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Abstract

The idea of introducing a general financial transaction tax (FTT) has recently attracted rising attention. 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. A FTT would provide governments with substantial revenues. Third, the dampening effects of a FTT on the real economy would be much smaller as compared to other tax measures like increasing the VAT. The paper summarizes at first the six main arguments in favour and against a FTT. It provides then empirical evidence about the movements of the most important asset prices. These observations suggest that a small FTT (between 0.1% and 0.01%) would mitigate price volatility not only over the short run but also over the long run. At the same time, a FTT would yield substantial revenues. For Europe, revenues would amount to 1.6% of GDP at a tax rate of 0.05% (transaction volume is assumed to decline by roughly 65% at this rate). In the UK, tax receipts would be highest. Even if only transactions on exchanges are taxed in a first step (at a rate of 0.05%), a FTT would yield 3.6% of GDP in the UK. In Germany, FTT receipts would amount to 0.9% of GDP in this case. If a FTT is introduced in the UK and Germany at the same time, neither country needs to fear a significant “emigration” of trading. This can be presumed because roughly 97% of all transactions on exchanges in the EU are carried out in these two countries

JEL: F31, G12, G13, G14, H25

Keywords: Boom and bust of asset prices, speculation, technical trading, transaction tax.

A General Financial Transaction Tax: A Short Cut of the Pros, the Cons and a Proposal*)

1. The concept of a general financial transaction tax

Over the past 30 years, financial innovations, in particular derivative instruments of all kinds, have contributed to a spectacular rise in turnover in all asset markets. At the same time, exchange rates, stock prices, and commodity prices have undergone wide swings. However, economic policy has not attempted to mitigate asset price volatility, e. g., by means of transaction taxes.

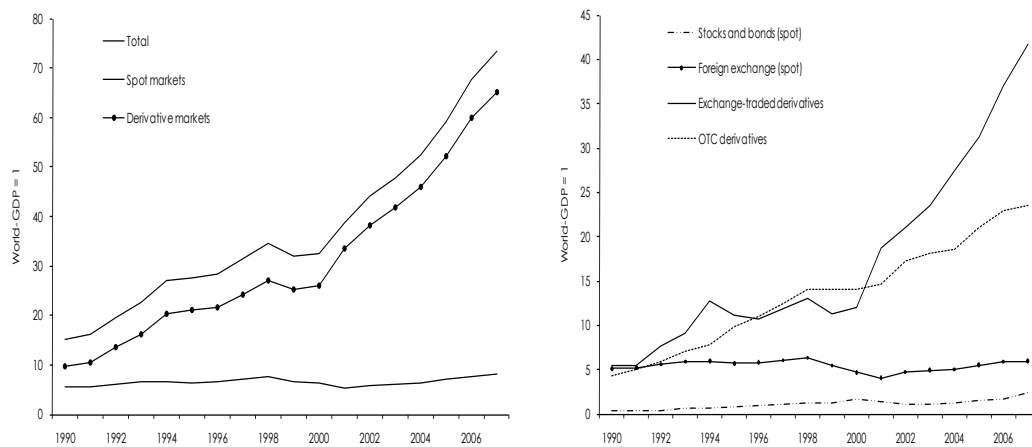
The growing instability of financial markets and the related crises in the 1990s have re-ignited the debate over the pros and cons of a currency transaction tax (*Haq – Kaul – Grunberg, 1996; Spahn, 2002; Jetin – Denys, 2005*). In addition, official bodies in the EU like the national parliaments in Belgium, France and Austria declared their support for such a tax.

The strong acceleration of the boom of financial transactions since 2000 and the related fluctuations of all important asset prices motivated the Austrian Institute of Economic Research, to consider the pros and cons of a general and uniform financial transaction tax (FTT). 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, Tobin (1978) for the foreign exchange market or securities taxes implemented in the past (e. g., stamp duties). The present paper summarizes and updates the results of this study (*Schulmeister – Schratzenstaller – Picek, 2008*).

A general FTT seems "prima facie" more attractive than a specific transaction tax for at least three reasons. First, a general tax does not discriminate against specific types of markets. Second, due to the enormous volume of the tax base the tax rate could be very small and yet, the tax receipts would be (very) considerable. Third, such a tax could be implemented in a stepwise fashion so that (a group of) countries willing to impose it would start with domestic exchanges, which can be taxed at almost no administrative costs (e. g., it is much easier to levy a tax on transactions on organized exchanges as compared to transactions in a dealership market like the global foreign exchange market).

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Figure 1: Overall financial transactions in the world economy



Source: BIS, WFE, OECD.

