Research article

Financial transaction tax, liquidity, and informational efficiency: Evidence from Italy

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ABSTRACT

This study investigates whether the liquidity of medium-sized and large caps has been differently affected by the Italian Financial Transaction Tax, among the firms subject to the tax. We evaluate changes in mean and median bid-off-search spreads and Amihud (2002) liquidity for aggregate market indexes and at the firm level. After the implementation of the tax, spreads have widened more for medium- than for large-caps, whereas the Amihud liquidity measure remained unaltered for the vast majority of the firms.

Introduction

The advantages and disadvantages of a Financial Transaction Tax (FTT) have been discussed for a very long time (e.g., Capelle-Blancard, 2016; Capelle-Blancard and Havrylchyk, 2016). Proponents argue that the FTT is a tool to curb speculative and noise trading, as well as the excess volatility associated with their activities (e.g., Summers and Summers, 1989; Stiglitz, 1989). Opponents fear the tax could deter price discovery and the participation of liquidity providers. From the perspective of the FTT's detractors, concerns on the effect of the tax on liquidity have become particularly compelling starting from the 2007-2009 financial crisis, as liquidity providers increasingly are investors, rather than market markets (e.g., Garcia-Appendini and Montoriol-Garriga, 2013; Bessembinder et al., 2020). Similar considerations on the FTT have been voiced during the first months of the 2020 pandemic, as illustrated by central bankers' preoccupation with liquidity for market operations usually supported by primary dealers (e.g., Federal Reserve Bank, 2020; European Central Bank, 2020).

Liquidity is an elusive concept, generically defined as the ease with which assets are traded. Accordingly, the empirical literature has developed a host of proxies aiming to capture different facets of liquidity. Colliard and Hoffmann (2017) note that spreads are suitable to estimate the trading costs of small transactions, whereas for large trades costs should take into account the effect of market depth. In their study of liquidity proxies in international equity markets, Fong et al. (2017) classify liquidity measures into two categories, respectively capturing the costs of placing small and large trades. According to their results, closing percent quoted spreads (henceforth, spreads) offer the best gauge of the costs associated with placing small transactions, among the daily liquidity measures they examine. In contrast, they find that the Amihud (2002) measure is the most suitable liquidity proxy for large trades’ costs. Taking stock of these results, this study contrasts the Italian FTT’s impact on liquidity by evaluating changes in spreads and in the Amihud liquidity measure around tax implementation.1

The Italian FTT was introduced by the (Italian) Stability Bill (Law 228) on December 24, 2012. The bill was then published on December 29, 2012, in the Italian Official Gazette. The implementation date was

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1 The findings of Fong et al. (2017) are relevant to this study, as their sample includes the Italian equity market over the period in which the FTT was implemented.

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set to March 1, 2013. The tax applies to stocks traded both on the Italian exchange (Borsa Italiana) and over the counter, and to equity-based derivatives. Only transactions in shares issued by Italian resident companies with a market capitalization of at least 500 million euros are taxed.

Over the period in which the FTT was first announced and then implemented, the Italian economy underwent several significant changes. Besides implementing the FTT, the Italian government undertook several legislative changes in response to a slow down of domestic economic growth. Among these pieces of legislation, we find decrees liberalizing internet access services and providing governmental support to energy infrastructure investments. Further, two economic sectors have been severely affected by severe shocks unrelated to the FTT. Starting from 2012, charges of weak governance at Banca Carige culminated in lengthy judiciary proceedings, which exacerbated over the first months of 2013. Further, about a month after the FTT’s announcement, the Banca Monte dei Paschi di Siena, an important player in the Italian Banking sector, had to be recapitalized by the Italian government on January 26, 2013.

The incidence of severe sector- and firm-specific shocks around the tax implementation period motivates this study’s reliance on several approaches to assess the FTT’s effect on liquidity. In particular, we evaluate the effect of the tax on liquidity indexes and at the firm level. Further, to address concerns on the effect of firm-level liquidity outliers, we examine the FTT effect both in mean and median liquidity, using regression analysis and non-parametric testing, respectively.

In the literature, the empirical evidence on the effect of the FTT on liquidity is mixed. Consistent with most previous studies, we find that, after the tax’s imposition, spreads for Italian equities have widened relative to the period before the tax’s announcement. This study adds the insights that this increase was particularly marked for medium-sized firms. Further, we argue that several exogenous (to the tax) shocks might have conflated the FTT’s effect on the liquidity of large firms’ equities, and especially for banks. Once we recognize the impact of these shocks on firm-specific liquidity trends, the results provide credible support to the view that deterioration of liquidity, as measured by widening spreads, might have been limited to mid-caps.

Our results show that the aggregate Amihud liquidity indexes did not significantly change after the tax implementation. Consistently, firm-level analysis shows that both mean and median Amihud liquidity did not change for the vast majority of the equities, consistent with the findings of Becchetti et al. (2014) for the French FTT.

Mindful of the conclusions of Tong et al. (2017), our results indicate that the FTT increased the cost of placing small trades in mid-caps but did not affect institutions’ trading costs.

Microstructure theory has shown that both spreads and the Amihud measure respond to informational asymmetries among investors. Spreads widen in response to an increase in the risk of interacting with an informed agent (e.g., Glosten and Milgrom, 1985). The Amihud measure is correlated with variations in the probability of informed trading (e.g., Kelly and Ljungqvist, 2012). The tax might fail to affect informed trading provided that it equally discourages both informed and uninformed investors (e.g., Bloomfield et al., 2009). On the other hand, price discovery could be impacted if the tax discourages informed investors from searching for information (e.g., Subrahmanyam, 1998). This study’s results provide preliminary support for the conjecture that the effect of the tax on informed trading might depend on the market structure (e.g., Dupont and Lee, 2007).

1. Previous literature

The 2007-2009 financial crisis has increased research on the FTT’s effect, as governments pondered options to tax the financial sector. Berman et al. (2016) and Matheson (2011) offer comprehensive reviews of the different types of FTTs, and their respective advantages and disadvantages. Davila (2020) is the last of series of theoretical contributions (e.g., Berentsen et al., 2016; Dow and Rahi, 2000) showing that the FTT is welfare enhancing.

The empirical evidence on the effect of the FTT on liquidity is mixed. Early laboratory experiments indicate that the tax should not affect spreads, but it should decrease volume (e.g., Bloomfield et al., 2009). The intuition is that the tax drives away both informed and uninformed investors, leaving the probability of informed trading unaltered. Consistently, Hu (1998) compares the mean of turnovers before and after the introduction of a transaction tax in Japan and concludes that the tax has no impact on liquidity.

