

WIFO

ÖSTERREICHISCHES INSTITUT
FÜR WIRTSCHAFTSFORSCHUNG

 **WORKING PAPERS**

**A Global Financial Transaction Tax
Theory, Practice and Potential Revenues**

Atanas Pekanov, Margit Schratzenstaller

582/2019

A Global Financial Transaction Tax

Theory, Practice and Potential Revenues

Atanas Pekanov, Margit Schratzenstaller

WIFO Working Papers, No. 582

May 2019

Abstract

This study presents in detail the concept of a financial transaction tax (FTT) and the theoretical and empirical evidence in favour and against introducing it, the potential revenues, different implementation designs and its ability to correct various market failures. We analyse the benefits and challenges of introducing a tax on financial transactions, putting special focus on the introduction of such a tax on a world-wide scale. For a number of reasons, international cooperation is deemed a central prerequisite for an efficient FTT. The purpose of the tax is to raise substantial revenues and help dampen excessive financial market speculation and market volatility. An FTT would ensure that the financial sector contributes more substantially to government revenues. In its optimal form, the tax would be broad-based and there will be no financial instrument types exempted. In a second step, we analyse from a political economy perspective the prospects, the current status, and the lessons learnt from the European discussion on the implementation of an FTT. Finally, we calculate the revenue potential of a global FTT and report how much revenues would accrue to specific countries. We estimate that the tax, if imposed globally and taking into account still evasion, relocation and lock-in effects, can bring significant revenues – between 237.9 and 418.8 billion \$ annually. The baseline case delivers 326.9 billion \$ overall for the global economy, which corresponds to 0.43 percent of global GDP. These are lower bounds for potential revenues due to missing data on a number of financial instrument types. For specific countries, in the baseline case this would result in 72.57 billion \$ annual potential revenues for the USA (0.37 percent of GDP), 119.46 billion \$ for the European Union (0.69 percent of GDP), 10.00 billion \$ for Germany (0.27 percent of GDP), 9.99 billion \$ for France (0.39 percent of GDP) and 19.99 billion \$ for Japan (0.41 percent of GDP).

E-mail address: atanas.pekanov@wifo.ac.at, margit.schratenstaller@wifo.ac.at
2019/130/W/0

© 2019 Österreichisches Institut für Wirtschaftsforschung
Medieninhaber (Verleger), Hersteller: Österreichisches Institut für Wirtschaftsforschung • 1030 Wien, Arsenal, Objekt 20 •
Tel. (43 1) 798 26 01-0 • Fax (43 1) 798 93 86 • <http://www.wifo.ac.at/> • Verlags- und Herstellungsort: Wien
Die Working Papers geben nicht notwendigerweise die Meinung des WIFO wieder
Kostenloser Download: <http://www.wifo.ac.at/www/pubid/61805>

A Global Financial Transaction Tax – theory, practice and potential revenues

Atanas Pekanov, Margit Schratzenstaller

March 2019

Internal review: Stephan Schulmeister, Thomas Url • Research assistance: Nathalie Fischer

Abstract

This study presents in detail the concept of a financial transaction tax (FTT) and the theoretical and empirical evidence in favour and against introducing it, the potential revenues, different implementation designs and its ability to correct various market failures. We analyse the benefits and challenges of introducing a tax on financial transactions, putting special focus on the introduction of such a tax on a world-wide scale. For a number of reasons, international cooperation is deemed a central prerequisite for an efficient FTT. The purpose of the tax is to raise substantial revenues and help dampen excessive financial market speculation and market volatility. An FTT would ensure that the financial sector contributes more substantially to government revenues. In its optimal form, the tax would be broad-based and there will be no financial instrument types exempted. In a second step, we analyse from a political economy perspective the prospects, the current status, and the lessons learnt from the European discussion on the implementation of an FTT. Finally, we calculate the revenue potential of a global FTT and report how much revenues would accrue to specific countries. We estimate that the tax, if imposed globally and taking into account still evasion, relocation and lock-in effects, can bring significant revenues – between \$ 237.9 billion and \$ 418.8 billion annually. The baseline case delivers \$ 326.9 billion overall for the global economy, which corresponds to 0.43% of global GDP. These are lower bounds for potential revenues due to missing data on a number of financial instrument types. For specific countries, in the baseline case this would result in \$ 72.57 billion annual potential revenues for the United States (0.37% of GDP), \$ 119.46 billion for the European Union (0.69% of GDP), \$ 10.00 billion for Germany (0.27% of GDP), \$ 9.99 billion for France (0.39% of GDP) and \$ 19.99 billion for Japan (0.41% of GDP).

Contents

1. Introduction	1
2. Aims and goals of a financial transaction tax	2
2.1 <i>The financial transaction tax as a revenue-raising instrument</i>	3
2.2 <i>Correcting financial markets inefficiencies</i>	4
3. Potential effects of an FTT	8
3.1 <i>Effects on volatility and trading volumes</i>	8
3.2 <i>Financialization and financial regulation</i>	13
4. The international debate about a financial transaction tax	17
4.1 <i>Discussions at the level of the G20</i>	18
4.2 <i>Discussion in Europe and in the European Union</i>	18
4.3 <i>The Debate in the US</i>	20
5. Different concepts and designs and international experiences	21
5.1 <i>Elements of an optimally designed financial transaction tax</i>	21
5.2 <i>Different forms of a tax of the financial sector</i>	22
5.2 <i>Existing financial transaction taxes</i>	23
5.2.1 <i>Overview of existing financial transaction taxes</i>	23
5.2.2 <i>Country experiences</i>	25
6. International coordination as central prerequisite for an efficient FTT	28
7. Estimates for potential revenues of a global financial transaction tax	32
7.1 <i>Potential revenues</i>	36
8. Conclusions and outlook	45
References	48
Annex	52

1. Introduction

The idea of a financial transaction tax (FTT) is not new. For decades, the introduction of an FTT was repeatedly brought into play within various economic and political contexts (Wahl, 2016). Beginning with John Maynard Keynes, who in 1936 suggested a tax on transactions on stock markets after the Great Depression, various concepts for the taxation of (certain) financial transactions were brought into discussion during the last decades. After the breakdown of the Bretton Woods System in the beginning of the 1970s and the currency crises in Russia and Asia in the 1990s, the focus was on the taxation of currency transactions, as suggested by James Tobin (1974). Tobin proposed to tax currency transactions as a way to reduce the volatility on currency markets and to limit what can be seen as “excessive”, purely speculative and potentially destabilizing trading by “throw[ing] some sand in the wheels of our excessively efficient international money markets” (Tobin, 1978).

With the introduction of the common currency in an increasing number of EU Member States the original idea of taxing currency transactions has lost much of its relevance in the European context. During the last decade the focus of the academic as well as the policy debate has shifted towards a general, broad-based financial transaction tax (FTT) levying a uniform tax rate on all kinds of financial transactions¹⁾. The recent financial and economic crisis resulted in new momentum for this concept of a general FTT, also against the backdrop of the general under-taxation of the financial sector (Cannas et al., 2014).

This coincided with a debate about the implementation of international solidarity taxes to finance global public goods²⁾. It was led rather intensely in the beginning of the 2000s, starting with the Monterrey Consensus of 2002 recognizing “the value of exploring innovative sources of finance” to meet the Millennium Development Goals (MDGs). In 2004, the so-called Landau Report commissioned by the French President Jacques Chirac identified the feasibility of new financial sources such as solidarity levies to be implemented at the international and national level (Landau Report, 2004). However, the concrete results of these debates and the ensuing initiatives were rather limited. While 79 Heads of State endorsed the Declaration of Innovative Sources of Financing for Development during the 60th general assembly of the United Nations in 2005, up to now the only international solidarity tax implemented within a coordinated move of a group of countries is a levy on plane tickets: with France as the only EU Member State in a group of (with the exceptions of Chile and Korea) non-OECD countries³⁾ applying such a tax at generally rather moderate rates and transferring the revenues to UNITAID, a fund purchasing medicine to fight HIV/AIDS, malaria and tuberculosis in the developing world (Lockley – Chambwera, 2011).

¹⁾ Schulmeister et al. (2008), for an early concept of a general financial transaction tax.

²⁾ For a brief overview Schratzenstaller (2013).

³⁾ See <http://unitaid.org/assets/factsheet-about-unitaid-en.pdf> for the countries included.

With the adoption of the Sustainable Development Goals (SDGs) in 2015, the question how to finance expenditures necessary to secure the provision of global public goods (for example internationally coordinated measures to fight climate change or to establish a humanitarian refugee and asylum framework) as one element of an overall strategy to make global development economically and socially sustainable has re-emerged. According to UNCTAD (2014), a \$ 2.5 trillion funding gap needs to be closed in order to achieve the 2030 Agenda for Sustainable Development. Sustainable Development Goal 17.3 aims at mobilizing additional financial resources for developing countries from multiple sources, without, however, specifying in detail the potential (tax-based) revenue sources.

The recent global financial crisis has led to renewed attention and public support for introducing a measure of taxing the financial sector to raise revenues, guarantee an adequate contribution of the financial sector to government coffers, which have in the past often been used to support it in crises situations, and possibly reduce the risk of such crises. This was made particularly clear after the Group of Twenty (G20) issued a statement on the need to have a summary of "... the range of options countries have adopted or are considering as to how the financial sector could make a fair and substantial contribution toward paying for any burden associated with government interventions to repair the banking system."

Against this background, this study explores the suitability of an FTT as an international solidarity tax. First, we analyse the benefits and challenges of introducing a tax on financial transactions, putting a special focus on the introduction of such a tax on a world-wide scale. For this purpose, the first part of the study provides a review of the existing theoretical and empirical literature on the potential effects of taxes on financial transactions. Secondly, we analyse from a political economy perspective the prospects, the current status, and the lessons learnt from the European discussion on the implementation of an FTT. In a third step, the revenue potential of a global FTT, broken down to regions (Europe, Asia, North America, South America and where available Rest of the world), is estimated. Furthermore, using a proxy based on national GDP and derivatives trading, we report an approximation of how much of the estimated revenues would accrue to each country.

2. Aims and goals of a financial transaction tax

The financial transaction tax (FTT) has been discussed primarily under two perspectives: First, as a way to make the financial sector contribute to government revenues. Secondly, the tax has often been related to the possibility to reduce speculative short-term financial activities, thus possibly helping reduce market inefficiencies and market failures. The first of these goals seems to be well in reach given the sizeable potential revenues that an FTT can generate, as we demonstrate in detail in chapter 7. What is more, the exact volume of these potential revenues crucially depends on the breadth of the base and the territorial scope of the tax. The second goal is still under trial given the uncertainty of the results of empirical work analysing how and in which direction an FTT would influence market volatility and thus whether it can help reduce market instability.

2.1 The financial transaction tax as a revenue-raising instrument

First and foremost, an FTT aims at raising significant additional revenues. These can, for example, be used to finance additional activities and initiatives by governments and international organisations, replacing national contributions of countries to international organisations providing international public goods. This has been frequently highlighted in discussions in the past decade regarding funding needs of governments and international organisations. Thus, a financial transaction tax can also be thought of as a tax on the consumption of financial services, especially since these are often exempt from the value added tax (Coelho, 2016). The debate about the pros and cons of the tax and its implementation design has been accompanied thus by studies estimating the potential revenues of a financial transaction tax, which is also one of the main goals of this study. Table 2 in chapter 6 shows that these estimations arrive at considerable yields to be expected from a financial transaction tax already under rather cautious assumptions on the extent of tax-induced avoidance and evasion activities.

A recurrent theme since the outbreak of the global financial crisis has been the urgent need to mobilize further financial resources with the aim of funding the provision of global public goods and ensuring the ability to fulfil a number of global initiatives, including the fight against climate change, broad environmental commitments or the financing gap in the area of development aid. Global challenges should best be addressed globally as their extent makes it impossible for a single country to take effective action. Accordingly, more global funding resources are required, as communicated in the UN's Sustainable Development Goals agenda. Many of the global problems of today, such as climate change and financing for development needs, present an even more serious collective action problem than the provision of national public goods, as the many stakeholders involved, including national governments, try to first maximize their national interests and would often avoid effective global solutions. This lack of contribution towards global public goods and towards solving global challenges has been deemed as the Global Solidarity Dilemma (Report of the *Committee of Experts to the Taskforce on International Financial Transactions and Development*, 2010). As the Report of the Committee of Experts to the Taskforce on International Financial Transactions and Development notes: "Based on these principles, it can be argued that the main beneficiaries of more balanced globalisation should contribute to meeting the funding needs of global challenges, which, if left unaddressed, could seriously disrupt the efficient functioning of transnational economic activity". The *Doha Declaration on Financing for Development* (2008) has e.g. made clear that: "We encourage the scaling up and the implementation, where appropriate, of innovative sources of finance initiatives. We acknowledge that these funds should supplement and not be a substitute for traditional sources of finance and should be disbursed in accordance with the priorities of developing countries and not unduly burden them. We call on the international community to consider strengthening current initiatives and explore new proposals". An FTT has been proposed as innovative funding source to finance global public goods, while also being perceived as instrument to stabilize financial markets (e.g. Atkinson, 2005). In the EU context the tax is often suggested, as in the initial proposal by the *European Commission* (2011), as an

innovative, sustainability-oriented tax-based own resource for the EU budget (see also *High Level Group of Own Resources*, 2016; *Nerudová et al.*, 2017). Alternatively, the tax is discussed as innovative financial source for development (e.g. *European Commission*, 2010B). Not least, delivering on these promises through the mechanisms and institutions of global cooperation can be an effective way to restore the somewhat shaken confidence in these.

Financial activities have been one of the main beneficiaries of globalisation trends and economic growth in the last three decades. However, there is a widely shared sense that the financial sector has not contributed back effectively and proportionally to the funding of important public policy goals. This is why the call for addressing this funding gap has been even more pronounced since the financial crisis. Finance was essential for globalisation and global growth, but it has often been associated also with heightened macroeconomic instability. To limit the current backlash in public opinion against globalisation, the financial sector needs to contribute more decisively to a fair distribution of its gains back to public goods and overall welfare. The financial transaction tax can be seen as one instrument, besides others, to have the financial sector pay its fair share to government revenues in general and to cover the budgetary costs of the recent financial crisis in particular (e.g. *IMF*, 2010). Accordingly, revenues of an FTT could go into national budgets, either to contribute to fiscal consolidation to bring down public deficits and debt driven up by banking rescue packages, or to reduce other taxes more distortionary than an FTT. Alternatively, the revenues could be used to substitute or decrease the national contributions of member states to the budgets of international organisations. While the concrete kind and design of global public goods needed to further balance global growth and development of course should be discussed, in any case their provision requires additional financial resources.

2.2 Correcting financial markets inefficiencies

In addition to the goal to raise much needed revenues, the second main aim of an FTT is to act as a corrective tax to limit important market failures⁴). Financial market vulnerabilities exist in various manifestations and are partly explained by specific frictions and market failures (*Yellen*, 2017; *Haldane*, 2017), often resulting from behavioural biases such as herd behaviour. Some developments of the financial sector in the decades before the global financial crisis have left the overall financial system susceptible to serious and painful crises (*Constâncio*, 2017). Various failures have contributed to the crisis – such as excessive risk-taking; focus on individual, rather than systemic risk; opacity of positions in financial derivatives that produce negative and dangerous externalities and runs on important banking institutions (*Acharya et al.*, 2011). In such an environment, financial institutions that are systemically important take a central role for the efficient functioning of the market – so much so that their failure infects and endangers the whole system. Risk thus becomes concentrated, but also contagious (*Yellen*, 2017). Furthermore, the possible complexity and opaqueness of the system leads to the fact that full and

⁴) For a thorough discussion of corrective taxation with regard to financial sector externalities, particularly in the context of the recent financial crisis, see *Keen* (2011).

correct information is not always available, reducing the resilience of the system to shocks (Gai *et al.*, 2011). The interconnectedness between banks and other financial institutions may lead to important spill-over effects meaning that a small shock has domino consequences for the whole system. While this phenomenon has been known since the *Diamond – Dybvig* (1983) model of bank runs, recent contributions (Gai *et al.*, 2011; Drehmann – Tarashev, 2011; Laeven *et al.*, 2014) have underscored its importance. Against this background, one central goal of the FTT is to dampen the transaction volumes of financial products that are excessively complex and opaque or are purely based on “irrational exuberance” (Shiller, 2006), inflated expectations or behavioural biases, to thus improve market stability. Systemic crises can have long-lasting damaging effects on the functioning of the economy and interventions are often required to prevent such crisis or limit their consequences. The recent financial crisis has led to a rethinking concerning the need for a stricter financial market regulation, and macroprudential instruments, as well as regulatory frameworks such as Basel III, have been developed to reduce the likelihood of such crises.

Proponents of the FTT stress its goal to contribute to limiting some of these dangerous vulnerabilities on financial markets. The FTT will burden more heavily short-term transactions, which are often assumed to be key drivers of speculative trading. Short-term speculative trading activity can have a destabilizing effect on markets and enhance periods of market turbulences unrelated to fundamentals. Bushee – Noe (2000) e.g. argue on the negative effects of market volatility as enhancing risks for investors and market participants. An FTT would reduce the volume of trades by raising transaction costs. Some trades that would have been profitable with lower transactions costs would become unprofitable due to the FTT and would not be undertaken – and this would affect short-term transactions most significantly as the tax burdens each single transaction, thus implying a cascade effect, making it more costly to have an overly active portfolio management. Comparing the burden of actively managed portfolios with portfolios where financial instruments are acquired based on a long-term holding strategy shows that over many years the overall accumulated burden of the FTT is considerable when there are many trades per year, while it is very small in comparison to transactions costs when the strategy is to hold the financial asset for a long period (Schäfer – Karl, 2012). Therefore, these long-term strategies of investment and financing would be much less affected by an FTT.

