemented the tax the respective share of these countries would be smaller. As in the case of Germany as forerunner it is assumed that the tax base would be reduced by 20% due to a relocation of placing orders from domestic banks/brokers to their affiliates in London ($14.3 = 71.6 * 0.25 * 0.8$).

Even if the tax base were to a greater extent reduced through trading activities that move from FTT-countries to the UK, at least 25% of the transactions carried out in London would be subject to the tax without the UK getting any revenues. This estimate seems to be a lower bound because it implies that more than 50% of the tax base would be reduced due to relocation of proprietary trading (i.e., from placing orders at exchanges).

7.2 Implementation of an FTT concerning OTC transactions

In this section, at first I shall summarize the status quo of the negotiations on the forthcoming "Regulation of the European Parliament and of the Council on OTC derivatives, central counterparty platforms and trade repositories" as of May 2011. Against the background of the future regulation of OTC markets in the EU, I will discuss the pros and cons of the centralized and the decentralized implementation of an FTT on OTC transactions.

7.2.1 The future regulation of OTC markets in the EU

In the negotiations between the European Parliament (EP) and the Council on the Regulation on OTC derivatives and clearing counterparties (EMIR) proposed by the Commission (EC), agreement has already been reached on the following key issues:

- All standardized OTC derivatives have to be cleared through central counterparty platforms (CCPs).
- Exemptions to the clearing obligation "should be narrowly tailored".
- A uniform OTC derivatives data basis will be established at the EU level through trade repositories that centrally store all details regarding OTC contracts (including non-standardised contracts).
- Authorities across member states should be given access to the data maintained by trade repositories.

Even though supervision, documentation and risk evaluation of activities in OTC derivatives markets could be carried out the easiest if there were just one CCP and just one trade repository for each class of underlying asset (foreign exchange, credits/bonds, commodities and stocks) under public management, the EC proposal implies that there might operate

some/many privately owned and hence profit-oriented CCPs and trade repositories. However, since the Commission and the "European Securities and Markets Authority" (ESMA) will be empowered to concretize the requirements for authorization of CCPs and trade repositories, both institutions could limit the number of private CCPs and trade repositories, or even restrict to one CCP and trade repository per class of derivatives. At least the following formulation in the current draft of the regulation (still under negotiation between the EP and the Council) can be interpreted as allowing for this option: "As this Regulation introduces a legal obligation to clear through specific CCPs for regulatory purposes....." (emphasis added).

In order to enable an efficient surveillance and risk evaluation of activities in OTC derivatives markets the information stored by CCPs and trade repositories will have to be aggregated across all EU member states and all classes of derivatives, differentiated by the different types of actors like banks, hedge funds or non-financial corporations. In this way, the supervisory authority can gain a comprehensive overview of the trading activities and the open positions of each type of actor in the different types of derivatives markets/instruments. This information could be used by the fiscal authorities in FTT countries to check if the CCPs or the banks/brokers have deducted the FTT in an orderly manner.

Since taxation remains national competence of EU member states and since an agreement has been reached between the EP and the Council that national authorities should have access to the data stored by CCPs and trade repositories, the following requirement for registration as a CCP or a trade repository could be added: Every CCP operating in the EU has to deduct the FTT (at request) for those member states that have introduced the tax (centralized approach). In addition, every trade repository has to provide the FTT country in question with the necessary information on the trading activities of banks, hedge funds and non-financial corporations registered in that country (this includes their affiliates abroad and helps to control the deduction of the FTTSL.)

7.2.2 Centralized FTT implementation by central counterparty platforms

In the centralized FTT implementation on OTC transactions, the deduction of the tax is carried out by those CCPs that clear the contracts. If both trading parties come from an FTT country the overall tax rate would be applied (e. g., 0.05%). If only one of the parties come from an FTT country the tax rate will be halved (e. g., 0.025%). The proceeds are then transferred by the CCPs to the fiscal authorities of the respective FTT country or countries.

Even though the FTT would be implemented in a centralized manner (meaning that the tax is deducted by CCPs) according to the principle of origin, it would only be levied on transactions of actors from FTT countries. In this regard, the centralized FTT implementation on OTC transactions differs from an FTT on exchange transactions. In the latter case, the territorial principle is applied. This is due to the fact that (traditional) exchanges are much better embedded in the financial centre infrastructure – like that of Frankfurt or London – than CPPs,

which can be described as "virtual market places". Consequently, CPPs would emigrate to non-FTT-countries if all transactions would be subject to an FTT (territorial principle).