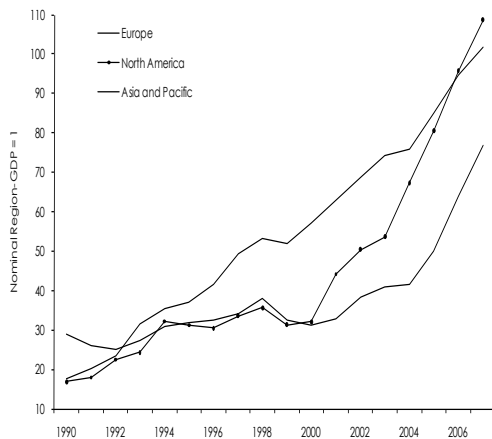
2. The debate over the usefulness of financial transaction taxes

The proponents of financial transaction taxes base their position on the various assertions about trading and price dynamics in asset markets and the effects of a transaction tax ([Keynes, 1936](#); [Tobin, 1978](#); [Stiglitz, 1989](#); [Summers – Summers, 1989](#); [Eichengreen – Tobin – Wyplosz, 1995](#); [Arestis – Sawyer, 1998](#); [Spahn, 2002](#); [Pollin – Baker – Schaberg, 2003](#); [Jetin – Denys, 2005](#)). These "pro-FTT-propositions" (PP) can be summarized as follows:

- PP1: There is excessive trading activity (= liquidity) in modern asset markets due to the predominance of short-term speculation.
- PP2: The most pressing problem is not so much the volatility of asset prices over the short run but over the long run. This is so because short-term speculation produces long swings in asset prices and, hence, persistent deviations from their fundamental equilibria.
- PP3: The overshooting of exchange rates, but also of stock prices, interest rates and commodities prices fosters the "predominance of speculation over enterprise" (Keynes, 1936) and thereby dampens economic growth and employment.
- PP4: A uniform tax per transaction increases the costs of speculative trades the more, the shorter their time horizon is. Hence, a transaction tax would have a stabilizing effect on asset prices and would thereby improve the overall macroeconomic performance.
- PP5: A FTT would compensate the distortion effect caused by the exemption of financial services from the value-added-tax.

- PP6: A transaction tax would provide governments and/or supranational organizations with considerable revenues which could/should be used for fiscal consolidation and/or the achievement of policy goals, particularly on the supranational level.

Figure 2: Overall financial transactions by regions



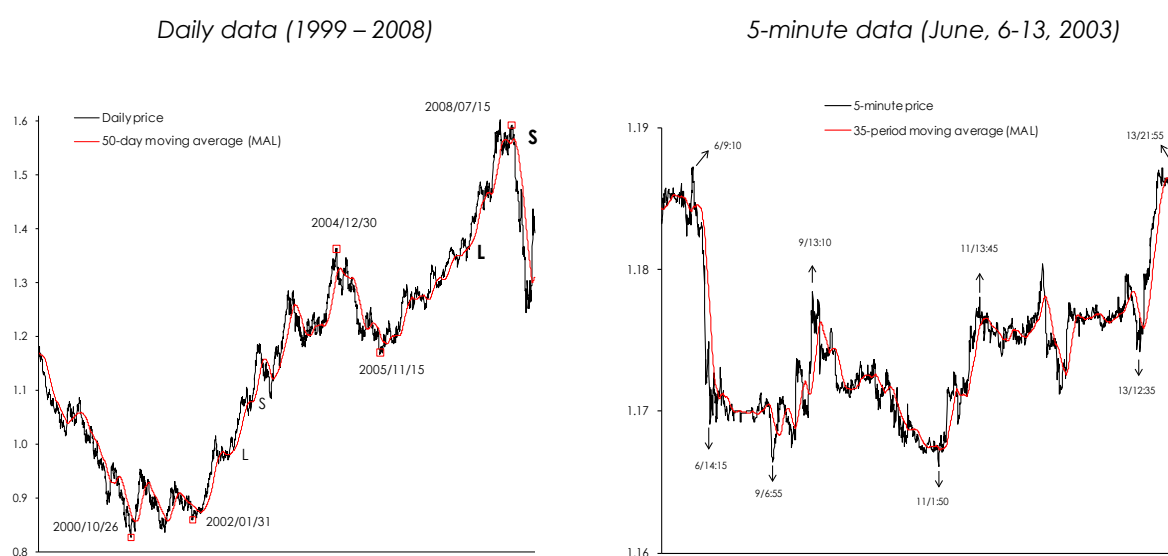
Source: BIS, WFE, OECD.