Besides the overall goal to reduce volatility, the proponents of an FTT aim at discouraging dangerous speculations and thus to contribute to reducing periods of excessive market adjustments which can lead to significant deviations of prices from fundamentals – “bubbles”. Such “bubbles” and periods of excessive credit growth were identified in some of the recent contributions in the literature as important precursors to deep economic crises (Brunermeier – Oehmke, 2012; Jordà *et al.*, 2015). Theoretically, a smaller share of speculative trading in relation to overall trading should mean that prices more accurately reflect the underlying values of assets and are less influenced by short-term expectations. The potential of an FTT to potentially reduce especially the activities of high-frequency traders can contribute to such a stabilizing effect. High-frequency trading is often mentioned as one of the main reasons for

finding the FTT a suitable instrument to stabilize financial markets, so we discuss it separately below.

A further possible outcome of the FTT related to its ability to decrease financial transactions of high frequency could be to thus redirect financial markets towards a more long-term model of financing. As *Haldane (2010)* points out, throughout the past decades developed capital markets have undergone a significant shift to short-termism. While, e.g., equities were held by investors for years on average in the USA in the 1970s, so that it can be assumed that they are bought and sold based on their fundamental characteristics, the average holding period today has decreased to several months only.

A further aim of the FTT could be the shift of assets or capital away from the shadow banking system, where financial entities have transferred significant parts of their assets throughout the past decades. If transactions between a company and a shadow banking entity were taxed by the FTT, this would partly discourage such transactions and would lead banks and companies to keep the transactions internal – which is preferred as long as the shadow banking industry is seen as intransparent, unregulated and susceptible to risks.

The Relationship between High-Frequency Trading and Market Volatility

High-frequency trading represents a way of trading that has mainly benefitted from the introduction of computer algorithms to impose automatic trading orders executed in milliseconds when a certain rule to buy or sell the asset in question after a specific threshold is fulfilled. This has had significant impacts on the financial sector throughout past decades. Big investment banks and hedge funds have developed faster and more complex algorithms to be ahead of their competitors in that respect, thus making it more challenging for common participants in financial markets to compete with the profits of high-frequency trading (HFT) firms. HFT enables top firms to extract profits from systems with lower latency by simple automation of the process. High-frequency trading in high volumes can affect the valuations of assets without a fundamental change of the underlying asset or instrument and therefore is often seen as unnecessary for the market clearing price mechanism.

It is unclear from both empirical and theoretical perspective whether has HFT increased market liquidity and trading volumes in a healthy manner or whether it has rather decreased the relative importance of fundamental price signals therefore enhancing reactionary spirals in times of market stress. Firms using high-frequency trading can often profit from exploiting the fact they dispose of faster technology for the processing of orders. Activity in high-frequency trading has been on the rise significantly throughout past decades. The effect of high-frequency trading on volatility is important because it could increase market risks, but there is no clear empirical result on the effect of HFT on market volatility. *Bushee – Noe (2000)* e.g. argue on the negative effects of market volatility as enhancing risks for investors and market participants. While some papers find a positive relationship between HFT and market volatility (e.g. *Zhang, 2001*), there are others that point to no correlation between the two. *Zhang (2001)* argues, using fixed effects estimations on volatility of companies' stocks, that HFT activity can increase volatility

and leads to excessive reactions to news. The attention towards high-frequency trading and its side effects has increased after a number of prominent market stress cases throughout past years, which have partly been explained by the enhancement of surprising market reactions through high-frequency trading. The most well-known of them has been "the Flash Crash of May 6th, 2010", when US markets collapsed for a few minutes and then recovered fast without any obvious fundamental reason. Subsequently, it was analysed that a large number of high-frequency orders and herding behaviour by market participants have contributed considerably to this period of market stress (*Demirer, 2019*). Against this background, one specific goal of an FTT is to stabilize financial markets through dampening HFT.

3. Potential effects of an FTT

Although the concept of the financial transaction tax has a long history, the public debate as well as the academic literature have been characterised by widely diverging views on its suitability and feasibility. There are a number of commonly cited and well-known arguments against the introduction of an FTT, especially regarding some of its main goals. While these are consistent and realistic arguments, they do not necessarily imply that an FTT is infeasible, but mostly point to the importance of it being designed in a most efficient manner and considering the trade-off between the positive and negative effects of the tax for overall welfare.

In this chapter we therefore address the potential benefits, challenges and obstacles of introducing a tax on financial transactions. We make use of the existing theoretical and empirical literature to discuss the potential positive and negative effects of taxes on financial transactions (in particular on trading volumes, market volatility, and liquidity on financial markets) and discuss the current insights from past and present attempts to introduce FTTs, which has mostly occurred on a national level.

There is a wide range of studies exploring the effects of an FTT, resting on different methodological approaches. While some analyses try to assess the effects, the costs and benefits of the tax as a whole, others focus on either estimating ex ante the potential revenues from imposing such a tax on a global scale or within a group of countries or on evaluating ex post the impact of existing national FTT on the functioning of financial markets. There is a limited number of papers that analyse the effects of the tax in a general equilibrium setup. The most notable one by *Raciborski et al.* (2012) points out that there would most probably be distortive consequences of an FTT similar to a tax on capital, but that the FTT can indeed reduce volatility, albeit only rather modestly. However, in this paper, as in most others, any possible indirect feedback effects from the additional government revenues and therefore government spending are not considered in addition to the effects it might have on the financial sector. In such a setting, the overall societal welfare effects from the tax might diverge significantly and compensate for any possible costs it imposes on financial markets. Although such an overall assessment in a general equilibrium set-up would be a practical and insightful exercise, it goes beyond the scope of this paper.

3.1 Effects on volatility and trading volumes

Much of the discussion regarding the consequences of the introduction an FTT, beyond its potential to generate significant government revenues, revolves around how the tax would affect market liquidity. Market liquidity itself does not have a precise definition. A liquid market is characterized by the ability of market participants to buy or sell assets at a reasonable price at any time (*Burman et al.*, 2016). This means there are ample opportunities both on the buying and the selling side and individual transactions should not affect prices considerably. The decisions of individual actors to buy and sell should theoretically not lead to rapid price adjustments in liquid markets. One way to assess this is by the bid-ask spreads – the differences between the

highest price buyers are paying and the lowest price sellers accept. If the bid-ask spread is low, this normally points to a liquid market.

If the increased tax leads to decreased market liquidity through decreased trading volumes, this would affect market volatility. To estimate the extent of these effects it is important first to assess to what extent the tax would affect trading volumes. The size of such an effect depends on the elasticity of the volume of transactions to transaction costs. The additional FTT represents an increase of the already existing transaction costs and would therefore make the transaction unprofitable or less profitable for some market participants. Financial agents might decide not to make the transaction in the first place (lock-in effect) or to divert their liquidity to other market segments or other jurisdictions. The extent of this reduction, but also which transaction types will exactly be reduced is of key significance. The reduction in market activity can affect negatively the price finding process, but it could also affect it positively, if it decreases activity by "speculative" traders more than that of fundamental traders. Proponents of the FTT often argue that there are segments of the financial sector where some of the trading is pure speculation or due only to an increased usage of algorithms. It is relatively unclear whether increasing the cost of trading by introducing an FTT would decrease excess volatility in asset prices, not the least because it is very difficult to define which volatility is excessive.

The FTT rates suggested in most existing proposals for an FTT and applied in our estimations below are very low, especially in comparison to current average transaction costs. Under these circumstances, the FTT can have the desired result of reducing speculative trading simply because it will burden very frequent trading disproportionately more. This trade-off between the two types of financial market activity is important for determining the overall market effects of an FTT, but it should not be decisive for its overall suitability from a welfare perspective, if there is good reason for policymakers to wish to reduce some financial activities in return to considerable government revenues. Even if there are negative market effects due to decreases of financial market activity in the rest of the sector besides short-term trading, these negative effects are expected to be minor due to the low tax rates at which the FTT is proposed⁵).

Proponents of the FTT in the tradition of Tobin argue that as a corrective tax it will mostly offset the volatility that is unnecessary and "speculative", thus improving market efficiency. The expectation that an FTT could reduce trading that is seen as unproductive and not based on fundamentals, and that it could also decrease volatility is a key motivation for the FTT proposals by Keynes (1936), Tobin (1974), Stiglitz (1989), and Summers – Summers (1989). However, there is not much empirical clarity whether the FTT will indeed decrease volatility, or rather can be expected to increase it. The effect on volatility may go in either direction, depending on how much the FTT influences fundamental traders and how much it influences noise traders.

From a theoretical point of view, one can describe financial markets as populated by two kind of traders. Fundamental traders drive an asset's price toward its fundamental value, while

⁵) See, for example, the impact assessment provided by the *European Commission* (2011).

speculative or noise traders introduce random variation in either direction. Having more fundamental traders will reduce volatility and most probably improve market efficiency, while noise traders will raise volatility. If an FTT primarily reduces speculative behaviour and removes disproportionately more noise traders than fundamental traders, then it could reduce volatility. *Deng et al.* (2014) report evidence consistent with this hypothesis. They estimate that in less mature markets, which might have more noise trading because information is less readily available, FTTs reduce market volatility, but in more mature markets, presumably with more fundamental traders and better information, FTTs increase volatility.

Davila (2013) analyses how a linear FTT would influence aggregate welfare in a model with different beliefs and reasons for trading – fundamental trading, based on hedging, risk aversion and other reasons, and non-fundamental trading governed by beliefs and simple rules. In such a model, one can obtain a standard formula for the optimal tax where the welfare-enhancing reduction in trading based on distortions and non-fundamental belief are counterbalanced by a welfare-decreasing loss in trading based on fundamentals. Although an interesting contribution to the current literature, this study does not take into account additional welfare effects regarding other sectors (households, corporations) besides agents in financial markets, and it does not include other benefits of an FTT besides the corrective function of reducing non-fundamental trading, such as closing tax loopholes in the financial sector or reducing excessive market rents.

It is important to note that the empirical evidence with regard to the question whether the introduction of an FTT indeed reduces volatility so far has been inconclusive. Supporters of the FTT argue in the tradition of Tobin that the tax might be used as a classical corrective tax and would therefore decrease undesirable trading by increasing its costs. One of the main counter arguments against the usage of an FTT has been that it might slow the process of price discovery, especially by reducing liquidity in the market. Therefore, the opponents of this idea point out that if the tax reduces overall liquidity in the market this would distort the market efficient result and volatility might rise. The empirical evidence is somewhat mixed. While a number of papers find an increase in volatility (*Baltagi et al.*, 2006; *Hau*, 2006; *Pomeranets – Weaver*, 2011), others find a negative relationship between an FTT and volatility (*Jones – Seguin*, 1997; *Liu – Zhu*, 2009) or no effect (*Roll*, 1989; *Saporta – Kan*, 1997).

A number of studies estimate the effects of FTTs on trading volumes of financial assets. The change in the trading volumes of different financial instruments is the elasticity of turnover volumes to the tax. There are high uncertainties around the estimates of these elasticities, but they are central to the estimation of potential revenues, because they estimate the effects that the additional tax would have on trading activity on the specific market. Studies by *Hu* (1998), *Schwert – Seguin* (1993) and *Bond et al.* (2004) as well as a survey by *Oxera* (2007) find a range for the elasticities of between -0.50 and -1.70, while these surveys also estimate the asset value elasticities to be between around -0.15 and -0.40 (relative to total transaction costs). In our further estimations of potential revenues, we keep this range of an elasticity of between -0.50 and -1.50 for different financial instruments types. Some studies (e.g. *Schäfer – Karl*, 2012), as

well as the Impact Assessment of the European Commission (*European Commission, 2011; European Commission, 2013*), take these values as assumptions for their assessment of potential revenues. This is the approach we take in chapter 7 as well.

In a detailed empirical study, *Coelho (2016)* disentangles and estimates the relative size of the effects of the different channels of evasion and reduction in trading volumes and how that might affect the overall potential revenues of the FTT. The study follows other canonical studies in the optimal taxation literature and in a way builds upon the study by *Piketty et al. (2011)* on optimal income tax rates by disentangling three elasticities representing different channels of reaction to the new tax: a substitution away from taxed assets, a retiming and lock-in response to the tax, and a tax arbitrage response in avoiding taxation by switching platforms or even jurisdictions. The study analyses the introduction of an FTT in Italy and France (see section 6) and uses difference-in-difference methods to assess how these have affected financial markets activity in these countries. Most theoretical models imply that higher transaction costs due to an additional tax would induce a lock-in effect, as well as a substitution and evasion effects. *Coelho (2016)* estimates the relative size of these effects by using the natural experiment of introducing the tax in both countries and comparing trading volumes in the two countries with neighbouring similar countries. The different channels can be differentiated in an extensive margin of response and a number of intensive margins. The extensive margin of response is the substitution from taxed assets to other assets, as explained in *Slemrod – Yitzhaki (2002)*. On the intensive margin, there are two channels – one is a retiming response in the realization of transactions, but more importantly because a lock-in effect, which minimizes the frequency of transactions. Furthermore, there could also be observed arbitrage and shifting towards other trading platforms or financial instruments, which are economically equivalent. A large lock-in effect can significantly erode government revenues expected from the tax. It is crucial thus to estimate the elasticities of asset prices and market volumes and to assess whether they are low enough to guarantee the potential revenues from an FTT will still be sizeable. *Coelho (2016)* finds a small substitution response to the implementation of the FTT, but a very high avoidance response, which manifests itself in shifts in the timing of transaction realizations over-the-counter, a sharp lock-in-effect of high-frequency trading and a divergence across platforms to exploit tax arbitrage opportunities. This is especially important as far as the global FTT will produce an opportunity to minimize avoidance opportunities if there is enough cooperation across jurisdictions. A possible move from OTC trading to exchange trading would also constitute a further advantage, as the latter are more transparent and better regulated. The shift to exchanges could therefore have additional important positive effects left out of welfare analysis – by making systemic risk exposure more transparent and by ensuring better access to information about financial instruments overall. Even though *Coelho (2016)* finds the design of the FTT as introduced in France and Italy to be suboptimal for revenue maximization, the author admits that it might have a welfare-enhancing character as a corrective tax if the tax is designed properly to lead to optimal trading behaviour and takes into account the opportunities for tax avoidance.

An important caveat with regard to the empirical literature on FTTs discussed above is that it refers to FTTs which are implemented on the national level only. In such cases the evasion and substitution effects are much higher, as an FTT implemented only in one jurisdiction is easy for financial firms or market participants to avoid. If the tax was imposed globally, it would become almost impossible for such a substitution to take place, or there would be other countervailing factors such as the importance to be present at major financial centres that would mean that trading volumes are much less affected. Thus, if countries agreed to be part of a global FTT agreement, significant evasion and relocation effects could be avoided. As far as many of the studies, with the exception of *Coelho (2016)*, report only one elasticity, this estimate also includes the effects from substitution and evasion and could therefore be biased upwards. Elasticities of trading volumes would be lower in the case of a global FTT. The same principle also holds for the scope of the tax regarding different sub-market and financial assets – the broader the base of an FTT, the more effective the tax would be due to the lack of relocation or substitution options for market participants to choose to do other transactions with lower overall transaction costs. We discuss these design issues in chapter 4 again in more detail.

To assess the overall suitability of an FTT, from a theoretical point of view it is important to identify how these reductions in trade volumes influence volatility on markets. Excess volatility, which has been defined by *Shiller (1981)* as the volatility of the equity market that cannot be justified by variation in subsequent dividends, can be a sign of financial market irrationalities and inefficiencies (*Dumas, 2003*) and can be regarded as undesirable. Similar to the question of how an FTT affects trading volumes, it is a difficult question to identify properly the changes in volatility caused by the introduction of the FTT and differentiate it from changes that are explained by other macroeconomic processes. This is even more difficult with regard to estimating the effects on volatility, as market volatility is much more driven by global business and financial cycles. *McCulloch – Pacillo (2011)* present an overview summarizing different studies that analyse the relation between transaction costs and volatility and conclude that the empirical literature suggests that an FTT, which could be seen as a raise in transaction costs, would probably rather increase volatility. *Deng et al., (2014)* find that a stamp duty tax decreases volatility in more mature financial markets, such as e.g. Hong Kong, and increases it in less mature market (e.g. mainland China). *Schulmeister et al. (2008)* show that the existing empirical evidence on the effects of FTTs on volatility is mixed, with a number of studies pointing even towards a positive relationship between FTTs, transaction costs and volatility. Based on this evidence it can be concluded that an FTT probably would not necessarily dampen short-run volatility. Most of the existing studies, however, focus on short-run volatility and are not able to capture any long-run effects of FTTs on financial market stability (*McCulloch – Pacillo, 2011*). It therefore remains an open question whether an FTT is able to reduce financial market volatility in the long run. The empirical studies that are based on national FTT reforms are insufficient to realistically assess the effects of a global FTT in this regard.