Becchetti et al. (2014) uses difference-in-differences, as well as firm-level analysis, to analyze the effect of the French FTT, and find that the mean of the Amihud liquidity did not change for the vast majority of the firms subject to the tax, relative to non-taxed French equities. They also find that spreads increased for the firms in the tax base after the tax implementation. Coelho (2016) draws similar results. Capelle-Blancard and Havrylych (2016) also rely on the difference-in-difference approach and benchmark French equities subject to the tax to several control groups of European stocks. Their conclusion is that (the inverse of) the Amihud measure liquidity remained unchanged after the imposition of the tax, whereas spreads did increase.

Hvozdyk and Rustanov (2016) argue that the general conclusion of the literature on the impact of FTTs on liquidity is that the tax widens bid-ask spreads, a result they confirm for the Italian market. Specifically, they evaluate the Italian FTT effect on median spreads for value-weighted portfolios of equities subject to the tax and conclude that spreads significantly widened after the FTT’s imposition. Cappelletti et al. (2017) rely on a difference in difference approach and compare bid and ask spreads and the Amihud measure for Italian equities that were or were not subject to the tax. Both for the Amihud measure and spreads, they conclude that the tax significantly decreased liquidity, relative to a control group of firms not subject to the tax. Meyer et al. (2015) elicits the effect of the tax on French equities by comparing their liquidity with British stocks, whereas Colliard and Hoffmann (2017) contrast French stocks with a pool of European equities. Both studies find a negative effect on volume, which declines after the tax’s implementation, but not on spreads.

In this study, we do not benchmark the liquidity of firms subject to the tax to that of non-taxed equities. Instead, we investigate whether the tax differently impacts the liquidity of medium-sized and large caps, where the analysis is restricted to the firms subject to the tax. In this sense, our analysis explores the potential of a heterogeneous impact of the tax on firms of different sizes. Meyer et al. (2015) and Colliard and Hoffmann (2017) rely on high-frequency data, with timestamps to the millisecond. The use of high-frequency data allows accounting for the liquidity provided by algorithmic traders. These traders typically unwind their positions before the end of the day, as they seldom retain overnight positions. Therefore, employing daily data, like done in this study, captures the effect of the tax on the liquidity of low-frequency traders.

A line of the microstructure literature in finance is concerned with the effect of security taxes on the probability of informed trading. An

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2 For details on the design and implementation of the tax see Salvadori di Wiesenhoff and Ergin (2013) and Hemmelgarn et al. (2016).

3 This study employs only prices quoted on the Italian exchange.

4 For example, the decrees n. 5 and 179 of February and October (2012) initiate a funding program for public-private collaborations supporting large energy infrastructure projects.

5 The central bank of Italy ordered a series of inspections to Banca Carige starting from 2012.

6 Becchetti et al. (2014) calculates the spreads as in Corwin and Schultz (2012).
early contribution along these lines is from Subrahmanyam (1998), who theorizes that the FTT will induce investors to reduce their efforts to acquire new information. Vives (2017) argue that tax corrects agents’ excessive reliance on private information, thus resulting in prices containing less information. In particular, they argue that the diffusion of higher levels of private information is not necessarily welfare enhancing. While not drawn from the same assumptions, this conclusion is consistent with the view of Subrahmanyam (1998), who argue that agents waste too many resources in pursuing private information.

Again, on the FTT effect on information, the theoretical model of Dupont and Lee (2007) provides insights on the interaction between informed trading and the FTT. Specifically, the authors explore the tax’s impact in a market with a competitive or monopolistic dealer, liquidity providers, and asymmetric information. Their results suggest that when the probability of informed trading is low, the tax might be associated with a widening of the spreads even if the tax decreases the probability of informed trading.7 Contrary to the classical view that it is an increase in informed trading that widens spreads (e.g., Glosten and Milgrom, 1985), they predict that the probability of informed trading might decline while spread increase in response to an FTT, when asymmetric information is severe. This departure from the standard result of Glosten and Milgrom stems from allowing the dealer to adjust both the bid-ask spread and its ability to accommodate large orders (i.e., market depth) as a function of the probability of informed trading. If we gauge the probability of informed trading by the Amihud measure (e.g., Wang, 1994; Kelly and Ljungqvist, 2012), these predictions imply that the FTT might result in a widening of the spreads not being coupled with an increase in the Amihud measure.

2. Data and variables

We consider ordinary shares of equities listed in the Italian exchange, for which we obtain daily bid and ask prices, market capitalization, returns, and trading volume (in euros). The firm sample is restricted to the set of equities subject to the tax using the end-month market capitalization for the end of November 2012, as stipulated in the tax bill. The period under examination is restricted to two months before the announcement and two months after the tax implementation, for a total of six months of daily data, as in Hvozdyk and Rustanov (2016). Our sample period thus starts on 10/29/2012 and ends on 4/30/2013.8 The number of trading days between the publication of the law on the official gazette and the first day of implementation is 42, covering the period from January 2 to February 28, 2013.9

The full set of daily data is available for 59 equities subject to the FTT. Our equity sample includes fewer firms that are subject to the tax than Hvozdyk and Rustanov (2016) and Cappelletti et al. (2017), who examine 77 and 70 stocks, respectively. The sample size reduction is due to additional filters we impose to ensure the data’s quality. We exclude all saving shares (RSP shares) to limit the sample to ordinary shares, as in Cappelletti et al. (2017). Further, we drop equities for which spreads are zero for more than a third of the days in the sample, as identical bid and ask prices raise data quality concerns.10

Cappelletti et al. (2017) and Hvozdyk and Rustanov (2016) rely on data from Datastream and Bloomberg, respectively, to study the impact of the Italian FTT. This study relies on both databases to perform a check for data quality. We find that the bid and ask prices reported in the two databases are markedly different for a few stocks. These equities are excluded from the analysis, as this discrepancy raises data quality concerns. Hence, the results presented in this study are for data from Datastream, for which prices, returns and market capitalization have been verified using data from Bloomberg.

The daily Amihud measure for equity \( j \) in day \( t \) is defined as in Amihud (2002), as the ratio of the absolute value of the daily return over daily trading volume. Formally,

\[
\text{Amihud}_{j,t} = \frac{|r_{j,t}|}{\text{vol}_{j,t}}
\]

where \( r_{j,t} \) is the day-\( t \) return of equity \( i \), calculated using the daily closing price, and \( \text{vol}_{j,t} \) is the trading volume for the same equity on the same day.11 A lower value of the Amihud liquidity measure corresponds to a liquidity improvement. In this sense, the Amihud variable is an illiquidity measure. Hereafter, an improving (deteriorating) Amihud liquidity indicates a decrease (increase) in the Amihud measure.