The centralized implementation would be optimal if all EU member states with important financial market introduced an FTT (scenario 2). However, if only a group of EU member states introduced an FTT (scenario 1) the centralized approach would only be feasible if a consensus were reached that CPPs should deduct the FTT for those member states which have decided to implement such a tax.

7.2.3 *Decentralized FTT implementation by banks*

If only some Euro countries like Germany and France introduced an FTT (scenario 1) and if the (future) CPPs were not obliged by an EU Regulation to deduct the FTT on behalf of the FTT-countries, the FTT on OTC transactions should be implemented in a decentralized manner. In this case, every bank in an FTT country would have to deduct the tax for OTC transactions on its own account (proprietary trading), on behalf of other financial institutions (e. g., a hedge fund), or on behalf of a non-financial corporation.

Banks without an international affiliate network would hardly be able to circumvent the FTT as they know that the fiscal authorities have access to the information stored in the trade repositories, which form an integral/important component of the future financial architecture in the EU. However, these banks are not the "big players" in OTC derivatives trading.

A part of the transactions conducted by (large international) banks specialized in OTC derivatives trading (dealer banks) would be relocated from FTT-countries like Germany or France to non-FTT-countries like the UK as a reaction to the partial introduction of the FTT in the EU (scenario 1). However, the extent of such relocation is limited because the OTC trading is already highly concentrated on the London market place (roughly 67% of all OTC transactions in Europe are carried out in the UK as compared to only 3.4% in Germany and 7.5% in France).

8. Institutional and political aspects of implementing an FTT

Even though the "free market/neoliberal paradigm" has become the predominant "Weltanschauung" in economics and politics over the past three decades, the degree to which the long-term shift from welfare state concepts to neoliberal guidelines has changed the structure of the economy differs substantially across countries. Let us take the pension system as example. In the US and the UK, e. g., capital funding has become the most important source of (future) pensions, whereas in most (continental) European countries like Germany or France the welfare state provides the greatest part of pension payments according to the pay-as-you-go-system.

One important root of this difference lies in the long-term economic development ("path dependency"). Over the past 150 years, the financial sector has expanded much stronger in the US and the UK - together with the "economic culture" of Wall Street and "the City". By

contrast, in countries like Germany or France (but also in Japan) the "real economy" in general and manufacturing in particular serve as main drivers of economic growth.

Due to the differences between the "economic cultures" even within the EU, it seems almost impossible to reach a consensus on the introduction of any common tax in a few steps. This is particularly true for a financial transactions tax since the concept of such a tax implies that short-term speculation causes exchange rates, commodity prices, interest rates and stock prices to systematically overshoot their fundamental equilibrium values. Of course, politicians in countries with a huge financial sector and - not coincidentally - with a deeply rooted "free market tradition" can hardly subscribe to the perception that the "freest" markets are characterized by too many trading activities unrelated to fundamentals ("excessive liquidity"). However, if a deepening of the debt crisis in the Euro area or other developments like rising political tensions in the Middle East would trigger a simultaneous fall of stock prices, commodities prices and bond prices (i.e., rising interest rates, particularly in countries with highly indebted governments), then the new crisis - again induced by a threefold wealth devaluation - might cause more and more politicians and economists to reconsider their "laissez-faire-position" as regards financial markets. At the same time, the new crisis would strongly raise the need of governments for those types of revenues which do not weaken demand in the real economy. Both factors might lead politicians even in countries like the US or the UK to give up their objection to an FTT.

However, as long as this does not take place it seems realistic that a coalition of some Euro countries like Germany, France, Austria, Belgium and Finland would start with the introduction of an FTT in their jurisdictions. There are three implementation options which would take into account the potential trade relocation to market places abroad (in particular to the UK), and which would aim at restricting the extent of this relocation:

- Option 1: Decentralized FTT implementation as regards both, transactions on exchanges as well as OTC transactions combined with the introduction of an FTT substitute levy (FTTSL) as sketched in sections 7.1.2 and 7.2.3.
- Option 2: Decentralized implementation of an FTT on exchange transactions combined with the introduction of an FTTSL, and centralized implementation of an FTT on OTC transactions. This option would only be feasible if OTC transactions would be cleared through CCPs and if an EU regulation would oblige CCPs to deduct the FTT for those transactions which stem from an FTT-country (see section 7.2.2).
- Option 3: Centralized implementation of an FTT on exchange transactions combined with the introduction of an FTTSL, and decentralized implementation of an FTT on OTC transactions. This option would only be feasible if the tax rate were very low (0.01% or less), otherwise the relocation effects might be too strong.