A further line of argumentation against the taxation of financial products through a financial transaction tax revolves around the theoretical understanding that finance instruments are an

investment of its own, with its own market clearing purpose. Eroding them would reduce the efficiency of the market. The old and classical optimal capital taxation literature in a recursive macroeconomic setting has for a long-time included the central notion that the optimal capital tax is zero, based on the canonical *Judd* (1985) and *Chamley* (1986) contributions. In an analogous manner the case can be made that the FTT, similarly to capital taxation, would just reduce the overall return on investment, making less investment feasible or profitable, thus degrading the productive capacity of the economy. However, new and revised evidence on the capital taxation literature shows that earlier theoretical results were susceptible to changes in their policy conclusions due to changes in parametrization, assumptions or the specification of the utility function. In this manner, *Straub – Werning* (2018) show in a more realistic environment, with intertemporal elasticity of substitution of below 1.00, that the optimal capital tax is actually positive. A similar story may apply to an FTT, even if any positive welfare effects that could come from the additional government revenues and their uses are ignored.

In addition, it must be pointed out that the deadweight losses that might be imposed by a corrective FTT could be smaller than those resulting from other, currently existing more distortionary taxes. These could be decreased in response to the implementation of an FTT. The overall welfare effects would depend on the overall difference between the two, but also on the preference weights given in a theoretical social utility function with respect to different groups – financial market participants, which will be burdened with the cost of the tax, savers, and non-financial firms and corporations.

3.2 Financialization and financial regulation

The last three decades both across developed, but also developing countries have been characterized by a stable and consistent trend of a growing significance of financial markets and the financial sector for the world economy. This has not only been due to a further development of capital markets and the issuance of classical shares and bonds as a means of funding for companies, but has also been considerably affected by the growth of the derivatives industry. The nominal value of OTC derivatives around the world today is a multiple of world GDP. The aggregate nominal value of different forms of derivatives has risen by more than 700% since 2000. As shown in Figure 1, trading volumes of three of the four major groups of financial instruments – equities, OTC derivatives and exchange traded derivatives – have experienced a significant rise throughout the past decade. This is especially the case for OTC derivatives and exchange traded derivatives, which have increased in trading volumes by more than 50% since 2008, based on the BIS data provided below. Derivatives, both traded over-the-counter and through regulated exchanges, could be a major source of increases in potential revenues from the FTT, as demonstrated by our estimations below.

The main reasons pointed out for these impressive developments have been the significant decreases in transaction costs, the variability of new products available and the decrease in the timespan for which these instruments are held. The significant advantage of derivatives as

instruments for hedging risk is the possibility for a much higher leverage, although this can often result in an accompanying liquidity risk.

But the growing importance and significance of financial transactions has been observed also in the global financial crisis. Unlike during the short US recession in 2001, trading in foreign exchange did not decrease during the global financial crisis – pointing to the fact that significant reductions in the financial transactions volumes today are improbable even in times of great uncertainty and worries on the markets. What is more, transactions might even increase in such periods, as new and more sophisticated products have made it possible to trade and bet against high volatility, partly also due to the increase in high-frequency trading, which automatically increases significantly in times of excessive market pressures, when different thresholds for automatic execution of orders are reached. It is thus under discussion whether these transactions actually help the market clear in times of stress or whether they strengthen rapid and painful adjustments based on herd behaviour and algorithmic trading, thus enhancing periods of over-optimism or over-pessimism, similarly to the process described by *Shiller* (2006) and others.

A central line of counter-arguments against an FTT starts with the well-articulated theoretical idea that financial deepening and further developments of financial markets and an increasing size of the financial sector have positive effects on economic growth. Through raising the cost of capital, an FTT would slow down the development of financial markets and thus impede growth. While this theoretical notion holds for developing countries, where access to properly functioning financial markets can still be a problem, some recent re-examinations of this older literature have put doubt whether the relationship between financial deepening and economic growth holds for countries with financial markets well advanced in their development. Before the global financial crisis, there was a widely shared consensus that financial deepening has a monotonic and linear positive effect on growth (*Levine*, 2005). In recent years though, there has been a re-assessment and a number of studies have pointed out that this relationship might not be linear – after passing a specific threshold, further financial deepening can stop supporting or even sometimes hurt economic growth (*Arcand et al.*, 2015; *Beck et al.*, 2014). From a certain point onwards, financial intermediation can start supporting unproductive investments projects (*Beck et al.*, 2012; *Cecchetti et al.*, 2015). Furthermore, intensified financial intermediation can bring about a trade-off between economic development and macroeconomic risk (*Rancièrè et al.*, 2008; *Popov*, 2014). *Zingales* (2015) articulates that argument by pointing out the importance of financial deepening for economic growth, but it is unclear whether the deepening of more advanced markets for financial assets – such as exotic instruments and other derivatives – necessarily has a positive effect on growth. Although these in theory should play an important role in the price finding process and constitute further opportunities for hedging and -thus insurance for end consumers, clear empirical evidence for this is missing.

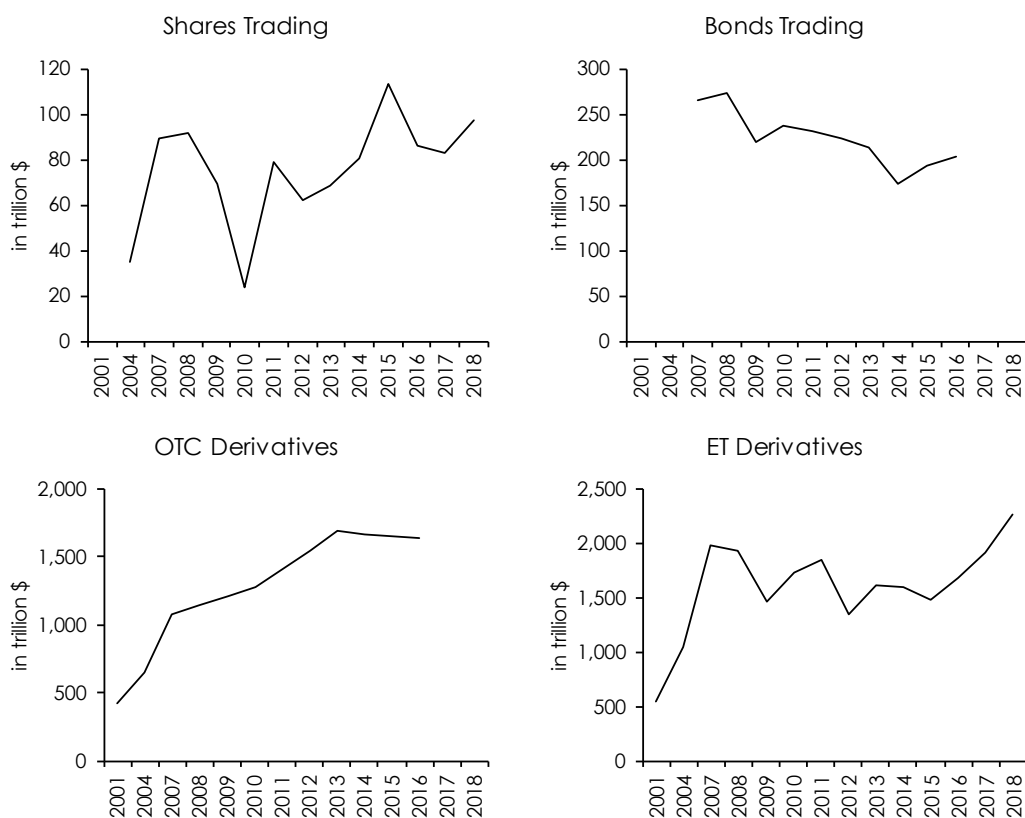
The global financial crisis has spurred a discussion whether the growing significance of the financial sector can also have potentially negative effects for the economy. Credit markets are

an important source of funding for firms and can contribute decisively to economic growth. However, credit and financial instruments can also grow “excessively” and become dangerous. This rise in significance of the financial sector in relation to the real economy – also known as “financialization” (*Epstein, 2005; Baker, 2005; Turner, 2011*) – has been characterized as the phenomenon that finance has come to dominate the economy and often is the biggest source of business cycle fluctuations. Such an important role for finance has been criticised for exposing the real sector to dangerous periods of instability and market swings. The ability of financial markets to self-regulate has often been overestimated and market failures have widely been underestimated. Those economic crises which emanated from financial markets combined with excessive private debt have had the greatest impact and spread most worldwide (*Schularick – Taylor, 2012*). As discussed above, financial markets often suffer from harmful herd behaviour, while financial instruments can be too complex or opaque, therefore hiding potential risks.

As the impact of the global financial crisis has been enormous in terms of growth, employment and the costs to public budgets, there has been much rethinking on whether financial regulation, that significantly contributed to the rise of the role of finance, has not been inappropriate and failed to ensure macroeconomic stability. In 2009, at the G20 summit in Pittsburgh, important reforms of financial market regulation in response to the financial crisis were discussed, which included the possible introduction of an FTT. A new consensus regarding financial regulation has evolved ever since on the need for a much stricter and better suited financial regulation to limit financial risks.

Some progress has been made since then, mostly along the Basel III framework, which includes important reforms to address systemic risk, introduces new regulatory instruments, addresses macroprudential risks and others, but still much remains to be done to develop regulation that ensures maximal welfare. Many proponents of the FTT see this as a further argument in favour of introducing an FTT. The significant increases in financial markets activity throughout the past decades would be very mildly affected by the introduction of an FTT with a relatively low tax rate. And even if financial markets are considerably affected, this would not necessarily have an overall negative welfare effect. There has been no decisive evidence that an FTT will ensure macroeconomic stability – this is where decisive and fine-tuned regulation needs to step in. But if it limits the sustained rise in importance of the financial sector for business cycle fluctuations and if that sustained rise is not always contributing to overall welfare increases, the FTT will not harm this goal either.

Figure 1: Trading volumes of major groups of financial assets



Note: Global trading volumes for trading of shares, bonds, over-the-counter derivatives (OTC) and exchange-traded derivatives (ETD).
 Source: BIS, WFE.

Distributional effects

As with every tax, it is furthermore important to analyse how the incidence of the tax would be distributed. While it is often argued that raising costs of capital will be shifted towards final consumers and that the effective tax burden will be carried by households, it is important to note that these increased costs will accrue mostly to top income groups, which are the ones that mostly trade with financial instruments. The Impact Assessment of the European Commission (European Commission, 2011) explicitly points out: “Concerning the distributional impacts, like any taxes on capital income, the short run effects of the FTT would likely to be progressive, impacting particularly on households in the highest deciles of the income distribution, as these are typically the households that directly invest in taxed products”. Burman *et al.* (2016) and Matheson (2011) argue that if in the long run FTT increased the cost of capital, the burden would fall on owners of capital and partly on workers. Burman *et al.* (2016) thus distribute the burden similarly to a corporate income tax increase – following the assumptions by the Tax Policy Center 80% of this burden will fall on capital owners and 20% on labor. A microsimulation presented by Burman *et al.* (2016) shows that the tax would be quite progressive in this case and that for the US, 75% of the burden of the tax would fall on the highest-income quintile and 40% would fall on the top 1%.

However, a more complete modelling might show an even more concentrated burden for top wealth groups than suggested by Burman *et al.* (2016). Financial transactions and especially trading of shares, bonds and/or derivatives are carried out mostly by high net-worth individuals. In the United States, the top 1% of households held almost two-thirds of all financial securities in 2010 (Wolff, 2012). The distribution of wealth is in general quite skewed not only in the United States, but also in Europe, as the HFCS data provided by the European Central Bank shows. Top wealth groups would be carrying the increased burden from the additional tax if indeed the tax was shifted towards households. There are fears that an FTT may be passed as additional costs to ordinary investors. However, most ordinary investors would not be significantly affected by an FTT, as they do not make transactions very frequently, but rather buy assets and instruments to hold them for a longer period based on long-term investment strategies. It is exactly the nature of the FTT that it aims at taxing those financial markets participants that make transactions very frequently. Thus, for ordinary investors, the FTT charge would be small in comparison to the other transaction costs like fees and commissions that are normally paid in a normal financial transaction (Schulmeister *et al.*, 2008; European Commission, 2011). Altogether, it can be assumed that an FTT would not have undesirable distributional consequences.

4. The international debate about a financial transaction tax

This chapter traces the most important policy debates centred on the financial transaction tax during the last decades. The debates around the potential introduction of a financial transaction tax have normally intensified around periods of financial turbulence, when public perceptions about the possibilities of financial market instability to spill over to the real economy become very acute, or when potential bank failures burden government budgets and therefore

taxpayers. One of the first well-known proponents of an FTT was John Maynard Keynes, who has argued that such a levy can potentially curb excessive speculation in markets that leads to excessive volatility. His concept, put forward in 1936, was based on the idea that some uninformed traders, if in majority, can drive up volatility in the market that is not driven by a fundamental assessment of financial assets. In the 1970s, the eminent economist James Tobin has further developed the idea of an FTT, developing it in the form of a currency transaction tax, which has ever since often been dubbed as "Tobin Tax". During the 1990s, the discussions have evolved in the direction of the optimal design of the FTT as a global tax with as broad a scope as possible to limit substitution and relocation effects. In this chapter we briefly summarize the international debate on the introduction of an FTT.

4.1 Discussions at the level of the G20

The global financial crisis has led to renewed attention and public support for introducing a measure of taxing the financial sector, also against the backdrop of the general under-taxation of the financial sector (*Cannas et al.*, 2014), to raise revenues, guarantee the contribution of the financial sector to government coffers, which have in the past often been used to save it in crisis situations, and if possibly to reduce the risk of such crises. A G20 financial transaction tax aiming at raising revenues for development aid was first proposed in 2008. In June 2010 the *IMF* (2010) published a report titled "A Fair and Substantial Contribution by the Financial Sector" requested by G20 leaders at their Pittsburgh meeting 2009 in preparation for their Toronto summit in June 2010. The report considers various options to tax the financial sector, among them a tax on financial transactions. Finally, two forms of contribution from the financial sector are proposed, a financial stability contribution and a financial activities tax, while an FTT is not recommended because it "... does not appear well suited to the specific purposes set out in the mandate from G20 leaders." (*IMF*, 2010). However, the report does not dismiss the concept of the FTT as such (*Matheson*, 2011). Eventually, however, G20 leaders could not agree on an internationally coordinated introduction of an FTT: At the Toronto summit in 2010, G20 leaders declared that a global tax on the financial sector was no longer an option to be pursued at the global level, but that individual countries should decide whether to tax the financial sector unilaterally.

4.2 Discussion in Europe and in the European Union

In the EU the introduction of an FTT has been discussed for almost a decade⁶). Right from the beginning, this debate was linked to the search for alternative revenue sources to finance the EU budget (e.g. *European Commission*, 2010B; *European Commission*, 2011) as well as development cooperation and other global public goods (*European Commission*, 2010B).

⁶) See for an overview *Hemmelgarn et al.* (2015).

The European Commission started to examine various options to tax the financial sector in 2010 (*European Commission, 2010A, 2010B*) parallel to the discussions at the G20 level. These initiatives were strongly supported by the European Parliament, which adopted a resolution in March 2010 asking the European Commission to “elaborate, sufficiently in advance of the next G20 Summit, an impact assessment of a global financial transaction tax”⁷⁾. The resolution also urges the European Commission to consider the possibilities to use the revenues of a financial transaction tax to finance the EU budget and “as innovative financial mechanisms to provide support for adaptation to and mitigation of climate change for developing countries, as well as for financing development cooperation”.

In 2011, the European Commission launched the concept of an EU-wide, broad-based general FTT to be introduced in 2014 (*European Commission, 2011*). The proposal foresaw a tax rate of 0.1% on stock and security transaction and a tax rate of 0.01% on transactions with stock and security derivatives. Currency transactions on the spot market and other transactions with derivatives as well as typical financial transactions of small savers, like loans, mortgages, insurance contracts and credit card transactions, were supposed to remain untaxed, as the tax was aimed at professional financial market actors, in particular banks, insurance companies, funds and hedge funds. The potential revenues of the tax for the EU were estimated at € 57 billion, equal to around \$ 79 billion.

Besides stabilising the financial sector, a further argument put forward by the European Commission in favour of the FTT was that it would secure an adequate contribution of the financial institutions to the recovery of the crisis costs. It should also partly compensate for the VAT exemption of financial services. Moreover, it would bring about a certain convergence of the national specific FTTs applied in a number of Member States and thus remove existing distortions on the European common market. The revenues of the FTT should be used as new own resource to finance the EU budget.

As the United Kingdom as well as Sweden, Bulgaria and the Czech Republic fiercely opposed this proposal, the unanimity required in tax matters (which are subject to the special legislative procedure in the EU) could not be reached. The European Commission therefore in 2012 suggested the introduction of the FTT using the instrument of enhanced cooperation, which requires the participation of at least 9 Member States. In the end of 2012, 11 Member States joined forces to advance the implementation of an FTT within the framework of enhanced cooperation⁸⁾. These countries decided to seek an agreement for implementing a common system of an FTT under enhanced cooperation, based on the European Commission's initial proposal, without ignoring the fact that this approach might lead to substantial evasion, distortions and relocations by the financial sector to other untaxed jurisdictions. In the beginning of 2013 the European Commission released a slightly modified proposal which was expected to yield rev-

⁷⁾ <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P7-TA-2010-0056+0+DOC+XML+V0//EN>.

⁸⁾ Germany, France, Italy, Belgium, Austria, Spain, Greece, Portugal, Slovak Republic, Slovenia, Estonia.

venues between € 30 billion and € 35 billion (*European Commission, 2013*). In May 2014 all participating countries, with the exception of Slovenia, agreed on a progressive tax on transactions with securities and selected derivatives, to be implemented in 2016. In the end of 2015, Estonia left the “Coalition of the Willing” after several fruitless negotiation rounds.