The critics of an FTT base their position on a fundamentally different perception of trading and price dynamics in financial markets that is (e.g., ECB, 2004; Habermeier – Kirilenko, 2003; Grahl – Lysandrou, 2003; one should add that conventional equilibrium economists implicitly reject the idea of any FTT because it runs counter to their most fundamental assumptions like market efficiency). The counter-FTT-propositions (CP) can be summarized as follows:

- CP1: The high transaction volumes in modern financial markets reflect the liquidity necessary for the price discovery process and, hence, for facilitating and smoothing the movements of asset prices towards their fundamental equilibria.
- CP2: A great deal of short-term transactions is related to hedging and, hence, to the distribution of risk.
- CP3: Speculation is an indispensable component of both, the price discovery process as well as the distribution of risks. As part of the former, speculation is essentially stabilizing, i.e., it moves asset prices smoothly and quickly to their equilibria.
- CP4: Any increase in transaction costs, e.g. due to an FTT, will cause liquidity to decline which in turn will increase the short-term volatility of asset prices.
- CP5: An endogenous overshooting caused by excessive speculation does not exist. Any deviation of asset prices from their fundamental equilibrium is due to exogenous shocks.
- CP6: Transaction taxes are hard to implement, in particular taxes on international transactions. In addition, actors will find ways to circumvent the tax.

The pros and cons with respect to the usefulness of an FTT as summarized above are derived from two fundamentally different perceptions of the behavior of market participants, price dynamics, and market efficiency. Hence, any evaluation of the different arguments has to answer the following question. Does the empirical evidence concerning transaction volumes and price dynamics in financial markets fit into the picture drawn by the proponents of an FTT or does this evidence rather support the view of traditional (equilibrium) economics?

Figure 3: Movements of the dollar/euro exchange rate and technical trading signals



Source: Fed, Olson Ltd.

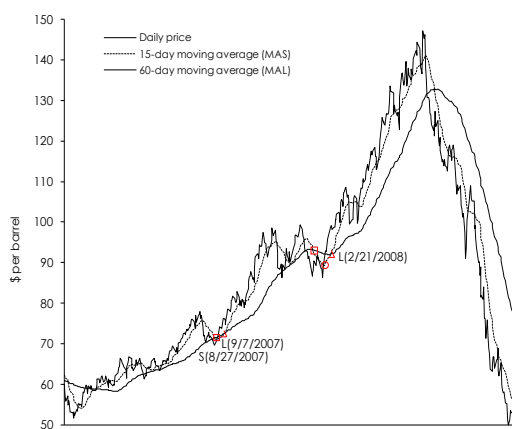
3. Trading practices and price dynamics in financial markets

The main observations about transactions volumes and price dynamics in financial markets can be summarized as follows (these observations are documented more in detail in *Schulmeister – Schratzenstaller – Picek, 2008; Schulmeister, 2009A and 2009E*):

- Observation 1: The volume of financial transactions in the global economy is 73.5 times higher than nominal world GDP, in 1990 this ratio amounted to “only” 15.3. Spot transactions of stocks, bonds and foreign exchange have expanded roughly in tandem with nominal world GDP. Hence, the overall increase in financial trading is exclusively due to the spectacular boom of the derivatives markets (figure 1).
- Observation 2: Futures and options trading on exchanges has expanded much stronger since 2000 than OTC transactions (the latter are the exclusive domain of professionals). In 2007, transaction volume of exchange-traded derivatives was 42.1 times higher than world GDP, the respective ratio of OTC transactions was 23.5% (figure 1).

- Observation 3: Financial market activities are highly concentrated on the most advanced economies. Hence, in Europe and North America, the volume of financial transactions is almost 100 times higher than nominal GDP (figure 2).
- Observation 4: The discrepancy between the levels of financial transactions and the levels of the "underlying" transactions in the "real world" has risen dramatically. E. g., the volume of foreign exchange transactions is almost 70 times higher than world trade of goods and services. In Germany, the UK and the US, the volume of stock trading is almost 100 times bigger than business investment, and the trading volume of interest rate securities is even several 100 times greater than overall investment.

Figure 4: Technical trading signals for WTI crude oil futures contract 2007 – 2008

