# Transaction Costs, Trading Elasticities and the Revenue Potential of Financial Transaction Taxes for the United States

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## SUMMARY

This note reviews the available recent evidence on trading costs and trading "elasticities" in U.S. financial markets and elsewhere, in order to inform ongoing discussions as to the viability of establishing a financial transaction tax (FTT) for U.S. financial markets. Specifically, in discussions in the U.S. around a bill supported by Senator Thomas Harkin and Congressman Peter DeFazio, the proposed FTT rate is 0.03 percent of the value of a trade. This low rate is justified on the grounds that setting the rate higher—for example, at the 0.5 percent rate that now applies to stock trades in the United Kingdom—could render financial market trading prohibitively expensive. Revenues generated by the 0.5 percent FTT could then end up lower than at the 0.03 percent rate, since trading values would fall excessively. However, working with a series of alternative assumptions based on actual current financial market conditions, we show that there is no scenario within our range of assumptions in which a 0.03 percent FTT will generate more tax revenues than a 0.5 percent FTT. Rather, considering all of our alternatives, a 0.5 percent FTT generates between 3 and 17 times more revenue than a 0.03 percent FTT.

## INTRODUCTION

Over recent months, proposals have been advanced at both the European Union and the United States Congress to institute versions of a financial transaction tax (FTT). In the version being considered at the European Union, the tax rate being considered is 0.1 percent (10 basis points) for equity and bond trades and 0.01 percent (one basis point) for derivatives. In the U.S. Congress, Senator Tom Harkin and Congressman Peter DeFazio have proposed a tax with one flat rate at 0.03 percent (three basis points) for all financial transactions.[1] These are all two-sided tax rates; i.e. these rates would be the total tax liability on transactions; and there is no stipulation as to how this overall tax obligation would be divided up between buyers and sellers.

Especially as regards equity trades, these tax rates are significantly below the rates that are being applied up to now as well as below rates that have been either applied or proposed in the past in various country settings. For example, the rate that now applies on stock market trading in the United Kingdom is 0.5 percent—five times higher than the rate on equities proposed for the European Union and 17 times higher than the rate proposed in the U.S. in the Harkin-DeFazio bill.

In the aftermath of the 1987 U.S. stock market crash, then-Speaker of the U.S. House of Representatives Jim Wright introduced a proposal for an FTT for U.S. stock markets set at 0.5 percent—that is, the same rate that now applies in the U.K. This proposal was widely supported at the time by both Democratic and Republican policymakers, including both the Treasury Secretary Nicholas Brady and the Director of the Office of Management and Budget Richard Darman serving under President George H.W. Bush.

[1] Transaction costs can be expressed in either percentage terms or as basis points. In financial market jargon, a basis point is defined as 0.01 percent, so that one percent is equal to 100 basis points. We use the terms interchangeably in this paper, more frequently using the financial market term, "basis points."

In the discussions in the U.S. around the Harkin-DeFazio proposal, the 0.03 percent rate has been justified on the grounds that transactions costs on financial market trades are currently extremely low in the U.S. As such, setting the tax rate at a higher level would render financial market trading prohibitively expensive. Overall trading could then possibly decline by an excessive and even dangerous amount. The net result would be to generate less revenue through imposing a high tax rate relative to current transaction cost levels. This is because producing a flow of revenue from such a tax depends not only on the tax rate but also on the amount of trading that takes place at the stipulated tax rate.

The purpose of this note is to review the available recent evidence on trading costs and trading "elasticities" in U.S. financial markets and, as relevant, elsewhere in the world. "Elasticity" is the term economists use to describe the amount that one economic variable will change in response to another variable. Consider, as an example outside of financial markets, the effects on consumer behavior when the price of gasoline rises by, say, 25 percent. An elasticity estimate tells us how much less gasoline consumers will purchase—and thereby, how much they will cut back on driving—in response to having to pay more at the pump. Specifically, the elasticity shows the percentage reduction in gasoline purchases associated with the 25 percent price increase. In the case of financial market transactions, with an elasticity estimate, we consider how much trading volume is likely to fall when a FTT is established.

Putting an FTT in place will of course increase the overall costs of trading financial assets. Indeed, one of the stated aims of FTT proponents is to discourage excessive financial market trading. The other aim of such a tax is to raise revenue. As such, there is an inevitable tension between the two aims for an FTT: 1) reducing overall speculative trading; and 2) raising revenues through taxing such trading. We do not try to review that tension here, but rather to focus on, more simply, recent evidence concerning transaction costs and elasticity estimates.[2]

In what follows, we first report on evidence gathered from both the professional literature and sources gathering primary data from the financial market as to both levels of transaction costs in different market segments as well as on trading elasticities. We then conduct a series of hypothetical exercises which illustrate how much revenue would be generated from an FTT in the U.S. stock market, assuming the FTT is set at three alternative rates—3 basis points, the Harkin-DeFazio proposal; 10 basis points, the EU proposal; and 50 basis points, the rate now operating in the U.K. stock market. After taking account of alternative estimates of pre-FTT transaction costs in the U.S. stock market, as well as a range of trading volume elasticities, we show that there is *no scenario* in which a 3-basis-point FTT will generate more tax revenues than a 50-basis-point FTT. Considering all of our alternative scenarios, the 50-basis-point FTT generates between 3 and 17 times more revenue than a 3-basis-point FTT. In dollar terms, a 3-basis-point FTT would generate between $8.1 and $9 billion in one year, assuming an initial level of stock market trading comparable to the actual 2010 level of about $30 trillion. By contrast, a 50-basis-point FTT would generate between $24.6 and $150 billion in one year.

