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ESTIMATING THE REVENUE YIELD FROM A FINANCIAL TRANSACTIONS TAX FOR THE REPUBLIC OF IRELAND

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ABSTRACT

In 2011 the European Commission outlined proposals for a Europe wide financial transactions tax (FTT). Since then the proposal has been pursued by ten countries under 'enhanced cooperation' procedures with plans evolving to introduce the tax during 2017/2018. To date Ireland has not signed up to adopting a FTT.

This paper estimates the revenue that Ireland would collect from participating in the European FTT. Drawing on data from official sources, it first establishes the size of the FTT tax base. Subsequently, the paper estimates a baseline tax revenue and considers the robustness of this estimate using a suite of sensitivity tests.

The paper finds that were Ireland to adopt a FTT, the net revenue yield would be between €320m and €350m per annum. It also considers some of the implications which would accompany the taxes adoption. Of these most are positive although the tax, like all taxes, does carry some distortionary effects. However, it is hard to argue that the benefits would be exceeded by the costs.

In the years to come Ireland will face a decision on its participation in a FTT. This paper is intended as a contribution towards the formation of that policy choice.

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1. INTRODUCTION

Proposals to levy a small tax on financial transactions have been made on a number of occasions since the Wall Street Crash in the late 1920s.[1] In the context of the recent international financial crisis, one principally derived from the reckless speculative behaviour of numerous banking and financial corporations, the long-term hesitancy towards this tax has begun to thaw with politicians, Governments and international agencies joining the previous coalitions of many researchers, economists, NGOs and development charities in calling for the introduction of a Financial Transactions Tax (FTT).[2]

Reflecting this, in 2011 the European Commission (EC) outlined proposals for a Europe wide FTT (2011a). Since then the proposal has been pursued by ten countries under 'enhanced cooperation' procedures with plans evolving to finalise the design of the tax and introduce it by 2017/2018.

While the initial EC proposal required that two-thirds of the revenue raised was allocated towards funding the European Commission budget, this has now changed so that member states are entitled to keep all of the revenue raised. This is an important development for Ireland as it alters the metrics of a FTT significantly from being more-or-less revenue neutral to being a potential source of significant recurring taxation revenue.

Although Ireland is, to date, not one of the FTT countries, this study is intended to examine the likely revenue yield that the state would receive were it to sign up to the EC FTT proposal. In doing so the paper derives the tax base upon which this tax would be levied using data from national and international sources including the Central Bank of Ireland, the European Central Bank (ECB), the World Bank (WB), the International Monetary Fund (IMF), the Bank for International Settlements (BIS), the Futures Industry Association (FIA) and the Association for Financial Markets in Europe (AFME). In all cases, the paper attempts to bring together data so that a robust estimate of an annual tax base can be established.

The paper models the potential revenue from the FTT following the approach taken by the EC (2011b) in its 2011 Impact Analysis (IA). This approach was also used in the only previous Irish examination of the EC FTT proposal; when a paper from the Central Bank/ESRI estimated a net annual yield of between €308m-€548m per annum (2012: 2, 33). However, that assessment was made on a narrower tax base and with a number of simplifying modelling assumptions that are avoided in this examination.

[1] In particular see Keynes (1936) and Tobin (1972).
[2] In the case of Ireland see for example Social Justice Ireland (2015a) and ICTU (2012). At a European level see ETUC (2013), Botsch (2012) and Griffith-Jones and Persaud (2012).

As the EC FTT proposal is still evolving, the paper includes a comprehensive sensitivity analysis. This allows both the assumptions of the model to be examined and an assessment of the implications for revenue from further changes to the scope and structure of the FTT.

The paper is structured as follows. Section 2 outlines the EC proposal and Ireland's current position. Section 3 presents the model and the parameters that are used in the baseline empirical analysis. The following section details how the paper establishes a tax base for the FTT including the origin of estimates for the volume of transactions in shares, bonds and various forms of derivatives. The model and tax base data come together to estimate a baseline net revenue yield from the tax in Section 5. That section also considers the yield in the context of the current Irish taxation system. A series of sensitivity tests follow in Section 6 before Section 7 considers some of the implications for Ireland were a FTT adopted. Finally, the paper concludes.

2. THE EC FTT PROPOSAL

In September 2011, the European Commission produced a directive suggesting the establishment of a FTT across all EU member states. Objections from a number of states, including Ireland, prevented unanimous adoption of the proposal and subsequently 11 countries indicated their willingness to implement a FTT under an enhanced co-operation procedure. Their approach was endorsed by the European Parliament and the European Council in late 2012 and early 2013. The 11 member states were: Austria, Belgium, Estonia, France, Germany, Greece, Italy, Portugal, Slovakia, Slovenia and Spain. Since then work on the proposal has continued with the Portuguese Government taking the lead on the technical development of the tax and the Austrian Government taking the political lead. One country, Estonia, has stepped back from the initiative.

While the precise structure of the tax is still evolving, the proposed minimum rates for the FTT are 0.1% (one-tenth of one per cent) on the trading of bonds and shares and 0.01% (one-hundredth of one per cent) on the value of derivative agreements. The rates are minimums as countries within the EU retain the right to set individual tax rates and could choose higher levels if desired. Countries also get to keep the revenue raised by the tax; a deviation from the initial EC proposal which indicated that two-thirds should flow to the central EC budget.

The scope of the FTT proposal takes a 'triple A' approach as it aims to cover all markets, all instruments and all actors. Thus, the tax has been designed to limit opportunities for avoidance via tax-planning, substitution and institutional/transaction relocation.

Through a series of 'principles', it has been designed to ensure that the tax is levied if at least one of the financial institutions involved in a transaction is deemed to be established (tax resident) in the EU – even if the transaction occurs outside the EU. This is known as the 'residency principle'. A further principle, the 'issuance principle', ensures that the trading of all securities originally issued in the EU is subject to the tax irrespective of the location of that trade. Similarly, the payment of the FTT has been linked to the formal transfer of legal ownership of assets – akin to stamp duty; this is known as the 'ownership principle'.

The comprehensiveness of this design renders the tax difficult to avoid for financial institutions who wish to remain active within any of the implementing member states or who wish to

continue to trade in any EU issued financial assets. The 10 countries currently planning to adopt the FTT account for 63.7% of total EU-28 GDP.[3]

The FTT proposal exempts private transactions by households, those made by SMEs, insurance contributions, capital raising activities by companies and public bodies, refinancing transactions by Central Banks with various EU entities, and transactions involving government bonds or other derivatives linked to sovereign debt. The proposal also includes a commitment by Eurostat to collect and publish annual data on the financial flows subject to the FTT within the EU.

European Commission (2011b) estimates of the annual revenue likely to be generated from this proposal range between €30-35 billion, or 0.4-0.5% of the GDP of the participating states. It would be higher, at approximately €57 billion, if all EU member states implemented the FTT.

In Ireland the European proposal for a FTT has been met with interest and hesitancy. Government has indicated that it finds the concept appealing; something which is unsurprising given the central role financial institutions played in Ireland's economic crash. However, to date Government has been unwilling to support the proposal unless it is adopted for all EU countries; a position principally driven by fears of competitive disadvantages between Dublin's International Financial Services Centre (IFSC) and the City of London's financial centre.

While the final details of the FTT proposal are still being negotiated, the current aim is for the completion of negotiations during 2016 followed by an EC directive which will set out the finalised design and minimum rates. Subsequently, national parliaments will adopt their own FTT rates and implement the tax, probably during 2017-2018.

3. THE FTT STRUCTURE

As a means of estimating the potential revenue from a FTT the approach taken is the same as that adopted by the European Commission in their 2011 Impact Analysis (IA). The Commission's estimate was based on the following equation:

$$R = \tau . V . E . \left(1 + \frac{\tau}{c}\right)^{\varepsilon} \qquad \textit{(equation 1)}$$

where τ is the tax rate, V is the annual value of transactions being taxed, E is the rate of evasion, displacement or avoidance, c is the transaction costs and ε is the elasticity of the volume of transactions in the market (post any evasion) to the increase in taxation. The formula is similar to those used by Jetin and Denys (2005), McCulloch and Pacillo (2011) and Schafer (2015). It is also the same formula used by the Central Bank/ESRI in their 2012 preliminary analysis of the FTT for Ireland (2012: 31).[4]

The parameters used for the baseline estimation are summarised in Table 1. The tax rates (τ) are those proposed in the EC 2011 proposal with rates of 0.1% applying to shares and bonds

[3] Data for 2014 calculated from Eurostat online database indicator tec00001.

