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The End of Derivatives? What the European Union Model Forebodes, and the Subsequent Stock Market Effect

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Abstract

In 2011 The European Union Tax Commission proposed the establishment of a Financial Transaction Tax (FTT). The FTT was subsequently implemented in France (8/1/12) and Italy (1/1/13). It is also scheduled to be adopted in 9 other European Union states during 2015. Great Britain has thus far failed to accept such a tax. The purpose of the FTT is twofold; minimize and control derivative trading by taxing it, and raise revenues. Opponents of the FTT have suggested that such a tax would increase volatility (i.e., risk) in the securities market and would also lead to a reduction in security trading and a drop in security prices. These are all reasons why Great Britain has thus far refrained from passing the tax.

Index terms— derivatives, security prices, financial transaction tax.

1 Introduction

ince the pronounced end of the U.S. recession, the global economy is still beset by problems. In the U.S., deteriorating urban finances, from Detroit to Stockton, California, threaten municipal bondholders, public sector workers, and taxpayers. In addition, a rise in long term interest rates seems inevitable sooner or later, either because of inflation or because the Federal Reserve backs away from its easy-money policies. Higher interest rates would mean big losses for bond investors, and also for government-sponsored entities such as Fannie Mae and Freddie Mac, that hold mortgage-backed assets. The greatest risk of all, however, may be one of the least visible, the derivatives market. These highly sophisticated instruments have contributed to financial disasters from the 2008 bankruptcy of Lehman Brothers to J.P. Morgan's 2012 trading losses in London, which totaled more than $6 billion [Sivy 2013].

Basically, derivatives are financial contracts with values that are derived from the behavior of something else, such as interest rates, mortgages, commodities, or even the weather. Just as homebuyers make only a down payment when they buy a home with a mortgage, derivative traders put down only a small amount of cash. In addition, one derivative can be used to offset or serve as collateral for another. The end result is that a massive edifice of derivatives can be supported by a relatively small amount of real money.

Many derivatives are simply private contracts between banks or other sophisticated investors. As a result, it is difficult to know the total volume of derivatives now outstanding. The worldwide nominal value of derivatives tripled in the five years leading up to the recession, at which time it was around $600 trillion [The Economist 2015]. Since then, even though some specific categories of derivatives have shrunk, the total value of the derivatives has not been reduced at all, but has actually gotten bigger.

While there is no way of knowing for sure, estimates of the current nominal value of derivatives outstanding tops a quadrillion (1,000 trillion) dollars **??**The Economist 2015]. This is 14 times the entire world's annual Gross Domestic Product. By comparison, the value of all the stocks trading on the New York Stock Exchange is roughly $15 trillion. In fact, the New York Stock Exchange is being courted for acquisition by derivatives exchanges.

A key problem with derivatives is what is referred to as "counterparty risk." If you buy a stock with cash, you can't lose more than you invest. But if you sell $1,000 of derivatives and collateralize it by purchasing $900 of

another offsetting derivative, it is difficult to determine how much is really at risk. In theory, you can lose only $100, but if the entity from whom you purchased the $900 derivative defaults, you are liable for the full $1,000. So are you at risk for $100 or $1,000? It is almost impossible to know until the dominos begin to fall. Regulators try to assign weights and probabilities to determine capital requirements, but the bottom line is simple: If the whole market comes apart, everyone is at risk for much more than they expect.

In an initial attempt to minimize the potential downside effects of derivatives, the European Union Tax Commission proposed in 2011 a Financial Transaction Tax (FTT) to be introduced to all European Union (EU) states [Adam Smith Institute 2011]. The FTT levies a tax on derivative trading. Advocates of the FTT argue that it would reduce volatility in the derivatives market, and attempt to control this growing giant. Those opposed to the measure say it would lead to a reduction in market transactions, shrink the tax base, lead to a decline in investments and job losses and result in a significant decline in stock prices, while impacting firm risk. As it currently stands, France has adopted the tax (8/1/12), Italy adopted (1/1/13) and Germany, Belgium, Spain, Austria, Greece, Portugal, Slovakia, Estonia, and Slovenia are set to adopt during 2015 [Ernst and Young Tax Center 2015]. Great Britain remains a holdout, primarily because the city of London currently holds interest rate derivatives that comprise nearly 75% of its portfolio. The country feels that the FTT would lead to a collapse of the economy, beginning in London. In the U.S., the Congressional Budget Office proposed in 2013 a Tax on Financial Transactions. It took effect 1/1/15 by raising the tax rates on long term capital gains and dividends and imposing a fee on large financial institutions. This was passed as part of a deficit reduction attempt [Congressional Budget Office 2013]. Many see this as the first step to approaching a FTT similar to the EU.