[2] Pollin, Baker and Schaberg (2003) provide an in-depth overview of these and related questions concerning the design of an FTT.

# DEFINING TRANSACTION COSTS

## WHAT ARE TRANSACTION COSTS?

Overall transaction costs include several components. We can divide them into two broad categories, explicit costs and implicit costs. Explicit costs include brokerage commissions, market fees, clearing and settlement costs, and any taxes. A financial transaction tax would be included as one component of explicit costs. These costs are termed "explicit" because they are clearly defined and understood by all parties to a transaction before that transaction occurs. For example, an FTT of 50 basis points will remain unchanged regardless of how market prices may be fluctuating at any given time.

Implicit costs refer to costs that are not explicitly included in the trade price. They depend mainly on the characteristics of any given trade relative to prevailing market conditions. The most important such cost is the bid-ask spread. This is compensation provided to the entity or person supplying liquidity in a trade. These forms of compensation to a liquidity provider can be broken down into three main components as described by D'Hondt and Giraud (2008):

**1.** ***The order processing cost:*** Compensation to the liquidity provider for supplying liquidity to undertake the trade on an immediate basis, as needed.

**2.** ***Inventory control cost:*** Compensation to the liquidity provider for the risk of bearing unwanted inventories.

**3.** ***Adverse selection cost:*** Compensation to the liquidity provider for the risks of trading with traders who have inside information.

## VARIATION IN TRANSACTION COSTS

***Variation due to size of trade.*** Transaction costs vary according to the size of the trade being executed. Larger trades provide opportunities to benefit from economies of scale. This will enable the per unit costs of trading to fall. For the purposes of our discussion, we report costs for an average of trades that vary in size—i.e. we control for the variation in transaction costs by presenting the average, recognizing that these costs will be lower or higher as size varies.

***Variation due to extent of trading in market segment.*** Transaction costs will be lower in markets where a higher volume of trading occurs. This is because, in more heavily traded markets, it is by definition easier to make a trade in a timely way. For example, the market for U.S. treasury bonds is much larger than that for the bonds of the Greek government. This will mean that the market for U.S. sovereign debt will operate with significantly lower transaction costs than that for Greek treasuries.

## ONE- AND TWO-WAY TRANSACTION COSTS

Transaction costs are reported both in terms of one-way costs—i.e. the costs that fall only on either the buyer or seller, but not on both; and as two-way costs, which are the combined costs for both buyer and seller. In the tables that follow, we report transaction costs uniformly as two-way costs. But we do also

note in these tables when the data we are referencing are reported as one-way costs. When figures have been reported as one-way costs, we either multiply the one-way cost figures by two, to obtain the relevant two-way cost figure; or, when the costs for buyers and sellers are reported as being different, we add up both the buyer and seller costs to give us a two-way cost figure.

## MEASURING TRANSACTION COSTS

To obtain high-quality data on transaction costs, we reviewed the most recent professional literature that examines evidence on this matter.[3] We also acquired additional data from two leading private business firms that gather data on financial market trades directly from market participants, Elkins/McSherry and Markit. These organizations collect and organize raw data on current trading activity from market participants in equity, bond, and derivative trades.[4]

In the six panels of Table 1 (page 5), we report recent estimates of transaction costs in the U.S. markets for stocks, bonds, mutual funds, and credit default swaps. We also show data on the U.K. stock market. These U.K. figures are especially relevant for our discussion, given that the U.K. is currently operating with a 50 basis point transaction tax on stock trades.

***U.S. stock markets.*** We present three different estimates—a pre-crisis figure as of 2007 from the Elkins/McSherry database; a similar figure from Elkins/McSherry for 2009.1 – 2011.3, i.e. data that are virtually up to date. We also report and a third estimate from the ITC for 2010.3.

The figure from Elkins/McSherry show transaction costs at 33.2 basis points for 2007, with the figure dropping to 26.4 basis points over 2009.1 – 2011.3. In short, from this data source, we do see some fall-off in transaction costs since 2007, by about 7 basis points, which amounts to about a 20 percent decline. However, the transaction cost figures provided by Elkins/McSherry have been generally volatile, especially in the aftermath of the financial crisis. We therefore should not infer any trend from the decline in transaction costs from 2007 to 2009.1 – 2011.3. We should rather interpret these two figures as providing the general range in which, according to the Elkins/McSherry data, transaction costs have been fluctuating in recent years.