[4] An alternative formula is used by Copenhagen Economics (2014) to further capture the cascading effects of a FTT. This has been used in the sensitivity analysis - see section 6 (Table 7d).

and a lower rate of 0.01% for all forms of derivatives including credit default swaps (CDS). The Commission's analysis also provides a set of transaction costs. These are expressed as a proportion of the pre-tax transaction volume where these costs are based on the earlier estimates of McCulloch and Pacillo (2011: 56) and adjusted to account for efficiency gains (reductions) in transaction cost associated with enhancements in information technology systems since the period they reviewed (1980-1997).[5]

Table 1 Baseline Parameters for FTT Revenue Estimation

Instrument	Tax rate τ	Transaction costs *c*	Elasticity ε	Evasion *E*
Securities (shares and bonds)	0.10%	0.6%	-1.0	15%
Exchange Traded Derivatives	0.01%	0.3%	-1.5	75%
OTC currency linked Derivatives	0.01%	0.024%	-2.0	75%
OTC interest, equity and commodity-linked Derivatives	0.01%	0.7%	-1.5	75%
Credit Default Swaps	0.01%	0.7%	-1.5	75%

Note: Parameters are as per the EC IA baseline analysis (2011b and Schafer, 2015: 17).

Like all taxes, a FTT carries distortionary effects which are captured by two elements of equation 1 measuring elasticity and evasion. The EC IA provides a set of elasticities (ε) capturing the responsiveness of traded volumes to the imposition of a tax. Their values, which are also used in the baseline analysis here, derive from a review of previous applications of similar taxes (Copenhagen Economics, 2011). The elasticities vary across the different financial instruments reflecting the availability of substitutes and the characteristics of certain trading platforms. Given the structure of equation 1, the elasticity effect is determined separate, and subsequent to the effect of E on the tax base. It also implies that for elasticities between 0 and -1 revenue will always increase in the tax rate whereas for elasticities less than -1 there is a Laffer-curve effect where revenue could decrease as the tax rate increases (EC, 2011b: 3-4).

The evasion parameter (*E*) captures the rate of displacement or relocation that would occur following the introduction of a FTT. The 2011 EC IA examines various evasion configurations without focusing entirely on any one configuration. Schafer (2015: 17) established that the 2011 EC calculations, which determined that a FTT would raise €57 billion if introduced for all EU countries, used rates of 15% for securities and 75% for derivatives. Consequently, these rates are used in the baseline estimates here; although alternative configurations are incorporated into the sensitivity analysis.

While the EC proposal continues to evolve, it is clear that the FTT will be structured such that the tax base for shares will be where they are issued while for all other instruments it will be the location of the financial transaction. The latter has implications for the taxation yield for Ireland given that it is likely that each transaction will only be subject to the FTT once with the revenue generated split, if appropriate, between the countries involved in the trade. For example, a transaction subject to the FTT and involving a party in Ireland and a counter-party in Germany

[5] Higher transaction costs, based on McCulloch and Pacillo's (2011) estimates are used in the sensitivity analysis.

will see a sum of tax raised which would be split equally between the Irish and German governments. In the case of the counter-party being in a non FTT country, the entirety of the revenue would flow to the Irish Government. Reflecting this, the calculations in this paper assume three possible categories for all non-equity transactions[6]:

(1) Irish party and Irish counter-party: 100% of revenue to Ireland
(2) Irish party and FTT zone counter-party: 50% of revenue to Ireland; 50% to other FTT zone country[7]
(3) Irish party and non FTT zone counter-party: 100% of revenue to Ireland

In the absence of country-specific data on the turnover of Irish financial instruments by traders in other countries, the proportions of transactions in each of the three categories must be derived. The steps associated with this determination are outlined in the next section.

By implication, there are also likely to be transactions in other FTT zone countries, to which Ireland is a counter-party, and so taxation revenue will flow to Ireland from these. As the scale of this effect is difficult to accurately determine, it has been excluded from the baseline analysis. However, some assumptions are made to facilitate its inclusion in the sensitivity analysis.

4. ESTABLISHING A TAX BASE

As a means of determining the Irish FTT tax base, the paper follows four steps:

1. Obtain data on each instruments turnover
2. Adjustment(s) of turnover figure if appropriate
3. Allocation of corrected turnover to domestic and foreign (FTT, non-FTT) sources
4. Establish turnover relevant to calculation of Irish FTT tax revenue

In **Step 1** we obtain data for each of the following instruments: equities, bonds, exchange traded derivatives (ETDs), over-the-counter (OTC) derivatives including interest rate and foreign exchange derivatives, and credit default swaps (CDS). In all cases, the paper attempts to bring together data that is as up-to-date as possible.[8] Subsequently, **Step 2** adjusts this data, based on precedents in previous research work, so that it is more representative of the volume of transactions occurring in the market. The process followed for each of these two steps is outlined instrument by instrument below.

Equities

To calculate the volume of share turnover we use data on the market capitalisation of all Irish resident entities from the Central Bank and turnover data from the World Bank.

The overall value of the market capitalisation of Irish resident entities is published as part of a monthly *Security Issue Statistics* release by the Central Bank. The total monthly figure is prone to

[6] The approach follows Copenhagen Economics (2014) and Schafer (2015).
[7] Assuming both countries tax at the same rate; if they do not, the FTT would be calculated using each countries tax rate on a base of 50% of the transaction value.
[8] Inevitably, this involves using data corresponding to different time periods. Some data is recent (at the time of writing) while others are current (i.e. not updated since), but collected 2-3 years ago.

increases and decreases depending on the volume of merges and acquisitions, such that any monthly figure in and of itself might be misleading. Reflecting this, the paper uses an average market capitalisation of quoted shares for the year to July 2015 (August 2014 to July 2015).[9] The analysis excludes the value of unquoted shares which account for less than 0.5% of the overall figure.

As the Central Bank data does not provide information on the turnover of shares, we turn to data from the World Bank's World Development Indicators to estimate this. The WDI's include a measure of the turnover ratio for stocks where this measures the total value of shares traded during the period divided by the average market capitalisation for the period - average market capitalisation is calculated as the average of the end-of-period values for the current period and the previous period.[10] The data demonstrate that turnover levels can be volatile so an average figure is used rather than just taking the latest figure (for 2012). The average has been calculated over the period from 2000-2012 but excludes the years 2006, 2007 and 2008 when the lead up to, and emergence of, the financial crisis notably skews turnover volumes.[11] Given the international nature of equity trading, the paper uses as a baseline the average turnover figure for the European Union which equals 1.025 for the period.[12]

Following Schafer (2015) a correction factor is applied to take into account OTC share trading – trading occurring outside of exchanges. Gomper and Pierron (2010: 15) estimate this to be approximately 40% of European turnover, a figure echoed by studies from CESR (2010) and Reuters (2014).[13] However, an alternative estimate by the Association for Financial Markets in Europe (AFME, 2011) found it to represent 16%. Given this uncertainty, the baseline calculations assume a value half way between the two (28%) and adjust the estimated turnover accordingly.[14]

Finally, and following the EC IA analysis (2011b: 30) and Schafer (2015:16), the estimated turnover is corrected to reflect an assumption that only 85% of turnover is generated within the financial sector and thus would be subject to the tax. This correction assumption is applied to equities and to the calculation of the tax base for most other instruments.

Bonds

To calculate the value of transactions in the bond market the paper uses data from the Central Bank/European Central Bank. Data on the volume of transactions across all debt securities are published monthly with the transactions decomposed into short-term and long-term securities and further into those involving commercial debt and those involving Government debt.[15] For the year to July 2015 (August 2014 to July 2015) the paper establishes the value of transactions

[9] See http://www.centralbank.ie/polstats/stats/sis/Pages/releases.aspx See also ECB's 'Outstanding amounts and transactions of euro-denominated listed shares by country of residence and sector of the issuer' http://www.ecb.europa.eu/stats/money/securities/quoted/html/quoted_shares_index.en.html
[10] See http://data.worldbank.org/indicator/CM.MKT.TRNR/countries
[11] For example, the average turnover ratio for the European Union over these years (2006-08) is 159 compared to 102 for the period 2000-2012 when these years are excluded.
[12] Note the WDI turnover ratio records an average of 102.4732 for the period which implies a turnover level of 1.025 per share.
[13] The precise estimate from Gomper and Pierron is 37.8% (2010: 15).
[14] The paper revisits this assumption in the sensitivity tests (see Table 7b).
[15] See http://www.centralbank.ie/polstats/stats/sis/Pages/releases.aspx
and http://www.ecb.europa.eu/stats/money/securities/debt/html/index.en.html

under four headings: long-term commercial bonds, short-term securities, long-term Government bonds and short-term Government bonds. While the current EC proposal excludes Government bonds, the base is established so that the revenue forgone associated with this exclusion can be estimated.