Although minimal information is available for how the FTT would affect stock prices, there does exist limited data for the two EU countries that have incorporated the tax, namely France and Italy. An analysis of the impact of the tax on these two countries could give insight as to what may be in store for the other EU countries adopting the FTT, and for countries such as the U.S., who may be contemplating such a move.

2 II.

3 Literature Review

The use of derivatives is a contentious issue. Nevertheless, whether one subscribes to Warren Buffet's warning about the danger of derivatives or Allen Greenspan's assertion that derivatives reduce risk (Berry 2003), the fact is that derivatives are popular and growing in use (Bodner et al 1995, Wolfson and Crawford 2010). Therefore, given the place of derivatives in the financial market place, it seem reasonable to ask what, if any, information content they provide in relation to security prices.

Many studies have examined the risk associated with derivative usage (Cornfield 1996, Guay 1999, Kuprianov 1995, Newman 1994, Hentschel and Kothari 2001). In general, these studies note that firms use derivatives as a hedge against exposure, but find that compared to firms which do not use derivatives, there does not appear to be any measurable difference in risk. This would lead one to suspect that no market impact from the use of derivative instruments would be found.

In addition to risk, other researchers have examined the role of derivatives in an earnings management context. Jan **??**arton (2001) examined this issue and presented evidence "consistent with managers using derivatives and discretionary accruals as partial substitutes for smoothing earnings." An implication of this finding is that derivatives may indeed have a market impact through their effect on corporate earnings.

The main contentions of the financial school of thought that link derivatives to the recent financial crisis lie in the artificial credit boom. The credit expansion created systematic risk, which led to the use of derivatives as an attempt to reduce the risk. The derivatives were traded in a market that lacked transparency, and proper regulation, i.e., the Over the Counter Market (OTC), (Stulz 2009). In addition, there is a popular belief that derivatives do not contribute any financial or economic substance to the general economy but are mere financial gambling devices (Gilani 2008). As a result, many arrive at the conclusion that derivatives do indeed lay at the root of the financial crisis.

But how exactly can things go wrong for buyers and sellers of derivative instruments and how can this in turn lead to adverse earnings results which may in turn affect stock prices? Skeel and Partnoy 2007, describe the scenario in which this can occur. The ease of credit, in conjunction with loose U.S. monetary policy led to the mispricing of credit. This means that loans which eventually turned out to be sub-prime in nature were bundled together with loans with lesser risk, the risk on the bundle was underestimated. As a result, mispricing on the bundled rate led to highly leveraged bets for the holders of such bundles. The subsequent defaults led to a massive attempt to unwind these bundles but it was too late from a liquidity standpoint, the effects then steamrolled and permeated national and international financial markets. All of this unraveled in a few weeks. Holders of undervalued derivatives were forced to record current period losses as the swaps took place, placing downward pressure on earnings and forcing greater securitization (Pertrova 2009).

From an international perspective, Guay (1999) uses an event-study approach on selected European firms and finds a decrease in firm risk exposure, but concedes that there was poor data availability during this period. Marshall (2000) shows that derivative use does not decrease the value of a European firm's stock. Hentschel and Kothari (2001) find European firms that trade in derivatives display few differences, from a risk perspective,

compared to firms that do not use derivatives. Allayannis and Weston (2001) analyze 720 international firms and find a positive relation between firm value (i.e., stock price) and the use of derivatives.

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5 C

Bartram et al (??004) analyze 7,263 firms from 48 countries and find a general positive stock association with firms that use derivatives. Muller and Verschoor (2005)evaluate 471 European firms and find that the more growth opportunities European firms have, the less these firms depend upon derivatives. In addition, the presence of associated taxes on such instruments results in a reduced use of derivatives.