Option 1 could theoretically be realized by very few "forerunners" or even by only one country. By contrast, options 2 and 3 call for a broader "coalition of the willing". If all or some members of such a coalition would not care about losing a great deal of short-term trading

to financial centres abroad, in particularly in the UK, they might adopt the mixed approach as regards exchange transactions (see section 7.1.3). In this case not only all transactions on exchanges located in the respective country would be subject to the FTT ("territorial principle") but also all orders by residents of this country to be executed on exchanges abroad ("personal principle").

The options for introducing an FTT would be the same as sketched above if more and more euro countries would gradually join the "coalition of the willing". This is so because only if the country with the by far most important financial markets, the UK, was also willing to introduce the FTT would the rank order of implementation options be changed. The reason is straightforward. If also the UK and the other EU member countries implemented an FTT no other important financial centre within the European trading time zone would remain to which a great deal of transactions could emigrate.

Under this condition, the optimal realization of an EU-wide FTT would consist of taxing both types of transactions, exchange transactions as well as OTC transactions in the centralized manner. A prerequisite of this approach would be that all OTC transactions which involve at least one partner from an EU country are mandatorily cleared through a European CCP (see section 7.2.1).

If an EU-wide consensus on taxing financial transactions would be reached one could also combine the centralized and decentralized FTT implementation as regards transactions on exchanges ("mixed approach to FTT deduction"). In this case, all transactions on exchanges in the EU 27 would be subject to the FTT, but also all transactions of actors from member countries on the exchanges all over the world. Non-FTT-countries, in particular the US, might then be motivated to also introduce an FTT since otherwise the revenues from indirectly taxing transactions on their domestic exchanges - those stemming from EU market participants - would exclusively go to the EU countries.

9. Summary and conclusions

The main result of the present study can be summarized as follows.

A small tax on all transactions of financial assets would increase the costs of trading activities the more, the shorter the time horizon of the transactions is (e. g., "fast" trading based on computer algorithms) and the riskier the transactions are, i. e., the higher their leverage is. At the same time, transactions related to the "real economy" like payments for trade and investments or for hedging purposes could be kept exempt from the FTT (even if this were not the case, these transactions would hardly be affected by a small tax of, e. g., 0.05%).

The main arguments against a general FTT as recently put forward by the International Monetary Fund and the European Commission are not convincing because these arguments are derived from theoretical models which are based on assumptions like rational expectations, and market efficiency which do not hold in practice.

There are two fundamentally different ways of how an FTT could be implemented:

- With the centralized approach, the tax is collected at point of settlement, either from the electronic settlement systems at exchanges, or from Central Counterparty Platforms (CCPs) in the case of OTC transactions, respectively.
- With the decentralized approach, the tax is deducted by the banks and brokerage firms which transmit an order to an exchange (on behalf of a customer or as part of proprietary trading) or which carry out an OTC transaction.

Centralized tax deduction would be the optimal form of an FTT implementation. At the same time, however, this approach is difficult to realize in practice because it necessitates a broad consensus among countries within the same trading time zone to introduce an FTT and to force OTC transactions to be settled via CCPs. Such a consensus has to be achieved at least among all EU countries with important financial markets. Otherwise substantial shifts in market shares of financial centres would occur.

In addition, there is the issue of how to distribute FTT receipts. Due to the concentration of trading on the exchanges in London and Frankfurt, roughly three quarters of revenues would stem from transactions on the London market place and one quarter from transactions in Frankfurt. However, the tax will effectively be paid by all counterparties who make use of these exchanges.

These considerations suggest that the FTT revenues from exchange transactions should be divided into three parts if all EU countries agree to implement a common FTT. One part should go to the home country of the exchange, one part should go to the countries from which the transactions on exchanges originate, and the third part should/could go to supranational institutions like the EU or to supranational projects like development aid.

As regards OTC transactions, a major prerequisite for the centralized solution is the central mandatory clearance of all OTC transactions through Central Counterparty Platforms (CCPs). If such a consensus could be reached, then it would be easy to legally force all banks and other financial institutions to centrally clear their OTC transactions. In this case, counterparties from countries outside the EU would also be obliged to use the CCPs if they want to do business with financial institutions from EU countries.