Two correction factors are applied to this data. First, and following Copenhagen Economics (2014: 16-17, 59), an estimate is made to take account of the unreported OTC part of the bond market. Unlike equities, there are no published estimates of the scale of this sector. Using the aforementioned AFME OTC equity market estimates as a conservative figure (16%), the observed bond turnover data is increased to reflect this adjustment. [16] As with equities, the second adjustment is that the estimated turnover is corrected to reflect an assumption that only 85% of turnover is generated within the financial sector and thus would be subject to the tax.

Exchange Traded Derivatives

There are challenges associated with establishing a robust data basis for the volume and value of exchange traded derivatives (ETDs) traded in Ireland. Ideally, one would establish the tax base for these instruments across each of the five components, in particular given the possibility of future variations in the rates of tax that might be applied to each one. These components are: securitised derivatives, equity derivatives (including single stock options and futures, stock index options and futures, and exchange traded funds options and futures), interest rate derivatives (both options and futures), commodity derivatives (both options and futures), and currency derivatives (both options and futures). Instead, the paper uses one figure for the combined value of trade in all these instruments, following the precedent of the 2012 Central Bank/ESRI report.

That report estimated a value of €533.26bn for ETDs traded in Ireland during 2010. The estimate was based on Central Bank data on the volume of transactions combined with Bank for International Settlements (BIS) data on the average notional value per contract in that year (2012: 36). The calculated figure was then deflated by 25% to provide the estimate.

As no further turnover data is available for Ireland, this paper has estimated the value of ETDs by updating the 2010 estimate using Futures Industry Association (FIA) data on the growth rates of the volume of ETDs in Europe between 2010 and 2014.[17] Over these years volumes grew by +13.5%, -12.5%, -0.7% and +2.1% respectively. The updated 2014 figure for Ireland is calculated as €536.68bn. As there are no growth rates available for 2015, this 2014 figure is used.

The evolving EC FTT proposal seems likely to include some exclusions, lower tax rates and variations in the determination of the tax base for ETDs. Reflecting this, the estimated figure has been deflated by 20%; such that the baseline ETD value is conservative and that any revenue estimate is reliable in the context of the evolving FTT proposal. The baseline estimate used is €429.34bn.

[16] The paper revisits this assumption in the sensitivity tests (see Table 7b).
[17] The BIS Quarterly Review also cites this source for these instruments (September, 2015: A12-A16).

Over the Counter Derivatives

OTC derivatives divide into two categories: interest rate derivatives and foreign exchange (FX) derivatives. The former includes subcategories of forward rate agreements, swaps and options while the latter includes outright forwards, FX swaps, currency swaps and options. Turnover data for each of these instruments was sourced from the results of the latest BIS Triennial Central Bank Survey for 2013; the Irish Central Bank was one of the participants in the survey (Menton, 2014).[18]

As with equities and bonds, the final figures for all of these instruments are reduced by 15% to reflect an assumption that only 85% of turnover is generated within the financial sector and thus would be subject to the tax. One further adjustment is made to the figures for the three interest rate derivative instruments. As it is a stated objective of the evolving EC FTT proposal that derivatives related to sovereign debt be excluded from the tax, these figures are further deflated by 20% in an attempt to take account of the likely impact on the tax base of their exclusion.[19]

Credit Default Swaps

Data on the sales of CDS in Ireland are unavailable. However, following Schafer (2015:20), it is possible to estimate a value for the scale of these activities by comparing BIS global data for CDS and OTC interest rate derivatives. Across the years 2013-2014 the notional amounts outstanding (a measure of market size) on CDSs were equivalent to 3.65% of the notional amounts outstanding on interest rate contracts (BIS, 2015: 7, 8 and 15). Making an assumption that CDSs are traded as often as other OTC interest rate derivatives one can estimate a taxable turnover for CDS transactions as being equal to 3.65% of OTC interest rate derivatives. Reflecting the aforementioned adjustments for the proportion of turnover generated within the financial sector and the exclusion of derivatives related to sovereign debt from the tax base, this proportion is calculated from the sum of the adjusted interest rate derivative instruments.

As the intention of this paper is to determine the tax revenue yield for the Irish state from a FTT, **Step 3** focuses on the allocation of the corrected turnover between domestic and foreign (FTT, non-FTT) sources. As countries are free to set their own tax rate for instruments within the EC FTT proposal, determining the national tax base is key to estimating the overall national revenue yield.

For equities, the current EC proposal is for the tax to be collected by the state where the shares have been issued. Therefore, the tax base for equities is equivalent to the value calculated in Step 2. For all other instruments, the revenue yield is divided depending on the residency of the parties to each transaction. Consequently, reflecting the aforementioned structure, the yield for these instruments from a FTT is assumed to be distributed as follows:

[18] See BIS (December 2013 tables 4-7) and (February 2014: tables 13-16).

[19] The selection of a 20% reduction is arbitrary as data on the composition (sovereign debt related and other) of Irish OTC interest derivative are unavailable. However, higher and lower reductions are examined in the sensitivity analysis but have limited impact on the estimated revenue yield (see Table 7d).

(1) Irish party and Irish counter-party: 100% of revenue to Ireland
(2) Irish party and FTT zone counter-party: 50% of revenue to Ireland; 50% to other FTT zone country[20]
(3) Irish party and non FTT zone counter-party: 100% of revenue to Ireland

Given this structure, Step 3 adjusts the tax base determined in Steps 1 and 2, to identify the tax base from which Ireland can derive its FTT revenue. Table 2 outlines the decomposition of financial transactions volumes into the three categories (domestic, foreign FTT-countries, foreign non-FTT countries) for each of these instruments.

For bonds, the paper uses data from the Central Bank on the domestic and foreign holdings of Irish Government long-term bonds as the basis for determining the structure of holding for the overall bond market (both Government and Commercial). Averaging over the year to July 2015 (August 2014 to July 2015) 42.2% of long-term Government bonds were held domestically and 57.8% were held by non-residents (foreign). Although Government bonds are excluded from the EC FTT proposal it is assumed that the structure of commercial bond holdings has a similar pattern to that of the overall bond market. Furthermore, it is assumed that the pattern of bond transactions is the same as the structure of bond ownership.

Data from the International Monetary Fund (IMF) Coordinated Portfolio Investment Survey (CPIS) provides details on the cross-border holdings of equities, bonds and long- and short-term debt securities broken down by the economy of residence of the issuer. Using the results of this survey for Ireland (December 2014), it is possible to determine the holdings of Irish equities and bonds across more than 240 territories, states and international organisations. Table A1 of the appendix summarises these results which show that foreign held Irish issued bonds split 28% to countries that are participants in the evolving EC FTT proposal and 72% to other non-FTT countries.[21] Assuming that the pattern of transactions is similar to the structure of bond holdings, this information is used to split the volume of bond transactions involving a foreign party between FTT and non-FTT countries.[22]

BIS data provides details on the proportion of transactions that are domestic or cross-border for all OTC derivatives. This information is use to allocate transactions in these markets between domestic and foreign parties.[23] Following Copenhagen Economics (2014: 62) the foreign proportion is further decomposed between FTT countries and non-FTT countries using the aforementioned IMF CPIS structure for bonds. CDS are assumed to follow a similar pattern to interest rate derivatives.

[20] Assuming both countries tax at the same rate; if they do not, the FTT would be calculated using each countries tax rate on a base of 50% of the transaction value.
[21] The FTT countries included in the calculation are the 11 states which chose to pursue the FTT proposal under enhanced cooperation during 2014. These include: Austria, Belgium, Estonia, France, Germany, Greece, Italy, Portugal, Slovakia, Slovenia and Greece.
[22] Copenhagen Economics (2014: 60-63) follow a similar approach.
[23] In the case of interest rate derivatives, swaps represent 98.8% of this market and it is the local/cross-border structure of transactions on this instrument that is used. A weighted average of the proportion that are local and cross-border was calculated for the four instruments within the OTC foreign exchange derivatives category - see Table 2.