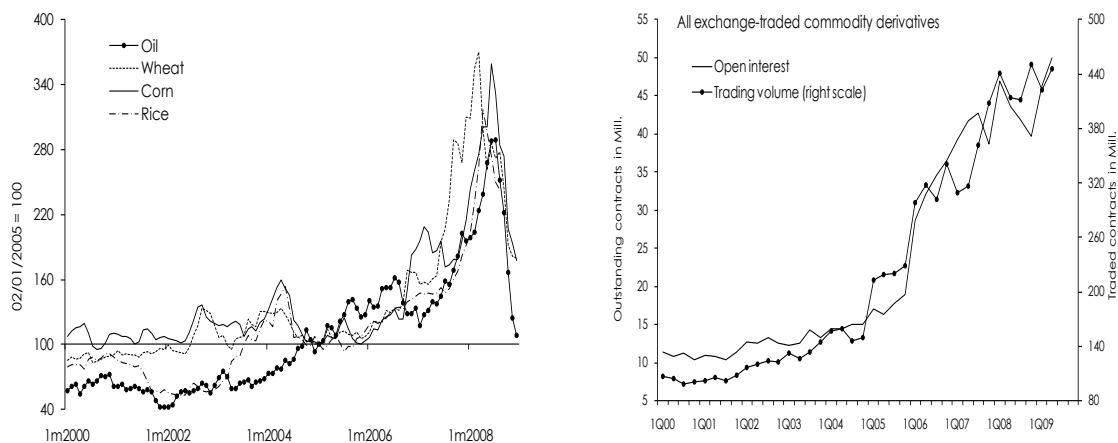


Source: New York Mercantile Exchange (NYMEX).

- Observation 5: Over the short run, asset prices fluctuate almost always around "underlying" trends. If one smoothes the respective price series with simple moving averages, one can easily identify the "underlying" trends (figure 3). The phenomenon of "trending" repeats itself across different time scales. E. g., there occur trends based on 5-minutes-data as well as trends based on daily data (figures 3, 4, 5).
- Observation 6: Technical trading – the most popular strategy in modern financial markets – aims at exploiting the trending of asset prices. In the case of moving average models, e. g., a trader would open a long position (buy) when the current price crosses the MA line from below and sells when the opposite occurs (figures 3). If a model uses two moving averages, then their crossing indicates a trading signal (figure 4).
- Observation 7: Technical models are applied to price data of almost any frequency, ranging from daily data to 5-minute or tick data (figures 3, 4, 5). The improved availability of intraday data, the improved trading software and the improved market access through the internet have contributed to the expansion of technical trading and its "speeding-up" by the increasing use of intraday data (Schulmeister, 2009C).

- Observation 8: 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).
- Observation 9: These price runs 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 3 and 4). This process of (over)appreciation and (over)depreciation of asset prices is systematically strengthened by technical trading (Schulmeister 2009A; 2009E).
- Observation 10: All important asset prices like 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, asset prices fluctuate in irregular cycles ("long swings") around its fundamental equilibrium without any tendency to converge towards this level (figures 6, 7, 8, 9).

Figure 5: Dynamics of commodity futures prices and derivatives trading activities 2007 – 2008



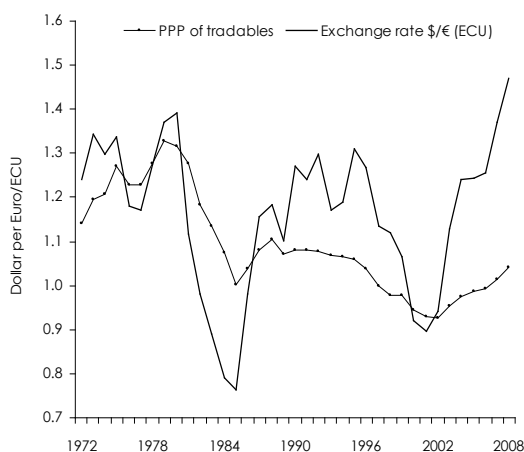
Source: New York Mercantile Exchange (NYMEX), Chicago Board of Trade (CBOT), BIS.

These observations suggest that financial markets are characterized by excessive liquidity 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. These conclusions can be drawn from the empirical evidence for the following reasons:

- Price expectations of market participants must be (very) heterogeneous and must have become progressively more so because otherwise trading (opportunities) had not risen so much faster than transactions in the "underlying" goods markets (observations 1 – 4).

- The spectacular rise of derivatives trading cannot be caused by hedging activities because the volume of derivatives transactions is just much too big to be accounted for by hedging (observation 2).
- As a consequence, the greatest part of derivatives transactions has to be attributed to speculative trades between actors with heterogeneous price expectations.
- A great and rising part of overall transaction volumes stems from technical trading since this practice uses data of ever higher frequencies (trading becomes progressively “faster” – observations 6 and 7). At the same time, technical trading is unrelated to market fundamentals. Hence, a great and rising part of financial transactions is not related to the price discovery process (but rather “disturbs” this process).
- The pattern of asset price dynamics as a sequence of very short-term runs which accumulate to “bull markets” or “bear markets” and, hence, to long swings around the fundamental equilibrium, suggests that the cumulative effects of increasingly short-term transactions are destabilizing also over the long run (observations 8, 9, and 10).