Percentage bid-ask spreads are defined as in Fong et al. (2017)

\[
\text{spread}_{i,t} = 100 (\text{ask}_{i,t} - \text{bid}_{i,t})/((\text{ask}_{i,t} + \text{bid}_{i,t})/2)
\]

where \( \text{ask}_{i,t} \) and \( \text{bid}_{i,t} \) are the daily closing ask and bid prices of firm \( i \) on day \( t \). Higher spreads indicate a deterioration of liquidity, in the sense of worse terms of trade. According to the results in Fong et al. (2017), the spread measures the cost of trading for small firms. Spreads are not stationary, but, as done in this stream of the literature, we dismiss non-stationarity concerns due to the presence of market mechanisms preventing spreads from becoming too large in absolute value.

Using the median of the end-of-month market capitalization for November 2012 (the month before the announcement), the sample is split into large and medium-sized firms.12 We construct the aggregate index of the Amihud liquidity measure as an equally weighted (EW) portfolios of the firm-level Amihud measure series, as done in Amihud (2002). For consistency, also spreads are aggregated using EW portfolios. We also calculated the analogous EW liquidity indexes for the large and medium-sized categories.

Employing value-weighted portfolios to construct aggregate liquidity indexes (e.g., Hvozdyk and Rustanov, 2016) might raise concerns, as firms with large market capitalization carry a higher weight. This consideration is particularly relevant for our sample since several large firms (e.g., banks) were subject to severe shocks in the months around the FTT’s implementation. Hence, to gain a more robust perspective of the aggregate tax effect, we employ EW portfolios rather than value-weighted indexes. The EW indexes provide insights on the impact on the average firm.

Fig. 1 plots the five-day moving average of the Amihud measure and spreads for the EW portfolios of the firms subject to the FTT, as well as for the corresponding portfolios of large and medium-sized equities. We note that both using the Amihud liquidity measure and bid-ask spreads, liquidity is higher for large firms (i.e., spreads are narrower and the Amihud measure is lower). After the implementation of the tax, both these liquidity gauges increased, but much more markedly so for medium caps. However, by the end of the sample, the gap between large and medium caps’ average liquidity appears to decrease. The differential effect of the tax on the liquidity of large and medium-sized firms appears to mostly concentrate in the weeks following implementation.

Following Amihud (2002), we winsorize at the 99th percentile the merged sample of all the firm-level Amihud liquidity series. We also

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7 Hence, Dupont and Lee (2007) conclude that the FTT discourages informed trading, as in Subrahmanyam (1998).
8 We consider a year-long sample period in Section 6. The extended sample ranges from 08/01/2012 to 07/31/2013. Non-trading days are excluded from the analysis.
9 The tax was published in the Italian Official Gazette on December 29, 2012, a Monday. Markets were closed from that day (included) to January 1, 2013. The implementation date was set to March 1, 2013.
10 Usually, if no trade occurs on a day, the exchange reports the previous day’s bid and ask spreads.
11 The Amihud measure is multiplied by 10^6, as it is standard in this literature (e.g., Amihud, 2002; Fong et al., 2017). For all the firms in the sample, the Amihud measure series is stationary, with the p-value of the Augmented Dickey-Fuller test for unit root lower than 0.001.
12 The results remain virtually unchanged if we rely on other dates to sort firms into the large and medium-sized categories.
winsorize spreads for consistency. Table 1 reports summary statistics for the variables of interest in the winsorized sample.

With respect to the average Amihud liquidity and spreads reported in Fong et al. (2017), which are 0.44 and 0.008%, respectively, for the Italian market over the 1996-2014 period, the values in Table 1 are lower, especially for large caps, indicating a more liquid market. This difference is consistent with this study’s focus on firms with relatively large market capitalization, which are typically more liquid, as only these equities are included in the FTT’s base, and thus in our sample. Furthermore, the early years of the sample of Fong et al., which are excluded from this study, show wider spreads and higher values of the Amihud measure, consistent with a trend of liquidity improvements in the Italian equity market.

2.1. Methodology

We partition the sample into three periods, namely before the announcement of the FTT (Period 1), after the announcement but before implementation (Period 2), and after implementation (Period 3). The sample period is from 10/29/2012 to 4/30/2013, and Period 2 ranges from January 2 to February 28, 2013. Each period consists of 42 trading days.

To evaluate mean changes in liquidity, we regress each liquidity series over a constant and two dichotomous variables. The first variable is zero except for Period 2, where it takes the value of one. The second variable is defined analogously, but for Period 3. The period preceding the announcement (Period 1) provides the baseline level of liquidity.

A positive and significant coefficient on the dichotomous variable of Period 2 signifies an increase in the mean of the dependent variable (spreads or Amihud measure) during Period 2, relative to the level of Period 1. A similar interpretation applies to the coefficient of Period 3.

We evaluate the effect of the FTT on liquidity for the aggregate liquidity EW indexes. This assessment might not be very informative if the impact of the tax on liquidity is heterogeneous over firms. To address this concern, we examine the changes in the liquidity proxies also at the firm level.

Over the sample period, some large firms and a couple of sectors have been subject to severe shocks, which raises concerns that firm or sector outliers might drive the evaluation of mean liquidity changes. To alleviate these concerns, we also evaluate changes in the median of the liquidity proxies, using the non-parametric Mann-Whitney U-test.

3. Amihud measure

Panel A in Table 2 report the averages of the Amihud liquidity measure over Periods 1, 2, and 2, in absolute and in relative terms, with the pre-announcement period as the liquidity base level. For the Amihud measure, changes are small, relative to the levels of Period 1, but for an increase of almost 30% after implementation for large caps.

The left side of Panels A and B in Table 3 reports the changes in mean and median Amihud liquidity for Period 2, respectively, for the aggregate EW index and the large and mid-cap portfolios. The right side of the same panels refers to the period after tax implementation (Period 3). The results show that after the announcement (Period 2), mean and median Amihud liquidity remained unchanged in aggregate and both for large and mid-caps. In Period 3, after the tax implementation, the Amihud liquidity did not change in aggregate and for mid-cap firms. However, the large caps’ portfolio experienced liquidity deterioration (i.e., an increase in the Amihud liquidity measure).