As there is no available information on the nationality of parties involved in ETDs, an assumption needs to be made regarding its structure. The paper assumes that the proportion of domestic transactions is likely to be less than the proportion of long-term Government bonds held domestically (42.2%); where the latter is taken as a proxy for the proportion of domestic only transactions in that market. Consequently a figure of 20% of transactions is used – this assumption is revisited in the sensitivity analysis.[24] There is also no available information on cross-country participation in, or holdings of, ETDs. Following Copenhagen Economics (2014: 62) the paper assumes that derivatives are mostly used to hedge risks related to securities portfolios and consequently the IMF CPIS results for the cross-border holdings of equities offer an appropriate insight into the likely division between FTT and non-FTT countries (see Table A1 in the appendix).

Table 2 Assumed Domestic and Foreign Holdings of Bonds and Derivatives

Instrument		
Bonds	42.2% domestic 57.8% foreign	28.0% FTT countries 72% non-FTT countries
OTC Interest rate derivatives & CDS	15.5% domestic 84.5% foreign	28.0% FTT countries 72% non-FTT countries
OTC Foreign Exchange derivatives	7.2% domestic 92.9% foreign	28.0% FTT countries 72% non-FTT countries
Exchange Traded Derivatives	20% domestic 80% foreign	13.9% FTT countries 86.1% non-FTT countries

Notes: Sources for distribution as outlined in text. Data from Central Bank of Ireland, BIS and IMF CPIS. The IMF CPIS distributions of Irish share and bond holdings is summarised in Table A1 of the appendix.

Step 4 brings together the results of the previous steps to provide an estimate of the FTT tax base for Ireland. Table 3 presents these results with the gross tax base figure corresponding to the tax base after steps 1 and 2 and the net tax base figure corresponding to the situation after step 3. This 'net tax base' represents the base of financial transactions upon which the tax that would remit to Ireland is levied.

[24] See Table 7d.

Table 3 Estimated FTT Tax Base for Ireland

Instrument	Gross Tax Base	Net Tax Base
	€ millions	***€ millions***
Securities		
Shares	527,449.9	527,449.9
Bonds		
Long-term commercial	162,524	149,372.6
Short-term securities	173,919	159,845.6
Government long-term	23,905	21,970.8
Government short-term	13,700	12,591.6
Exchange Traded Derivatives		
Overall ETDs*	429,342.0	405,470.6
OTC Derivatives		
Interest rate derivatives		
Forward rate agreements	4,341.3	3,733.5
Swaps	418,338.8	368,849.3
Options	526.2	452.5
Foreign Exchange Derivatives		
Outright Forwards	373,281.8	324,785.1
FX swaps	775,505.4	674,751.7
Currency swaps	42,425.9	36,913.9
Options	1,151.1	1,001.5
Credit Default Swaps	15,447.0	13,619.6
Total – all instruments	**2,961,857.9**	**2,700,808.2**
Total – excluding Gov. Bonds	**2,924,252.4**	**2,666,245.8**

Notes: *ETDs include equity futures, equity options, interest rate futures, interest rate options, securitized derivatives, commodity futures, commodity options, currency futures and currency options.
The gross tax base figure corresponding to the tax base after steps 1 and 2 and the net tax base figure corresponding to the situation after step 3.

5. ESTABLISHING THE NET REVENUE YIELD

Using the various tax rates and assumptions set out in section 3 and the tax base established in section 4, it is possible to estimate the revenue yield to the Irish state from the introduction of a FTT. However, the adoption of this tax would also require the simultaneous abolition of the exiting stamp duty (1%) on shares on the grounds of avoiding any double taxation. Consequently, the net yield to the state is calculated as the revenue from the FTT minus the revenue forgone from the abolition of stamp duty on shares.

Table 4 outlines Revenue Commissioners data on the receipts from stamp duty from 1997-2014. The table's figures for 2015 and 2016 are projections based on an assumed 5% per

annum growth in receipts. The estimated 2016 figure of €311.24m is taken as the revenue forgone cost of abolishing the 1% stamp duty on shares.

Table 4 Stamp Duty on Shares, Receipts and Estimates for 1997-2016 (€ millions)

Year	Yield	Year	Yield	Year	Yield
1997	88.57	**2004**	260.50	**2011**	194.76
1998	161.16	**2005**	324.02	**2012**	171.41
1999	226.37	**2006**	406.19	**2013**	251.41
2000	231.40	**2007**	608.72	**2014**	282.30
2001	345.79	**2008**	419.36	**2015***	296.42
2002	302.88	**2009**	207.62	**2016***	311.24
2003	255.77	**2010**	181.74		

Source: Revenue Commissioners on-line Statistics and Statistical Reports (2002, 2006, 2009)
Note: *Estimates for 2015 and 2016 assuming a 5% per annum growth rate

Table 5 presents the baseline results from this analysis. Given the aforementioned calculation and tax base assumptions, overall a FTT would raise €638.54m per annum. Taking account of the revenue forgone from the stamp duty on share transactions, the net FTT revenue estimate is €327.30m.

Table 5 Baseline FTT Revenue Estimate (€ millions)

Instrument	*€ millions*	*% Gross Yield*
Shares	384.28	60.18%
Bonds (commercial)	225.29	35.28%
ETD	6.58	1.03%
OTC interest rate derivatives	9.13	1.43%
OTC FX derivatives	12.92	2.02%
CDS	0.33	0.05%
Gross FTT Revenue Estimate	**638.54**	**100.00%**
Estimated Stamp Duty Revenue 2016	311.24	
Net FTT Revenue Estimate	**327.30**	

Note: Baseline model uses tax base data from Table 3 and estimation parameters for tax rates, transaction costs, elasticities and evasion as outlined in Table 1.

The composition of the FTT revenue outlined in Table 5 highlights the core role of transactions in equities and commercial bonds. Together these account for over 95% of the revenue yield. Consequently, issues regarding the ongoing EC design of the tax, and any possible changes to the taxation of securities, is of critical importance to the feasibility of the FTT for Ireland. Derivatives, although responsible for a large proportion of the tax base, provide limited revenue (€29m per annum); a feature driven by their low tax rate and higher assumptions for evasion/displacement.

Table 6 and Chart 1 give some context to the scale of this potential additional annual revenue. The gain is equivalent to 0.51% of the estimated tax yield for 2016 and 0.15% of GDP. Compared to other taxation measures, the net gain is similar in size to the revenue change (gain or loss) associated with a 1% change in the 5.5% USC rate, a 10c change in the cost of a litre of petrol or diesel and a 1% change in the standard (23%) VAT rate. In net terms, a FTT would provide more revenue than would be required to change the top income tax rate by 1%, change personal tax credits by €100 or change the standard income tax band by €1,000.

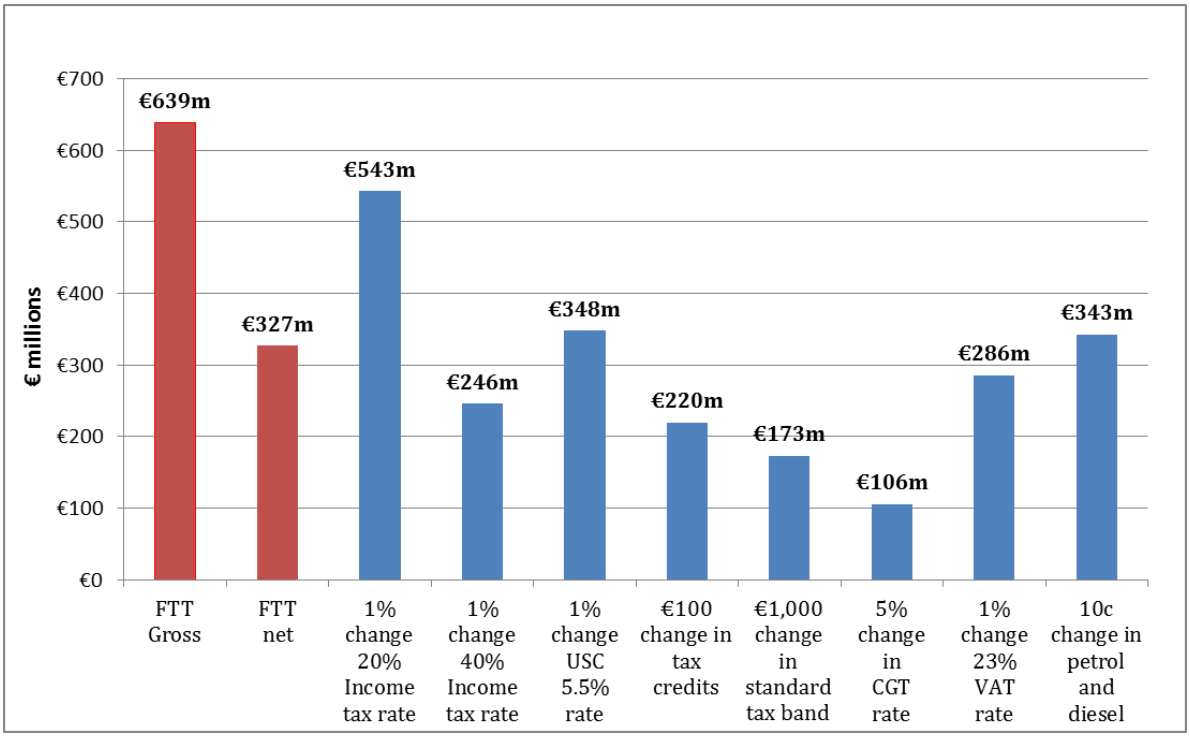
Overall, a FTT would represent a small but recurring area of additional taxation revenue – an important clarification, as at times it has been portrayed as a panacea.