Derivatives remain a shadowy financial devise that some claim can lead to the downfall of economies. Many studies, however, indicate that the presence of derivatives in the financial structure actually increase firm stock value and create minimal added risk. Some countries, such as the European Union States, seek to interject tax as: 1. A control over derivative usage, and 2. A revenue source. This prompts a re-evaluation of how this change might impact derivative usage and security prices of firms which use derivatives. This line of research becomes even more important as the Financial Accounting Standards Board (FASB) continues to struggle to identify what exactly their role should be in the derivatives debate, and the U.S. Congress contemplates expanding the Financial Transaction Tax to include derivatives.

6 III.

7 Hypothesis Development

As previously noted, extant studies for the prior decade indicate that public firms engaging in derivative trading actually see an increase in stock price, and with minimal change in risk. With the advent of a new scenario, namely, the existence of a Financial Transaction Tax, many believe that this will cause a shift in heretofore findings. The premise of the tax is to minimize derivative trading while increasing revenues for the taxing entity. Some, particularly in Great Britain, believe, that such a tax will among other things change the risk structure of firms while reducing their associated stock price, along with overall trading. The European Union states of France and Italy have early adopted the FTT. Although the historical base is minimal, an analysis of public firms trading in derivatives in these two countries may provide insight into the ongoing discussion regarding the implications of such a tax.

The European Union Tax Commission advocated that the passage of the FTT would reduce the volatility (i.e., risk) of firms trading in derivatives, and thus minimize the overall risk of the derivatives market. This leads to the first hypothesis stated in the null form: H1: The imposition of a Financial Transaction Tax on derivatives does not result in a significant difference in firm risk for firms trading in derivatives.

Opponents of the FTT advocate that, for firms trading in derivatives, the tax would bring about reduced trading of those firms' stocks. This leads to the second hypothesis stated in the null form: H2:

The imposition of a Financial Transaction Tax on derivatives does not significantly impact the trading volume of firms trading in derivatives.

Opponents of the FTT further state that firms trading in derivatives would see a decrease in stock price as a result of the tax's passage. This leads to the third hypothesis stated in the null form: H3:

The imposition of a Financial Transaction Tax on derivatives does not significantly impact the security price of firms trading in derivatives.

8 IV.

9 Data and Methodology a) Data

The

10 b) Test of Hypothesis One

Beta is a crucial variable in the Capital Asset Pricing Model (CAPM). CAPM creates an estimate for the expected value of a security based on its beta. This required or expected return is equal to the risk-free rate plus a market risk premium, and the market risk premium is the product of a security's beta and the general market risk premium. The beta represents the sensitivity of a firm's stock returns to the overall market risk. A stock with a beta greater than one is more volatile, thus riskier, than the overall equity market. A stock with a beta less than one is less volatile, thus less risky, than the overall equity market. Lilti and Le Montagner (1998) find that beta is a determinant of returns on the French stock market. Bauer et al (2004) conclude the same for the beta and stock return relationship on the German stock market, while Fletcher (2000) has similar findings for groups of international markets. Given the established use of beta as a In order to assess beta, Compustat Global is used to derive beta coefficients for all firms in the study during the study period. This consists of 212 French firms trading in derivatives between the periods 8/1/12-3/31/15, and 156 Italian firms trading in derivatives between

the periods 1/1/13-3/31/15. Betas for these same firms are selected from a sample period prior to adoption of the FTT. In this case, 1/1/10-12/31/11 is used as a comparative base. Care is taken to exclude recession years that may confound the base sample. An Analysis of Variance (ANOVA) is then conducted to assess any differences between the base period (pre FTT adoption) to the study period (post FTT adoption).