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Table 1. Summary Statistics.

|                | N  | Avg. r. | σ   | Max     | Min     | Avg. Amihud | Avg. Spreads |
|----------------|----|---------|-----|---------|---------|-------------|--------------|
| Aggregate      | 59 | 0.158   | 2.051 | 34.832  | -12.097 | 0.209       | 0.274        |
| Large          | 29 | 0.138   | 2.071 | 14.736  | -12.097 | 0.1653      | 0.120        |
| Medium         | 30 | 0.177   | 2.031 | 34.832  | -11.367 | 0.237       | 0.424        |

The figure displays the 5-trading-day moving average of the Amihud measure and spreads for the all-firms EW index and for the large and medium-cap portfolios.

Fig. 1. 5-day Moving Average Liquidity.
Table 2. Period Averages.

|          | P1 Average | %P1/P1 | P2 Average | %P2/P1 | P3 Average | %P3/P1 |
|----------|------------|--------|------------|--------|------------|--------|
| Aggregate| 0.191      | 100    | 0.199      | 104.3  | 0.215      | 112.9  |
| Large    | 0.148      | 100    | 0.156      | 105.3  | 0.191      | 128.6  |
| Medium   | 0.232      | 100    | 0.240      | 103.7  | 0.239      | 103.2  |

**Panel A: Amihud**

|          | P1 Average | %P1/P1 | P2 Average | %P2/P1 | P3 Average | %P3/P1 |
|----------|------------|--------|------------|--------|------------|--------|
| Aggregate| 0.259      | 100    | 0.215      | 83.1   | 0.350      | 135.3  |
| Large    | 0.118      | 100    | 0.096      | 80.8   | 0.146      | 123.3  |
| Medium   | 0.394      | 100    | 0.330      | 83.7   | 0.547      | 138.7  |

**Panel B: Spreads**

The table reports the average and gross percentage change, relative to the levels of the pre-announcement period (Period 1), of the daily Amihud liquidity measure (Panel A) and spreads (Panel B), for Period 1, for the months after the announcement and before the tax implementation (Period 2), and after implementation (Period 3). The sample period is from 10/29/2012 to 4/30/2013, and Period 2 ranges from January 2 to February 28 of 2013.

Table 3. EW indexes: Changes in Mean and Median.

**Panel A: EW mean Amihud**

|          | Period P2 | Period P3 |
|----------|-----------|-----------|
| Coef     | Pval      | Coef      | Pval      |
| Aggregate| 0.008     | 0.659     | 0.024     | 0.133     |
| Large    | 0.008     | 0.686     | 0.007     | 0.752     |
| Medium   | 0.008     | 0.686     | 0.007     | 0.752     |

**Panel B: EW median Amihud**

|          | Period P2 | Period P3 |
|----------|-----------|-----------|
| Coef     | Pval      | Coef      | Pval      |
| Aggregate| -0.048*** | 0         | 0.099***  | 0         |
| Large    | -0.023*** | 0         | 0.027***  | 0         |
| Medium   | -0.064*** | 0         | 0.153***  | 0         |

**Panel C: EW mean spreads**

|          | Period P2 | Period P3 |
|----------|-----------|-----------|
| Coef     | Pval      | Coef      | Pval      |
| Aggregate| 82.607*** | 0         | 139.44*** | 0         |
| Large    | 80.045*** | 0         | 121.29*** | 0         |
| Medium   | 83.435*** | 0         | 140.99*** | 0         |

**Panel D: EW median spreads**

|          | Period P2 | Period P3 |
|----------|-----------|-----------|
| Coef     | Pval      | Coef      | Pval      |
| Aggregate| 82.607*** | 0         | 139.44*** | 0         |
| Large    | 80.045*** | 0         | 121.29*** | 0         |
| Medium   | 83.435*** | 0         | 140.99*** | 0         |

Panel A reports the coefficients and p-values of the dichotomous variables P2 and P3 in the regression $y_t = \alpha + \beta_1 P2 + \beta_2 P3 + \epsilon$, where $y_t$ is one of the EW indexes of the Amihud liquidity measure or spreads. Panel B reports the ratio of the median for Periods 2 and 3 over the median for Period 1 for the indexes, followed by the p-value of the Mann-Whitney U-test for the equality of the medians in Periods 2 and 3. Panels C and D reports the analogous statistics for mean and median spreads, respectively. The sample period is from 10/29/2012 to 4/30/2013, and Period 2 ranges from January 2 to February 28, 2013.

Table 4 shows the firm-level analysis results for the mean and median of the Amihud liquidity measure. Panels A and B report the percentage of firms for which mean liquidity significantly changed in Periods 2 and 3, respectively, followed by the mean of these changes, relative to the corresponding levels in Period 1. Panels C and D report the analogous results for the median.

The results show that only three firms experienced Amihud liquidity changes in Period 2, using either the mean or the median. In untabulated results, we find that two of the three firms are in the energy sector, both using the mean and the median. After the tax was implemented (Period 3), the mean of the Amihud measure remained unchanged for about 76% of the firms. Among the 14 equities for which mean liquidity did change, liquidity deteriorated in all cases (i.e., mean Amihud liquidity increased), except for the construction company Webuild.15

The incidence of the increase in mean Amihud is about the same for large and medium-caps. The medium-sized group includes a medium-sized bank, and four companies specialized in the construction of large infrastructures. Median Amihud liquidity changed in Period 3 for only 13 firms, one fewer equity than for mean changes.15 All except Webuild experienced liquidity deterioration, where the increase in median Amihud liquidity was more marked for medium-sized firms than large caps. We note that the firms showing significant changes in mean and median Amihud liquidity are about the same, bar two discrepancies.16

Overall, the results support the conclusion that neither the announcement nor the FTT implementation had a significant impact on the Amihud measure for most of the firms in our sample. The firm-level analysis findings show that Amihud liquidity deteriorated after the tax implementation for about a fifth of the equities. The concentration of these effects in sectors that, at the time, were strongly affected by shocks unrelated to the tax suggests that the FTT may not have been the main driver of these changes. Hence, the conjecture that the FTT has a detrimental effect on liquidity is not supported by the analysis of Amihud liquidity’s changes.

Fong et al. (2017) note that the Amihud measure is an effective gauge of large trades’ cost. Hence, this section’s results indicate that the cost of placing large trades was not affected by the tax, but for a few large caps. The implication is that the cost of trading for institutional investors was not affected by the FTT.