Figure 6: Dollar/euro exchange rate and purchasing power



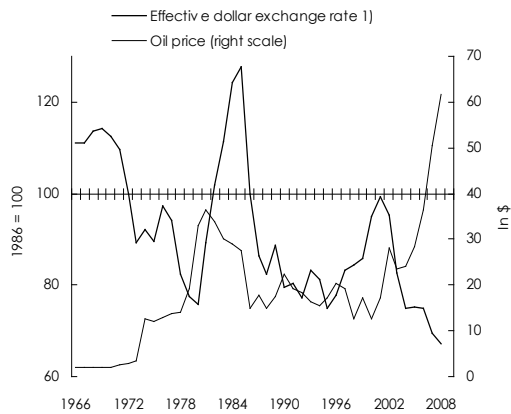
Source: OECD, WIFO, *Schulmeister* (2005).

The “normality” of asset price overshooting is documented by the development of that exchange rate which is by far traded most in currency markets. Figure 6 shows the wide fluctuations of the US-dollar/Euro(ECU) exchange rate around its theoretical equilibrium level, i.e., the purchasing power parity (PPP) of internationally traded goods and services (for the calculation of PPP based on tradables see *Schulmeister*, 2005).

Figure 7 displays the sequence of booms and busts of the US dollar exchange rate and of the crude oil price since the late 1960s. Even though one can hardly quantify the fundamental equilibrium price of crude oil, it seems implausible that the latter fluctuates as widely as the market price (figure 7). It is much more plausible that oil price overshooting is the result of the

interaction between news-based trading and technical trading in oil futures markets (figures 4 and 5; see *Schulmeister, 2009A* for a detailed investigation of this hypothesis).

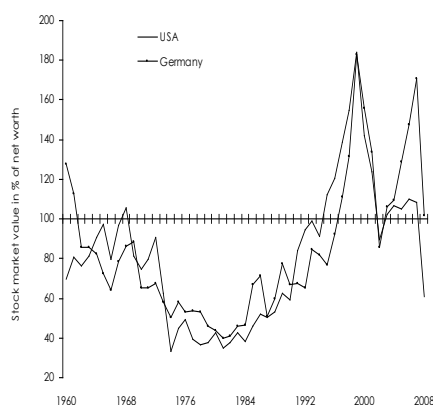
Figure 7: Dollar exchange rate and oil price fluctuations



Source: OECD, IMF. - 1) Vis-a-vis DM, Franc, Pound, Yen.

Also stock prices overshoot their fundamental equilibrium over the long run (figure 8). Over the 1960s and 1970s, e. g., stock prices in the US and Germany became progressively undervalued, the stock market value of non-financial corporations strongly declined relative to their net worth (real assets at goods market prices minus net financial liabilities¹⁾). The stock market boom of the 1980s and 1990s and the slow-down in real investment dynamics caused stock prices to become progressively overvalued. This overvaluation was the most important cause of the "tilt" from a "bull market" into a "bear market" in 2000.

Figure 8: Stock market value and net worth of non-financial corporations



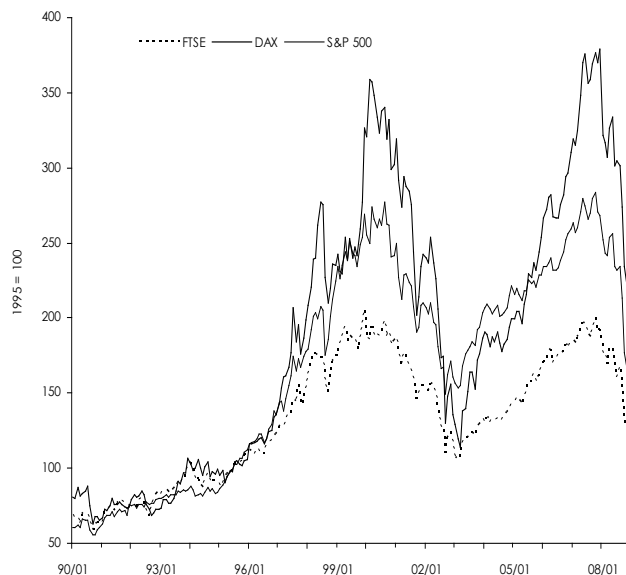
Source: Fed, Deutsche Bundesbank, Schulmeister (2003)

¹⁾ The relation depicted in figure 11 is an estimate of Tobin's q. For the method to calculate this relation und for an analysis of its long-term fluctuations see *Schulmeister, 2003*.

Between spring 2003 and summer 2007 stock prices were again booming, in Germany even stronger than in the US. At the same time real investment expanded in the US much stronger than in Germany. Hence, the discrepancy between the stock market value of non-financial corporate business and its net worth rose much stronger in Germany than in the US (figure 8). Unsurprisingly, since summer 2007 stock prices have fallen much stronger in Germany as compared to the US (figure 9).

To conclude: An evaluation of the empirical evidence suggests that asset markets are characterized by excessive liquidity and excessive price volatility leading to large and persistent deviations of stock prices, exchange rates and commodity prices from their fundamental equilibria. The growing importance of technical trading systems contributes significantly to the volatility of asset prices over the short run as well as over the long run.