11 c) Test of Hypothesis Two

Any empirical analysis of trading activity in the market must start with a proper measure of volume. The literature on trading activity in financial markets is extensive and a number of measures of volume have been proposed and studied. Some studies of aggregate trading activity use the total number of shares traded as a measure of volume (Epps and Epps(1976), Gallant, Rossi, and Tauchen (1992), Hiemstra and Jones (1994), and Ying (1966)). Other studies use aggregate turnover the total number of shares traded divided by the total number of shares outstanding as a measure of volume (Campbell, Grossman, Wang(1993), LeBaron (1992), Smidt (1990)). Individual share volume is often used in the analysis of price/volume and volatility/volume relations (Andersen (1996), Epps and Epps (1976), and **??**astrapes (1990, 1994)). Studies focusing on the impact of information events on trading activity use individual turnover as a measure of volume (Bamber **??**1986, **??**987), Lakonishok and Smidt (1986), Morse (1980), Sefcik, Thompson (1986), Stickel and Verrecchia (1994)). Alternatively, Tkac(1996) considers individual dollar volume normalized by aggregate market dollar-volume. And even the total number of trades (Conrad, Hameed, and Niden (1994)) and the number of trading days per year (James and Edmister (1983)) have been used as measures of trading activity. While all of these measures are viable, Lo and Wang (2005) find that the total number of shares traded is historically sound and most relied upon. In addition, it is one of the easiest for most researchers to obtain, since it is available from multiple sources. It is therefore, total number of shares traded that will be utilized for study purposes.

The source for the trades for French stocks between 8/1/12-3/31/15 and Italian stocks between 1/1/13-3/31/15 is Statista, which is a statistics portal for worldwide market related data.

As in the assessment of the beta changes, to properly assess whether or not trading volume has significantly changed since inception of the FTT in France and Italy, the "post FTT" period must be compared to a "pre FTT" base period. The trading volume period of 1/1/10-12/31/11 was used as a base period for purposes of consistency with beta comparisons. An ANOVA is then conducted to assess any differences between "pre FTT" and "post FTT" periods.

12 d) Test of Hypothesis Three

The purpose of this test is to assess the relative information content of the firm's security prices to the earnings for the firm in pre-FTT, and post-FTT periods. A premise set forth by Ball and Brown (1968) and others, was that earnings, more specifically "unexpected earnings" was causing the stock price to move. The logical extension of Ball and Brown's study was to see whether the magnitude of unexpected earnings (as opposed to merely the sign of unexpected earnings) was related to the magnitude of the stock price response. Beaver, Clarke and Wright (1979) addressed the issue and discovered, in fact, that the magnitude of unexpected earnings was related to the magnitude of the stock price response. Again, they focused on market-adjusted stock returns to facilitate across-firm comparisons and to control for market-wide movements in stock prices. Ball and Brown (1968) and Beaver, Clarke and Wright **??**1979) show that despite the deficiencies of historical cost accounting, accounting earnings are potentially useful to investors. They also ushered in the so-called information perspective on the decision usefulness of accounting. The information perspective implies that investors' response to accounting information can provide a guide as to what type of information is or is not valued by investors.

The next logical question to ask was whether the market responded more strongly to unexpected earnings in some firms, and less strongly in other firms. This question is quite pertinent to accountants because we potentially would be better able to design financial statements if we knew the factors that predict when and why investors respond more strongly (less strongly) to financial statement information. Consistent with the literature, the term "Earnings Response Coeffcient," or "ERC" is used to describe the strength of the market response to unexpected earnings. To understand this line of research, one needs to have an intuitive understanding of how investors might respond to accounting information in light of single person decision theory, portfolio theory, and efficient market theory. Here is the basic idea: Let's say that last period's earnings were $1 and, accordingly, that is the level of earnings an investor expects this year. When this year earnings are announced, the level of earnings are, say, $1.25, implying a $0.25 earnings surprise. If the investor believes this $0.25 level of unexpected earnings is a one-time shot that will not recur into the future, the investor will increase his assessment of stock value by to earnings that will recur in future years, then the investor's increase in stock price is $0.25 + the present value of receiving $0.25 into perpetuity. Given this framework for thinking about how investors should respond to unexpected earnings, it can be predicted that investors will respond more strongly to unexpected earnings when those earnings are expected to persist into the future. It can also be predicted that investors' response to unexpected earnings will be smaller the higher the discount rate they use in discounting those unexpected earnings that are expected to be received into perpetuity. Therefore, the above extant theory and rationale is used to replicate the model first used by Ball and Brown in 1968 in order to establish that there is a correlation between earnings and security prices, that model is shown below. Both Statista and World scope are used to

identify the date that each firm in the study released financial data for the study periods. This date of data release is known as the event date. The following model is established for determining information content:

The coefficient "a" measures the intercept. The coefficients b 1, and b 2 are the traditional earnings response coefficient (ERC), found to have correlation with security prices in traditional market based studies, for the two separate study periods.

