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The impact of the French financial transaction tax on HFT activities and market quality

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ABSTRACT

Based on the first results, the French government estimates that the tax on cancelled orders, considered as tax on High Frequency Trading (HFT), generated no revenue in 2012. Our paper question the effectiveness of a modified cancelled order tax with no exemptions, all orders cancelled or modified within half-second time span are taxed. Our study has important implications for the regulation of HFT; we provide recommendations for regulators in relation to market rules which have yet to be introduced, using an artificial market framework. This paper addresses the question of whether this tax leads to a reduction in HFT activities and, as a result, to deterioration or amelioration of market quality. The evidence we provide should help market regulators to better understand the role played by HFT firms as liquidity suppliers. We show that HFT liquidity is short-lived. With the implementation of tax, decreased HFT activities do not have a statistically significant impact on market volatility and market liquidity measured by bid/ask spreads, but decrease dollar volumes as a liquidity measure. In addition, reduced HFT activities lead to less efficient markets as the deviation from fundamentals increases.

1. Introduction

The idea of taxing financial transactions, dates back to Keynes (1936) and Tobin (1978) who proposed it for different economic reasons including raising revenue and helping to curb financial market excesses and mitigate financial markets failures. As a reaction to the global financial crisis and the role of speculative and high frequency trading (HFT) activity related to flash crashes, policy leaders and regulators are paying more attention to financial transaction taxes (FTTs). The World Federation of Exchanges report, Understanding High Frequency Trading published on May 29, 2013, confirms that high-frequency flows are becoming very significant in today's markets with the incidence of HFT in Europe estimated at 39% in 2012.

The literature provides mixed findings on the impact of HFT on market quality. HFT activities often are considered to be purely speculative and also destabilizing trading strategies. Zhang (2010) and Boehmer et al. (2012) highlight a positive correlation between HFT and increased market volatility. HFT has been blamed for the flash crash in May 2010 (Kirilenko et al., 2016). It is assumed that the speed of HFT creates unfair and unstable market conditions. However, there is also evidence that the majority of HFT trading volumes contribute to liquidity provision. Pastor and Strambaugh (2003), Acharya and

Pedersen (2005), Chordia et al. (2008), Boehmer and Kelley (2009) report that quantitative trading strategies, typical of HFT, increase the number of smaller orders and enable more efficient allocation and price discovery. Hendershott et al. (2011) state that the increased order flow from HFT improves market liquidity. Using Deutsche Boerse data, Hendershott and Moulton (2011) find no evidence of increasing volatility due to HFT, and Hasbrouck and Saar (2010) report similar results using NASDAQ data.

As the arrival of HFT coincided with extreme volatility events (flash crashes) and investors' perception of rising unfairness in the markets, there have been many calls for HFT regulation. Regulatory initiatives can be categorized broadly as those dedicated to extreme events -such as flash crashes- and those dedicated to normal volatility periods. According to Biais and Foucault (2014), we can sub-divide this further into tax initiatives which apply to a targeted trading practice, and market mechanism initiatives which attempt to slow the whole market. The latter are aimed at reducing colocation and the possibilities for sponsored access, and the smallest possible price increments. Several papers study regulatory initiatives related to flash crashes (Oriol and Veryzhenko, 2015) with some scholars highlighting the difficulty involved in setting optimal mechanisms (Biais and Foucault, 2014). Also, Brewer et al. (2013) find that attempts to slow down the market

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cannot be efficient and could generate negative externalities.

In conditions of financial crisis and general economic development, a financial transaction tax (FTT) is often seen as a means of stabilizing the market and raising revenue to help pay for the costs of crisis (Matheson, 2011). The Financial Transaction Tax (FTT) implemented on 1 August, 2012 by the French government comprises three different taxes: (i) a tax on the acquisition of equity securities; (ii) a tax on HFT; and (iii) a tax on naked sovereign Credit Default Swaps (CDS). In this paper we focus on tax on HFT, which is a 0.01% tax on the amounts of cancelled or modified orders within a half-second time span, on a given trading day, which exceeds a threshold of 80% of total trading orders. This tax applies only to French actors, who, in fact, are minimally affected because an exemption applies to market-making activities, and because of the very high threshold. Based on first results, government estimates that the tax on HFT generated no revenue in 2012. In the present paper, we consider the effectiveness of a modified cancelled order tax with no exemptions and attempt to figure out whether this regulatory policy has discouraged speculative activity and, as a consequence, resulted in deterioration or amelioration of market quality.

Given the poor quality of data plaguing work on the impact of FTTs on market quality, some studies have developed an artificial market in an attempt to simulate financial markets accurately and effectively and, where possible, test the impact of a transaction tax. Agent-based modeling (ABM) allows insights into the effectiveness of certain regulatory mechanisms. It enables the generation of multiple data to analyze all outputs within the policy maker's control parameters (Hommes, 2006; LeBaron, 2006; Westerhoff, 2008). However, previous ABM studies focus mainly on a Tobin tax on foreign exchanges, or a tax on the acquisition of equities securities in a chartist/fundamentalist framework.