4. Spreads

Panel B 2 reports the averages of spreads over Periods 1, 2 and 3, in absolute and in relative terms, with the pre-announcement period serving as the base. We find that spreads declined by about 17% after the announcement and increased by about 35% in Period 3. Spread widen more for mid-sized firms than for large caps, at about 39% and 23%, respectively.

Consistently, Panels C and D in Table 3 show strongly significant changes in mean and median spreads for the EW spread indexes. Average and median aggregate spreads narrowed after the tax announcement (Period 2) and widened after implementation (Period 3).17

The strong statistical significance of the decrease in the spreads of the EW portfolios in Period 2 might suggest that the improvement in liquidity was pervasive. However, firm-level analysis shows that such a decline is not observed for the majority of the firms. As shown in Panel A of Table 5, mean spreads significantly narrowed only for about 38% and 30% of large and medium caps, respectively.18 The decreases are,

14 For Webuild, we find that mean Amihud liquidity and mean spreads decreased throughout Periods 2 and 3.

15 Specifically, one fewer large firm experienced a deterioration in the median than in the mean of Amihud liquidity. Significant changes in mean and median Amihud liquidity are found for the same number of mid-caps.

16 These exceptions are resolved when allowing for weakly (i.e., at 10%) significant changes.

17 Coelho (2016) suggests that spreads narrowed in Period 2 as investors locked-in positions ahead of the FTT’s implementation.

18 Among the large caps for which mean spreads declined we find four large banks, including Banco BPM and Banca Carige.
Table 4. Amihud Measure Firm-level: Changes in Mean and Median.

|          | Panel A: Firm-level mean Amihud P2 | Panel B: Firm-level mean Amihud P3 | Panel C: Firm-level median Amihud P2 | Panel D: Firm-level median Amihud P3 |
|----------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
|          | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- |
| Aggregate | 59 | 5.085 | 3.390  | 1.695  | 121.880 | 158.197 | 49.244 | 59 | 23.729 | 22.034 | 1.695 | 161.947 | 171.382 | 39.297 | 59 | 0.508 | 0.085  | 0.659 | 95.652 | 95.652 | 49.244 |
| Large    | 29 | 3.448 | 3.448  | 0      | 158.452 | 158.452 |        | 29 | 27.586 | 27.586 | 0      | 171.321 | 171.321 |        | 29 | 0     | 0      | 0     | 180.859 | 180.859 |        |
| Medium   | 30 | 6.667 | 3.333  | 3.333  | 103.593 | 157.943 | 49.244 | 30 | 20    | 16.667 | 3.333 | 149.448 | 171.478 | 39.297 | 30 | 10    | 0      | 10    | 199.641 | 235.485 | 49.244 |

Panels A and B refer to the coefficients of P2 and P3 in the firm-level regression $y_t = a + \beta_2 P2 + \beta_3 P3 + \epsilon$, where $y_t$ is the firm-level Amihud measure. The left side of Panel A reports the number of firms, the percentage of significant coefficient for P2, and the percentage of significantly positive and negative coefficients, in aggregate and for each size group. The right side of Panel A reports, in aggregate and for each size group, the average of the ratio of the mean of $y_t$ over Period 2 to the mean of $y_t$ in Period 1, where the average is over the firms for which there is a significant mean change, and, in the following two columns, over the firms for which the mean of $y_t$ significantly increased or decreased, in Period 2. The right side of Panel B reports the analogous average ratios for Period 3. The left side of Panel C reports the number of firms, and the percentage of firms for which the Mann-Whitney U-test rejects the equality of the medians in Periods 2 and 1, also broken down in the percentage of median increases or decreases. The right side of Panel C reports the average of the ratio of the median of $y_t$ over Period 2 to the median of $y_t$ in Period 1, where the average is over the firms for which the test rejects median's equality, and over the firms for which the median in Period 2 significantly increased or decreased. The sample period is from 10/29/2012 to 4/30/2013, and Period 2 ranges from January 2 to February 28, 2013.

Table 5. Firm-level Spreads: Changes in Mean and Median.

|          | Panel A: Firm-level mean spreads P2 | Panel B: Firm-level mean spreads P3 | Panel C: Firm-level median spread P2 | Panel D: Firm-level median spread P3 |
|----------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
|          | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean  | Mean + | Mean- |
| Aggregate | 59 | 40.678 | 6.780  | 33.898  | 78.628 | 136.798 | 66.994 | 59 | 55.932 | 50.847 | 5.085 | 169.657 | 180.118 | 65.052 | 59 | 34.483 | 31.034 | 3.448 | 165.513 | 176.231 | 69.057 |
| Large    | 29 | 44.828 | 6.897  | 37.931  | 79.958 | 134.149 | 70.105 | 29 | 55.932 | 50.847 | 5.085 | 169.657 | 180.118 | 65.052 | 29 | 34.483 | 31.034 | 3.448 | 165.513 | 176.231 | 69.057 |
| Medium   | 30 | 36.667 | 6.667  | 30      | 77.056 | 139.446 | 63.191 | 30 | 76.667 | 7       | 6.667 | 171.459 | 181.784 | 63.049 | 30 | 76.667 | 7       | 6.667 | 171.459 | 181.784 | 63.049 |

Panels A and B refer to the coefficients of P2 and P3 in the firm-level regression $y_t = a + \beta_2 P2 + \beta_3 P3 + \epsilon$, where $y_t$ are firm-level daily spreads. The left side of Panel A reports the number of firms, the percentage of significant coefficient for P2, and the percentage of significantly positive and negative coefficients, in aggregate and for each size group. The right side of Panel A reports, in aggregate and for each size group, the average of the ratio of the mean of $y_t$ over Period 2 to the mean of $y_t$ in Period 1, where the average is over the firms for which there is a significant mean change, and, in the following two columns, over the firms for which the mean of $y_t$ significantly increased or decreased, in Period 2. The right side of Panel B reports the analogous average ratios for Period 3. The left side of Panel C reports the number of firms, and the percentage of firms for which the Mann-Whitney U-test rejects the equality of the medians in Periods 2 and 1, also broken down in the percentage of median increases or decreases. The right side of Panel C reports the average of the ratio of the median of $y_t$ over Period 2 to the median of $y_t$ in Period 1, where the average is over the firms for which the test rejects median’s equality, and over the firms for which the median in Period 2 significantly increased or decreased. The sample period is from 10/29/2012 to 4/30/2013, and Period 2 ranges from January 2 to February 28, 2013.