Unexpected earnings (UE i) is measured as the difference between the management earnings forecast (MF i) and security market participants' expectations for earnings(EX i). With the adoption of International Financial Reporting Standards (IFRS) [France (January, 2009), Italy (January, 2002)] firms in these nations became subject to those standards, which includes the disclosure of earnings estimates. The World Economic Database provides earnings projections for these firms, thus resulting in the derivation of unexpected earnings. The unexpected earnings are scaled by the firm's stock price (P i) 180 days prior to the forecast, as reported on the AMADEUS database:

Unexpected earnings are measured for each of the total 368 firms during each study period; pre-FTT (b 1 variable), and post-FTT (b 2 variable). This is done in order to assess any differences in information content of security prices to earnings releases in each of the study periods.

For each firm sample, an abnormal return (AR it) is generated around the event dates of -1, 0, +1 (day 0 representing the day that the firm's financials were available per Statista and Worldscope). The market model is utilized along with the AMADEUS equallyweighted market index and regression parameters are established between -290 and -91. Abnormal returns are then summed to calculate a cross-sectional cumulative abnormal return (CAR it).

V.

13 Results

14 a) Hypothesis 1 Results

As indicated in Table 2, the two groups analyzed using the one-way ANOVA included the average betas for; pre-FTT (consisting of the 212 French firms in the sample between 1/1/10-12/31/11 and 156 Italian firms in the sample for the same period), and post-FTT (consisting of 212 French firms between 8/1/12-3/31/15 and 156 Italian firms between 1/1/13-3/31/15, for a total of 368 firms). The same 368 firms are assessed in each group for a total sample of 736 df (1, **??**34). The one-way ANOVA test indicates an F-ratio of 20.514 with an associated p-value of .0000. When the Levene test was performed to assess for homogeneity of variance, a Levene statistic of 6.1928 was obtained with a significance level of .001. These tests indicate significance difference in the variances of the groups. These results lead to the rejection of the null hypothesis that there is no significant difference in the average betas of the sample groups between the two study periods.

In addition, close analysis of Table 2 indicates that the average beta actually increased in post-FTT periods (from 1.98 in pre-FTT periods to 2.48). This appears to be counterintuitive to one of the rationales for instituting the tax, which was to minimize derivative trading thus making firm capital structure less risky. (2)

15 b) Hypothesis 2 Results

As in the case of Hypothesis 1, the same two study groups are analyzed for purposes of comparing average trading volume between the two periods. The results are presented in Table **??**. The same 368 firms are assessed in each group for a total sample of 736 df (1, **??**34). The one-way ANOVA test indicates an F-ratio of 26.212 with an associated p-value of .0000. When the Levene test was performed to assess for homogeneity of variance, a Levene statistic of 7.01293 was obtained with a significance level of .001. These tests indicate significance difference in the variances of the groups. These results lead to the rejection of the null hypothesis that there is no significant difference in the average trading volume of the sample groups between the two study periods.

In addition, close analysis of Table **??** indicates that the average trading volume fell in post-FTT periods (from $576.09 billion in pre-FTT periods to $404.28 billion). This represents an average decrease in trading volume of 30%. This result appears to be confirmed by statistics that indicate that through 2014, trading in Italian stocks fell by 34% and French stock trading fell by 9%, while European stock trading, on average, rose by 4.5% **??**MarketMedia.com April, 2015). The result of this test appears to align more closely with opponents to the FTT who had indicated that the passage of the tax would result in reduced market trading. As indicated in Table **??**, the coefficient representing the pre-FTT ERC, b 1 , is positive, .12 (.01 significance level) indicating a positive security price effect for the 368 firms in the study prior to the inception of the FTT. However, the coefficient representing the post-FTT ERC, b 2 , is negative, -.03 (.01 significance level) indicating a negative security price effect for the 368 firms in the study after the FTT was instituted. Study results indicate that investors view earnings to contain information content in the pre-FTT study period, this information content provides information enhancing signals, while the post-FTT period information content is interpreted to be much more noisy and less informative, and thus results in a negative impact on security prices. As a result of these findings, Hypothesis 3, which states that the FTT does not significantly impact stock price among firms trading in derivatives must therefore be rejected.