Since then, even more negotiation rounds have taken place. However, the discussions have been partly subdued to other political considerations and economic policy debates of currently higher priority, although there have been a number of signals coming especially by France and Germany that the introduction of the tax is still pursued as planned initially. However, the latest suggestions narrow down the scope of the FTT to the trading of shares. In June 2018, France and Germany released a rather vague proposal on the introduction of a Eurozone budget to be financed, inter alia, by the revenues from an FTT. In December 2018, both countries proposed to focus the discussion in the group of the 10 willing EU Member States on an FTT based on the design of the French FTT tax introduced in 2012⁹⁾.

Parallel to the EU debate, France and Italy, which had abolished their FTTs shortly after the outbreak of the recent financial and economic crisis, implemented a broader-based national FTT in 2012 and 2013, respectively, inter alia to impart a new momentum to the discussion about the introduction of an FTT at the EU level (*Schäfer – Karl, 2012; Hemmelgarn et al., 2015*).

In the EU discussions, various proposals how to use FTT revenues were put forward. The initiative of the “Coalition of the Willing” envisages channelling FTT revenues into national budgets to be used for fiscal consolidation and/or the reduction of other taxes. The original proposal by the European Commission launched in 2011 (*European Commission, 2011*), however, suggested to use FTT revenues as a new own resource for the EU budget. The interinstitutional High Level Group on Own Resources chaired by Mario Monti, which was established by the European Commission, the European Council, and the European Parliament to explore options for a fundamental reform of the EU system of own resources, mentions in its final report the FTT as one suitable option for tax-based own resources (*High Level Group of Own Resources, 2016*), as well as the European Commission’s “Reflection Paper on the Future of EU Finances” (*European Commission, 2017*). These proposals provide a useful basis for any concepts aiming at using the revenues from a global FTT to finance a supranational budget dedicated to providing global or at least international public goods.

4.3 The Debate in the US

The global financial crisis has revitalised the debate about implementing an FTT in the US as well, after the original debate has been initiated by prominent US economist in the 70s, but has moderated somewhat in the next decades (see for an account of the US debate *Burman et al., 2016*). The US had introduced a stock transaction tax in 1914, which was doubled during the Great Recession in 1932 and abolished in 1965. Currently the Securities and Exchange Commission is financed by a very small securities transfer tax. In recent years, several

⁹⁾ See for details on the French financial transaction tax *Hemmelgarn et al. (2015)* and *Colliard – Hoffmann (2017)*.

senators have proposed the introduction of an FTT, the most prominent one the primary presidential candidate Bernie Sanders, while presidential candidate Hillary Clinton suggested to introduce a tax on high-frequency trading. Different proposals have been brought forward in the United States Congress, with varying rates of the tax and numerous proposals for how the revenues can be used. The FTT proposal by Representative DeFazio and Senator Harkin has gained considerable media attention and has gathered a number of cosponsors when it was suggested in 2013 under the name "*The Wall Street Trading and Speculators Tax Act*" (H.R. 880 or S. 410). The proposal revolved around a tax of 0.03% on all financial instruments types and was estimated by the Congressional Joint Committee on Taxation (JCT) to raise \$ 352 billion over the years 2013 to 2021, which would be around 0.2% of GDP.

5. Different concepts and designs and international experiences

The large variety of concepts and possible methods of implementation of an FTT has given rise to many different proposals and versions of national financial transaction taxes across countries. There is, however, a crucial difference between a national FTT and a global FTT. As financial markets have become increasingly globalized and capital movement across jurisdictions has been made relatively easy, it is increasingly getting unrealistic for a national FTT to be highly efficient or to limit the negative effects of capital flight after its introduction at the national level. A global FTT is therefore seen as much more effective, but because of the extent of global cooperation between jurisdictions needed for such a global FTT it is much less politically feasible.

5.1 Elements of an optimally designed financial transaction tax

There is broad consensus how an FTT should be designed to generate the highest possible revenues. There are of central characteristics that an FTT needs to comply with to ensure that it creates a minimum of distortions to the market while raising substantial revenues. An optimal design of an FTT should be based on the following design elements:

- The tax should be imposed on all transactions of financial assets and financial instruments of all kinds. It should therefore cover the trading of classical stocks, interest rate securities and foreign exchange as well as bonds, but also all derivative contracts such as options, futures and swaps (for stocks or stocks indices, interest rates, foreign exchange, commodities or credits), traded both on organized exchanges or over-the-counter (OTC). To avoid economically inefficient substitution effects and substantial reduction of the tax base, the FTT should be comprehensive across assets and instrument types, but also across economically equivalent financial contracts that lead to identical pay-off patterns, which would otherwise represent an easy substitute and thus an obvious loophole to be taken advantage of.
- The tax rate should be low, thus ensuring it will hit transactions that are made very often (or very fast) over-proportionately, as these are often part of automated, high-frequency trading that is often seen to be increasing volatility excessively. Rates that have often been

discussed in the literature and in policy proposals range between 0.1% and 0.01% on the value of the asset transacted, while for derivatives the rate is 1/10 of this tax rate since the notional value, which is necessarily much higher, serves as the tax base.

- Important exemptions of transactions to be taxed relate to initial public offerings of stocks and bonds, so that the tax is only based on secondary market transactions. A number of countries in the European Union have also proposed a further exemption regarding pension funds, as their taxation might translate into lower rates of returns for their customers, but this can create significant and detrimental evasion and relocation opportunities.

5.2 Different forms of a tax of the financial sector

There are various forms of a levy on the financial sector that have been discussed or introduced throughout recent years by international organisations or in developed countries. A securities transactions tax (STT) is the designation that some international organisations have given to a tax of the form we discuss here – imposed on the trades and transactions involving a number of specific financial instruments, with possible exemptions regarding their original issuance and some particular sectors. This tax could be a fixed percentage rate below or a lump-sum tax for each trade made. The original tax proposed by James Tobin was not a general FTT, but rather a currency transaction tax – a levy imposed only on the transactions of foreign exchange and possibly on their derivatives. A bank transaction tax (also known as a financial activity tax) on the other hand is a tax that is imposed on the overall deposit or withdrawals from bank accounts and can be seen as a way for banks to contribute more to government budgets. In contrast to a securities transaction tax, it is mostly of a flat nature and does not burden the overall trading of households, but their usage of bank services. Therefore, it affects a much wider proportion of the population. This is one of the main issues for proponents of the FTT, as a bank transaction tax might impose a much higher burden on ordinary households and savers. A capital levy or a registration tax differs from both the preceding concepts as it is levied on increases of business capital via stocks or the issuance of new debt via bonds by firms and corporations. It might be regarded as suboptimal due to its influence on primary funding channels, which are normally considered as crucial.

A financial transaction tax differs from a bank tax or a financial institution tax in the strict sense, as it does not aim at taxing the institution that is providing a financial transaction or a financial asset itself. This is already the goal of corporate taxation (levied on the profits of financial institutions) or of a bank levy (levied, for example, on a bank's balance sheet)¹⁰. In contrast, the FTT aims at taxing transactions themselves. This has the additional effect of targeting transactions that are made very often or are automated, because some of them can be expected to produce financial market instabilities through herd behaviour, which is one of the main reasons to want to introduce an FTT in the first place. The International Monetary Fund (e.g., *IMF*, 2010) has often discussed a general bank levy or a financial activities tax as a better instrument to

¹⁰ See for an overview and discussion of various instruments to tax the financial sector *IMF* (2010) and *European Commission* (2010A).

enhance the contribution of the financial sector towards government revenues. However, such a bank levy would burden all banks independent of the structure of their activities (and thus transactions), and accordingly all their customers equally, as the incidence of a bank tax would fall on the end users of all bank services – households and firms. On the other hand, the FTT would imply a proportionally higher burden on financial market participants that trade at very high speed, which could be assessed as a destabilizing behaviour or as a strategy that does not follow fundamentals.

5.2 Existing financial transaction taxes

5.2.1 Overview of existing financial transaction taxes

Since the global financial crisis, calls for the introduction of a financial transaction tax have become louder around the world (*Burman et al., 2016*). Table 1 illustrates that some form of an FTT is applied in quite a few countries worldwide, among them several major financial centres, for example, the United Kingdom with its stamp duty tax, Switzerland, South Korea, China, India, or South Africa. Generally, the existing national FTTs are not broad based but cover a rather narrow range of financial transactions and financial market sectors only, thus opening ways for avoiding them. With very few exceptions (Italy, France), these national FTTs do not include short-term and highly speculative transactions but focus on the conventional trades with securities on stock exchanges or over the counter. Therefore, the efficiency of the existing FTTs as well as their revenue potential is generally limited.

Table 1: Overview of existing financial transaction taxes

Argentina	0.6% on stocks, corporate/government bonds, and futures
Australia ¹⁾	N/A at a federal level, states may levy transaction taxes
Belgium	0.27% stock exchange transaction tax on purchase/sale of Belgium or foreign listed shares, bonds and other securities (maximum of € 1,600)
Brazil ²⁾	0.38% on foreign exchange, 6% on short-term foreign loans and bonds (180 days of less)
China ¹⁾	0.1% on stocks
Cyprus	0.15% stock exchange transaction tax on purchase/sale of shares, bonds and other securities
Finland	1.6% on OTC purchase/sale of shares, bonds and other securities
France	0.3% on sale of listed shares of firms located in France with a market capitalisation of above € 1 billion, 0.01% on certain high-frequency transactions
Greece	0.2% stock exchange transaction tax on purchase/sale of listed Greek or foreign shares
India ³⁾	0.1% on stocks assessed on buyer and seller (total 0.2%), 0.017 to 0.025% on sale of options, 0.01% on sale of futures
Indonesia ⁴⁾	0.1% on stocks
Ireland	1% stamp duty on purchase/sale of listed shares of firms registered in Ireland
Italy	0.2% on purchase/sale of shares of firms located in Italy with a market capitalisation of above € 500 million and 0.1% on purchase/sale on the stock exchange, 0.02% on domestic high frequency transactions, lump sum tax of € 0.01875 to € 200 for OTC derivative trades and € 0.00375 to € 40 for derivative trades on stock markets
Malta	2% stamp duty on purchase/sale of marketable securities
Poland	1% on OTC purchase/sale of shares, bonds and other securities with a relationship to the Polish market
Russia	0.2% on value of new share and bond issues
South Africa	0.25% on stocks
South Korea	0.3% on stocks and corporate bonds
Switzerland	0.15% stock exchange transaction tax on purchase/sale of domestic securities, 0.3% stock exchange transaction tax on purchase/sale of foreign securities if transaction is performed by a domestic trader
Turkey	0.2% stock issuance fee, 0.6 to 0.75% bond issuance fee
United Kingdom	0.5% stamp duty on purchase/sale of shares or marketable securities
United States ⁵⁾	0.00184% on stocks, \$ 0.0042 per futures transaction

Notes: N/A=not applicable, OTC=over the counter.

¹⁾Matheson (2011), ²⁾PricewaterhouseCoopers (2014), ³⁾National Stock Exchange of India (2014), ⁴⁾Pomeranets (2012), ⁵⁾U.S. Securities and Exchange Commission (2015)

Source: Hillman – Ashford (2012); Bundesministerium der Finanzen (2018); Burman et al. (2016).

It is important to note that many countries have repealed their financial transaction taxes in the last few decades. The US eliminated their stock exchange transaction tax in 1965. Japan had a transaction tax at differentiated rates on various financial instruments until 1999. In the EU, 9 Member States have abolished their stock exchange transaction taxes since the end of the 1980s (Solilová et al., 2017). Among these countries are France and Italy, which eliminated their stock exchange transaction taxes in 2008 and introduced broader-based FTTs in 2012 and 2013, respectively. While in some cases FTTs were abolished due to a poor design, as in the case of Sweden (see Schulmeister et al., 2008, for a more detailed account of the shortcomings of the Swedish stock exchange transaction tax), many other countries were motivated by the increasing competitive pressures resulting from the increasing mobility of financial market participants and the decreasing costs of re-locating transactions (Hillman – Ashford, 2012). The abolishment of national FTTs therefore can be interpreted as a form of race to the bottom

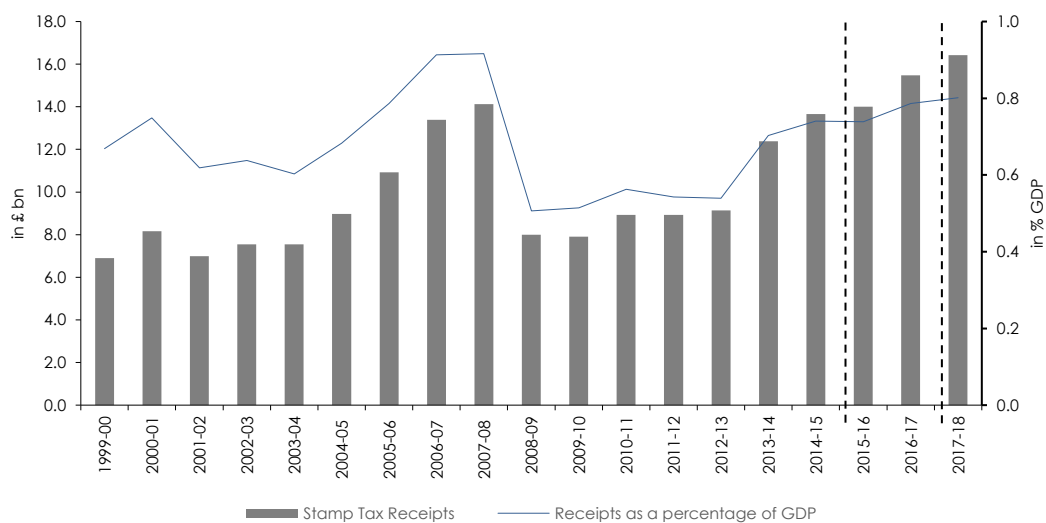
similar to the downward competition observed for corporate taxation taking place worldwide (see, e.g., OECD, 2018).

5.2.2 Country experiences

The UK stamp duty tax

As the United Kingdom has had arguably the longest history of an FTT, we shortly discuss the design of this tax, but also its long-term stable contribution to the UK budget. The well-known British stamp duty tax was introduced back in 1694 and imposes a levy of 0.50% on all transfers of stocks issued by a UK company (*Campbell – Froot, 1994*). The tax only focuses on stocks and does not affect derivatives and bond transactions, while also exempting the primary issuance of the stock itself, as well as market making activities. This design has important implications, notably in influencing a decision by market participants to avoid stock transactions and substitute them with other financial instruments. Nevertheless, the UK stamp duty has stood the test of time and contributes considerably to the government budget, while its administrative costs are relatively low. Figure 2 and Figure 3 show the importance of the UK stamp duty, which has not been eroded through time and continues to yield significant revenues. It is the longest standing example of an FTT and does not seem to have influenced in a significantly negative way the position of London as one of the most important financial centres in the world. As shown in Figure 2, the tax has generated between 0.4% and 0.8% of GDP in government revenues annually for the past 15 years. It consistently has generated around £ 1 billion to £ 1.5 billion monthly in the past five years, as shown in Figure 3. The UK experience with the stamp duty shows that an FTT can be a sustainable source of government revenues if it is well embedded and accepted as part of the overall financial system of the specific country.

Figure 2: Receipts from the UK stamp duty, 1999-2018, in bn pounds and in % of GDP



Source: UK Government¹⁾.

Figure 3: Monthly receipts from the UK stamp duty, in bn pounds



Source: UK Government²⁾.

¹⁾ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/780013/Jan19_Receipts_NS_Bulletin_Final.pdf.

²⁾ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/780013/Jan19_Receipts_NS_Bulletin_Final.pdf.

Italian Financial Transaction Tax Reform

In Italy, which had abolished its stock exchange transaction tax in 2008, a national financial transaction tax was enacted into law as of 1st March 2013, levying a 0.1% tax on shares of Italian companies with a market capitalisation of over € 500 million if the shares are traded on exchanges and 0.20% if they are traded over-the-counter (OTC). In addition, there is a lump sum tax on derivatives trading ranging from € 0.01875 to € 200 depending on the relevant instruments and market places with stepwise increases dependent on the notional value. Furthermore, the tax targets specifically also high-frequency trading, defined as trading generated by a computer algorithm that automatically determines orders, where the share of orders that have changed or have been cancelled in less than half a second is more than 60% of the total orders. The overall revenues forecasts were for around € 1 billion in the first years of its implementation (*Hemmelgarn et al.*, 2016). Regarding the effects of this FTT, *Rühl – Stein* (2014) and *Coelho* (2014) do not find a substantial decrease in trading volumes. *Coelho* (2014) however reports a considerable decline in trading on Italian over-the-counter markets (85% drop relative to the Spanish control group). While *Rühl – Stein* (2014) report an increase in volatility, *Coelho* (2014) points to a very small impact on the volatility of stocks.