However, economically meaningful, at 30% and 37% in each group. All but three of the 24 firms for which mean spreads changed in Period 2 also experienced a significant change of the same nature (decrease or increase) in median spreads. Significant changes appear to be more pervasive but weaker in medians than in means. As shown in Panel C of Table 5, median spreads declined for 79% of large firms, with an average decrease of about 20%. The share of medium-sized caps for which spreads narrowed is just 30%, both for median and mean changes.

Of the 36 firms for which we find a significant change in median spreads in Period 2, 14 did not experience a mean spread change. For instance, all but two of the 10 banks in our sample experienced a decrease in median spreads in Period 2, with the two exceptions showing no changes. However, only six banks experienced a significant change...
Table 6. One-year Sample Period Averages.

|                | P1 Average | %P1/P1 | P2 Average | %P2/P1 | P3 Average | %P3/P1 |
|----------------|------------|--------|------------|--------|------------|--------|
| Aggregate      | 0.204      | 100    | 0.193      | 94.691 | 0.193      | 94.459 |
| Large          | 0.154      | 100    | 0.151      | 97.843 | 0.162      | 104.84 |
| Medium         | 0.254      | 100    | 0.235      | 92.769 | 0.223      | 88.124 |
| Aggregate      | 0.260      | 100    | 0.213      | 82.115 | 0.3376     | 120    |
| Large          | 0.125      | 100    | 0.102      | 81.596 | 0.162      | 128.89 |
| Medium         | 0.393      | 100    | 0.323      | 82.28  | 0.513      | 130.36 |

The table reports the average and gross percentage change with respect to the pre-announcement period of the Amihud liquidity measure (Panel A) and spreads (Panel B), for the period before the announcement (Period 1), after the announcement and before the tax implementation (Period 2), and after implementation (Period 3). The sample period is from 08/01/2012 to 07/31/2013 and Period 2 ranges from January 2 to February 28, 2013.

In mean over the same period. In unreported results, we find strong volatility in the daily spreads of the firms for which spreads show a significant change in mean but not in median. We argue that this high level of volatility suggests that mean spreads constitute a less reliable gauge of liquidity changes than median spreads for Period 2, at least for these firms.

Overall, we conclude that spreads decreased in more instances for large than medium caps in the period between the tax announcement and implementation. This result stands in sharp contrast to the findings for Period 3, as shown next.

The EW indexes of mean and median spreads indicate that the gap between bid and ask prices increased for both large and medium-sized firms after the tax implementation (Period 3), relative to the pre-announcement period. Panels B and D of Table 5 show that mean and median spreads increased for about 51% and 42% of the equities, respectively. This deterioration of liquidity is not distributed equally among large and medium caps. Mean spreads increased for about 31% of large caps, but for 70% of medium-sized equities. When significant, the magnitude of the increase was about the same for large- and mid-caps, corresponding to a 76% and 82% rise. Similarly, there was a widening of median spreads for 24% and 60% of large and medium-sized firms, respectively. Again, the increase in median spreads for medium-sized firms, at 85%, was stronger than that for large caps, at 60%.

In untabulated results, we find dramatic mean spread widening for a few large banks (i.e., Banca Monte dei Paschi di Siena and Banca Carige). This sharp deterioration of liquidity might be associated with these banks’ complex situation, starting from mid-February 2013, more than with the FTT. The second-largest increase in mean spreads for large caps is for the defence system producer Leonardo. While the FTT could have contributed to this decrease in liquidity, it is also possible that the widening of the spreads is due to the judiciary proceeding involving Leonardo’s top management, which started in mid-February 2013.

Overall, the firms for which mean and median spreads narrowed span sufficiently many sectors to conclude that, in Period 2, spreads declined, and more often so for large than medium caps. By the same token, we can conclude that in Period 3 spreads widened for medium-sized stocks. However, changes in spreads were not pervasive. For Period 2, about 59% and 39% of the firms in our sample did not experience changes in mean and median spreads. The corresponding percentages for Period 3 are equally substantial, at about 44% and 45%. Drawing firm conclusions on the effect of the tax on large caps’ spreads in Period 3 is challenging, given the exogenous (to the tax) shocks affecting major large firms.

According to Fong et al. (2017) and Colliard and Hoffmann (2017), spreads gauge the trading costs of small-sized transactions. From this perspective, this study’s results thus indicate that trading about half of the Italian mid-caps became more expensive after the implementation of the FTT for investors placing small trades.

Table 7. One-year EW indexes: Changes in Mean and Median.

|                | Coeff | Pval | Coeff | Pval |
|----------------|-------|------|-------|------|
| Aggregate      | -0.010| 0.492| -0.011| 0.346|
| Large          | -0.003| 0.492| -0.011| 0.489|
| Medium         | -0.018| 0.376| -0.018*| 0.070|
| Aggregate      | 88.067| 0.238| 88.276| 0.169|
| Large          | 89.025| 0.499| 107.76| 0.685|
| Medium         | 99.838| 0.466| 92.64**| 0.037|

Panel A reports the coefficients and p-values for the dichotomous variables P2 and P3 in the regression \( y = a + \beta_1 P2 + \beta_2 P3 + c \), where \( y \) is one of the EW indexes of the Amihud liquidity measure or of spreads. Panel B reports the ratio of the median for Periods 2 and 3 over the median for Period 1 for the same set of EW indexes, as well as the p-value of the Mann-Whitney U-test for the equality of the medians in Periods 2 and P3. Panels C and D reports the analogous statistics for mean and median spreads, respectively. The sample period is from 08/01/2012 to 07/31/2013 and Period 2 ranges from January 2 to February 28, 2013.

5. Effect of the FTT on information diffusion

Building on the insights of the theoretical model of Wang (1994), Kelly and Ljungqvist (2012) argue that the Amihud measure constitutes a natural proxy for information asymmetry. Given the results in Fong et al. (2017), the intuition for a link between the Amihud measure and informed trading is that higher levels of the Amihud measure make large trades more costly, where informed investors typically place large trades (e.g., Kyle, 1985; Shilklo, 2019).19

The familiar model of Glosten and Milgromph (1985)) proposes that bid-ask spreads widen when the probability of informed trading increases, as agents hedge the risk of interacting with investors with informational advantages.