In addition, whenever regression variables are employed, there is a probability of the presence of multicollinearity within the set of independent variables which may be problematic from an interpretive perspective. To assess

the presence of multicollinearity, the Variance Inflation Factor (VIP) is utilized. Values of VIP exceeding 10 are often regarded as indicating multicollinearity. In the test of hypothesis 3, a VIP of 1.9 was observed, thus indicating a non-presence of significant multicollinearity.

16 VI.

17 Concluding Comments

In 2011 The European Union Tax Commission proposed the establishment of a Financial Transaction Tax (FTT). The FTT was subsequently implemented in France (8/1/12) and Italy (1/1/13). It is also scheduled to be adopted in 9 other European Union states during 2015. Great Britain has thus far failed to accept such a tax. The purpose of the FTT is twofold; minimize and control derivative trading by taxing it, and raise revenues. Opponents of the FTT have suggested that such a tax would increase volatility (i.e., risk) in the securities market and would also lead to a reduction in security trading and a drop in security prices. These are all reasons why Great Britain has thus far refrained from passing the tax.

This study evaluates 368 French and Italian firms that trade derivatives. The study compares a test period after the FTT adoption to a base period prior to adoption of the FTT, for the same 368 firms. For the 368 French and Italian firms analyzed, beta risk increased significantly after FTT adoption. In addition, market trading of the firms decreased significantly while, at the same time, combined European Union states' trading increased. Also, security prices of the firms are shown to significantly decrease after the FTT passage. Results suggest that Great Britain's reluctance to adopt the FTT may indeed be well grounded.

These results hold dire warning for the U.S. and any contemplated expansion of the newly instituted 2015 tax on financial transactions. This tax was adopted in the U.S. to; raise tax rates on long term capital gains and dividends, and impose a fee on large financial institutions. However, there are discussions within the Congressional Budget Office of extending this tax to incorporate such things as derivative trading. This is coupled with the on-going consideration by FASB of what exactly to do to better govern a market that some say is exploding and helped fuel the past economic crisis.

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Figure 1: Global

[1] [2]

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Figure 2: Table 1 :

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France	Italy	Total

Figure 3: Table 1 -

(1)Where: CAR it	= Cumulative abnormal return firm i, time t	Year 201
a	= Intercept term	
T 1 UE it = Unexpected earnings for Pre-FTT firm i, time t		
T 2 UE it = Unexpected earnings for Post-FTT firm i, time t e it = error term for firm i, time t		Volume X Version I ( )
UE i =	(MF i) - (EX i) P i	Global Managem Business

Figure 4: C

2

One Way ANOVA Summary						
Groups	Count	Sum	Average	Variance		
Pre-FTT	368	728.64	1.98	2.95976		
Post-FTT	368	912.62	2.48	3.19821		
Source of Variation		SS	df	MS	F-ratio	P-value
Between Groups		25,308.97	1	629.810	20.514	0.0000
Within Groups		2,596.45	734	2.103		
Total	25,6205.42		735			
Levene Statistic		df1	df 2	Two-tail Significance		
6.1928		1	734	.001		

Figure 5: Table 2

Table 4
Test of Hypothesis 3
Model: CAR it = a + b 1 T 1 UE it + b 2 T 2 UE it + e it Sample: 368 Firms a b 1 b2 Adj. R 2 Year 2015

	.20	.12	-.03	
	(.88)	(1.69) a	(1.75) a	.221

a Significant at the .01 level
CAR it = Cumulative abnormal return firm i, time
a = Intercept term
T 1
( )

Figure 6: C

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