The 2010.3 figure reported by ITC is nearly twice as high as the 2011 figure from Elkins/McSherry, at 47.6 basis points. This ITC estimate of current transaction costs in the U.S. stock market is therefore roughly

[3] In addition to the sources whose figures we cite below, some additional relatively recent references, with earlier figures on U.S. and U.K. market transaction costs as well as those from other countries include: Boussema, Bueno and Sequier (2001); Domowitz, Glen, and Madhavan (2001); Munck (2005); and Thapa and Poshakwale (2010). Further references with earlier data are presented in Pollin, Baker and Schaberg (2003).

[4] Elkins/McSherry describes its database on its home page as follows: "Our universe is a collection of trading data from institutional investors. It covers over 24 million transactions, $7.2 trillion of principal and 375 billion shares of trading from 1500 investment managers and 2000 brokers worldwide. Elkins/McSherry uses these trading data to assess institutional averages for commissions, fees and market impact costs in 47 countries." Similarly, Markit describes its data gathering on the derivative markets, for example, as follows: "Markit is a trusted provider of independent derivative valuations for major trading participants in the physical and financial commodities markets."

**TABLE 1. RECENT ESTIMATES OF TRANSACTION COSTS IN STOCK, BOND, MUTUAL FUND AND CREDIT DEFAULT SWAP MARKETS**

| Dates of trades being covered | Estimated two-way transaction costs: basis points | Details | Source |
|---|---|---|---|
| **A) U.S. Stock Market** | | | |
| 2007 | 33.2 | Implicit plus explicit costs. Average of NYSE and NASDAQ. Reported as one-way costs. | Elkins/McSherry |
| 2009.1 – 2011.3 | 26.4 | Explicit plus implicit costs. Average of NYSE and NASDAQ. Reported as one-way costs. | Elkins McSherry |
| 2010.3 | 47.6 | Implicit costs and commissions. Reported as two-way costs. | ITC Global Cost Review, 2010.3 |
| **B) U.K. Stock Market** | | | |
| 2007 | 86.4 | Explicit and Implicit average costs. Reported as one-way differential one-way costs: 67.9 (buy); 18.5 (sell). | Elkins/McSherry |
| 2008.4 – 2011.3 | 82.4 | Explicit and Implicit average costs. Reported as one-way differential one-way costs: 67.9 (buy); 18.5 (sell). | Elkins/McSherry |
| 2010.3 | 57.2 | Average implicit costs plus commissions. Does not include transaction tax. Reported as average two-way costs. | ITC Global Cost Review |
| **C) U.S. Bond Markets** | | | |
| 2003-05 | 9.0 | Reported as mean two-way costs, evaluated at mean size of trade. | Edwards, Harris, and Piwowar (2007) |
| 2008.1 – 2011.3 | 13.0 | Reported as one-way costs for mean trade size, U.S. corporate bonds. | Elkins/McSherry |
| **D) U.S. Mutual Funds** | | | |
| 2002 | 83 | Explicit plus implicit costs, reported as average one-way costs. Costs are weighted by net assets of funds. | Karceski, Livingston, and O'Neil (2004) |
| **E) U.S. Credit Default Swaps** | | | |
| 2006.3 – 2008.3 | 75 (20.5 for bid/ask spread) | Average two-way implicit cost. Cost of unwinding positive relative to notional value, calculated as discounted cash flow. | Fulop and Lescourret (2009) |
| April 2010 to November 2010 | 32 (for bid/ask spread) | Bid-ask spread relative to notional value of credit instrument, 5-year maturity. | Markit |

equal to a 50-basis-point FTT—that is, the transaction tax rate proposed for the United States in 1987 by Speaker Jim Wright, and the rate that is operating at present in the United Kingdom.

We do not have enough information from Elkins/McSherry and ITC to identify the sources of the differences in their measures of stock market transaction costs. It is reasonable though to consider the difference between the two estimates—i.e. between about 25 and 50 basis points—as providing a reliable range for current transaction costs in the U.S. stock markets.

***U.K. stock market.*** As with the U.S. figures, we have three figures for the U.K. market as well, two from Elkins/McSherry and a third one from ITC. With these figures, we see consistently that transaction costs in the U.K. stock market are greater than the U.S. rates, and that the amount that the U.K. costs are higher are roughly equal to the value of the U.K.'s 50-basis-point tax. For example, for 2008.4 – 2011.3, the figures from Elkins/McSherry show U.K. stock market transaction costs at 82.4 basis points. This contrasts with the 26.4 basis point figure for the U.S. over roughly the same time period. If we were to simply add a 50 basis point tax to the U.S. costs, that would put total transaction costs at 76.4 basis points. This would still be lower, but roughly on par with the U.K. rate of 82.4 basis points as of 2011.3. In short, what appears to be happening in the U.K. stock market is that stock traders are simply tacking the 50-basis-point tax onto a level of transaction costs which are otherwise roughly comparable to the U.S.