French transaction tax

In France, which had also applied a stock exchange transaction until 2008, a unilateral transaction tax of a 0.20% on the purchase of shares of companies with a market cap of € 1 billion and above with headquarters in France was announced in February 2012 and came into law on 1st August 2012. The payment is based on the share prices of the company and is made at the beginning of the month following the transaction. The tax is levied only on transactions in the secondary market and not on the issuance of shares. The rate of this form of FTT was set to be similar to the existing bid-ask spread, which for high-market capitalisation equity transactions in France was about 0.24%. In addition, a 0.01% levy was implemented for sovereign credit default swaps based on the notional value of the transaction, as well as on high-frequency trading transactions. High-frequency transactions were identified as those that are executed via program trading with amended or cancelled orders exceeding two-thirds of transmitted orders. The tax was forecasted to accrue around € 1.6 billion in its first full year (2013), but these expectations were revised downward afterwards, after the first results showed lower government revenues. Several empirical studies have analysed the French FTT and most of them find significant declines in trading volumes of around 20% (*Hemmelgarn et al.*, 2016). These are in line with or are even lower than some of the response assumptions on which our estimations of potential revenues on the global level are based. *Meyer et al.* (2015) and *Colliard – Hoffmann* (2017) find that the highest effects were on the largest and most liquid stocks. The detailed study by *Coelho* (2016) discussed above finds a general price elasticity of stocks of -3.6, while for HFT it is much larger at around -9, pointing towards the much higher effect the tax has on HFT, exactly as expected from the theoretical literature. The *European Commission* (2014) considers the country evidence from France to be mixed, as the trading of some forms of financial

instruments has dropped before the introduction of the tax and has recovered ever since. In any case, the experiences of the French and the Italian transaction tax corroborate the important effects that introducing an FTT in an individual country can have and therefore suggest significant benefits of introducing the FTT on a global level and through a system of international coordination rather than on the national level.

6. International coordination as central prerequisite for an efficient FTT

Given the difficulties of implementing an FTT on the national level, especially due to significant possible evasion and relocation effects and the negative consequences for the given financial jurisdictions from lower trading volumes, there has been much discussion on the need to implement a financial transaction tax on the global level. Many observers consider international coordination and multilateral consensus to be indispensable cornerstones for an effective implementation and administration of an FTT. Global implementation on the one hand makes sense from a theoretical point of view, as it would give policymakers the opportunity to optimally design the tax along the lines presented above (see chapter 5), and in particular to include all financial transactions as well as financial market sectors and actors in the tax base, thus avoiding potential distortions caused by exemptions. On the other hand, global implementation would allow to raise significant revenues as it would restrict the opportunities to evade the tax, to relocate tax payers and/or tax base to non-taxing jurisdictions, or to substitute taxed assets and instruments by untaxed financial products. In the absence of global cooperation individual non-participating jurisdictions would be able to undermine the revenue potential of an FTT in a beggar-thy-neighbour manner by promoting their own country as a place where financial transactions can take place unhindered by taxes. A number of studies have undertaken to estimate the potential revenues from globally implemented FTTs. Table 2 presents several of these estimations, some of which were based on a global FTT, while others focused on a tax to be introduced in the US or the EU only or only on currency exchanges. Importantly the two studies we can use for comparison with our results in Section 7 are the Impact Assessment of the European Commission for an FTT to be implemented at the level of the European Union – which estimates total potential government revenues of € 57 billion, equal to around \$ 79 billion, and the study by *Schulmeister et al.* (2008) for a global FTT – which estimates total potential government revenues globally of between \$ 202 billion and \$ 266 billion.

Table 2: Revenues estimates from previous studies regarding FTT or a Tobin Tax

Tax	Source	Revenue Estimate	
		Billion \$	
Financial Transaction Tax (only EUR)	European Commission (2011)	Total for the European Union	28 79 (57 bn €)
Securities Transaction Tax (only US)	Pollin et al. (2002)	Total for the United States	66-132
		Of which:	
		US equities	28-55
		US gov bonds	21-42
		US corporate bonds	11-22
Currency Transaction Tax (Tobin tax)	Schmidt (2007)	Total	33
		Of which:	
		USD	28
		GBP	12
		EUR	6
		JPY	5
Currency Transaction Tax (Tobin tax)	Spratt (2006)	Total	19.6-38.3
		Of which:	
		USD	11-21
		GBP	2-4
		EUR	4-8
		JPY	2.5-5
Global FTT	Schulmeister et al. (2008)	Total	202-266

Source: Matheson (2011), European Commission (2011).

The estimates lie in a rather broad range, reflecting the assumptions made in the individual studies on the tax-induced extent of the evasion and avoidance effects. It is plausible to assume that the tax base elasticity – at least the part resulting from relocation to non-taxed jurisdictions – will be the smaller, the more countries are included in a coordinated initiative to introduce an FTT. Therefore, it may be assumed that the revenue potential determined in the earlier studies considered here could lie in the upper range of the estimations if the tax was introduced on a global scale.

Overall, the recent years have seen an erosion of the willingness of some countries to support and to comply to the multilateral arrangements agreed upon earlier. Also trust in international institutions has been faltering. The FTT could be an opportunity for international institutions and for multilateralism to illustrate the benefits that could be gained by international cooperation. Global implementation of an FTT would require the agreement on a uniform tax base and tax rates to be applied in all countries worldwide. In the absence of a Global Tax Authority, tax revenues would be collected by national tax authorities and be transferred to a supranational institution, which would finance global public goods. To limit tax avoidance and evasion, international cooperation between national tax authorities would be required.

However, with regard to international cooperation in tax matters there has been recent support and a number of initiatives pursued by international organisations. Important examples are the Base Erosion and Profit Shifting project and the automatic exchange of information

coordinated by the OECD or various initiatives at the European level to avoid tax fraud and tax evasion. These initiatives were inspired by budgetary pressures in many countries following the recent financial crisis, but also by the several media leaks inspiring an extensive public debate in many countries, as well as by recent academic work quantifying the extent of private wealth hidden from tax authorities in tax havens (e.g. *Zucman, 2015; Alstadsæter et al., 2018*) and of corporate tax avoidance due to profit shifting (e.g. *Torslov et al., 2018*).

Right from the beginning of the debate about the introduction of a broad-based FTT, many countries have succumbed to concerns that the tax will endanger their attractiveness as financial centres and lead to financial activity flight, therefore rejecting introduction at unilateral or regionally limited level. Similar to other taxes on allegedly or actually mobile tax bases and tax subjects (net wealth¹³), international aviation¹⁴), etc.), these fears have led to the elimination of existing national FTTs (see chapter 4) within a race to the bottom or have prevented countries to introduce national or regionally coordinated FTTs in the first place¹⁵).

The initiatives led by international organisations and the successes they have achieved so far are gradually changing countries' perspectives on taxation in an international context. There is increasing understanding of the need for international cooperation in tax matters on the level of national governments, international/supranational organisations and citizens. *Scheve – Stasavage (2016)* show, based on a long-term historical analysis, that higher tax levels have normally emerged during periods of war or after crises, in response to political pressure from the population. Similarly, for the case of an FTT citizens' preferences as well as increasing awareness of fairness aspects of taxation might lead to increasing pressure from international institutions and policymakers to tax the financial sector.

The trend towards the usage of central clearing houses and central clearing parties (CCPs) could facilitate further the collection of the revenues from an FTT and could complicate tax evasion. CCPs have been one of the central regulatory responses in the aftermath of the global financial crisis to decrease the probability and consequences of future financial crises. The G20 has agreed in 2009 that all standardized OTC derivative contracts should be cleared through central counterparties when appropriate and feasible. Even so, tax avoidance is of course never completely avoidable.

Besides the fact that global implementation would prevent tax evasion and avoidance most effectively, there are a number of additional reasons why it would be optimal to introduce an FTT on a global level¹⁶):

- As currently the most urgent challenges facing governments worldwide result from global externalities or require the provision of global public goods, fair burden-sharing

¹³) See for the example of taxes on net wealth *Krenek – Schratzenstaller (2018)*.

¹⁴) See for the example of national flight ticket taxes *Krenek – Schratzenstaller (2017)*.

¹⁵) This phenomenon is labelled as "stuck to the bottom" by *Weibust (2009)*.

¹⁶) For the following deliberations, see particularly *European Commission (2010B)*, *IMF (2010)*.

at the global level with regard to the financial means needed to finance these global public goods is required.

- The uncoordinated introduction of a broad-based general FTT on a unilateral basis or in certain regions only could distort competition and prevent the creation of a level playing field for global financial players.
- Initiatives to introduce an innovative financial instrument involving substantial potential revenues and affecting politically powerful sectors and actors require a global political commitment supported by key international stakeholders to credibly demonstrate the determination to push such an initiative through against all resistance.
- The political acceptance of an FTT can be expected to increase when the tax is introduced on a global level with revenues being earmarked to finance a global public good, as for example a climate funds for the poorer countries or development aid.

There are a number of reasons why, among the potential candidates for internationally coordinated taxes to finance global public goods, a tax on financial transactions appears as particularly well suited:

- The tax has a global base, which suggests using revenues for the provision of global public goods.
- International financial transactions on global financial markets constitute a tax base containing a cross-border element. Therefore, the tax base and accordingly the tax revenues can only partially be attributed to individual countries, which suggests using revenues to finance a supranational budget¹⁷⁾.
- The tax would be a new and additional financing source, as the existing FTTs cover rather narrow segments of financial markets only, thus generally yielding rather low revenues¹⁸⁾. Potential conflicts about the “ownership” of tax revenues between national governments and supranational bodies would be limited therefore, as the extent of financial flows from sources already used that would have to be redirected from the national to the global level would be limited.
- Although the concept of national impact and tax incidence is of limited meaningfulness in the case of an FTT due to the transnational nature of its base, an FTT would burden the developed countries, where the major financial centres are located, over-proportionally, thus implying progressive distributional effects across countries and equitable burden sharing on the global level.
- Due to the very broad base, also very low tax rates would yield significant revenues to finance global public goods, while in the best case stabilizing international financial markets and in the worst case only minimally distorting the economy.

¹⁷⁾ For this line of argumentation, see Keen *et al.* (2012), in the context of taxing international aviation and shipping.

¹⁸⁾ The UK stamp duty with its considerable revenues is an exception in this regard.

- The tax can be expected to meet with high political acceptance, as it imposes the fiscal burden on a sector which is perceived to currently not take on its fair share of the tax burden.
- There is a broad civil society alliance, including tax justice and anti-poverty NGOs and trade unions, often with an international scope and presence, that supports the introduction of a global FTT.
- An FTT is a suitable candidate for a global solidarity tax due to its likely distributional effects: The European Commission's impact analysis (*European Commission, 2011*) suggests that an FTT would not have undesirable distributional effects. In a similar vein, simulations for the United States show that the introduction of an FTT can be expected to have rather progressive effects (*Burman et al., 2016*).

All these arguments underline the nature of the FTT as a global tax and strengthen the case for global implementation, encompassing all jurisdictions as well as all financial market sectors and actors. They also point to the importance to gather revenues in a global pool that could be used by international organisations for the provision of global public goods. A global cooperation regime will be crucial to fulfil these goals in the most efficient manner.

The G20 offers itself as the most suitable international forum to pursue a renewed initiative for implementing an FTT, as it represents the world's main economic and political centres. Introducing the FTT on a G20 level would imply that the tax would not cover 100% of jurisdictions. However, G20 wide implementation would mean that the main financial centres would be covered and would therefore also allow the introduction of a credible sanction mechanism against non-cooperative jurisdictions, thus minimizing avoidance possibilities. Recent progress made with regard to international coordination and cooperation to tackle tax evasion and avoidance on the G20, the OECD and the EU level can be expected to facilitate a new initiative to introduce a global FTT.

7. Estimates for potential revenues of a global financial transaction tax

In this chapter we present our estimations of the revenue potential of a global FTT given current trading volumes of the four major types of financial instruments (stocks, bonds, exchange traded derivatives and over-the-counter derivatives). Based on the global estimates derived in a first step, which can be broken down to a few major regions in a next step, proxies can be used to estimate also country-specific revenues for a number of countries. These estimations are based on different scenarios for the elasticity of trading volumes and the evasion effects of the tax. We assume three major scenarios and thus obtain three different potential revenue estimations. The elasticities reflecting potential adjustment effects are calibrated based on those applied in earlier studies. They are also adjusted accounting for the fact that the almost global introduction and implementation of the tax will significantly restrict the possibilities to avoid it or to redirect trading to untaxed instruments, assets, and regions.

Estimation of potential revenues

There is a common approach to estimate the potential revenues of a financial transaction tax by using a well-known and easily to implement formula¹⁹⁾. This formula has been used by the *European Commission* (2011) and *Anthony et al.* (2012) to obtain revenues from an FTT introduced in specific regions or individual countries. The formula requires data on the transaction volumes of the specific financial instrument in question, as well as assumptions on the evasion effects, the relation of the tax rate to the transaction costs of the financial instrument, and the elasticity of traded volumes to the tax rate in relation to transaction costs. By changing the assumptions regarding evasion effects and the implied elasticities, we calculate different scenarios based on assumed values for the reaction, since there is no structural model to explain the precise reaction for all market segments and market instruments to derive theoretical expectations about the behavioural changes.

$$Revenue = Tax Rate * Volume * Evasion * \left(1 + \frac{Tax Rate}{Transaction Cost}\right)^{Elasticity}$$

The various existing official sources for data on transaction volumes are described below. We attempt to use data from sources offering comparable data across jurisdictions or across regions, such as the data gathered by the Bank for International Settlements (BIS), the World Federation of Exchanges (WFE), or the Federation of European Stock Exchanges (FESE). While there is detailed data also on the country level from some sources and for some financial instruments, data availability varies widely by instrument. Therefore, we first calculate the overall revenues from a global using the most aggregated data available. In a next step, we can calculate separate country revenues for a number of countries – these are approximation either based on country specific data for some countries (such as some EU countries, the USA and Japan), or – if such country-specific data is not available – by using proxies that enable us to calculate the share of the overall revenues that would accrue to different countries, jurisdictions or regions.

All estimations are crucially dependent on the parameters assumed for the evasion and relocation effects caused by the tax, on the assumed transaction costs of trading the respective instrument, and on the assumed elasticity of the relevant tax bases. The assumptions regarding these parameters are prone to considerable uncertainty and there is little empirical evidence providing guidance which values would be most realistic. Therefore, we consider different scenarios, based on the assumptions on these key parameters, and present them for each type of instrument: a conservative, a baseline, and an optimistic scenario. Our middle-case assumptions regarding the parameters describing the evasion and relocation effects in stocks, bonds and derivatives trading and the elasticity of trading volumes of different instruments constitute our baseline scenario and this can be seen as the most realistic one.

¹⁹⁾ The formula was introduced in a study by the French Ministry of Finance in 2000 on transaction taxes for currencies and was used in the seminal study by *Jetin – Denys* (2005).

Table 3: Estimation assumptions

	Conservative Scenario	Baseline Scenario	Optimistic Scenario
Evasion effects for stocks and bonds	15%	15%	15%
Evasion effects for derivatives	90%	70%	50%
Elasticity of trading volumes	-1.5	-1.0	-0.5

Data

Our main data sources include the World Federation of Exchanges (WFE), the Federation of European Securities Exchanges (FESE) and the Securities Industry and Financial Markets Association (SIFMA) data for equities and bonds trading, the Bank for International Settlements (BIS) data for exchange-traded derivatives, and the Bank for International Settlements (BIS) Triennial Survey data for over-the-counter derivatives transaction volumes. From each source we use the most recent available data for a full calendar year, which is in all the cases either 2016 or 2017. In addition to the global potential of the FTT, below we also report potential revenues for three different regions – USA/Americas, Europa/EU and Asia, as well as the Rest of the world, if data is available. The first two regions are a combination of estimations only for the US and the European Union, respectively, as aggregates, with estimations for the larger regions of the Americas and Europe as a whole, as some of the information from the Bank for International Settlements is only available at this more aggregate level.

Table 4: Data Sources

Type Of Assets	Source	Notes
Equity Trading	World Federation of Exchanges (WFE)	Data split in three regions: America, Asia and Pacific, EMEA
Bonds Trading	Federation of European Securities Exchanges (FESE) and Securities Industry and Financial Markets Association (SIFMA)	Only data available for Europe and North America as a whole
OTC Derivative Trading	Bank for International Settlements (BIS) Triennial Survey	All Countries
Interest Rate Derivatives	Bank for International Settlements (BIS)	All Countries
Exchange Traded Derivatives	Bank for International Settlements (BIS)	Data split in three regions: North America, Europe, Asia and Rest of the World

In this study, we concentrate on four major financial instruments groups and their trading volumes to estimate the overall global potential revenues of the tax, similar to *Schulmeister et al. (2008)* and *Schulmeister (2011)*: equities, bonds, exchange traded derivatives (ETD) and OTC derivatives. There are further financial instruments that would yield additional revenues: such as Exchange Traded Funds (ETFs), Undertakings for the Collective Investment in Transferable Securities (UCITs) and Alternative Investments Funds (AIFs), as examined in the Impact Assessment of the *European Commission (2011)* regarding the possible introduction of an EU-wide FTT. However, comparable global data on the trading volumes of these instruments is not readily available. Their trading volumes are small, yet not trivial in relation to the bigger four

groups mentioned above. Due to the data constraints we do not examine these instruments in detail in this study. However, data is available for some European countries for these three types of instruments – Exchange Traded Funds (ETFs), Undertakings for the Collective Investment in Transferable Securities (UCITs) and Alternative Investments Funds (AIFs). Using these countries, we can obtain a relative approximation of the missing revenues that we do not include in our calculations if we do not examine these financial assets. Given their relative size in some EU countries, the potential revenue of these instruments would be around 14% of the estimated potential of the four major groups. However, the trading volumes of such alternative financial assets differ significantly in different jurisdictions, depending on how they are regulated and the tradition of using them. Under these circumstances, we cannot provide a consistent estimation of how much more revenues would come from these alternative instruments. In any case, against this background our estimations below, that do not include these three financial asset types, represent partly an underestimation of the overall potential revenues from the FTT and can therefore be regarded as rather conservative. If we assume a constant ratio of trading volumes of these three types of instruments – ETFs, UCITs and AIFs, to overall trading volumes globally, these additional 14% of potential revenues would e.g. equal to additional potential revenues globally of \$ 46 billion. Therefore, all our further considerations below are only a lower bound for potential revenues from a global FTT.