Table 6 Comparisons of FTT Tax Yield

	Nominal €m	FTT Gross	FTT Net
FTT Yield		*€638.54m*	*€327.30m*
GDP (nominal 2016)	€223,125m	0.29%	0.15%
Overall Tax Take (2016)	€64,706m	0.99%	0.51%

Notes: Estimated 2016 Nominal GDP and tax take from Budget 2016 (Department of Finance, 2015: C42-44). Tax take includes current taxes on income and wealth, capital taxes, taxes on production, imports and consumption, social contributions and EU taxes.

Chart 1 Comparing FTT Tax Yield to other taxation measures (post-Budget 2016 basis)



Source: Revenue Commissioners online statistics (post-Budget 2016) and authors calculations

Note: Following Social Justice Ireland (2015b) the change in the personal tax credit assumes a commensurate change in the couple, widowed parents and the single person child carer credit.

6. SENSITIVITY ANALYSIS

Implicit in the establishment of the tax modelling approach in Section 3, and the tax base in Section 4, are a number of assumptions and uncertainties regarding the net yield calculation. In this section these are examined through a series of sensitivity tests.

These tests cover variations in the tax rates, alternative definitions of the tax base, and different model parameters to those assumed in the baseline calculation. They also incorporate a number of other tests reflecting proposals elsewhere in the literature. The tests are intentionally comprehensive, given the prevalence of assumptions and uncertainties in the baseline calculation, and are a means of both assessing the robustness of the baseline calculation and of accommodating the papers estimates in the context of what remains an evolving EC FTT proposal. In particular the results highlight those areas where decisions regarding the design of any FTT has impacts on the likely yield to the Irish state from its adoption.

Throughout the section the text will focus on the effect of these tests on the net revenue yield as established in Table 5; in all cases it is the calculated gross figure that is changing while the assumed revenue forgone cost of the loss of stamp duty (see Table 4) remains constant. Tables 7a to 7d present the full results of the tests. They are followed by Table 8 which presents results for two plausible scenarios.

6a. Variations in Tax Rates

Table 7a reports the results of five sensitivity tests where different taxation rates are used. The first of these models the impact of imposing a lower tax rate on short-term bonds given that it might be possible to argue that they should be treated differently, with a lower tax rate, than that imposed on long-term bonds. The tax rate for this instrument is reduced by 75% (to 0.025%) and reduces the baseline revenue estimate by €84m (26%). A similar reduction in the tax rate on ETDs (-75% to 0.0025%) has a limited impact – reducing the baseline estimate by 1.3%. Applying that tax rate (0.0025%), which is one-quarter of the EC proposed rate, to all derivatives reduces the net revenue yield by €19m (almost 6%).

A series of alternative tax rates for securities and derivatives are modelled reflecting approaches elsewhere in the literature. Schafer (2015: 18-26) considers the impact on revenues if tax rates were set at half the baseline level, one-tenth of that level and a mixed scenario where rates are halved for securities and reduced by 90% for derivatives. In all cases these reductions are extreme, representing significant reductions in tax rates from a baseline positon of low rates, and are applied to all instruments. Consequently, they have significant effects on the estimated revenue, reducing it by between €300m and €500m. Were a FTT introduced at tax rates such as these, it would not be in Ireland's interest to adopt the proposal. Schulmesiter and Sokoll (2013) suggest a single rate for both securities and derivatives, where the latter's tax rate is used. The results from such a structure would be that a FTT would raise a gross €74m per annum; a figure considerably less than the stamp duty revenue that would be foregone upon its introduction. The Central Bank/ESRI report (2012: 37) modelled a scenario where the tax rates doubled (0.2% for shares and 0.02% for derivatives). In such a situation the net revenue from a FTT would be almost €800m per annum.

The final scenario modelled in Table 7a considers the outcome of a situation where a higher tax rate is imposed on OTC derivatives (including CDS). These transactions may be perceived as less mobile, and therefore more likely to withstand a higher tax rate. However, from the perspective of the Irish FTT revenue yield such a change has limited nominal impact, increasing revenue by €11.6m (3.5%).

Overall, given the results of these tests, and given the baseline revenue structure outlined in Table 5, the rate of tax charged on securities is a key determinant of the revenue yield to the Irish exchequer from a FTT.

Table 7a Sensitivity Analysis – Variations in Tax Rates

	Gross Revenue €m	Net Revenue €m	Change in Net Revenue v's Baseline €m	% change in Net Revenue v's Baseline
Baseline estimate	**€638.54**	**€327.30**	**-**	**-**
Lower rate on ST securities (0.025%)	€554.69	€243.45	-€83.85	-25.6%
Lower rate on ETDs (0.0025%)	€634.21	€322.97	-€4.34	-1.3%
Lower rate all derivatives (0.0025%)	€619.54	€308.30	-€19.00	-5.8%
Alternative Tax Rates				
0.05% securities; 0.005% derivatives	€345.92	€34.68	-€292.63	-89.4%
0.01% securities; 0.001% derivatives	€74.27	-€236.97	-€564.27	-172.4%
0.05% securities; 0.001% derivatives	€332.55	€21.31	-€305.99	-93.5%
0.01% for all	€98.92	-€212.32	-€539.62	-164.9%
0.2% securities; 0.002% derivatives	€1,110.14	€798.90	+€471.60	+144.1%
Higher rate for OTC derivatives (0.02%)	€650.12	€338.88	+€11.58	+3.5%

6b. Variations in the Tax Base

The analysis reported in Table 7b considers the impact of assumptions regarding the calculation of the FTT tax base, as established in Table 3. A total of five tax base variations are considered. The first of these assesses the impact on the baseline revenue estimate of the decision to exclude Government Bonds. Were these included in the FTT base and additional €25m in annual revenue would be generated.

Given the aforementioned importance of equity transactions to the FTT's revenue yield, the sensitivity tests which alter the assumed size of these transactions, demonstrate the dependence of the yield on transactions in this area. The baseline estimate uses a value for equity transactions based on the average market capitalisation of quoted shares in the year to July 2015. However, if the base is calculated off the average values across 2012-2014, a period when activity was lower, the equity base would reduce by 43% and the calculated yield would halve so that the annual gain from introducing the tax would be €166m. The baseline net revenue yield reduces by almost 40%, to €200m per annum, if we assume that the rate of share turnover is one-third less than average European levels.

It could be argued that the introduction of a FTT in Ireland might result in a number of re-domiciled PLCs shifting their operations back to the UK, thus reversing a trend over recent

years[25], or that the tax might lessen the turnover of high value shares. As a means of assessing the possible impact of these situations the table includes a sensitivity test of an alternative equity base where this is reduce by one-third from the baseline estimate. In such a case, the net revenue from a FTT would fall by €96m to €230m per annum. The yield is also recalculated based on variations to the equity base given the assumption in section 4 on the size of the OTC share trading portion of that market. If this segment of equity transactions was at the level (16%) estimated by the AFME (2011) net revenue would reduce by €55m. It would be €77m higher if the estimate (40%) of Gomper and Pierron (2010) is used.