This finding is especially notable, in that the U.K. market is the fourth largest in the world, (after the United States, China and Japan). Market capitalization for the U.K. market was about $2.8 trillion in 2009, roughly 20 percent as large as the U.S. market. In other words, the fact that the U.K. stock market operates with a 50-basis-point tax, which in turn pushes overall transaction costs in the U.K. market approximately 50 basis points higher than the U.S., has not prevented the City of London from operating as one of the world's leading stock markets.[5]

***U.S. bond markets.*** We report two estimates here. Our first estimate is 9.0 basis points over 2003-05, from a 2007 study by Edwards et al. Our second estimate is an up-to-date figure from Elkins/McSherry. This figure is 13 basis points, about 40 percent above that from Edwards et al. However, as noted above with respect to the U.S. stock market, the transaction cost figures from Elkins/McSherry are also volatile for the U.S. bond market. Thus again, the two figures we report here on bond market transaction costs should be seen as providing a broad range rather than showing any sort of trend movements.

***U.S. mutual funds.*** We have only one estimate to report here, which is a figure for the year 2002, reported in a 2004 study by Karescki et al. In this study, the average transaction cost that mutual funds incurred in their 2002 trading was 83 basis points. This figure is clearly well above the more recent figures for both the U.S. stock and bond markets. It is therefore consistent with the idea that transaction costs have fallen since early in the 2000s—to a range that we have seen above, i.e. around 30 basis points for U.S. stocks and 12 for U.S. bonds.

***U.S. credit default swaps.*** Here we have two sets of data. The first is from a 2009 study by Fulop and Lescourret. They report only on implicit transaction costs—based on the bid/ask spreads—for the U.S. CDS market. Their definition of the 'round-trip' (i.e. two-way) transaction costs in this study is the overall costs of unwinding a position in the market relative to the notional value of the credit instrument (e.g. the bond) underlying the CDS. Using this definition, their estimate is 75 basis points over the period 2006.3 - 2008.2 based on an average bid-ask spread of 20.5 basis points.

With our more recent primary source from Markit, working with the same definition of transaction costs in the CDS market as Fulop and Lescourret, but with data now for April – November 2010, the average bid-ask spread that emerges is 32 basis points across global markets for CDSs. More generally, these figures

[5] More broadly, it is similarly notable that all of the seven fastest growing stock markets over the 2000s were operating with an FTT. These markets were in Russia, Colombia, China, India, Indonesia, Brazil, and South Korea.

on the CDS market suggest that the bid-ask spreads, expressed as a percent of the notional value of the credit instrument being guaranteed, are roughly on par with the transaction costs in the stock market.

### SUMMARY OF EVIDENCE ON TRANSACTION COSTS

We derive three major overall conclusions from the evidence we have gathered on transaction costs in U.S. stock, bond, mutual fund and credit default swap markets, as well as the U.K. stock market. These are:

1. Transaction costs in the current United States stock market are at a level comparable to the U.K. market before adding the expense of the 50-basis-point FTT for the U.K. Thus, incorporating a 50-basis-point FTT into the U.S. market would have a similar impact on overall costs as is now experienced in the U.K. market.

2. Transaction costs in the U.S. stock market are not consistently higher than those in the other markets on which we reported information. Transaction costs are roughly equal in the CDS market, and, at least as of 2002, were significantly higher in the market for mutual funds. Bond market transaction costs are between one-third and one-half lower than stocks.

3. All of our estimates for all markets show transaction costs as being substantially higher than the FTT tax rate of 3 basis points in the proposed Harkin-DeFazio bill. This suggests that U.S. financial markets could likely operate with an FTT well above the 3 basis point rate proposed by Harkin-DeFazio without inducing a dramatic decline in market trading. But to obtain a clearer sense of any such possibilities, it will first be necessary to consider evidence on trading elasticities in these various financial markets.

## MEASURING TRADING ELASTICITIES

Relatively little serious research has been conducted on estimating trading elasticities in financial markets. Moreover, a high proportion of the available research is dated. This becomes clear from examining two 2011 surveys of the relevant studies, conducted by a staff member at the International Monetary Fund (IMF; Matheson 2011) and the other by economists at the Institute of Development Studies at the University of Sussex (IDS; McCulloch and Pacillo 2011). In Tables 2 – 4 below, we reproduce the summary tables from both survey studies. As can be seen from the tables, these surveys have gathered figures from a range of countries—China, Taiwan, Sweden and multinational figures, in addition to the U.S. and U.K. They also report figures on various markets, including stocks, bonds, foreign exchange and a range of derivative instruments, including index funds, treasury futures markets and different commodity futures markets. The IMF survey reports findings from studies ranging between 1985 and 2007. The IDS survey reports findings from studies between 1985 and 2006. With the IMF study in particular, the author notes that the measurements of transactions costs used for establishing elasticities vary widely across the studies reviewed and include total transaction costs, bid/ask spreads only, and those based only on the imposition of a transaction tax. However, it is notable that in the IMF table, there are no figures reported for U.S. stock or bond markets.

The IMF study does not attempt to generate any summary statistics for the full set figures they report. But we can see from the table that their low figure is zero for a multi-country study of stock markets in Asian countries. The high figure is -2.6 for the U.S. gold futures market, as reported in 1998. Overall, the

IMF table reports on 23 separate short-run elasticity figures, including all high and low estimates for a single market as separate figures. The median figure for these 23 elasticity estimates is -0.9.