Figure 9: Stock price fluctuations in Germany, the United Kingdom and the US 1990-2008



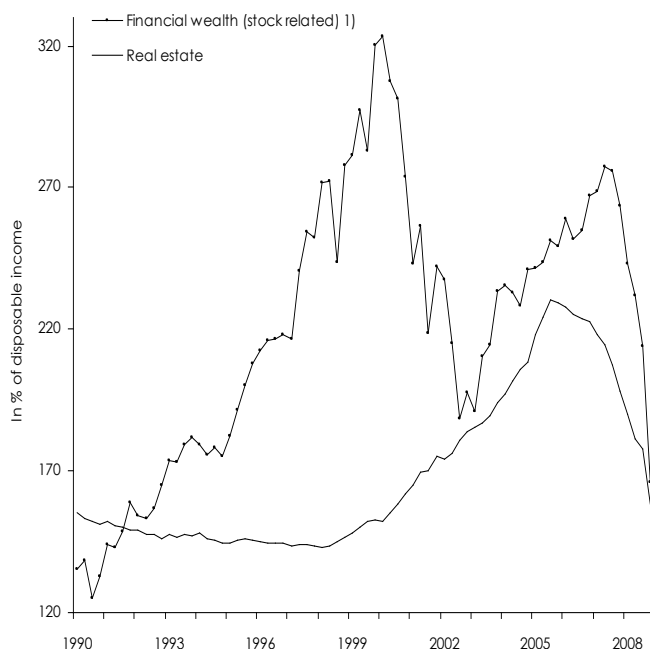
Source: Yahoo Finance (<http://de.finance.yahoo.com/m8>).

4. Asset price fluctuations and financial crises

The overshooting of the most important asset prices affects the real sphere of the economy through many channels, e. g., by increasing uncertainty, by producing waves of positive and negative wealth effects (strengthened by the importance of pension and college funds), by inflating and deflating the balance sheets of financial institutions and by redistributing trade earnings between consumers and producers of commodities. These effects reinforced each other during the phase of building-up the potential for the “great crisis” as well as after the crisis finally broke out:

- The boom of stock prices in the 1990s and again between 2003 and 2007 as well as the boom of house prices between 1998 and 2005 stimulated the US economy through positive wealth effects (figure 10). At the same time, however, the "twin booms" laid the ground for the subsequent "twin busts". The related devaluation of financial as well as housing wealth has strongly depressed consumption and investment in the US (figure 10).
- After the outbreak of the sub-prime mortgage crisis, the third "bull market", i. e., the commodity price boom, accelerated, mainly driven by speculation of financial investors in commodity derivatives markets (figures 4 and 5). This development further deteriorated global economic prospects.
- Between spring 2008 and spring 2009 the devaluation process of stock wealth, housing wealth and commodity wealth was globally "synchronized" (as was the preceding "triple booms"). This process set free several contraction forces, not only through wealth effects and balance sheet compression but also via import reductions on behalf of commodity producers (commodity prices fell by roughly 60% within 4 months – figure 5).
- The fall of stock prices and commodity prices has been strengthened by trend-following technical trading via taking huge short positions in the respective derivatives markets. Due to the extraordinary strength of these "bear markets", hedge funds using these models (in many cases "automated trading systems") reported higher returns than ever before (Schulmeister, 2009D).

Figure 10: Wealth of private households in the US



Source: Federal Reserve Board, OEF. - 1) Stocks, Investment funds, Pension funds.

To conclude: The “epicenter” of the “financial tsunami” was the simultaneous devaluation process of stock wealth, housing wealth and commodity wealth (the same happened between 1929 and 1933). The extent of this devaluation process was made possible through the preceding overvaluation via the simultaneous boom of stock prices, house prices and commodity prices. The three “bull markets” and the three “bear markets”, are predominantly the result of “business as usual” in modern financial markets.

5. How a transaction tax will mitigate asset price fluctuations

A general FTT would render transactions the more costly the shorter is their time horizon. Hence, it would specifically dampen technical trading, which is increasingly based on intraday price data. At the same time, technical trading strengthens price runs which in turn accumulate to long-term trends that involve growing departures from fundamental levels. As a consequence, a FTT would reduce excessive liquidity stemming from transactions which are very short-term oriented and destabilizing over the short run as well as over the long run.

To put it differently: Any (expected) profit from trend-following (technical) trading is reduced by a general FTT. This reduction will be the bigger the smaller is the average difference between the buy price and the sell price, i. e., the higher is the “speed” of trading. As short-term trading becomes less attractive, price runs will become less pronounced. This effect will in turn reduce the attractiveness of technical trading based on (ultra-)high frequency data (often fully “automated systems”).