7.1 Potential revenues

In the following section we estimate the potential revenues from the introduction of a global, broad-based FTT, which is levied on the transactions of all financial asset types, with no exemptions. The tax rate is 0.1% on the trading of stocks and bonds instruments and 0.01% on transactions of derivatives. These are the rates that have been discussed as part of the proposal in 2011 to introduce a broad-based general FTT in the European Union. We estimate the global potential revenues of such a tax for three different scenarios, where different values for the elasticity of trading volumes and the evasion and relocation response in derivatives trading are assumed.

Conservative Scenario

The most conservative approach is based on an elasticity of -1.50 for all financial instruments covered. This corresponds to the baseline case used for the European Commission's original Impact Assessment presented in 2011, although later studies have consistently used much smaller values, especially for securities. We also assume the highest possible evasion and relocation effects for derivatives used in impact assessments so far: a 90% market reaction and evasion effect, leaving only 10% of the initial pre-taxation turnover volume. This is an unrealistically high extent in the case of a global FTT, as the possibilities for evasion and relocation would be very significantly limited. Nonetheless, we do not assume an ideal scenario in which evasion and relocation will be completely made impossible. Even if an agreement on the introduction of an FTT is reached at the G20 level, that is then used as a basis for a global solution, it is very likely that some jurisdictions (particularly tax havens) will vouch to stay out of the tax regime. Furthermore, we assume 15% evasion on bonds and equities trading. We report global estimates, as well as mixed estimates for the wider regions of North America/USA, Europe/EU, Asia and the Rest of the world. As presented in Table 4, different data sources provide decompositions of global financial transactions trades in different regional groupings. The BIS data on exchange-traded derivatives provide data split into four regions – North America, Europe, Asia and Pacific and Other Markets. The data gathered on equity trading is on the level of Europe as a whole, the Americas as a whole (North and South America) and for Asia, while the data on bonds trading is for Europe and the US only. Therefore, we cannot precisely differentiate between North America and the US and Europe and the European Union on the regional level. To obtain better estimates of the revenues accruing to each country or region therefore, we use proxies as described below.

Table 5: Potential Revenues from a global FTT; Conservative Scenario

Summary Table	Revenues				
	Global	North America/USA	Europe/EU	Asia	Other
	Million \$				
Equities	65,644.00	36,840.84	19,684.30	9,118.86	-
Exchange Traded Derivatives	18,168.03	12,870.92	4,548.60	513.40	235.11
ETD Options	4,068.79	3,389.86	623.75	14.39	40.78
ETD Futures	14,099.24	9,481.06	3,924.85	499.00	194.32
OTC Derivatives	15,628.18	3,051.89	7,445.22	-	-
Interest Rate Derivatives	1,729.21	580.45	189.82	15.29	-
Bonds	136,693.50	130,858.06	5,835.44	-	-
Total	237,862.92	184,202.16	37,703.39	9,647.55	235.11

Source: Authors calculations based on data given in Table 4; Assumptions: evasion effects for equities and bonds: 15%; evasion effects for derivatives: 90%; elasticity of trading volumes: -1.50. For the Asian region and Rest of the world (Other) region data was not available for all financial instrument types.

This scenario delivers around \$ 237.9 billion overall for the whole global economy, which corresponds to 0.31% of global GDP. Of these, \$ 184.2 billion will accrue to the North America/United States region, \$ 37.7 billion to the European/EU region, and \$ 9.7 billion will accrue to the Asian region.

Baseline Scenario

In the conservative scenario above, we assume a very significant relocation and evasion effect due to the imposition of the tax. In doing so, we use the assumed parameters regarding relocation and evasion effects when FTTs are implemented only in a single country. A global financial transaction tax could be expected to lead to significantly lower reactions. Of major significance for assessing the real evasion and relocation effects is the question which jurisdictions would decide not to take part in a potential global financial tax. This will be dependent of the exact tax regime and possible penalties or fines for non-cooperation. If some small, but central jurisdictions (e.g. Luxembourg and Hong Kong) decided not to implement the FTT, this would open the way for significant evasion and relocation possibilities. If, however, some smaller jurisdictions, which are both geographically separated and located in different time zones than important financial centres, decided to not implement the FTT, the effects can be expected to be much smaller. In the further scenarios we will thus use smaller, but still significant evasion parameters for the potential revenue formula. Instead of a 90% relocation and evasion effect, in our baseline estimation thus we assume a smaller size of the effect of 70%.

This is still considerable and would most probably underestimate the potential revenues and as primarily depends on the number of countries and jurisdictions that decide to take part in the global implementation of an FTT and its design. The assumed elasticity of trading volumes in this baseline scenario is -1.00 for all financial asset classes.

Table 6: Potential Revenues from a global FTT; Baseline Scenario

Summary Table	Revenues				
	Global	North America/USA	Europe/EU	Asia	Other
	Million \$				
Equities	70,903.63	39,792.66	21,261.48	9,849.49	-
Exchange Traded Derivatives	55,405.05	39,251.03	13,871.38	1,565.65	716.98
ETD Options	12,408.15	10,337.69	1,902.19	43.90	124.37
ETD Futures	42,996.89	28,913.34	11,969.19	1,521.75	592.61
OTC Derivatives	47,659.54	9,307.01	22,704.86	-	-
Interest Rate Derivatives	5,273.39	1,770.14	578.88	46.64	-
Bonds	147,645.85	141,342.86	6,302.99	-	-
Total	326,887.46	231,463.70	64,719.59	11,461.79	716.98

Source: Authors calculations based on data given in Table 4; Assumptions: evasion effects for equities and bonds: 15%; evasion effects for derivatives: 70%; elasticity of trading volumes: -1.00. For the Asian region and Rest of the world (Other) region data was not available for all financial instrument types.

This scenario delivers around \$ 326.9 billion overall for the whole global economy, which corresponds to 0.43% of global GDP. Of these, \$ 231.5 billion would accrue to the United States/Americas region, \$ 64.7 billion to the European/EU region, and \$ 11.5 billion to the Asian region.

Optimistic Scenario

In the optimistic scenario we assume that the size of the relocation and evasion effect for derivatives will decrease further to 50%. This is still considerable and could thus underestimate the potential revenues if the FTT is indeed implemented globally. Given some limited experience, e.g. for Sweden, as well as based on theoretical considerations one could expect very significant relocation effects for derivatives, so even if we assume that the tax is global, this mirrors the possibility for evasion of the tax, as well as the possibility that some small jurisdictions might still manage to retain a tax-free regime, where much of the derivatives can deviate to. The assumed elasticity of trading volumes here is -0.50 for all financial asset classes, which is also the elasticity used for equities trading by the European Commission for their latest revised assessment.

Table 7: Potential Revenues from a global FTT; Optimistic Scenario

Summary Table	Revenues				
	Global	North America/USA	Europe/EU	Asia	Other
	Million \$				
Equities	76,584.67	42,980.98	22,965.02	10,638.67	-
Exchange Traded Derivatives	93,101.82	65,956.86	23,309.26	2,630.90	1,204.80
ETD Options	20,850.48	17,371.30	3,196.42	73.76	209.00
ETD Futures	72,251.34	48,585.55	20,112.85	2,557.13	995.81
OTC Derivatives	80,745.59	15,768.09	38,466.95	-	-
Interest Rate Derivatives	8,934.27	2,999.01	980.75	79.02	-
Bonds	159,475.74	152,667.73	6,808.01	-	-
Total	418,842.10	280,372.67	92,530.00	13,348.59	1,204.80

Source: Authors calculations based on data given in Table 4; Assumptions: evasion effects for equities and bonds: 15%; evasion effects for derivatives: 50%; Elasticity of Trading Volumes: -0.50. For the Asian region and Rest of the world (Other) region data was not available for all financial instrument types.

This scenario delivers around \$ 418.9 billion overall for the whole global economy, which corresponds to 0.55% of global GDP. Of these, \$ 280.4 billion would accrue to the United States/Americas region, \$ 92.5 billion to the European/EU region and \$ 13.4 billion will accrue to the Asian region.

Possible underestimation of revenues

These estimations are a lower bound for the expected potential revenues for three distinct reasons. First, we still assume high relocation and evasion effects even in the case of a global financial transaction tax to account for the possibility that small jurisdictions decide to not comply with the tax. Ensuring that there are as few non-complying countries as possible could increase significantly potential revenues.

Secondly, we do not have globally comparable data on a number of financial instruments, such as Exchange Traded Funds (ETFs), Undertakings for the Collective Investment in Transferable Securities (UCITs), and Alternative Investments Funds (AIFs). Using an approximation for some EU countries for which there is available data on the trading volumes of these instruments – the 10 countries that have been discussing the introduction of a possible FTT through enhanced cooperation at the EU level, we estimate that these financial instruments can result in additional 14% in FTT revenues. If we assume a constant ratio of trading volumes of these three types of instruments – ETFs, UCITs and AIFs, to overall trading volumes, these additional 14% of potential revenues would equal to additional potential revenues globally of \$ 45 billion in the baseline case.

Finally, there is no data available for the trading volumes for bonds in the Asian region and the Rest of the world region, which would also bring additional revenues. Overall, the reported potential revenues are relatively conservative estimates in each of the scenarios estimated and could be considerably higher in reality.

Proxies to estimate country-by-country breakdown of revenues

In a further step and based on the calculations above, we calculate the revenues accruing to various individual countries or from the introduction of a global FTT. We focus our estimations to a number of larger countries and regions, respectively: the USA, the European Union and some of its larger Member States, and Japan. The increased revenues can then be used for different purposes – can either be transferred to the countries in question or can be used as a substitute to their contributions to international organizations such as the IMF, the World Bank or the BIS, that will carry over much of the administrative work to the FTT.

To estimate the shares of revenues going to each of the jurisdictions regarded, we can use various proxies for the country-by-country breakdown of revenues. These proxies serve as approximation to the country specific relative size of the real economy or the financial sector. Our simplified proxies are the share of GDP of a particular country in global GDP and the share of over-the-counter derivatives trading to overall derivative OTC trading in the world as given by the BIS. The GDP proxy might considerably bias the results due to the relative differences in the importance of the financial sector across different countries in the EU, but overreliance on other indicators might also lead to biases due to country specific financial sector business models or the over proportional importance of certain financial centres or financial practices. The BIS data on OTC derivatives includes detailed data on the country level trading volumes of deriv-

atives, which could be a good proxy for the development and the importance of each particular country as a financial centre. This is why we take a simple average of both proxies and use them to weight how much of the estimated global revenues can accrue to each country or region.

Table 8: Proxies to estimate country-by-country breakdown of revenues

Country	Individual weight according to GDP 2017 (%)	Individual weight according to OTC derivatives trading volumes (%)	Average individual weight (%)
World	100.00	100.00	100.00
United States	25.37	19.53	22.45
EU-28	22.57	47.64	35.11
Austria	0.55	0.29	0.42
Belgium	0.65	0.35	0.50
Bulgaria	0.08	0.03	0.05
Czech Republic	0.28	0.06	0.17
Denmark	0.43	1.55	0.99
Finland	0.33	0.21	0.27
France	3.37	2.77	3.07
Germany	4.83	1.79	3.31
Greece	0.26	0.02	0.14
Hungary	0.18	0.05	0.12
Ireland	0.43	0.03	0.23
Italy	2.54	0.27	1.41
Latvia	0.04	0.01	0.02
Lithuania	0.06	0.00	0.03
Luxembourg	0.08	0.57	0.32
Netherlands	1.09	1.31	1.20
Poland	0.69	0.14	0.41
Portugal	0.29	0.04	0.16
Romania	0.27	0.04	0.16
Slovakia	0.12	0.04	0.08
Spain	1.72	0.50	1.11
Sweden	0.70	0.64	0.67
United Kingdom	3.44	36.94	20.19
Japan	6.33	6.13	6.23
Australia	1.80	1.86	1.83
Hong Kong SAR	0.44	6.70	3.57
Singapore	0.44	7.94	4.19
Switzerland	0.88	2.40	1.64

Note: Average individual weight is the simple average of the first two proxies.
Source: BIS; World Bank, Global Economic Monitor; Macrobond.

Using these simple averages as a proxy, we report the potential revenues estimated for a number of countries and regions, respectively, including the United States, Japan, the European Union countries and a few of the G20 countries. These estimations are based on our baseline scenario, an assumed elasticity of -1.00 and an evasion effect for derivatives of 70%. These are rough approximations, however, given the size of the global revenues they should be in a close and realistic range of the actual potential revenues.

Table 9: Country specific potential revenues from an FTT, Baseline Scenario

	Equities	Exchange Traded Derivatives	OTC Derivatives	Interest Rate Derivatives	Bonds	Total
	Million \$					
United States	15,915.50	12,436.59	9,307.01	1,770.14	33,141.58	72,570.82
EU28	24,891.58	19,450.61	22,704.86	578.88	51,832.86	119,458.79
Austria	295.53	230.93	137.49	1.11	615.39	1,280.43
Belgium	354.38	276.92	168.63	48.51	737.94	1,586.38
Bulgaria	36.52	28.54	12.93	-	76.05	154.04
Czech Republic	121.10	94.63	27.96	0.01	252.17	495.88
Denmark	701.33	548.03	737.65	20.97	1,460.42	3,468.40
Finland	190.39	148.77	98.99	3.59	396.45	838.19
France	2,178.72	1,702.48	1,321.29	254.90	4,536.86	9,994.26
Germany	2,344.80	1,832.26	851.46	90.55	4,882.69	10,001.77
Greece	99.25	77.56	7.43	-	206.68	390.92
Hungary	82.59	64.54	24.18	0.41	171.99	343.71
Ireland	165.36	129.22	16.07	-	344.34	654.99
Italy	996.67	778.81	129.91	19.63	2,075.40	4,000.41
Latvia	17.30	13.52	4.33	-	36.03	71.18
Lithuania	23.29	18.20	1.71	-	48.49	91.68
Luxembourg	229.15	179.06	269.29	0.47	477.16	1,155.12
Netherlands	847.79	662.47	622.53	63.99	1,765.38	3,962.16
Poland	293.24	229.14	66.69	6.12	610.62	1,205.81
Portugal	114.60	89.55	17.61	0.28	238.64	460.70
Romania	113.00	88.30	21.13	-	235.30	457.72
Slovakia	57.48	44.92	17.81	-	119.70	239.91
Spain	785.78	614.02	238.54	5.56	1,636.26	3,280.14
Sweden	475.94	371.90	306.81	62.78	991.06	2,208.49
United Kingdom	14,314.87	11,185.83	17,604.44	2,743.66	29,808.51	75,657.31
Japan	4,416.01	3,450.73	2,919.34	6.02	9,195.67	19,987.77
Australia	1,299.83	1,015.70	887.24	30.04	2,706.70	5,939.51
Hong Kong SAR	2,533.43	1,979.65	3,193.90	25.07	5,275.47	13,007.52
Singapore	2,970.09	2,320.87	3,783.88	12.29	6,184.76	15,271.89
Switzerland	1,164.89	910.26	1,144.47	13.54	2,425.71	5,658.88

Source: Authors calculations based on data given in Table 4; Assumptions: evasion effects for equities and bonds: 15%; evasion effects for derivatives: 70%; elasticity of trading volumes: -1.00. For the Asian region and Rest of the world (Other) region data was not available for all financial instrument types.

Furthermore, we can express the total revenues estimated using our proxy in relation to country GDP. This enables us to give some perspective of our results. Table 10 presents the total revenues for a number of countries and regions in the baseline scenario. Globally, the FTT would result in \$ 326.89 billion overall for the whole global economy, which corresponds to 0.43% of global GDP. For individual countries this would mean considerable revenues – \$ 72.57 billion for the United States (0.37% of GDP), \$ 119.46 billion for the European Union (0.69% of GDP), \$ 10.00 billion for Germany (0.27% of GDP), \$ 9.99 billion for France (0.39% of GDP) and \$ 19.99 billion for Japan (0.41% of GDP). These results are broadly in line with previous estimates of potential revenues in relation to GDP. The result for the European Union is inflated upwards through the very central position that the UK has in global derivatives trading. The usage of our proxy inevitably redistributes from global trading volumes to a number of countries, which explains why some values in the country-specific potential revenues below are higher than the ones in the summary tables for the different scenarios above.

We report the country-by-country breakdown of revenues for the conservative and optimistic scenarios in the Annex. Because of the importance of derivatives trading for the overall revenues from the FTT, there are significant differences in these two scenarios in comparison to the baseline case – we can interpret these as intervals for our baseline estimations. For the United States, potential revenues thus vary between \$ 53.13 billion (0.27% of GDP) annually and \$ 92.65 billion (0.48% of GDP) in the conservative and the optimistic case. For the European Union these annual revenues are estimated to be between \$ 85.05 billion (0.49% of GDP) annually and \$ 155.00 billion (0.89% of GDP), while for Japan – between \$ 14.69 billion (0.30% of GDP) annually and \$ 25.46 billion (0.52% of GDP). All country-by-country revenue estimates using our proxy for the selected countries and the related percentage shares in terms of nominal GDP are reported in the Annex tables A1-A4.