**TABLE 2. ESTIMATED ELASTICITIES OF TRADING VOLUME WITH RESPECT TO TRANSACTION COSTS FROM INTERNATIONAL MONETARY FUND SURVEY**

*(Matheson 2011)*

| Source | Country | Market | Elasticity | Measure |
|---|---|---|---|---|
| Baltagi et al. (2006) | China | Stock market | -1 | TTC |
| | China | Stock market | -0.5 | STT |
| Chou and Wang (2006) | Taiwan | Futures market | -1 | STT |
| | Taiwan | Futures market | -0.6 to -0.8 | BAS |
| Ericsson and Lindgren (1992) | Multinational | Stock markets | -1.2 to -1.5 | TTC |
| Hu (1998) | Multinational | Stock markets | 0 | STT |
| Jackson and O'Donnell (1985) | UK | Stock market | -0.5 (-1.7)* | TTC |
| Lindgren and Westlund (1990) | Sweden | Stock market | -0.9 to -1.4 | TTC |
| Schmidt (2007) | Multinational | Foreign exchange | -0.4 | BAS |
| Wang et al. (1997) | United States | S&P 500 Index Futures (CME) | -2 | BAS |
| | United States | T-bond futures (CBT) | -1.2 | BAS |
| | United States | DM futures (CME) | -2.7 | BAS |
| | United States | Wheat futures (CBT) | -0.1 | BAS |
| | United States | Soybean futures (CBT) | -0.2 | BAS |
| | United States | Copper futures (COMEX) | -2.3 | BAS |
| | United States | Gold Futures (Comex) | -2.6 | BAS |
| Wang and Yau (2000) | United States | S&P 500 Index Futures (CME) | -0.8 (-1.23)* | BAS |
| | United States | DM futures (CME) | -1.3 (2.1) | BAS |
| | United States | Silver futures (CME) | -0.9 (1.6) | BAS |
| | United States | Gold futures (CME) | -1.3 (1.9) | BAS |

*Long-run elasticities in parentheses

TTC = Total Transaction Costs
STT= Security Transaction Tax
BAS = Bid-Ask Spread

The IMF study also raises an important point with respect to elasticities relative to transaction taxes specifically. It is that elasticities in response to the establishment of transaction costs will vary according to whether there are other financial instruments that are close substitutes to the taxed instruments that are not also subject to the transaction tax. For example, if there is a tax on stock trading, but no tax on stock option trades, then market participants could migrate out of the stock market and into the stock option market, and thereby avoid paying the transaction tax. This effect would increase the elasticity of trading in the stock market relative to the transaction tax. If the stock option market were also taxed, the effect of a transaction tax on both the stock and stock options markets would be relatively weaker. As such, a broadly designed transaction tax will likely produce smaller trading elasticities than one that is narrowly targeted to a small number or even one market segment.

The IDS study reports separate sets of figures for foreign exchange and equity markets. The foreign exchange figures all come from one 2008 study by Bismans and Damette, which examined different currency markets for U.S. dollars—e.g. those for Europe, the U.K., Japan and Canada. They report data for nine different elasticities. The median figure here is -0.36. The IDS study then reports on findings from the Chinese, U.K., and Swedish stock markets and the broader U.S. security market. As they summarize the results of these equity and security markets, their median elasticity figure is -0.58.

What emerges from these two 2011 surveys is that trading elasticities are highly variable across specific market segments, specific circumstances, as well as the time period. As such, we cannot establish with certainly what the effect would be on market trading if an FTT were established in the United States. The responses will vary depending on which market segment we are considering, and what other market segments would be covered by the tax.

**TABLE 3. ESTIMATES OF ELASTICITY OF FOREIGN EXCHANGE VOLUME WITH RESPECT TO TRANSACTION COSTS FROM INSTITUTE OF DEVELOPMENT STUDIES SURVEY**

*(McCulloch and Pacillo 2011)*

| Method | Period | Currencies | Elasticity (-) |
|---|---|---|---|
| Time series analysis: single series separately | 24/11/04 to 25/11/04 | EUR–USD | **0.61** |
| | 24/11/04 to 25/11/04 | GBP–USD | **0.55** |
| | 24/11/04 to 25/11/04 | CAD–USD | **0.3** |
| | 24/11/04 to 25/11/04 | JPY–USD | **0.79** |
| Time series analysis: system of four equations (SURE) | 24/11/04 to 25/11/04 | EUR–USD | **0.33** |
| | 24/11/04 to 25/11/04 | GBP–USD | **0.36** |
| | 24/11/04 to 25/11/04 | CAD–USD | **0.23** |
| | 24/11/04 to 25/11/04 | JPY–USD | **0.008** |
| Panel: fixed effect | 24/11/04 to 25/11/04 | EUR–USD<br>GBP–USD<br>CAD–USD<br>JPY–USD | **0.606** |