A centralized FTT implementation necessitates also the creation of a "Standard Classification of Financial Transactions" (SCFT). Such a classification (similar to the SITC as regards international trade) is also a prerequisite for an efficient supervision and regulation of financial markets (including restrictions to tax fraud as well as to terrorist activities).

According to the decentralized approach, all orders of actors from an FTT country are subject to the tax, irrespective at which exchanges – domestic or abroad - these orders are carried out ("personal or origin principle"). The tax is deducted by the bank or broker which places the respective order at the exchange ("taxing at the source").

However, some hedge funds and investment banks might shift their (very) short-term transactions (even more) from Frankfurt to London. The same might be true for some amateur

"day traders" who would process their orders through brokers at London. The extent of this emigration of trading could be restricted by introducing an FTT substitute levy (FTTSL). The FTTSL would be charged on any transfer of funds from a bank account in an FTT country to a brokerage firm or hedge fund in a non-FTT country.

The size of the FTTSL should be several times higher than the FTT. With an FTT of 0.05% the FTTSL could be 2% or even higher. If it were 2% it would be the equivalent of 40 "round trip transactions" (pairs of one buy and one sell transaction). The FTTSL can be considered some kind of "security deposit". If the actor documents that the value of exchange transactions carried out abroad by himself or by his fund is smaller than the original deposit he gets part of the FTTSL reimbursed.

The decentralized approach takes into account the different political and institutional conditions among the advanced economies. In a pragmatic way, it would enable a group of EU or euro countries to start with the implementation of an FTT. Based on the experiences of the "forerunner countries", other countries might then follow in implementing a general FTT.

References

- Arestis, P., Sawyer, M., "The Tobin Financial Transactions Tax: Its Potential and Feasibility", in Arestis, P., Sawyer, M., (eds.), *The Political, Economy of Economic Policies*, Macmillan Press, London, 1998, pp. 248-287.
- Baker, D., *The Benefits of a Financial Transactions Tax*, Center for Economic and Policy Research, Washington, D. C., December 2008.
- Baker, D. *The Deficit-Reducing Potential of a Financial Speculation Tax*, Center for Economic and Policy Research, Washington, D. C., January 2011.
- Baker, D., Polin, R., McArthur, T., Sherman, M., *The Potential Revenue from Financial Transaction Taxes*, Center for Economic and Policy Research, London, Washington, D.C., 2009.
- Clark, C. L., "Controlling risk in a lightening-speed trading environment, Chicago Fed Letter, March 2010.
- Claessens, S., Keen, M., Pazarbasioglu, C., *Financial Sector Taxation – The IMF's Report to the G-20 and Background Material*, Washington, September 2010
- Eichengreen, B., Tobin, J., Wyplosz, C., "Two Cases for Sand in the Wheels of International Finance", *The Economic Journal*, 1995, 105(428), pp. 162-172.
- European Commission (2010A), *Innovative financing at the global level*, SEK (2010) 409 final, April 2010.
- European Commission (2010B), *Financial Sector Taxation*, SEC (2010) 1166/3, August 2010.
- European Parliament, Directorate General for Internal Policies, 2010, "Financial Transaction Tax: Small is Beautiful" by Zsolt Darvas and Jakob von Weizsäcker, Bruegel, Brussels, January 2010.
- Haq, M., Kaul, I., Grunberg, I. (eds.), *The Tobin Tax: Coping with Financial Volatility*, Oxford University Press, New York–Oxford, 1996.
- Jetin, B., Denys, L., *Ready for implementation – Technical and legal aspects of a currency transaction tax and its implementation in the EU*, World Economy, Ecology and Development (WEED), Berlin, November 2005.
- Keen, M., Krelove, R., Norregard, J., "The Financial Activities Tax" in Claessens, S., Keen, M., Pazarbasioglu, C., *Financial Sector Taxation – The IMF's Report to the G-20 and Background Material*, Washington, September 2010, 118-143.
- Keynes, J. M., *The General of Employment, Interest and Money*, MacMillan, London, 1936.
- King, M. R., Rime, D., "The \$4 trillion question: what explains FX growth since the 2007 survey?", *BIS Quarterly Review*, 2010, 27-42.
- International Monetary Fund, *A Fair and Substantial Contribution by the Financial Sector*, Final Report for the G-20, June 2010; reprinted in Claessens, S., Keen, M., Pazarbasioglu, C., *Financial Sector Taxation – The IMF's Report to the G-20 and background Material*, Washington, September 2010, 2-73.
- Matheson, T., "Taxing Financial Transactions: Issues and Evidence", in Claessens, S., Keen, M., Pazarbasioglu, C., *Financial Sector Taxation – The IMF's Report to the G-20 and Background Material*, Washington, September 2010, pp. 144-187.
- Menkhoff, L., *The use of technical analysis by fund managers: International evidence*, *Journal of Banking and Finance*, 34, 2573-2586, 2010.
- Menkhoff, L., Taylor, M.P.: *The obstinate passion of foreign exchange professionals: Technical analysis*, *Journal of Economic Literature*, 45(4), 2007, pp. 936-972.
- OECD, *Harmful tax competition*, Paris, 1998.
- Pollin, R., Baker, D., Schaberg, M., "Securities transaction taxes for U.S. financial markets", *Eastern Economic Journal*, 2003, 29(4), pp. 527-558.
- Schmidt, R., *The Currency Transaction Tax: Rate and Revenue Estimates*, United Nations University Press, Tokyo, New York, London, 2008.
- Schuberth, H., Schulmeister, S., *Settlement Systems and Transactions Taxes*, WIFO study, forthcoming, 2011.
- Schulmeister, Stephan, Margit Schratzenstaller and Oliver Picek. 2008. "A General Financial Transaction Tax. Motives, Revenues, Feasibility and Effects." *Austrian Institute of Economic Research WIFO Monographs*, 3/2008.