19 Institutional investors generally have informational advantages relative to retail investors, possibly due to institutional investors paying more attention to information (e.g., Da et al., 2013; Ben-Rephael et al., 2017) or having privileged access to information sources (e.g., Ivashina and Sun, 2011).
Table 8. One-year Sample Amihud Firm-level: Changes in Mean and Median.

| n. | Panel A: Firm-level mean Amihud P2 | Panel B: Firm-level mean Amihud P3 | Panel C: Firm-level median Amihud P2 | Panel D: Firm-level median Amihud P3 |
|----|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|    | %Sgnf # | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + | %Sgnf | Mean | Mean + | Mean | %Sgnf | %Sgnf + |
| Aggregate | 60 | 10 | 3.333 | 6.667 | 92.485 | 141.753 | 67.851 | 6.667 | 10 | 3.333 | 3.333 | 72.850 | 72.850 | 23.333 | 10 | 13.333 | 13.333 | 150.925 | 141.753 | 66.184 | 10 | 23.333 | 10 | 13.333 | 101.435 | 194.925 | 65.242 | 30 | 16.667 | 10 | 13.333 | 135.779 | 154.321 | 61.610 |
| Large | 30 | 3.333 | 0 | 3.333 | 72.850 | 72.850 | Large | 30 | 16.667 | 6.667 | 92.485 | 141.753 | 67.851 | Large | 30 | 16.667 | 13.333 | 133.779 | 154.321 | 61.610 | Large | 30 | 16.667 | 10 | 13.333 | 135.779 | 154.321 | 61.610 | Large | 30 | 16.667 | 6.667 | 92.485 | 141.753 | 67.851 |
| Medium | 30 | 16.667 | 6.667 | 92.485 | 141.753 | 67.851 | Medium | 30 | 23.333 | 10 | 13.333 | 101.435 | 194.925 | Medium | 30 | 23.333 | 13.333 | 135.779 | 154.321 | 61.610 | Medium | 30 | 23.333 | 6.667 | 92.485 | 141.753 | 67.851 | 65.242 | Medium | 30 | 23.333 | 8.333 | 15 | 102.285 | 171.255 | 63.968 |

Panel A refers to the coefficients of the dichotomous variables P2 and P3 in the regression \( y_i = a + \beta_1 P2 + \beta_2 P3 + c \), where \( y_i \) is the firm-level daily Amihud measure. The left side of Panel A reports the number of firms, the percentage of the coefficient of P2 that are significant, and the percentage of significantly positive and negative coefficients, in aggregate and for each size group. The right side of Panel A reports the average of the ratio of the mean of \( y_i \) over Period 2 to the mean of \( y_i \) in Period 1, where the average is over the firms for which there is a significant mean change, and, in the following two columns, over the firms for which the mean of \( y_i \) significantly increased or decreased. Panel B reports the corresponding results for Period 3. The left side of Panel C reports the number of firms, and the percentage of firms for which the Mann-Whitney U-test rejects medians’ equality in Periods 2 and 1, also broken down into the percentage of median increases or decreases. The right side of Panel C reports the average of the ratio of the median of \( y_i \) over Period 2 to the median of \( y_i \) in Period 1, where the average is over the firms for which the test rejects equality in median, and over the firms for which the median in Period 2 significantly increased or decreased. Panel D reports the analogous results for Period 3. The sample period is from 08/01/2012 to 07/31/2013, and Period 2 ranges from January 2 to February 28, 2013.

According to our results, the FTT generally did not affect Amihud liquidity. To the extent to which the Amihud measure varies with informed trading, the implication is that the tax did not impact the probability with which trades are based on information. If this is the case, the asymmetric information component of the spreads should have remained unchanged over the same period. However, spreads widened for about 56% of firms after the FTT implementation. By exclusion, these increases should be fully attributed to drivers of bid and ask prices that are unrelated to information (e.g., dealers’ inventory costs).

The theoretical framework of Dupont and Lee (2007) provides an alternative explanation. Their model predicts that when asymmetric information is severe, the probability of informed trading and spreads might positively respond to an FTT. The effect is due to the dealers’ ability to hedge against informed trading using both spreads and market depth. In this sense, our results provide preliminary evidence that the effect of the tax on information diffusion might be complex and dependent on the market structure and dealers’ behavior.

6. One-year sample

The assessment of the effect of the FTT on Amihud liquidity and spreads presented insofar focuses on a six-month sample, equally subdivided in Periods 1, 2 and 3. This section investigates whether the conclusions drawn for the six-month sample period find empirical support using a longer sample period. We thus double the sample’s length to one year and consider the period starting from the beginning of August 2012 to the end of July 2013. As the announcement and implementation dates remain unchanged, there are 42 trading days in Period 2 also in the year-long sample. The pre-announcement period (Period 1) and post-implementation period (Period 3) instead comprise 103 and 106 trading days, respectively.\(^{20}\)

Exploring the effect of the tax over a longer period provides robustness to this study’s conclusions. However, extending the sample period also raises the concern that other market changes might confound the tax’s effect on liquidity. Hence, the identification of the extended sample requires careful consideration.

We select August 2012 as the starting month of our year-long sample period as the spreads’ levels are much higher in the months of 2012 preceding July than those observed after that, for all Italian equities.\(^{21}\) The Italian government scheduled the implementation of taxes on equity derivatives and high-frequency trading for July 2013. It then postponed it to the fall of the same year.\(^{22}\) Extending the analysis beyond the end of July 2013 would therefore raise concerns of mixing the FTT’s effects with those of additional legislation of similar nature. Hence, the introduction of this additional bill identifies the end of the year-long sample, as in Cappellietti et al. (2017).

This study evaluates liquidity changes relative to the pre-announcement period (Period 1). Once we extend the reference period’s length, relative liquidity might change even if the post-announcement periods’ liquidity levels are similar in the six-month and year-long sample. Fortunately, this is not the case. Tables 2 and 6 show the average of the Amihud measure (Panel A) and spreads (Panel B) for the six-month and one-years sample periods, respectively. Comparing these tables, we find that, in the pre-announcement period, mean Amihud liquidity is lower in the six-month than in the year-long sample, by 7% overall, and by 4% and 9% for large and medium caps, respectively. For spreads, the levels are about the same. Hence, the differences between the six-month and year-long samples should yield comparable results for relative liquidity changes.

Table 7 reports the changes in mean and median for the EW indexes of the Amihud measure (Panels A and B) and of spreads (Panels C and

\(^{20}\) The year-long sample includes an additional large firm because, in the longer sample, this firm has non-zero spreads for more than a third of the trading days.

\(^{21}\) Figure 3 in Cappellietti et al. (2017) also illustrates this change. As they rely on a difference-in-differences approach, higher spread levels for all equities in the first part of the same are not a concern in their study but would be problematic for our analysis.