**TABLE 4. ESTIMATES OF ELASTICITY OF EQUITY VOLUME WITH RESPECT TO TRANSACTION COSTS FROM INSTITUTE OF DEVELOPMENT STUDIES SURVEY**

*(McCulloch and Pacillo 2011)*

| Author(s) | | Market | Elasticity | Median Values |
|---|---|---|---|---|
| Schwert and Seguin (1993) | US security market | | 0.25–1.35 | **0.8** |
| Baltagi, Li and Li (2006) | Equity | Chinese stock exchanges | 1.0 | **1.0** |
| Zhang (2001) | Equity | Shanghai stock exchange market | 0.58 | **0.58** |
| Zhang (2001) | Equity | Shenzhen stock exchange market | 0.49 | **0.49** |
| Jackson and O'Donnell (1985) | Equity | UK | 0.9–1.65 | **1.275** |
| Lindgren and Westland (1990) | Equity | Sweden (1970–88) | 0.85–1.35 | **1.1** |
| | | Median | | **0.8** |
| | Median estimations (without long run) | | | **0.58** |

Nevertheless, from these figures, as well as our data reported above on transaction costs in the taxed U.K. stock market versus the untaxed U.S. market, we can generate a reasonable range within which trading levels could decline in response to the FTT as an additional transaction cost.

The low end of this range would be zero—that is, instituting a transaction tax in the U.S. would not alter trading activity at all. As we showed in Table 2 (page 8), the IMF paper includes in its survey a study by Hu (1998) on the impact of FTTs specifically on trading volume in Asian stock markets. Hu found that trading elasticity was zero in these markets when transaction costs rose as a result of an FTT. This result is

consistent with the evidence we presented above from the U.K. stock market. We saw that the transaction costs resulting from the 50-basis-point FTT in the U.K. stock market were simply being added to the other transaction costs traders face operating in this market, with these other costs being comparable to those in the U.S. stock market. This pattern for the U.K. stock market is consistent with a zero elasticity for the U.K. market. But it is not an explicit measure of trading elasticities in the U.K. market, comparable to what Hu provided for the Asian markets.

Higher average rounded figures for trading elasticities that can be supported from the IMF and IDS survey studies would include -0.3, -0.6, and -0.9. The -0.3 figure is close to the median figure for foreign exchange trading reported in the IDS survey; -0.6 reflects the -0.58 median figure for stock markets reported in the IDS survey; and -0.9 is the median figure on short-run elasticities presented in the IMF survey paper.

## ALTERNATIVE FTT REVENUE ESTIMATES

Based on this range of elasticities—from zero to -0.9—we can now generate hypothetical projections of the effects on trading volume and tax revenues based on alternative FTT rates for the U.S. stock market.[6] We report the results of such hypothetical statistical exercises in Tables 5A and 5B. In the interest of brevity, we do not report similar projections for the bond, mutual fund or credit default swap markets. To do so would entail working with a similar set of assumptions and undertaking a comparable set of calculations.

Specifically with respect to the U.S. stock market, we show in Table 5 our estimates of the effects of three alternative rates for an FTT. These rates are:

> ***3 basis points***, the rate proposed in Harkin-DeFazio;
>
> ***10 basis points***, the rate on stock trades being considered by the European Union; and
>
> ***50 basis points***, the rate that currently prevails for the U.K. stock market and was proposed for the U.S. market in 1987 by then-House Speaker Jim Wright.

We then generate estimates on trading volume and FTT revenues based on two separate assumptions for existing transaction costs in the U.S. stock market:

> ***25 basis points.*** This rate is close to the 26 basis point figure that comes out of the current trading data from Elkins/McSherry;
>
> ***50 basis points.*** This is close to the 47.6 basis point figure reported by IDC for 2010.3.

Finally, we perform these hypothetical tests assuming the pre-FTT level of annual trading in the U.S. stock market is $30 trillion. This figure closely approximates the actual level of trading in the U.S. market over 2010.

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[6] There are several ways of calculating the percentage change in any variable. Economic studies which measure elasticities typically calculate the percentage change using natural logarithms. For example, the percentage change in trading volume is calculated as the natural logarithm of the final trading volume (e.g. after a transaction tax is imposed) less the natural logarithm of the initial trading volume (e.g. before the tax is imposed). Since natural logarithms are frequently used in elasticity studies, we use the same approach here. The elasticity tells us the percentage change in trading volume associated with a particular percentage change in transactions costs. We then convert the percentage change in trading volume to a dollar value using natural logarithms, assuming that the annual trading volume starts out at $30 trillion.

Let us first consider the results of the exercises reported in Panel A of Table 5, in which we assume pre-FTT transaction costs are at our lower assumed level of 25 basis points. As the table shows, if we start with transaction costs at 25 basis points, this means that a 3-basis-point FTT will raise overall transaction costs by 12 percent (i.e. 25 basis points in initial costs plus 3 additional FTT basis points in taxes). A 10-basis-point tax will raise transaction costs by 40 percent (i.e. 25 basis points in initial costs plus 10 additional FTT basis points in costs). A 50-basis-point tax will raise total transaction costs by 200 percent (25 basis points initial costs plus 50 additional FTT basis points in costs). Moving down the rows of Table 5A, we can then see the impact on trading volume and tax revenues if we assume the elasticity of trading volume relative to transaction costs at either 0, -0.3, -0.6, or -0.9.