Table 10: Total revenues in % of nominal GDP (2017), Baseline Scenario

	Total Revenues	In % of GDP 2017
	Million \$	
Global	326,887.46	0.43
United States	72,570.82	0.37
EU28	119,458.79	0.69
Austria	1,280.43	0.31
Belgium	1,586.38	0.32
Bulgaria	154.04	0.26
Czech Republic	495.88	0.23
Denmark	3,468.40	1.05
Finland	838.19	0.33
France	9,994.26	0.39
Germany	10,001.77	0.27
Greece	390.92	0.19
Hungary	343.71	0.25
Ireland	654.99	0.20
Italy	4,000.41	0.21
Latvia	71.18	0.23
Lithuania	91.68	0.19
Luxembourg	1,155.12	1.85
Netherlands	3,962.16	0.48
Poland	1,205.81	0.23
Portugal	460.70	0.21
Romania	457.72	0.22
Slovakia	239.91	0.25
Spain	3,280.14	0.25
Sweden	2,208.49	0.41
United Kingdom	75,657.31	2.86
Japan	19,987.77	0.41
Australia	5,939.51	0.43
Hong Kong SAR	13,007.52	3.81
Singapore	15,271.89	4.53
Switzerland	5,658.88	0.83

Source: Authors calculations; BIS; World Bank, Global Economic Monitor; Macrobond.

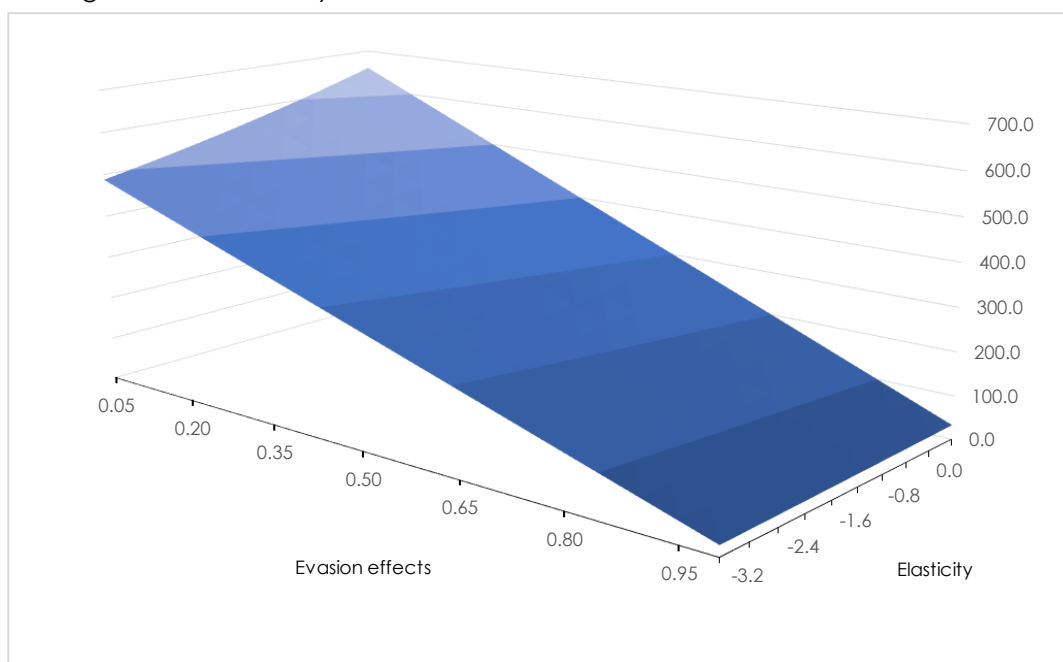
The potential of global cooperation to increase global revenues

As discussed above, the potential of the FTT to raise considerable revenues on the global level will depend crucially on the elasticity of trading volumes to the tax, as well as the evasion and relocation reactions. To understand better the influence of these two effects on the revenue potential of the FTT, Figure 4 shows the hypothetical global revenues from the FTT based on the formula and given different values for the parameters on the evasion effect and the elasticity of trading volumes. Global revenues from the FTT in \$ billion are given on the y-axis and are determined by the evasion effects and by the elasticity of trading volumes. The effect of the evasion coefficient dominates significantly the effects from the reduced trading volumes in its impact on the potential revenues from the tax. In comparison to the very steep increase in revenues when moving from a high to a lower evasion effect, the increases in revenues when the elasticity of trading volumes increases are very flat. The effect of reducing evasion by 10%

on accumulated revenues, for example, is multiple times higher than a reduction in the elasticity of transaction volumes of 10%. In the extreme and unrealistic case that the evasion effect is lower than 5% and the elasticity of trading volumes to the FTT is 0, the global revenues from the FTT are above \$ 600 billion.

The question on whether the elasticity of transactions volumes is -0.50 or -1.50 and therefore the overall effects on transaction volumes from the introduction of a small tax rate is rather unimportant compared to the almost limitless potential to increase potential revenues by ensuring a broad scope of the tax and limiting evasion and relocation. This underscores the dire need for significant global cooperation to achieve the goal of guaranteeing significant government revenues to be used for socially accepted global goals such as the UN Sustainable Development Goals.

Figure 4: Potential revenues from a global FTT and their dependence on evasion effects and trading volumes elasticity



Source: Authors calculations based on data from BIS & WFE.

8. Conclusions and outlook

In this study, we provide a detailed discussion on the benefits and shortcomings of a financial transaction tax and make the case for a global FTT. There have been many attempts to operationalize and implement an FTT at the country level, with some being more successful and others less so. We provide a short overview of the theoretical discussions and the available literature in favour and against the introduction of the FTT. We also provide an overview of the empirical results on the country and the regional level. Moreover, we discuss the history of the

FTT, as well as the political discussions that have accompanied it, especially since the global financial crisis.

Since the global financial crisis public support for taxing the financial sector and requiring it to contribute more to government revenues has grown, which has spawned a variety of proposals and initiatives to introduce an FTT either at the national or the global level. Many of these initiatives have then been inhibited by technical difficulties or lack of common acceptance of technical details. Much of the disputes in technical discussions has been the result of the competition between different jurisdictions. A role plays also the lack of willingness to impose the tax on specific financial instruments deemed as important for the particular country, which has brought numerous proposals to exempt certain asset types from the tax, which particularly coined the discussion of the past 10 years in the European Union.

Global and multilateral cooperation will thus be essential for the FTT to be successfully implemented by overcoming fruitless technical discussions and agreeing upon a common design that can raise substantial revenue and ensure it does not disproportionately distort market efficiency. An FTT is both viable and feasible, if there is broad acceptance of the idea that financial market participants are not contributing enough in taxation towards government budgets. Proponents of the FTT should accept that the tax might impose certain costs to market efficiency. The FTT might or might not help reduce market instability through its effect on market volatility. However, the very significant revenues that this will bring to governments should still mean it makes sense to introduce the tax from a welfare perspective. Furthermore, the potential revenues from such a tax would be determined mostly by the decisiveness and efficiency with which evasion of the tax is limited through its design. As our analysis shows, this evasion parameter is much more important for the overall revenues than any possible reduction in trading volumes that might result from imposing a tax at a small rate in comparison to transaction costs as proposed in the current proposals. Thus, a global solution for the FTT would be a necessary step for its most efficient implementation.

The FTT can therefore be an important source of revenues for governments and international institutions. In our estimations, the tax, if imposed globally, even after taking into account still significant evasion, relocation and lock-in effects, will bring significant revenues – between \$ 237.86 billion and \$ 418.84 billion annually. The baseline case delivers \$ 326.89 billion overall for the whole global economy, which corresponds to 0.43% of global GDP. Using a proxy that averages between the weight of the specific country in the real economy (GDP) and in the financial sector (derivatives trading), we can also distribute these results to individual countries. In the baseline case this would mean considerable revenues – \$ 72.57 billion for the United States (0.37% of GDP), \$ 119.46 billion for the European Union (0.69% of GDP), \$ 10.00 billion for Germany (0.27% of GDP), \$ 9.99 billion for France (0.39% of GDP) and \$ 19.99 billion for Japan (0.41% of GDP).

Our estimations can serve as a lower bound for the potential revenues due to a global FTT. They are most probably an underestimation for three separate reasons. First, we include high relocation and evasion effects even in the case of a global FTT due to the possible small jurisdictions

that decide to not comply with the tax. Ensuring they are as few as possible could increase significantly potential revenues. Secondly, we do not have globally comparable data on a number of financial instruments, such Exchange Traded Funds (ETFs), Undertakings for the Collective Investment in Transferable Securities (UCITs) and Alternative Investments Funds (AIFs). Using an approximation for a number of EU countries where this data is available, we estimate that these additional instruments can accrue an additional 14% in potential revenues from the FTT. In the baseline scenario this equals to around an additional \$ 46 billion in revenues globally. Finally, there is no available data for the trading volumes for bonds in the Asian region and the Rest of the world region, which would also bring significant additional revenues. Overall, the reported potential revenues are relatively conservative estimates in each of the different cases and could be higher in reality.

The FTT can raise significant revenues globally. If policymakers and international institutions follow the optimal design of such a tax with a very broad base and a relatively low rate of the tax, the distortionary effects should be quite small. In addition to that, the predominant burden of the tax would be on top wealth groups, which are most active on financial markets. The tax will have a progressive nature, which can also address growing concerns about inequality and distributional fairness. Finally, the FTT enjoys public support and the broad alliance between NGOs and civil society organisation in its favour might make it more feasible to be implemented. The additional revenues from a global FTT can contribute to the duly needed resources for a number of specific global priorities, where multinational cooperation is essential. In any case, with this amount of potential revenues, an FTT, if designed properly and imposed globally, could help address public calls for the financial sector to contribute more to government budgets and show that international cooperation and multilateral institutions can deliver significant and efficient solutions to the issues of our time.

References

- Acharya, V. V., Cooley, T., Rihcardson, M., Walter, I., "Market Failures and Regulatory, Failures: Lessons from Past and Present Financial Crises", Asian Development Bank Institute, ADBI Working Paper Series, 2011, (264).
- Alstadsæter, A., Johannesen, N., Zucman, G., "Who Owns the Wealth in Tax Havens? Macro Evidence and Implications for Global Inequality", *Journal of Public Economics*, 2018, (162), pp. 89-100.
- Anthony, J., Bijlsma, M., Elbourne, A., Lever, M., Zwart, G., "Financial Transaction Tax: Review and Assessment", CPU Discussion Paper, 2012, (202).
- Arcand, J., Berkes, E., Panizza, U., "Too much finance?", *Journal of Economic Growth*, 2015, 20(2), pp. 105-148.
- Atkinson, A.B. (ed.), *New Sources of Development*, 2005, Oxford: Oxford University Press.
- Baker, A., IPE, Corporate Governance and the New Politics of Financialisation: Issues Raised by Sarbanes-Oxley, Conference Paper, British International Studies Association Annual Conference, St Andrew's, 2005.
- Baltagi, B. H., Dong, L., and Qi, L., "Transaction Tax and Stock Market Behavior: Evidence from an Emerging Market", *Empirical Economics*, 2006, 31(2), pp. 393-408.
- Beck, R., Georgiadis, G., Straub, R., "The finance and growth nexus revisited", *Economics Letters*, 2014, 124(3), pp. 382-385.
- Beck, T., Büyükkarabacak, B., Rioja, F., Valev, N., "Who gets the credit? And does it matter? Household vs. firm lending across countries", *The B.E. Journal of Macroeconomics*, 2012, 12(1), pp. 1-46.
- Bond, S., Hawkins, M., Klemm, A., "Stamp Duty on Shares and Its Effect on Share Prices", Institute for Fiscal Studies, London, Working Paper, 2004, (WP04/11).
- Brunnermeier, M. K., Oehmke, M., "Bubbles, Financial Crisis, and Systemic Risk", NBER Working Paper, 2012, (18398).
- Bundesministerium der Finanzen, *Die wichtigsten Steuern im internationalen Vergleich 2017*, 2018, Berlin: Bundesministerium der Finanzen.
- Burman, L., Gale, W. G., Gault, S., Kim, B., Nunns, J., Rosenthal, S., "Financial Transaction Taxes in Theory and Practice", *National Tax Journal*, 2016, 69(1), pp. 171-216.
- Bushee, B., Noe, C., "Corporate disclosure practices, institutional investors, and stock return volatility", *Journal of Accounting Research*, 2000, 38, pp. 171-202.
- Campbell, J., Froot, K., "International Experience with Securities Transaction Taxes", in Frankel, J. A. (Hrsg.), *The Internationalization of Equity Markets*, Chicago: University of Chicago Press, 1994, pp. 277-303.
- Cannas, G., Cariboni, J., Nicodème, G., Giudici, M. P., Zedda, S., "Financial Activities Taxes, Bank Levies and Systemic Risk", *European Commission Taxation Papers*, Working Paper, 2014, (43).
- Cecchetti, S., Kharroubi, E., "Why does financial sector growth crowd out real economy economic growth", *BIS Working Paper*, 2015, (490).
- Chamley, C., "Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives", *Econometrica*, 1986, 54(3), pp. 607-622.
- Coelho, M., *Dodging Robin Hood: Responses to France and Italy's Financial Transaction Taxes*, Job Market Paper, University of Carolina, Berkeley, 2016.
- Colliard, J.-E., Hoffmann, P., "Financial transaction taxes, market composition, and liquidity", Working Paper Series, European Central Bank, 2017, (2030).
- Committee of Experts to the Taskforce on International Financial Transactions and Development, *Report – Globalizing Solidarity: The Case for Financial Levies*, Taskforce on International Financial Transactions for Development, 2010.
- Constâncio, V., *The future of finance and the outlook for regulation*, Remarks, Vice-President of the European Central Bank, at the Financial Regulatory Outlook Conference, organised by the Centre for International Governance Innovation and Oliver Wyman, Rome, November, 2017.
- Dávila, E., "Optimal Financial Transaction Taxes", Job Market Paper. Harvard University, Cambridge, MA, 2013.
- Demirer, R., Leggio, K., Lien, D. D., *Herding and Flash Events: Evidence From the 2010 Flash Crash*, Finance Research Letters, 2019.
- Deng, Y., Liu, X., Wei, S.-J., "One Fundamental and Two Taxes: When Does a Tobin Tax Reduce Financial Price Volatility?", NBER Working Paper, 2014, (19974).

- Diamond, D., Dybvig, P., "Bank runs, deposit insurance, and liquidity", *Journal of Political Economy*, 1983, 91(3), pp. 401-419.
- Doha Declaration on Financing for Development, Outcome document of the Follow-up International Conference on Financing for Development to Review the Implementation of the Monterrey Consensus, United Nations, Doha, Qatar, 2008.
- Drehmann, M., Tarashev, N., "Measuring the systemic importance of interconnected banks", *BIS Working Papers*, 2011, (342).
- Dumas, B., Why the excess volatility?, INSEAD, Europlace Institute conference, 2003.
- Epstein, G. A., *Financialization and the World Economy*, Cheltenham, U.K. Northampton, Edward Elgar Pub, 2005.
- European Commission, Reflection paper on the future of EU finances, European Commission, 2017.
- European Commission, Did the New French Tax on Financial Transactions Influence Trading Volumes, Price Levels and/or Volatility on the Taxed Market Segment? A Trend Analysis, European Commission, 2014.
- European Commission, "Impact Assessment: Proposal for a Council Directive Implementing Enhanced Cooperation in the Area of Financial Transaction Tax, Analysis of Policy Options and Impacts", Working Document, 2013, (28).
- European Commission, "Impact Assessment: Proposal for a Council Directive on a Common System of Financial Transaction Tax and Amending Directive 2008/7/EC", Working Paper, 2011, (1102).
- European Commission, "Financial Sector Taxation", Taxation Working Paper, 2010A, (10).
- European Commission, "Innovative Financing at the Global Level", Commission Staff Working Document, 2010B, (409).
- Gai, P., Haldane, A., Kapadia, S., "Complexity, concentration and contagion", *Journal of Monetary Economics*, 2011, 58(5), pp. 453–470.
- Haldane, A. G., Rethinking Financial Stability, Speech, Chief Economist, Bank of England, "Rethinking Macroeconomic Policy IV" Conference, Peterson Institute for International Economics, Washington, October, 2017.
- Haldane, A., Patience and Finance, Bank of England, Speech at the Oxford China Business Forum, Beijing, 9. September 2010.
- Hau, H., "The Role of Transaction Costs for Financial Volatility: Evidence from the Paris Bourse", *Journal of the European Economic Association*, 2006, 4(4), pp. 862–890.
- Hemmelgarn, T., Nicodème, G., Tasnadi, B., Vermote, P., "Financial Transaction Taxes in the European Union", *European Commission Taxation Papers*, Working Paper, 2015, (62).
- High Level Group of Own Resources, Future Financing of the EU – Final Report and Recommendations of the High Level Group on Own Resources, European Commission, High Level Group on Own Resources, 2016.
- Hillman, D., Ashford, C., *Financial Transaction Tax: Myth-Busting*, Stamp Out Poverty, 2012, London, UK.
- Hu, S., "The Effects of the Stock Transactions Tax on the Stock Market: Experiences from Asian Markets", *Pacific-Basin Finance Journal*, 1998, 6(3), pp. 347-364.
- IMF, A Fair and Substantial Contribution by the Financial Sector – Final Report for the G-20, International Monetary Fund, 2010.
- 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 Study*, 2005.
- Jones, C. M., Seguin, P. J., "Transaction Costs and Price Volatility: Evidence from Commission Deregulation", *American Economic Review*, 1997, 87(4), pp. 728–737.
- Jordà, Ò., Schularick, M., Taylor, A. M., "Leveraged Bubbles", *NBER Working Paper*, 2015, (21486).
- Judd, K. L., "Redistributive taxation in a simple perfect foresight model", *Journal of Public Economics*, 1985, 28(1), pp. 59-83.
- Keen, M., "Rethinking the Taxation of the Financial Sector", *CESifo Economic Studies*, 2011, 51(1), pp. 1-24.
- Keen, M., Parry, I., Strand, J., "Market-Based Instruments for International Aviation and Shipping as a Source of Climate Finance", *World Bank Policy Research*, Working Paper, 2012, (WPS5950).
- Keynes, J. M., *General Theory of Employment, Interest Rates and Money* (New York: Harcourt Brace & World), 1936.
- Krenek, A., Schratzenstaller, M., "A European Net Wealth Tax", *WIFO Working Papers*, 2018, (561).