- Schulmeister, S., "The interaction between technical currency trading and exchange rate fluctuations", *Finance Research Letters*, 2006, 2, pp. 212-233.
- Schulmeister, S., (2009A), *Trading Practices and Price Dynamics in Commodity Markets and the Stabilizing Effects of a Transaction Tax*, Study of the Austrian Institute of Economic Research (WIFO) commissioned by the Ministry of Finance and the Ministry of Economics and Labour, Vienna, January 2009. Download: [www.wifo.ac.at/wwwa/servlet/wwwa.upload.DownloadServlet/bdoc/S_2009_TRANSACTION_TAX_34919\\$.PDF](http://www.wifo.ac.at/wwwa/servlet/wwwa.upload.DownloadServlet/bdoc/S_2009_TRANSACTION_TAX_34919$.PDF)
- Schulmeister, S. (2009B), "Aggregate Trading Behavior of Technical Models and the Yen/Dollar Exchange Rate 1976-2007", *Japan and the World Economy*, 2009, 21, pp. 270-279.
- Schulmeister, S. (2009C), "The Profitability of Technical Stock Trading: Has it Moved from Daily to Intraday Data?" *Review of Financial Economics*, in press, available online www.science-direct.com.
- Schulmeister, S., (2009D), *Asset Prices Fluctuations, Financial Crises and the Stabilizing Effects of a General Transactions Tax*, in in: Balling, M., Berk, J.M., Strauss-Kahn, M.O. (eds.), *The Quest for Stability: The View of Financial Institutions*, A joint publication with de Nederlandsche Bank and Rabobank, SUERF Study, 2010/3, p. 99-130.
- Schulmeister, S. (2009E), *Technical Trading and Trends in the Dollar/Euro Exchange Rate*, Study by the Austrian Institute of Economic Research (WIFO), supported by the Anniversary Fund of the Österreichische Nationalbank, Vienna, September 2009.
- Schulmeister, Stephan (2010): *Boom-Bust Cycles and Trading Practices in Asset Markets, the Real Economy and the Effects of a Financial Transactions Tax*, WIFO Working Paper 364/2010, presented at the International Monetary Fund on March 15, 2010. www.wifo.ac.at/wwwa/jsp/index.jsp?fid=23923&id=38641&typeid=8&display_mode=2
- Spahn, P. B., *On the feasibility of a tax on foreign exchange transactions*, Report to the Federal Ministry for Economic Cooperation and Development, Bonn, February 2002.
- Spratt, S., *A euro solution: Implementing a levy on euro transactions to finance international development*, Stamp Out Poverty, London 2006.
- Stiglitz, J. E., "Using tax policy to curb short-term trading", *Journal of Financial Service Research*, 1989, 3, pp. 101-115.
- Summers, L. H., Summers, V. P., "When financial markets work too well: a cautious case for a securities transaction tax", *Journal of Financial Service Research*, 1989, 3, pp. 261-286.
- Tobin, J., "Proposal for International Monetary Reform", *Eastern Economic Journal*, 1978, 4, pp. 153-159.