**TABLE 5. HYPOTHETICAL EXERCISE ON FINANCIAL TRANSACTION TAX REVENUE POTENTIAL IN U.S. STOCK MARKET (WITH ALTERNATIVE ESTIMATES OF TRADING ELASTICITIES AND FTT TAX RATES)**

**PANEL 5A**

*Assumptions:*

1) Initial U.S. stock market trading level is $30 trillion; 2) Initial transaction costs in U.S. stock market are *25 basis points*

| | *3 basis points* (increases transaction costs 12%) | *10 basis points* (increases transaction costs 40%) | *50 basis points* (increases transactions costs 200%) |
|---|---|---|---|
| Trading elasticities | | | |
| **0 elasticity** | | | |
| Trading level | $30 trillion | $30 trillion | $30 trillion |
| Tax revenues | $9 billion | $30 billion | $150 billion |
| **-0.3 elasticity** | | | |
| Trading level | $28.9 trillion | $26.6 trillion | $16.5 trillion |
| Tax revenues | $8.7 billion | $26.6 billion | $82.3 billion |
| **-0.6 elasticity** | | | |
| Trading level | $27.9 trillion | $23.6 trillion | $9.0 trillion |
| Tax revenues | $8.4 billion | $23.6 billion | $45.2 billion |
| **-0.9 elasticity** | | | |
| Trading level | $26.9 trillion | $20.9 trillion | $5.0 trillion |
| Tax revenues | $8.1 billion | $20.9 billion | $24.8 billion |

To begin with, by definition, if trading elasticity is zero, then the FTT at any basis point rate will have no impact on trading volume. Trading volume thus remains at $30 trillion, regardless of the FTT tax rate. The difference in tax revenues will then depend entirely on the alternative tax rates. With a 3-basis-point tax, revenues will be $9 billion. Tax revenues then rise to $30 billion with a 10-basis-point tax, and to $150 billion with a 50-basis-point tax.

We then see the differential impact on trading volume and tax revenues at higher elasticities. For example, with a 3-basis-point tax, trading volume falls first to $28.9 billion with a -0.3 elasticity, then to $26.9 billion with a -0.9 elasticity. Tax revenues correspondingly fall from $8.7 to $8.1 billion.

Of course, with a 50-basis-point tax, trading volume and tax revenues will decline much more substantially as we allow for higher trading elasticities. Thus, with a -0.3 elasticity and a 50-basis-point tax, FTT

revenues fall from the initial zero elasticity level of $150 billion to $82.3 billion. With a 50-basis-point tax and a -0.9 elasticity, tax revenues fall to $24.8 billion.

This $24.8 billion in tax revenues is the lowest amount of revenue we attain with a 50-basis-point tax, based on our alternative elasticity assumptions. This follows from the fact that our assumed tax rate is at its highest level while our assumed rate of trading elasticity is also at its highest level, -0.9. Note, however, that this $24.8 billion in FTT tax revenues is still nearly three times higher than the *highest* level of tax revenues generated by a 3-basis-point tax.

Moreover, the tax revenues achieved with a 50-basis-point tax are also significantly higher than what would be attained with a 10-basis-point FTT at any of the assumed levels of trading elasticities that we are considering. For example, with a -0.6 elasticity, a 10-basis-point FTT would generate $23.6 billion, while a 50-basis-point FTT generates $45.2 billion. With a -0.3 elasticity, a 10-basis-point FTT generates $26.6 billion in revenues while the 50-basis-point FTT generates 3 times more—$82.3 billion.

This general pattern for comparative FTT revenues from the 3-, 10-, and 50-basis-point FTT alternatives becomes even stronger in our second set of hypothetical cases, reported in Table 5B. Here we assume the pre-FTT level of transaction costs to be 50, as opposed to 25 basis points. Under the assumption of a 50-basis-point initial level of transaction costs, the impact of the alternative FTT rates on overall transaction costs will be cut in half. That is, as Table 5B shows, the 3-basis-point tax will raise transaction costs by 6 percent, the 10-basis-point tax raises transaction costs by 20 percent, and the 50-basis-point tax raises total transaction costs by 100 percent. Moving down the rows of Table 5B, we then show what would be the impact of the alternative FTT rates, again assuming trading elasticities of zero, -0.3, -0.6, and -0.9.