The tax base for bonds established in Sections 4 and 5 cautiously assumes OTC activity in this sector to be equivalent to the lower estimates for OTC equity transcations (16%). However, were it to be higher at 40% the results in Table 7b show that the net revenue yield from a FTT would rise by €90m to €417m per annum.

Finally, the tests in Table 7b consider the impact of the aforementioned assumption that 20% of OTC derivatives are related to sovereign debt. If the true figure were higher (30%) or lower (10%) the impact on the baseline revenue estimate is minimal.

Table 7b Sensitivity Analysis – Variations in the Tax Base

	Gross Revenue €m	Net Revenue €m	Change in Net Revenue v's Baseline €m	% change in Net Revenue v's Baseline
Baseline estimate	**€638.54**	**€327.30**	**-**	**-**
Include Government Bonds	€663.72	€352.48	+€25.18	+7.7%
Using av. 2012-14 share levels	€472.35	€161.11	-€166.19	-50.8%
Lower share turnover (-33%)	€510.45	€199.21	-€128.09	-39.1%
Alternative equity base				
reduced equity base (-33%)	€542.47	€231.23	-€96.07	-29.4%
reduced OTC adjustment (16%)	€583.64	€272.40	-€54.90	-16.8%
reduced OTC adjustment (40%)	€715.40	€404.16	+€76.86	+23.5%
Alternative bonds base (40% OTC)	€728.66	€417.42	+€90.12	+27.5%
Alternative estimates for OTC derivatives base				
higher % related to sov. debt (30%)	€637.40	€326.16	-€1.14	-0.3%
lower % related to sov. debt (10%)	€639.73	€328.49	+€1.18	+0.4%

6c. Variations in the Models Parameters

While the baseline estimates use the EC's parameters (evasion rates, elasticities and transaction costs – see Table 1) there is merit in exploring the implications on the expected FTT revenue yield of changing these values. In particular this is relevant given the ongoing development of the EC proposals and the modelling approaches used in other research papers. These results are outlined in Table 7c.

[25] See FitzGerald (2013) for more details on these firms.

The impact of alternative assumptions on the rate of evasion (avoidance or relocation) associated with the introduction of a FTT is first considered. The baseline assumptions are rates of 15% for securities and 75% for derivatives. The Central Bank/ESRI report (2012) modelled rates of 10% and 90% while Copenhagen Economics (2014) assumed rates of 10% and 80%. Applying these parameters sees the baseline net revenue estimate increase by €18m (6%) and €30m (9%) respectively. Schafer (2015: 18) considers the EC parameters to represent the 'maximum evasion' scenario and models situations of moderate (0% securities, 50% derivatives) and no evasion; scenarios which increase the estimated net revenue by €137m (42%) and €194m (59%) respectively. Finally, the table reports the result of an extreme scenario where evasion is 30% for securities and 98% for derivatives. This scenario, reflecting one modelled by the Central Bank/ESRI (2012: 37), would see net revenue fall 41% (€134m) below the baseline estimate.

The Central Bank/ESRI report also modelled the revenue effects if different elasticities applied, where these were uniform rates across all of the financial instruments. Although the aforementioned studies by the EC (2011b) and Copenhagen Economics (2011) found different elasticities for different instruments, the results of applying a uniform rate are reported in Table 7c. If all instruments had an elasticity of -2 the net revenue yield would be €88m (27%) lower than the baseline estimate.

The final sensitivity test reported in Table 7c examines the implications of using McCulloch and Pacillo's transaction cost values in place of the EC ones. They found rates of 1.163% for securities, 0.039% for ETDs, 0.024% for OTC currency transactions and 0.761% for OTC interest rate, equity and CDS transactions (2011: 56). Applying these parameters results in an increase of €46m (14%) to the baseline estimate.

Table 7c Sensitivity Analysis – Variations in Model Parameters

	Gross Revenue €m	Net Revenue €m	Change in Net Revenue v's Baseline €m	% change in Net Revenue v's Baseline
Baseline estimate	**€638.54**	**€327.30**	**-**	**-**
Different Evasion Rates				
10% Securities; 90% Derivatives	€657.02	€345.78	+€18.48	+5.6%
10% Securities; 80% Derivatives	€668.61	€357.37	+€30.06	+9.2%
0% Securities; 50% Derivatives	€775.08	€463.84	+€136.54	+41.7%
0% Securities; 0% Derivatives	€833.02	€521.78	+€194.48	+59.4%
30% Securities; 98% Derivatives	€504.32	€193.08	-€134.22	-41.0%
Different Elasticities				
0% elasticity for all	€756.91	€445.67	+€118.36	+36.2%
-1% elasticity for all	€645.01	€333.77	+€6.47	+2.0%
-2% elasticity for all	€550.51	€239.27	-€88.03	-26.9%
Different transaction costs	€684.46	€373.22	+€45.92	+14.0%

6d. Other Tests

Table 7d provides the results of six other sensitivity tests. These reflect applications elsewhere in the literature as well as consider some gaps in the baseline analysis.

The first of these tests attempts to take into account the probability that revenue from a FTT will flow into Ireland as well as out.[26] Reflecting the structures outlined in Sections 3 and 4, where a non-equity transaction occurs in another FTT state and that state is in the FTT zone, half of the taxation revenue raised from the transaction will flow to Ireland. As the scale of this gain is hard to determine, an arbitrary figure of 5% is modelled in the sensitivity test. This sees the net revenue yield from the FTT increase by almost €32m to €359m. Such a revenue gain implies Ireland would be a net gainer under the modelled FTT structure as the foregone gross tax revenue flowing out would be equivalent to 3.6% of gross tax revenues.

High Frequency Trading (HFT) occurs to take advantage of small margins in financial markets and to exploit marginal arbitrage opportunities. The phenomenon is relatively recent and "was virtually non-existent in Europe before 2007" (Copenhagen Economics, 2014: 23). Trading is also rapid, with Baron et al noting that "the time scale of such activities can be measured at microsecond time frames, with position holding periods of mere seconds" (2012: 2). Profit margins on these trade are general low, with Copenhagen Economics pointing to a rate of 0.006% of turnover and Baron et al (2012: 10, 48) finding an average of US$0.50 per contract executed on the E-Mini S&P 500 during August 2010. However, the volume of contracts means that these small gains accumulate to large profit figures from this type of trading.

The second test in Table 7d assumes that the introduction of a FTT is likely to alter HFT activity. Given the small margins, the assumption is that these trades are highly elastic and that following the introduction of a FTT they will be limited to the most profitable of activities or disappear entirely (Schafer, 2015: 35; Brogaard, 2011: 12). Estimates of the share of HFT differ. Haldane (2010: 17) estimated that HFT accounted for around 30-40% of volumes in equities and futures in Europe. The EC IA document believes it to be "between 20 to 40% of the total" (2011b: 31). Following Copenhagen Economics (2014: 23-25), this paper models the FTT revenue associated with a scenario where almost all HFT is eliminated. To capture this, the test models a reduction of 35% in the turnover of all instruments other than bonds. This reduces the net tax base by 30.5%.

The implications for the net revenue yield depend on the assumptions for evasion/displacement in the market. Were these rates to remain unchanged from the baseline assumptions (see Table 1) the yield would be €183m per annum. However, it is more plausible to assume that the rates of evasion will decrease as most HFT is removed from the financial markets. Two variations of this effect are modelled: where the evasion rate is 5% for securities and 50% for derivatives and where it is 5% for securities and 25% for derivatives. The latter scenario reflects the likelihood that there would be smaller changes in the derivatives market once all the HFT is removed. These scenarios imply an annual net revenue yield of €257m and €276m respectively.

[26] The baseline model shows a reduction of 8.8% in the tax base (from gross to net) when account is taken of flows out of the state to other FTT countries (see Tables 2 and 3). Ireland's gross revenue yield from the FTT would be 3.6% higher (€662m rather than €638m) without these outflows.

The third set of sensitivity tests in Table 7d repeats those examined in the Central Bank/ESRI paper (2012: 33). Here revenue is calculated in three different ways, each assuming the same elasticity for all instruments[27], and the evasion rate is taken as 10% for securities and 90% for derivatives. The net revenue yield calculations range from €253m to €460m with an average of €354m.