\(^{22}\) See Article 56 of the Italian government’s Decree n. 69 on 21 June 2013.
Table 9. One-year Sample Firm-level Spreads: Changes in Mean and Median.

| Panel: | Firm-level mean spreads P2 |
|--------|-----------------------------|
|        | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean | Mean+ | Mean- |
| Aggregate | 60 | 50 | 5 | 45 | 75.782 | 136.893 | 68.992 |
| Large | 30 | 56.667 | 3.333 | 53.333 | 75.066 | 126.223 | 71.869 |
| Medium | 30 | 42.333 | 6.667 | 36.667 | 76.719 | 142.228 | 64.808 |

| Panel: | Firm-level mean spreads P3 |
|--------|-----------------------------|
|        | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean | Mean+ | Mean- |
| Aggregate | 60 | 66.667 | 63.333 | 3.333 | 170.057 | 175.220 | 71.965 |
| Large | 30 | 63.333 | 60 | 3.333 | 147.531 | 151.379 | 78.255 |
| Medium | 30 | 70 | 66.667 | 3.333 | 190.439 | 196.677 | 65.675 |

| Panel: | Firm-level median spread P2 |
|--------|-----------------------------|
|        | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean | Mean+ | Mean- |
| Aggregate | 60 | 61.667 | 6.667 | 55 | 82.880 | 177.100 | 71.460 |
| Large | 30 | 80 | 6.667 | 73.333 | 86.588 | 176.848 | 78.382 |
| Medium | 30 | 43.333 | 6.667 | 36.667 | 70.036 | 177.381 | 57.615 |

| Panel: | Firm-level median spread P3 |
|--------|-----------------------------|
|        | n. | %Sgnf | %Sgnf+ | %Sgnf- | Mean | Mean+ | Mean- |
| Aggregate | 60 | 65 | 53.333 | 11.667 | 157.735 | 172.624 | 89.673 |
| Large | 30 | 63.333 | 43.333 | 20 | 132.226 | 149.356 | 95.112 |
| Medium | 30 | 66.667 | 63.333 | 3.333 | 181.969 | 188.544 | 57.042 |

Panel A refers to the coefficients of the dichotomous variables P2 and P3 in the regression $y_t = \alpha + \beta_1 P2 + \beta_2 P3 + \epsilon_t$ where $y_t$ are firm-level daily spreads measure. The left side of Panel A reports the number of firms, the percentage of the coefficient of P2 that are significant, and the percentage of significantly positive and negative coefficients, in aggregate and for each size group. The right side of Panel A reports the average of the ratio of the mean of $y_t$ over Period 2 to the mean of $y_t$ in Period 1, where the average is over the firms for which there is a significant mean change, and, in the following two columns, over the firms for which the mean of $y_t$ significantly increased or decreased. Panel B reports the corresponding results for Period 3. The left side of Panel C reports the number of firms, and the percentage of firms for which the Mann-Whitney U-test rejects medians’ equality in Periods 2 and 1, also broken down into the percentage of median increases or decreases. The right side of Panel C reports the average of the ratio of the median of $y_t$ over Period 2 to the median of $y_t$ in Period 1, where the average is over the firms for which the test rejects equality in median, and over the firms for which the median in Period 2 significantly increased or decreased. Panel D reports the analogous results for Period 3. The sample period is from 08/01/2012 to 07/31/2013, and Period 2 ranges from January 2 to February 28, 2013.

The widening of the spreads during Period 3 is once more found in more instances for medium-sized firms than for large caps, both using mean and median spreads, in the one-year sample. The associated spread increases are also stronger for mid-caps than for large firms’ equities. Mean spreads increased by 51% and 97% relative to Period 1 for large and medium caps, respectively. The corresponding percentages for median spreads are 49% and 89%. The largest increase in spreads for large caps is for the company Leonardo and for a few banks, as found in the six-month sample. Further, median spreads declined in Period 3 for six large caps, but only for one firm mid-cap. Overall, the one-year sample analysis indicates that medium-sized firms experienced a more severe liquidity deterioration than large caps after implementation.

Comparing the six-month to the one-year sample, we find that the longer implementation period brings about a more pervasive widening of spreads for large firms, but only slightly fewer instances of spread increases for mid-caps. Median spreads increased for 24% and 43% of large caps over the horizons of two and five months, respectively, after the tax’s implementation. The corresponding percentages for medium-sized firms are much closer, at 70% and 63%. In the extended sample, the associated increases are markedly milder for large than medium-sized firms, suggesting that the effect on mid-caps is both strong and persistent.

Overall, the yearlong sample results indicate that the Amihud liquidity remained unchanged for the majority of the firms in Periods 2 and 3. Spreads declined more frequently and to a more considerable extent for large caps than smaller firms in Period 2, with the effect being reversed in the implementation period, as the spreads of mid-sized firms widened more than those of large caps. These results confirm the conclusion drawn for the six-month sample.

We find evidence of sector- and firm-specific liquidity changes that might be explained by shocks exogenous to the tax, especially for large caps, in Period 3.

7. Conclusions

The findings of Fong et al. (2017) identify the Amihud measure and the spreads as effective gauges of the trading costs of large and small
trades, respectively. Given this classification, this study’s results yield two conclusions. First, the cost of placing large trades remained essentially unaltered by the announcement and imposition of the tax. The implication is that the tax had no adverse impact on the cost of trading for institutional investors. Second, the cost of placing small trades has somewhat declined before the implementation phase, but it has markedly increased after the implementation of the tax, especially for medium-sized firms.

These two findings prompt the conjecture that the bulk of the tax burden has been passed onto non-institutional investors, perhaps due to dealers’ market power. This line of inquiry deserves further research. Consistently, our study presents preliminary evidence supporting the predictions of the theoretical model of Dupont and Lee (2007), which suggests that dealers’ characteristics may play a role in determining the impact of the tax on liquidity.

Lastly, our analysis also raises concerns about drawing conclusions on the effect of the FTT on liquidity without considering the potential confounding effects of firm- and sector-specific shocks. For instance, in the case of the Italian tax, a few large banks faced an existential crisis around the time of the tax implementation, with predictable repercussions on the whole banking system. Around the same period, the Italian government implemented significant domestic industrial policy changes affecting specific sectors, including companies specialized in the construction of large energy infrastructure projects. Therefore, the FTT might not have been the main liquidity driver for a large share of the Italian equity market.

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Author contribution statement

Valentina Galvani: Analyzed and interpreted the data; Wrote the paper.

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