In this paper, we propose an agent-based model to analyse the effects of the introduction of the French cancel order tax on stock markets, from a structural and behavioural perspective. We aim to contribute to the debate by studying whether and how market volatility and trading activity are influenced by a tax on HFT. We develop a simulator which acts as an artificial financial market. This computational-experimental approach enables us to perform several tests in order to offer some suggestions for regulators about formulating a tax which might deal better with the objectives of stabilizing the market and limiting speculation.

Also, to determine price the previous ABM studies (Westerhoff, 2003; Westerhoff and Dieci, 2006; Demary, 2011; Pellizzari and Westerhoff, 2009) use a simple excess demand/offer function which does not reflect a real market mechanism and is not appropriate for HFT simulations. We reproduce the main features of real order book and asynchronous trading at a fine grained level, and test trading rules not applied by the regulator in real markets (different tax levels on order cancelling). In our study we use an Artificial Open Market (ATOM) (Brandouy et al., 2013), which is a highly flexible simulation platform that allows different parametrizations of the microstructure and traders' behaviours, for different scenarios. We focus on two scenarios. First, one with no taxes, which we consider as a benchmark and control group for the statistical tests. Second, a scenario which proposes a market subject to tax regulations. Since we want to examine the impact of HFT tax regulations on market quality, we compute a wide range of measures of liquidity and volatility to account for different dimensions of market quality. To estimate the impact of this new regulation on the market quality measure we use a difference-in-difference technique (DiD). We show that HFT liquidity is short-lived. Essentially, the implementation of the tax decreased HFT activity, but does not have a statistically significant impact on market volatility and market liquidity measured by bid/ask spreads. However, the reduction in HFT activities has decreased dollar volumes as a liquidity measure, and increased deviation from fundamentals, which has led to a less efficient market.

The remainder of the paper is structured as follows. Section 2 provides a brief literature review. Section 3 defines the process of implementation of a transaction tax in an agent-based financial market model, and describes the simulated trading strategies and the different time spans for taxed order cancelling. Section 4 presents the econometric analysis of HFT activity proxies and Section 5 discusses the regulatory experiment. Section 6 concludes and suggests avenues for further research.

2. The financial transaction tax literature

Studies of the Tobin Tax focus mainly on foreign exchanges as Dooley (1996), Bismans and Damette (2008), Damette and Goutte (2015), Damette (2016). These works generally confirm what the debate on a Tobin tax suggest regarding its effectiveness for curbing speculative transactions, and reducing forex trading volumes and exchange rate volatility, even in turbulent periods such as the 2008 crisis. However, the academic literature on FTT, and on the impact in particular, of a high frequency tax on market quality is rather scarce. Hence, a rigorous evaluation should provide guidance for academics, practitioners, and especially regulators.

The findings from theoretical work on the impact of FTT on market quality is mixed. Some studies model different trader populations and their reactions to a FTT. Subrahmanyam (1998) and Amihud and Mendelson (2003) among many others, identify the negative effects of FTT implementation on reducing market liquidity which automatically amplifies market volatility by driving away rational agents. However, Subrahmanyam (1998) observes that a FTT can provide investors with signals related to future long-term prices, and consequently, compensates for the negative effects of a FTT. Nevertheless, Kupiec (1996) proposes a general equilibrium model which shows that the price volatility of a risky asset can exhibit modest reductions in response to implementation of a transaction tax but it shows also that this decline is accompanied by a fall in asset prices. The results in Song and Zhang (2005) and Bloomfield et al. (2009) are similarly mixed; these works confirm that a FTT deters both rational and noise traders, and so reduces market volume but “does not affect spreads and price impact measures, and has at most a weak effect on the informational efficiency of prices”. Other studies of the impact of a FTT on volatility such as Stiglitz (1989), Summers and Summers (1989), Eichengreen et al. (1995), investigate the behaviors of noise traders, and their impact on the market, and show that a FTT dampens market volatility by deterring noise traders.

Empirical research focused on market quality parameters such as liquidity, volatility, trading volumes and informational efficiency, are also not in agreement.

Several studies such as those conducted by Baltagi et al. (2006), Pomeranets and Weaver (2011), Liu and Zhu (2009) and Huber et al. (2014), find a positive relationship between transaction taxes and volatility. Evidence for the United States stock exchange in 1975, provided in Jones and Seguin (1997), shows that a decrease in transaction costs led to a significant decrease in stock price volatility, and vice versa. However, Roll (1989) and Saporta and Kan (1997) find no reliable evidence that volatility is related to FTT. Deng et al. (2014) concludes that the impact of a FTT on market volatility ultimately will depend on the composition of the market trader population.

Robust evidence on the impact of FTT on market liquidity, market volumes, and the informational efficiency of prices is similarly relatively scarce. This is due to the poor quality available data which had consequences for earlier studies. Some studies of the impact of transaction taxes/cost on volatility, also investigate their impact on market liquidity and informational efficiency. Examples include Baltagi et al. (2006), Liu and Zhu (2009), Pomeranets and Weaver (2011), Frino and West (2003) and Bloomfield and Wang (2006) which find a negative impact of FTT/transaction costs on the bid-ask spread representing market liquidity, the price efficiency of securities, and trading volumes.

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