Table 7d Sensitivity Analysis – Other Scenarios

	Gross Revenue €m	Net Revenue €m	Change in Net Revenue v's Baseline €m	% change in Net Revenue v's Baseline
Baseline estimate	**€638.54**	**€327.30**	**-**	**-**
If Revenue to Ireland included (+5%)	€670.47	€359.23	+€31.93	+9.8%
High Frequency Trading (HFT)				
Remove all HFT	€493.90	€182.66	-€144.64	-44.2%
Remove all HFT and adjust evasion (5% Securities; 50% Derivatives)	€568.62	€257.38	-€69.92	-21.4%
Remove all HFT and adjust evasion (5% Securities; 25% Derivatives)	€587.46	€276.22	-€51.09	-15.6%
Same parameters as CB/ESRI (Evasion 10%; 90%)				
0% elasticity for all	€771.30	€460.06	+€132.75	+40.6%
-1% elasticity for all	€659.61	€348.37	+€21.06	+6.4%
-2% elasticity for all	€564.43	€253.19	-€74.11	-22.6%
Variations in % of ETDs held domestically				
If 10%	€638.49	€327.25	-€0.05	0.0%
If 30%	€638.59	€327.35	+€0.05	0.0%
Including Cascading (Copenhagen Economics Formula)				
With all other baseline assumptions	€1,110.14	€798.90	+€471.60	+144.1%
Increase in ISE turnover (+33%)	€658.77	€347.53	+€20.23	+6.2%

A fourth test reported in Table 7d examines the assumption made regarding the proportion of ETDs held domestically. The initial estimate of the tax base assumed this was 20%. The test's results show that the precise value is immaterial to the annual net revenue yield calculation; a 10 percentage point variation in the assumed proportion alter the annual revenue yield by +/- €50,000 (0.01%).

An assumption of the baseline model is that each financial transaction is taxed once and where appropriate the revenue is split between countries. An alternative perspective is that each transaction is taxed twice; once on the buyers side and once on the sellers. Copenhagen Economics (2014: 22) provide a formula for calculating the FTT revenue where both legs are taxed:

$$R = 2\tau \,.(1-E).\, V.\left(1+\frac{2\tau}{c}\right)^{\varepsilon} \qquad \textit{(equation 2)}$$

where τ is the tax rate, V is the annual value of transactions being taxed, E is the rate of evasion, displacement or avoidance, c is the transaction costs and ε is the elasticity of the volume of transactions in the market (post any evasion) to the increase in taxation.

[27] As outlined earlier, the research literature points towards the appropriateness of different elasticities for each of these instruments; as modelled in this paper's baseline estimates.

Using this formula, and all the other baseline assumptions (see Table 1), the paper finds an annual net revenue yield of €799m. However, despite the ongoing development of the FTT proposal, it seems unlikely that final FTT design will allow multiple tax charges to the same transaction (so called cascading).

The final test in Table 7d attempts to estimate the net revenue effect associated with any increase in activity on the Irish Stock Exchange (ISE) following the adoption of a FTT. As the tax requires the abolition of the exiting 1% stamp duty on shares, and replaces it with a 0.1% FTT, this reduction in costs is likely to directly increase ISE turnover. A further positive turnover effect would derive from the emergence of lower stamp duty rates on the ISE relative to those imposed in London. This reversal of the current position, where London stamp duty at 0.5% is half that applied in Dublin, is also likely to boost ISE turnover as some trading activity transfers from London. The test assumes a 33% increase in ISE turnover on 2015 levels, adding an extra €27.7 billion to the equity tax base (ISE, 2016). This would see net FTT revenue increase by €20m to €348m per annum.

Plausible Scenarios

To conclude this section, a final assessment calculates the net revenue yield associated with two possible FTT scenarios. Given the ongoing negotiations regarding the structure of the FTT, there is still some uncertainty surrounding the comprehensiveness of the tax base and the precise nature of any exemptions, reduced rates or other derivations from the proposed structure as outlined to date.

Table 8 models two plausible FTT scenarios for Ireland. In the first scenario:

- the baseline parameters are used (see Table 1);
- HFT is almost eliminated (-35% of turnover in all instruments other than bonds) and the evasion rate falls to 5% for securities and 25% for derivatives;
- there is an increase in turnover for the ISE – a 33% increase on turnover following the reduction of HFT; and
- there is a flow of FTT revenues into Ireland equivalent to 5% of gross FTT revenue.

In the second scenario only the HFT assumption is altered, with a narrower definition assumed – where the 35% reduction only applies to equities and ETDs. These scenarios give a net revenue yield of between €321m and €346m per annum.

Table 8 Plausible Scenarios

	Gross Revenue €m	Net Revenue €m	Change in Net Revenue v's Baseline €m	% change in Net Revenue v's Baseline
Baseline estimate	**€638.54**	**€327.30**	**-**	**-**
Plausible Scenario 1	€632.26	€321.02	-€6.28	-1.9%
Plausible Scenario 2	€656.94	€345.70	+€18.40	+5.6%

Taking all the results of these tests in this section together, it is clear that a FTT will result in a net revenue yield to the Irish state. The scale of that gain is principally dependent on the design of the tax itself and in particular on the way in which securities are included and taxed.

7. SOME IMPLICATIONS

Although the primary objectives of this paper are to establish a comprehensive FTT tax base for Ireland, and to estimate the associated net revenue from the tax, this section briefly considers some of the implications associated with the introduction of a FTT. These are examined under four headings:

Scale and Incidence
Real Economy Effects
Stability and Knowledge of Financial Markets
Allocation of Funds Raised

Scale and Incidence

By design a FTT is a small tax levied on a wide base. Comparing the gross revenue baseline calculation (€639m) with the gross turnover in those instruments subject to the FTT (€2,266,246m) the effective rate is 0.024%. However, as outlined above the displacement and elasticity effects will alter the scale of the market once a FTT is imposed, implying a smaller tax base and a higher effective rate of approximately 0.07%.

The small scale of the tax carries implications for its incidence. Simply, a tax charged at such a small rate is very difficult to pass on, even for the largest of transactions. For example a transaction involving €10,000,000 of OTC derivatives will be subject to a FTT of €1,000; a figure that would be a fraction of the charges and costs normally associated with such transactions. In designing the tax the EC will need to decide which leg of the transaction is charged. If it is on buyers the tax would be somewhat like current stamp duties, if it is on sellers the tax would be somewhat like current VAT charges. Irrespective, both parties are likely to be financial institutions and it is onto these entities that the incidence of the tax would fall.

An objective of the 2011 EC FTT proposal is that the financial sector should contribute to the tax revenues of countries, given that it, unlike other sectors, is exempt from Value Added Tax (VAT). As the incidence is likely to fall on this sector, who are likely to absorb it as a small additional cost of trading in the market, the EC objective is somewhat achieved. However, relative to the scale of economic activity, the FTT yield is very small.

Real Economy Effects

As many financial transactions are linked to an underlying real economic aim, a FTT carries some implications for the real economy. There are challenges associated with evaluating such effects, in particular given that the final structure of the FTT is as yet undecided. Furthermore, the small rates of the FTT make it challenging to estimate real economy effects; effects which would be much easier to determine for a tax levied at levels 10 to 100 times those proposed. Some of the possible real economy effects are explored here, starting at the overall economy level and then focusing on specific areas and sectors.

Copenhagen Economics (2014: 44-46) determined that a FTT will increase the cost of capital. By raising the cost of trading assets the value of holding a security is reduced. Thus the return on capital in secondary markets will fall and lower the supply of capital to the real economy. However, they estimate that this effect is likely to be small; equivalent to a 0.13% increase in cost of capital assuming a reduction in HFT and the baseline EC model parameters (Copenhagen Economics, 2014:47).

If Ireland were to adopt a FTT and other countries did not, most particularly the UK, this gives rise to possible competition and relocation issues. *A priori* if it is cheaper to trade in country A than country B activity will shift from B to A. However, the relocation of financial market activities, from centres such as the IFSC in Dublin, depends on a number of things including taxation, but also regulation, legal systems, the availability of skilled employees, the broader costs of doing business and other agglomeration economy effects that derive from clusters of activity such as there is in the IFSC.

Evidence from the equities market shows small effects of relocation when there are differences in taxation regimes between the UK and Ireland. Currently, shares traded on the ISE are subject to stamp duty at 1% while a similar trade, of the same value or often on the same shares, performed on the London stock market is subject to a 0.5% stamp duty. Over time this difference has seen a number of Irish companies be jointly listed on both exchanges and some have transferred entirely to London.[28] However, the difference in transaction costs has not seen a complete relocation of activities away from the ISE, rather it has seen a small displacement.