Since long-term appreciation (depreciation) trends are the result of upward (downward) runs lasting longer than countermovements, a general FTT would dampen the “long swings” of asset prices, i. e., the sequences of “bull markets” and “bear markets”.

Since an FTT increases transaction costs the more the lower they are (before tax), it will generally hamper derivatives trading to a greater extent than spot trading. Since spot transactions are more long-term oriented and, hence, based to a larger extent on fundamentals than (speculative) derivatives transactions one can presume that an FTT will hamper specifically short-term, non-fundamental transactions.

At the same time, derivatives transactions for hedging purposes would not be affected by a low FTT (between 0.1% and 0.01%) since one usually needs just one transaction for hedging an open position stemming from “real-world-transactions” (e. g., future export earnings in foreign currency).

6. The revenue potential of a general financial transaction tax

The study estimates the potential revenues of a general FTT for three tax rates, namely, 0.1%, 0.05%, and 0.01%. 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. A FTT will therefore hamper specifically those transactions that involve high leverage and, hence, a high risk (chance) of great losses (profits).

*Table 1: Hypothetical transaction tax receipts in the global economy 2007
In % of GDP*

			World			Europe			North America			Asia and Pacific		
			0.1	0.05	0.01	0.1	0.05	0.01	0.1	0.05	0.01	0.1	0.05	0.01
Tax rate														
Reduction in transaction volume														
Spot transactions on exchanges														
Total	Low		0.222	0.114	0.023	0.240	0.123	0.025	0.365	0.186	0.038	0.319	0.163	0.034
	Medium		0.211	0.111	0.023	0.229	0.120	0.025	0.346	0.182	0.038	0.302	0.159	0.034
	High		0.200	0.108	0.022	0.217	0.116	0.024	0.326	0.177	0.036	0.285	0.154	0.032
Derivatives transactions on exchanges														
Total	Low		1.306	0.863	0.339	1.384	0.915	0.362	2.563	1.699	0.671	1.016	0.652	0.246
	Medium		0.889	0.653	0.298	0.937	0.692	0.317	1.733	1.281	0.588	0.728	0.508	0.217
	High		0.471	0.354	0.256	0.490	0.368	0.272	0.903	0.678	0.505	0.440	0.330	0.188
OTC transactions														
Total	Low		0.883	0.588	0.235	1.636	1.091	0.436	0.655	0.437	0.175	1.347	0.898	0.359
	Medium		0.588	0.441	0.206	1.091	0.818	0.382	0.437	0.328	0.153	0.898	0.674	0.314
	High		0.294	0.221	0.177	0.545	0.409	0.327	0.218	0.164	0.131	0.449	0.337	0.269
All transactions														
	Low		2.411	1.565	0.598	3.260	2.129	0.823	3.583	2.323	0.884	2.682	1.713	0.638
	Medium		1.688	1.205	0.527	2.257	1.630	0.724	2.515	1.792	0.780	1.928	1.341	0.565
	High		0.965	0.682	0.455	1.253	0.893	0.624	1.448	1.019	0.673	1.174	0.821	0.489

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 type of instrument, a low, medium and high "transactions-reduction-scenario" (TRS) is specified. In the case of the medium TRS it is assumed that transactions would decline by roughly 75% at a tax rate of 0.1%, at 65% at a rate of 0.05% and by roughly 25% at a tax rate of 0.01%.

Tables 1 and 2 present the estimated revenues of a general FTT for the world economy as a whole as well as for Germany and the United Kingdom. In the case of the medium TRS overall

tax revenues would amount to 1.7% of world GDP at a tax rate of 0.1%, and to 0.5% at a tax rate of 0.01%. In North America and Europe, tax revenues (relative to nominal GDP) would be significantly higher, lying between 2.3% and 0.7% of GDP.

*Table 2: Hypothetical transaction tax receipts in Germany and the United Kingdom 2007
In % of GDP*

		Germany			United Kingdom		
		0.1	0.05	0.01	0.1	0.05	0.01
Tax rate							
Reduction in transaction volume							
Spot transactions on exchanges							
Total	Low	0.133	0.068	0.014	0.476	0.243	0.050
	Medium	0.126	0.066	0.014	0.455	0.238	0.050
	High	0.119	0.064	0.013	0.430	0.230	0.048
Derivatives transactions on exchanges							
Total	Low	1.708	1.111	0.428	6.756	4.494	1.791
	Medium	1.194	0.854	0.376	4.525	3.378	1.568
	High	0.680	0.510	0.325	2.293	1.720	1.345
OTC transactions							
Total	Low	0.434	0.289	0.116	6.538	4.358	1.743
	Medium	0.289	0.217	0.101	4.358	3.269	1.525
	High	0.145	0.108	0.087	2.179	1.634	1.308
All transactions							
	Low	2.274	1.468	0.557	13.770	9.096	3.585
	Medium	1.609	1.137	0.491	9.338	6.885	3.144
	High	0.943	0.682	0.425	4.902	3.585	2.700