**PANEL 5B**

*Assumptions:*

1) Initial U.S. stock market trading level is $30 trillion; 2) Initial transaction costs in U.S. Stock market are *50 basis points*

| | *3 basis points* (increases transaction costs 6%) | *10 basis points* (increases transaction costs 20%) | *50 basis points* (increases transactions costs 100%) |
|---|---|---|---|
| Trading elasticities | | | |
| **0 elasticity** | | | |
| Trading level | $30 trillion | $30 trillion | $30 trillion |
| Tax revenues | $9 billion | $30 billion | $150 billion |
| **-0.3 elasticity** | | | |
| Trading level | $29.5 trillion | $28.3 trillion | $22.2 trillion |
| Tax revenues | $8.8 billion | $28.3 billion | $111.1 billion |
| **-0.6 elasticity** | | | |
| Trading level | $28.9 trillion | $26.6 trillion | $16.5 trillion |
| Tax revenues | $8.7 billion | $26.6 billion | $82.3 billion |
| **-0.9 elasticity** | | | |
| Trading level | $28.4 trillion | $25.1 trillion | $12.2 trillion |
| Tax revenues | $8.5 billion | $25.1 billion | $61.0 billion |

With the zero elasticity case, tax revenues remain precisely as with the previous table—i.e. the 3-basis-point tax will generate $9 billion and the 50-basis-point tax will generate 17 times more revenue, i.e. $150 billion. Moving down the rows further, we see in this case that the 50-basis-point tax consistently generates substantially more revenue at all elasticities than the 3- or 10-basis-point FTT rates. For example, with a -0.3 elasticity, the 3-basis-point tax will generate $8.8 billion, the 10-basis-point tax generates $28.3 billion, and the 50-basis-point tax generates $111.1 billion. With a -0.9 elasticity, the 3-basis-point FTT generates $8.5 billion, the 10-basis-point FTT generates $25.1 billion and the 50-basis-point FTT generates $61 billion. This is 7 times more than the 3-basis-point FTT and 2.4 times more than the 10-basis-point FTT.

## CONCLUSIONS

The statistical exercises on which we reported in Tables 5A and 5B are hypothetical cases only. But the alternative FTT revenue estimates that we have generated are all grounded in assumptions derived from relevant data and research out of the professional literature as well as primary source data collected by the firms Elkins/McSherry and Markit.

We reach a few key overall conclusions from these exercises. The most important is this: there is *no scenario* in which a 3-basis-point FTT will generate more tax revenues than a 50-basis-point FTT. The assumptions under which the 3-basis-point FTT comes closest to the 50-basis-point FTT in revenue generation is when we assume pre-FTT transaction costs are at our low figure of 25 basis points and the trading elasticity is at our highest level of -0.9. But even with this case, the 50-basis-point FTT generates *three times* more revenue than a 3-basis-point FTT.

To clarify this main finding further, we report in Table 6 the average revenue differentials between the 3-, 10-, and 50-basis-point FTTs in Tables 5A and 5B. That is, we are averaging out the differential levels of revenue generated over each of the zero, -0.3, -0.6 and -0.9 trading elasticity cases. As we see in Table 6, assuming a pre-FTT level of transaction costs at 25 basis points, with a 3-basis-point tax, the average amount of revenue generated is $8.5 billion. This amounts to about 11 percent of the $75.6 billion that would result from the 50-basis-point tax rate. Assuming pre-FTT transaction costs at 50 basis points, the average revenue from the 3-basis-point tax is $8.7 billion, 8.6 percent of the $101.1 billion in average revenue that would come out of the alternative scenarios with a 50-basis-point tax.

**TABLE 6. ALTERNATIVE AVERAGE REVENUE AMOUNTS FOR U.S. STOCK MARKET FINANCIAL TRANSACTION TAX UNDER ALTERNATIVE TAX RATES**

*Averaging revenue estimates for 0, -0.3, -0.6 and -0.9 trading elasticities*

| | 25 basis points pre-FTT transaction costs | | 50 basis points pre-FTT transaction costs | |
|---|---|---|---|---|
| | Average revenues | Revenues as percent of 50-basis-point FTT | Average revenues | Revenues as percent of 50-basis-point FTT |
| **Alternative FTT tax rates** | | | | |
| 3 basis points | $8.5 billion | 11.2% | $8.7 billion | 8.6% |
| 10 basis points | $25.3 billion | 33.5% | $27.5 billion | 27.2% |
| 50 basis points | $75.6 billion | --- | $101.1 billion | ---- |

*Source: Average figures from Tables 5A and 5B.*

There may be other reasons for setting the FTT rate on stock transactions as low as 3 basis points. For example, it may be that the purpose of the tax is to impose a minimum impact on stock market trading while still putting in place the technical and administrative apparatus of the FTT—even while recognizing that, in doing so, tens of billions of dollars in potential revenue are sacrificed. With the case of a 10-basis-point tax, the impacts on both trading volume and revenue generation are, not surprisingly, in between those of the 3- and 50-basis-points FTT alternatives. The 10-basis-point FTT will create less disruption to financial market trading activity, and specifically will mean less effect on trading volume than the 50-basis-point case, in all scenarios other than a zero elasticity case. The 10-basis-point FTT will still then also generate substantially more revenue than the 3-basis-point FTT under all scenarios.

The purpose of implementing an FTT will of course need to be sorted out through debates among policy-makers, in response to positions advanced by various interested constituencies. What we have established here are some basic findings to inform these discussions, derived through marshalling the available evidence.

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