Following the adoption of a FTT the current situation would reverse, with trading on the Dublin stock market having a competitive advantage over trading in London; 0.1% FTT in Dublin versus 0.5% stamp duty in London. As outlined earlier, the combined effect of a reduction in costs and this new competitive advantage would see some activity relocate to Dublin. Conversely, the costs of trading other instruments in Ireland would marginally rise. However, it is difficult to argue that there would be a considerable relocation of activities from Dublin to elsewhere give the small size of the tax and the limited evidence for relocation associated with the current, far bigger, difference in equity trading costs between Dublin and London. Evidence on the effects of changes to transactions taxes in the United States further underscores this. Persaud notes that US Section 31 fees, which levy a charge on the volume traded on US exchanges and are equivalent to a FTT, have been lowered nine times and raised seven times since 1934 with limited impact on activity and turnover (2012: 5).[29] [30]

The tax is likely to have some employment effects. A reduction in the level of transactions in the financial markets may see some trading jobs lost; but this is likely to be small for securities and derivative trading. More notable would be a loss of employment associated with any reduction in HFT. However, these effects would be countered by positive employment benefits from the use of the revenue (see later) and broader welfare gains for society associated with a near elimination of most risky HFT.

[28] There are other reasons beyond stamp duty differences that also explain these company decisions.
[29] The rate as of February 16th 2016 is $21.80 per million dollars of transactions – equivalent to 0.00218%. The assessment on security futures transactions is $0.0042 for each round turn transaction.
[30] See also Schulmeister and Sokoll (2013).

The most pronounced real economy effect is likely to be on the operating costs, transaction fees and profits of financial institutions. A reduced level of market transactions implies lower fees and charges for these firms. Furthermore, as the incidence of the tax is most likely to fall on these institutions, their profits will be reduced. For entities such as pension funds the FTT will marginally increase their operating costs; although the tax will remain a fraction of the management fees and costs these firms charge their investors.

Overall, the real economy effects of a FTT for Ireland are actual but small. It is likely to: marginally increase the cost of capital; have limited, if any, relocation effects which could be either positive or negative; have small direct employment effects in particular for those involved in HFT; and marginally increase the operating costs of financial institutions while reducing their profits. A further real economy benefit, associated with an enhancement of financial stability, and a reduction in the risk of booms and busts, is discussed in the next section.

Stability and Knowledge of Financial Markets

Despite the scale of transactions and liabilities occurring on a daily (indeed hourly) basis on financial markets, society's knowledge of these activities is limited. This lack of clear information on financial markets was reflected in Section 4 of this paper where various different and separate data sources were needed to establish the FTT tax base. Across the various financial markets the information available to Governments, policy makers and regulators ranges from real-time information (for equities and bonds) to BIS Survey snapshots every three years (for derivatives). As societies tend to be ultimately responsible for picking up the pieces after a financial crash, a fact proven across the world after multiple financial sector collapses over recent decades, there is a clear information deficit associated with the current structures of financial markets.

One aftermath of the Great Recession has seen the European Union adopt a new regulatory framework for financial markets, intended to enhance reporting and create a safer financial system by discouraging financial transactions that do not lead to more efficient financial markets. The introduction of a FTT would complement and strengthen this role, given that it would necessitate Central Banks and Governments to establish real-time monitoring mechanisms for the various flows of financial transactions happening each and every day. As Collins notes, "from a societal perspective, it would be worth implementing a FTT that provided as a bi-product immediate information on financial movements and liabilities even if the tax raised no money over and above that required to establish and run such a system" (2013: 2).

The risk profile of financial markets is also likely to change following the adoption of a FTT. In general this is beneficial, with risk seeking and speculative activities reduced including much of the aforementioned speculative HFT. However, the small increase in the price of derivative contracts makes hedging risk more expensive and theoretically less attractive; although this price increase is small and unlikely to deter most legitimate contracts intended to insure against adverse outcomes. The FTT should also bring about reductions in the short-term volatility of financial markets, mainly through a decrease in speculative trades, although it is unlikely to

have much of an effect on the volatility of markets measured in the long-run (Copenhagen Economics, 2014: 48; Capelle-Blancard and Havrylchyk, 2014; Honohan and Yoder, 2010).[31]

Allocation of Funds Raised

Evidence from FTTs, or equivalent taxes, across the world points towards them being taxes that are easy to collect. In general, the revenue is collected at source as part of the transaction process and subsequently passed on by financial institutions to the state. Like almost all taxes, the revenue flows into a central taxation fund (the exchequer) and is then available to pay for the various policies and services as adopted by Government.

A key selling point for organisations and others advocating a FTT is that the revenue it raises should be allocated to address specific policy areas. For many years objectives of ending world poverty dominated these proposals but in more recent times it has been broadened to capture funding national and international climate change issues, and domestic poverty objectives. The original 2011 EC proposal earmarked most of the funds raised for the EC budget, although this structure has since faded away letting national Governments adjudicate on the best way of allocating the resources raised. The 2015 campaign for a FTT in Ireland suggests that the funds raised should be divided with 50% allocated to address poverty in Ireland, 25% to address poverty in developing countries via an increased Official Development Assistance (ODA) budget and 25% to address climate change in Ireland and abroad.[32]

While the hypothecation of funds is attractive, in reality the revenue from a FTT, like most other taxes, will flow into a central taxation fund. However, that would not stop the earmarking of resources with such an approach likely to enhance the attractiveness of the tax for policy makers and society in general. Spending a portion of the FTT revenues on activities in the domestic economy (e.g. anti-poverty measures and climate change initiatives) carries further benefits by boosting employment, fuelling additional economic activity and enhancing the revenue collected from other taxation sources.

[31] In other words long-run market volatility is driven by real economic effects (growth, performance, expectations etc) and not by short-term speculative movements or small changes in the costs of financial transactions.

[32] See: http://www.robinhoodtax.ie/key-facts

8. CONCLUSION

As the EC FTT proposal moves towards completion and implementation, issues arise for Ireland. Should it decide to join the group of countries adopting the tax, or should it decide to refrain from the taxes implementation?

Like all such policy choices, the decision is ideally reached on the basis of a robust consideration of the evidence and implications of the measure. This paper is intended to contribute to that process. It establishes both the nature of the FTT tax base for Ireland and quantifies the likely net revenue yield to the exchequer from the adoption of the tax. Conversely, it quantifies the revenue forgone from deciding not to join the group of states implementing a FTT.

Annually, the net yield from a FTT would amount to between €320m and €350m – the tax would by itself raise a higher amount (€630m-€660m) but its introduction requires the simultaneous removal of stamp duty on shares. Given that 95% of the FTT's revenue will come from transactions in equities and commercial bonds, the paper highlights the importance of this area for assessments of the feasibility of the taxes introduction in Ireland and for Irish assessments of the evolving EC negotiation on the FTT's design. It also notes that there are some implications which accompany the taxes implementation. Of these most are positive although the tax, like all taxes, does carry some distortionary effects. However, it is hard to argue that the benefits would be exceeded by the costs.

In the years to come Ireland will face a decision on its participation in a FTT. This paper is intended as a contribution towards the formation of that policy choice.

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Other online data sources

Eurostat online database: http://ec.europa.eu/eurostat

Revenue Commissioners online statistics:
http://www.revenue.ie/en/about/statistics/index.html

APPENDIX

Table A1: IMF CPIS Data for Ireland

Shares		Bonds	
Shares top 10 destinations		**Bonds top 10 destinations**	
Country	**%**	**Country**	**%**
United States	30.9%	United States	24.6%
United Kingdom	13.6%	United Kingdom	20.3%
Luxembourg	6.8%	France	9.0%
Japan	6.4%	Italy	6.4%
Germany	4.0%	Germany	6.1%
Italy	3.9%	Netherlands	6.0%
France	3.6%	Spain	3.5%
Cayman Islands	3.1%	Australia	2.2%
Netherlands	2.4%	Sweden	2.1%
Switzerland	2.2%	Japan	1.8%
Rest of world	*23.1%*	*Rest of world*	*18.0%*
Total	**100.0%**	**Total**	**100.0%**
FTT countries	**13.9%**	**FTT countries**	**28.0%**
Non-FTT countries	**86.1%**	**Non-FTT countries**	**72.0%**

Source: IMF CPIS (2015). Data is for December 2014.

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