- Krenek, A., Schratzenstaller, M., "Sustainability-oriented tax-based own resources for the European Union: a European carbon-based flight ticket tax", *Empirica*, 2017, 44(4), pp. 665-686.
- Laeven, L., Ratnovski, L., Tong, H., "Bank Size and Systemic Risk", IMF Staff Discussion Note, 2014, (SDN/14/04).
- Landau Report, Rapport à Monsieur Jacques Chirac Président de la République (English version), Groupe de travail sur les nouvelles contributions financières internationales, 2004.
- Levine, R., "Finance and growth: Theory and evidence", Handbook of economic growth, 1, in: Philippe Aghion and Steven Durlauf (ed.), Handbook of Economic Growth, Edition 1, 2005, 1, Chapter 12, pp. 865-934.
- Liu, S., Zhu, Z., "Transaction Costs and Price Volatility: New Evidence from the Tokyo Stock Exchange", *Journal of Financial Services Research*, 2009, 36(1), pp. 65-83.
- Lockley, P., Chambwera, M., "Solidarity Levies on Air Travel", Oxford Energy and Environment Brief, 2011.
- Matheson, T., "Taxing Financial Transactions: Issues and Evidence", IMF Working Paper, 2011, (11/54).
- McCulloch, N., Pacillo, G., *The Tobin Tax – A Review of the Evidence*, Institute of Development Studies University Sussex, 2011.
- Meyer, S., Wagener, M., Weinhardt, C., "Politically Motivated Taxes in Financial Markets: The Case of the French Financial Transaction Tax", *Journal of Financial Services Research*, 2015, 47(2), pp. 177-202.
- Nerudová, D., Schratzenstaller, M., Solilová, V., "The Financial Transactions Tax as Tax-based Own Resource for the EU Budget", Umea Universitet, FairTax policy brief, 2017, (2).
- OECD, *Tax Policy Reforms 2018: OECD and Selected Partner Economies*, OECD Publishing, 2018.
- Oxera, *Stamp Duty: Its Impact and the Benefits of its Abolition*, Report prepared for Association of British Insurers, City of London Corporation, Investment Management association and London Stock Exchange (London), 2007.
- Piketty, T., Saez, E., Stantcheva, S., "Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities", NBER Working Paper Series, 2011, (17616).
- Pomeranets, A., Weaver, D. G., "Security Transaction Taxes and Market Quality", Bank of Canada Working Paper, 2011, (2011-26).
- Popov, A., "Credit constraints, equity market liberalization, and growth rate asymmetry", *Journal of Development Economics*, 2014, 107(C), pp. 202-214.
- Raciborski, R., Lendvai, J., Vogel, L., "Securities Transaction Taxes: Macroeconomic Implications in a General-Equilibrium Model", *Economic Papers*, 2012, (450).
- Ranciére, R., Tornell, A., Westermann, F., "Systemic crises and growth", *Quarterly Journal of Economics*, 2008, 123, pp. 359-406.
- Roll, R., "Price Volatility, International Market Links, and their Implications for Regulatory Policies", *Journal of Financial Services Research*, 1989, 3(2-3), pp. 211-246.
- Rühl, R., Stein, M., "The Impact of Financial Transaction Taxes: Evidence from Italy." *Economics Bulletin*, 2014, 34 (1), 25-33.
- Saporta, V., Kan, K., "The Effects of Stamp Duty on the Level and Volatility of Equity Prices", Bank of England Working Paper, 1997, (71).
- Schäfer, D., Karl, M., "Finanztransaktionssteuer – Ökonomische und fiskalische Effekte der Einführung einer Finanztransaktionssteuer für Deutschland", *Politikberatung kompakt*, DIW Berlin, 2012, (64).
- Scheve, K., Stasavage, D., *Taxing the Rich – A History of Fiscal Fairness in the United States and Europe*, Copublished with the Russell Sage Foundation, Princeton University Press, 2016.
- Schratzenstaller, M., "International Taxes – Why, What and How?", In: Leaman, J., Waris, A. (eds.), *Tax Justice and the Political Economy of Global Capitalism, 1945 to the Present*, New York – Oxford: Berghahn Books, 2013, pp. 283-307.
- Schularick, M., Taylor, A., "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008", *American Economic Review*, 2012, 102(2), pp. 1029-1061.
- Schulmeister, S., *Implementation of a General Financial Transactions Tax Summary*, WIFO Study, 2011.
- Schulmeister, S., Schratzenstaller, M., Picek, O., *A General Financial Transaction Tax Motives, Revenues, Feasibility and Effects*, WIFO Study, 2008.

- Schwert, G. W., Seguin, P., "Securities Transaction Taxes: An Overview of Costs, Benefits and Unresolved Questions", *Financial Analysts Journal*, 1993, 49(5), pp. 27-35.
- Shiller, R. J., *Irrational Exuberance*, Second Edition, Revised & Updated, Crown Business, 2006.
- Shiller, R. J., "Do stock prices move too much to be justified by subsequent changes in dividends?", *American Economic Review*, 1981, 71(3), pp. 421-436.
- Slemrod, J., Yitzhaki, S., "Tax avoidance, evasion, and administration," in A. J. Auerbach and M. Feldstein (eds.), *Handbook of Public Economics*, 2002, 3, Elsevier, chapter 22, pp. 1423–1470.
- Solilová, V., Nerudová, D., Dobranschi, M., "Sustainability-oriented future EU funding: a financial transaction tax", *Empirica*, 2017, 44(4), pp. 687-731.
- Stiglitz, J., "Using Tax Policy to Curb Speculative Short-Term Trading", *Journal of Financial Services Research*, 1989, 3(2-3), pp. 101-115.
- Straub, L., Werning, I., *Positive Long-Run Capital Taxation: Chamley-Judd Revisited*, Harvard University, 2018.
- Summers, L., Summers, V., "When Financial Markets Work Too Well: A Cautious Case for a Securities Transaction Tax", *Journal of Financial Services Research*, 1989, (3), pp. 261-286.
- Tobin, J., "A Proposal for International Monetary Reform", *Eastern Economic Journal*, 1978, 4(3-4), pp. 153-159.
- Tobin, J., *The New Economics – One Decade Older*, Princeton: Princeton University Press, 1974.
- Torslov, T., Wier, L., Zucman, G., "The Missing Profits of Nations", NBER Working Paper, 2018, (24701).
- Turner, A., *After the Crises: Assessing the Costs and Benefits of Financial Liberalisation*, Speech, 14th Chintaman Deshmukh Memorial Lecture, Reserve Bank of India, Mumbai, 2010.
- UNCTAD, *World Investment Report 2014, Investing in the SDGs: An Action Plan*, Geneva: United Nations Conference on Trade and Development, 2014.
- Wahl, P., "More Than Just Another Tax The Thrilling Battle Over the Financial Transaction Tax: Background, Progress, and Challenges", in Pogge, Th., Mehta, K. (eds.), *Global Tax Fairness*, Oxford: Oxford University Press, 2016.
- Weibust, I., *Green Leviathan: The Case for a Federal Role in Environmental Policy*, Surrey/Burlington: Ashgate, 2009.
- Wolff, E. N., "The Asset Price Meltdown and the Wealth of the Middle Class", 2012, NBER Working Paper, (18559).
- Yellen, J., "Financial stability a decade after the onset of the crisis", Speech, Chair of the Board of governors of the Federal Reserve System, at the Federal Reserve Bank in Kansas City Economic Symposium "Fostering a Dynamic Global Recovery", Jackson Hole, August, 2017.
- Zhang, L., *The Impact of Transaction Tax on Stock Markets: Evidence from an Emerging Market*, East Carolina, 2001.
- Zingales, L., "Presidential Address: Does Finance Benefit Society?", *The Journal of Finance*, 2015, 70(4).
- Zucman, G., *The Hidden Wealth of Nations – The Scourge of Tax Havens*, The University of Chicago Press, 2015.

Annex

Country-by-country breakdown of revenues for different scenarios

In the main part of the text we have reported our estimates for country-by-country revenues in the baseline scenario, with an elasticity of -1.00 and an evasion effect of 70% for derivatives and of 50% for equities and bonds trading. Here we include furthermore the other two cases – the conservative case with a higher evasion effect of 90% for derivative, and the optimistic case with a low evasion effect of 50%. The elasticity of trading volumes varies accordingly as well.

Table A1: Country-by-country breakdown of revenues – Conservative Scenario

	Equities	Exchange Traded Derivatives	OTC Derivatives	Interest Rate Derivatives	Bonds	Total
	Million \$					
United States	14,734.89	4,078.12	3,051.89	580.45	30,683.14	53,128.49
EU28	23,045.12	6,378.11	7,445.22	189.82	47,987.90	85,046.17
Austria	273.60	75.72	45.08	0.36	569.74	964.51
Belgium	328.09	90.80	55.30	15.91	683.20	1,173.30
Bulgaria	33.81	9.36	4.24	-	70.41	117.82
Czech Republic	112.12	31.03	9.17	0.00	233.47	385.79
Denmark	649.31	179.71	241.88	6.88	1,352.08	2,429.86
Finland	176.26	48.78	32.46	1.18	367.04	625.73
France	2,017.11	558.27	433.27	83.59	4,200.31	7,292.54
Germany	2,170.87	600.82	279.20	29.69	4,520.50	7,601.08
Greece	91.89	25.43	2.43	-	191.35	311.11
Hungary	76.47	21.16	7.93	0.13	159.23	264.92
Ireland	153.09	42.37	5.27	-	318.80	519.53
Italy	922.73	255.38	42.60	6.44	1,921.45	3,148.60
Latvia	16.02	4.43	1.42	-	33.36	55.23
Lithuania	21.56	5.97	0.56	-	44.89	72.98
Luxembourg	212.15	58.72	88.30	0.15	441.77	801.09
Netherlands	784.90	217.23	204.14	20.98	1,634.43	2,861.68
Poland	271.48	75.14	21.87	2.01	565.33	935.82
Portugal	106.10	29.37	5.78	0.09	220.94	362.28
Romania	104.61	28.95	6.93	-	217.84	358.34
Slovakia	53.22	14.73	5.84	-	110.82	184.61
Spain	727.49	201.34	78.22	1.82	1,514.88	2,523.75
Sweden	440.63	121.95	100.61	20.59	917.55	1,601.32
United Kingdom	13,253.00	3,667.98	5,772.72	899.68	27,597.32	51,190.70
Japan	4,088.43	1,131.54	957.29	1.97	8,513.53	14,692.77
Australia	1,203.41	333.06	290.94	9.85	2,505.91	4,343.17
Hong Kong SAR	2,345.50	649.15	1,047.32	8.22	4,884.13	8,934.33
Singapore	2,749.77	761.04	1,240.78	4.03	5,725.97	10,481.60
Switzerland	1,078.48	298.49	375.29	4.44	2,245.77	4,002.47

Source: BIS, Eurostat, IMF, WFE.

Table A2: Country-by-country breakdown of revenues – Optimistic Scenario

	Equities	Exchange Traded Derivatives	OTC Derivatives	Interest Rate Derivatives	Bonds	Total
	Million \$					
United States	17,190.71	20,898.26	15,768.09	2,999.01	35,797.00	92,653.06
EU28	26,885.97	32,684.52	38,466.95	980.75	55,985.89	155,004.09
Austria	319.21	388.05	232.93	1.87	664.70	1,606.75
Belgium	382.77	465.32	285.70	82.19	797.06	2,013.05
Bulgaria	39.45	47.96	21.90	-	82.15	191.45
Czech Republic	130.80	159.01	47.37	0.02	272.38	609.59
Denmark	757.53	920.90	1,249.73	35.53	1,577.43	4,541.12
Finland	205.64	249.99	167.71	6.08	428.22	1,057.64
France	2,353.29	2,860.83	2,238.56	431.86	4,900.37	12,784.91
Germany	2,532.68	3,078.91	1,442.56	153.41	5,273.91	12,481.47
Greece	107.21	130.33	12.58	-	223.24	473.35
Hungary	89.21	108.45	40.97	0.69	185.77	425.09
Ireland	178.61	217.13	27.23	-	371.93	794.90
Italy	1,076.52	1,308.70	220.09	33.25	2,241.69	4,880.25
Latvia	18.69	22.72	7.33	-	38.91	87.65
Lithuania	25.15	30.58	2.89	-	52.37	110.99
Luxembourg	247.51	300.89	456.24	0.79	515.39	1,520.81
Netherlands	915.71	1,113.21	1,054.70	108.41	1,906.83	5,098.87
Poland	316.73	385.04	112.99	10.36	659.55	1,484.67
Portugal	123.79	150.48	29.84	0.48	257.76	562.35
Romania	122.05	148.37	35.79	-	254.15	560.37
Slovakia	62.09	75.48	30.17	-	129.29	297.03
Spain	848.73	1,031.78	404.13	9.41	1,767.36	4,061.42
Sweden	514.07	624.94	519.80	106.37	1,070.47	2,835.65
United Kingdom	15,461.83	18,796.51	29,825.74	4,648.35	32,196.87	100,929.30
Japan	4,769.84	5,798.56	4,945.99	10.19	9,932.46	25,457.04
Australia	1,403.98	1,706.78	1,503.17	50.89	2,923.57	7,588.38
Hong Kong SAR	2,736.41	3,326.58	5,411.16	42.48	5,698.15	17,214.79
Singapore	3,208.07	3,899.96	6,410.71	20.83	6,680.30	20,219.86
Switzerland	1,258.23	1,529.59	1,938.98	22.94	2,620.07	7,369.81

Source: BIS, Eurostat, IMF, WFE.

Table A3: Total revenues in % of nominal GDP (2017), Conservative Scenario

	Total Revenues	In % of GDP 2017
	Million \$	
Global	237,862.92	0.31
United States	53,128.49	0.27
EU28	85,046.17	0.49
Austria	964.51	0.23
Belgium	1,173.30	0.24
Bulgaria	117.82	0.20
Czech Republic	385.79	0.18
Denmark	2,429.86	0.73
Finland	625.73	0.25
France	7,292.54	0.28
Germany	7,601.08	0.20
Greece	311.11	0.15
Hungary	264.92	0.19
Ireland	519.53	0.16
Italy	3,148.60	0.16
Latvia	55.23	0.18
Lithuania	72.98	0.15
Luxembourg	801.09	1.28
Netherlands	2,861.68	0.34
Poland	935.82	0.18
Portugal	362.28	0.16
Romania	358.34	0.17
Slovakia	184.61	0.19
Spain	2,523.75	0.19
Sweden	1,601.32	0.30
United Kingdom	51,190.70	1.94
Japan	14,692.77	0.30
Australia	4,343.17	0.31
Hong Kong SAR	8,934.33	2.62
Singapore	10,481.60	3.11
Switzerland	4,002.47	0.59

Source: Authors calculations; BIS; World Bank, Global Economic Monitor; Macrobond.

Table A4: Total revenues in % of nominal GDP (2017), Optimistic Scenario

	Total Revenues	In % of GDP 2017
	Million \$	
Global	418,842.10	0.55
United States	92,653.06	0.48
EU28	155,004.09	0.89
Austria	1,606.75	0.38
Belgium	2,013.05	0.41
Bulgaria	191.45	0.33
Czech Republic	609.59	0.28
Denmark	4,541.12	1.37
Finland	1,057.64	0.42
France	12,784.91	0.49
Germany	12,481.47	0.34
Greece	473.35	0.23
Hungary	425.09	0.30
Ireland	794.90	0.24
Italy	4,880.25	0.25
Latvia	87.65	0.29
Lithuania	110.99	0.23
Luxembourg	1,520.81	2.43
Netherlands	5,098.87	0.61
Poland	1,484.67	0.28
Portugal	562.35	0.26
Romania	560.37	0.27
Slovakia	297.03	0.31
Spain	4,061.42	0.31
Sweden	2,835.65	0.53
United Kingdom	100,929.30	3.82
Japan	25,457.04	0.52
Australia	7,588.38	0.55
Hong Kong SAR	17,214.79	5.04
Singapore	20,219.86	6.00
Switzerland	7,369.81	1.08

Source: Authors calculations; BIS; World Bank, Global Economic Monitor; Macrobond.