In Germany, revenues from a FTS would be roughly as high as on average in the advanced economies. At a tax rate of 0.05%, tax receipts are estimated at roughly 1.1% of GDP in the case of the medium TRS. Under the same conditions, tax revenues in the United Kingdom would be extremely high, amounting to roughly 6.9% of GDP. This result reflects the fact that the volume of financial transactions relative to GDP is by far highest in the UK (in 2007, it was 446.1 times higher than GDP). This extraordinarily high ratio is due to the traditionally strong position of the London market place. This concentration has been markedly strengthened by the bundling of the transactions on the (former) derivatives exchanges in Paris, Amsterdam, Brussels and Lisbon on Euronext in London.

It is interesting to note that the estimated revenues of a general FTT at the low rate of 0.01% come close to the hypothetical revenues from a VAT on financial services. In Europe, e.g., FTT

revenues at a rate of 0.01% are estimated to lie between 0.62% and 0.82% of GDP (tables 1 and 2). If financial services were not exempt from VAT the latter would yield roughly 0.7% of GDP (see *Huizinga, 2002*). Hence, the introduction of a general FTT would roughly compensate for the – distorting – exemption of financial services from VAT.

In addition, a general FTT would affect the (relative) profitability of different types of activities within the financial sector differently. Financing, insurance and risk transformation would practically remain unaffected by a FTT whereas short-term trading would become more costly (in particular derivatives transactions).

7. Feasibility a general financial transaction tax

A FTT should not tax those transactions which are simply the financial equivalent to "real-world-transactions" like payments related to transactions in the goods or labor markets. Following a pragmatic approach in line with this reasoning, we would propose to make the following transactions subject to a general and uniform FTT:

- All spot and derivatives transactions on organized exchanges, e.g., trades of stocks and interest rate securities, as well as trades of futures and options related to stocks, interest rate securities, currencies and commodities.
- Those "over-the-counter" (OTC)-transactions which are directly related to asset prices, in particular to exchange rates and interest rates, e.g., spot currency transactions as well as trades of foreign exchange derivatives and (single currency) interest rate derivatives.

The first group of transactions is clearly defined. The second group covers all transactions reported by the "Triennial Central Bank Survey" plus OTC spot transactions of interest rate securities and stocks. Since the latter two types of transactions are quantitatively not important it would be sufficient to tax all transactions covered by the BIS survey. For a detailed definition of all these transactions see *BIS, 2007*.

This proposal implies that all transactions between customers (households and enterprises) and financial institutions would not be subject to the FTT. E. g., if a private person gives an order to her broker to buy or sell stocks or a futures contract, only the transaction on the exchange would be taxed but not the payment between the customer and the broker.

Taxes on all transactions are collected by the exchanges themselves. At the same time, the exchanges debit the buyer and the seller of each transaction with 50% of the tax. The whole procedure should be easily organized due to the electronic settlement systems used on all important exchanges (the same is true for the collection of the tax on OTC transactions).

A general taxation of financial asset transactions in all major economies can only be the final stage in the process of implementing an FTT. The first stage could be the implementation of a tax levied only on spot and derivatives transactions on organized exchanges in some major EU economies. In fact, it would be sufficient if only the UK and Germany implemented such a

tax (roughly 97% of all transactions on exchanges in the EU are carried out in these two countries).

This extreme concentration of transactions on organized exchanges in Europe (only 6% are spot transactions, 94% refer to futures and options) clearly shows that network externalities of well-established market places 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".

Given the extremely high fiscal deficit in the UK (it will reach roughly 13% of GDP in 2010), the British government might become interested in introducing a FTT. Even if this tax would be levied only on transactions on exchanges, it would yield roughly 3.6% of GDP at a rate of 0.05% (medium TRS). If such a tax would be introduced in the UK and Germany at the same time, neither country needs to fear a significant "emigration" of trading.

This presumption is confirmed by the success of the British "stamp duty" on stock transactions (see *Schulmeister – Schratzenstaller – Picek*, 2008). Even the comparatively high tax rate of 0.5% has not done any harm to the attractiveness of the London market place. At the same time, the revenues from the "stamp duty" are substantial, amounting to 0.7% of total tax receipts.

Based on the experience with an FTT levied only on transactions on organized exchanges one could include in the second stage all OTC transactions within the Euro area which involve no other currencies, i.e., primarily euro interest rate derivatives. The third stage would then include also OTC transactions (spot and derivatives), in particular in the foreign exchange market.

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