Tick Size – Preliminary Results

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January 29, 2015

Firm policies can be affected by secondary market (e.g., Zucchi, 2015; Campello, Ribas, and Wang, 2014). In this project, I use the Euronext Brussels cash market's adoption of a step-increasing tick size on April 7, 2014 as an external liquidity shock to empirically explore the short term effect of liquidity change on firm policies.

The new tick size policy is a decent nature experiement setting because it is mandatory, not likely to be affected by firms themselves. Under the new tick size policy, the tick size of equities priced below €50 got decreased from the original €0.01. For equities priced below €10, the new tick size is €0.001, and for equities priced between €10 to €50, the new tick size is €0.005. While for equities priced between €50 to €100, the tick size remains €0.01.

1. Data

My sample consists of 156 firms from Euronext Brussels market June 2013 to May 2014. I dropped firm - quarter observations that have missing values or non-positive total assets, or that have splitted during my sample period. I also dropped those equities whose tick size got increased (priced above €100). Table 1 presents the descriptive statistics.

Table 1: Summary Statistics

This table reports summary statistics of main variables. $Size$ is the natural logarithm of total assets. $CommonStock$, $RetainedEarnings$, and $LongTermInvestments$ are all taken from firms' financial statement, deflated by total assets.

Variables	No. of Obs.	Mean	S.D.	25%	Median	75%
$Size$	191	13.734	2.145	12.358	13.578	15.040
$CommonStock$	191	0.334	0.459	0.077	0.227	0.379
$RetainedEarnings$	191	0.048	0.582	0.000	0.055	0.259
$LongTermInvestments$	191	0.110	0.235	0.000	0.009	0.087

2. Long Term Investments

I think that following a liquidity increase, long term investments will also increase, because firms' ability to raise funds from secondary market got increased and that secondary market liquidity can affect firms' internal liquidity (Zucchi 2015). Therefore, I estimate the following equation

$$LongTermInvestments_{i,t} = \beta_0 + \beta_1 Size_{i,t} + \beta_2 D_{i,t} + firm_i + quarter_t + \epsilon_{i,t}$$

D represents treatment, which is a real number ranging from 0 to 1. It is the percentage of treatment days of a certain firm in a certain period. Treatment only occurs after the adoption of the new tick size policy (April 7, 2014) and only when the price is below €50. Therefore, I define a treatment day as a day with average price below €50 and in the treatment period. Table 2 Column 1 reports the result. In column 2, I report the result of a placebo test, assuming the treatment happens to equities priced above €50 instead of below €50. In column 3 and 4, I assume the treatment only happens to equities priced between €10 to €50 (column 3), and below €10 (column 4), which corresponds to the treatment effect of tick size change from €0.01 to €0.005 (column 3), and from €0.01 to €0.001 (column 4), respectively.

Table 2: Long Term Investments

Table 2 reports the regression results for the effect of tick size on long term investments. I drop observations with non-positive total assets or long term investments. In addition, I trim total assets and long term investments at 5% cutoff in each tail. Column 1 is the main regression result. Column 2 is a placebo test, where I set the treatment D equals to 1 when equities are priced above €50 instead of below €50. Column 3 is the regression result assuming treatment happens only to equities priced between €10 and €50. And column 4 assumes treatment happens only to those priced below €10. Refer to Table 1 for detailed variable definitions. Standard deviation are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% (2-tail) test levels, respectively.

Independent Variables	1	2	3	4
Size	-0.369***	-0.330***	-0.342***	-0.362***
	(0.062)	(0.070)	(0.065)	(0.069)
D	0.037***	0.008	0.034***	0.044**
	(0.008)	(0.012)	(0.010)	(0.019)
Constant	5.382***	4.828***	4.997***	5.287***
	(0.887)	(0.998)	(0.922)	(0.981)
No. of Obs.	103	103	103	103
R^2	0.448	0.285	0.391	0.339

From table 2 column 1, we can see that following a tick size decrease, there is a significant increase in long term investment of 0.037 units, which then becomes insignificant during the placebo test. In addition, my results also shows that larger magnitude of tick size reduction corresponds to larger increase in investment. From column 3 and 4, we can see that the tick size reduction from €0.01 to €0.001 causes 0.044 unit of significant increase in long term investment, while reduction from €0.01 to €0.005 only causes 0.034 unit of increase.

The effect of tick size can be different depends on liquidity (Buti, Consonni, Rindi, Wen, and Werner, 2014). Table 3 reports the effect of tick size on long term investments at different liquidity levels (measured by turnover). Column 1 corresponds to

Table 3: Long Term Investments at Different Liquidity Levels
In table 2, I sort the observations according to their liquidity (measured by ratio of turnover to total assets) and divide them into 4 groups equally, from lowest liquidity to highest liquidity). Column 1, 2, 3 and 4 report the effect of tick size reduction on long term investments in each of the 4 groups, respectively. Refer to Table 1 for detailed variable definitions. Standard errors are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% (2-tail) test levels, respectively.

Independent Variables	1	2	3	4
Size	0. 257***	-0. 084	-0. 609***	-0. 020*
	(0. 067)	(0. 094)	(0. 109)	(0. 010)
D	0. 065**	0. 013	0. 014	0. 000
	(0. 027)	(0. 012)	(0. 017)	(0. 001)
Constant	-3. 364***	1. 311	8. 609***	0. 316**
	(0. 914)	(1. 315)	(1. 524)	(0. 135)
No. of Obs.	43	42	42	42
R^2	0.662	0.094	0.671	0.182

equities with lowest ratio of turnover to total assets, and it is the only column where there is an significant effect from tick size change according to my result. This means the effect of tick size is most prominent for illiquid equities. While for equities that are originally liquid enough, their long term investment policies are less likely to be affected by the tick size reduction.

3. Common Stocks and Retained Earnings

I also found that common stock and retained earnings can be affected by the tick size reduction, especially for small size firms. Table 4 and 5 reports the effect of tick size on common stock and retained earnings, respectively. From these two tables, we can see that for small size firms, a reduction in tick size causes significant increase of 0.149 units in common stock (table 4 column 1) and significant decrease of 0.148 units in retained earnings (table 5 column 1). The story behind this maybe like this: when firm's secondary market liquidity got increased, they can turn some of their precautionary cash holding into stocks, which provides better yields and could be changed back into cash easily if it is liquid enough, and in that case they would also be willing to pay more dividends, which results in less retained earnings.

Table 4: Common Stock

In table 4, I drop observations with non-positive total assets, trim them at 5% cutoff in each tail, sort according to firms' size (nature logarithm of total assets) and then divide them into 4 groups equally, from lowest size to highest size. Column 1, 2, 3 and 4 report the effect of tick size on common stock in each of the 4 groups, respectively. Refer to Table 1 for detailed variable definitions. Standard errors are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% (2-tail) test levels, respectively.

Independent Variables	1	2	3	4
Size	-0. 750**	0. 000	-0. 069	-0. 302
	(0. 294)	(0. 217)	(0. 151)	(0. 327)
D	0. 149***	0. 010	0. 019	-0. 020
	(0. 051)	(0. 029)	(0. 024)	(0. 033)
Constant	9. 323**	0. 271	1. 229	4. 919
	(3. 457)	(2. 847)	(2. 167)	(5. 137)
No. of Obs.	43	42	42	42
R^2	0.352	0.006	0.036	0.053

Table 5: Retained Earnings

In table 5, I drop observations with non-positive total assets, trim them at 5% cutoff in each tail, sort according to firms' size (nature logarithm of total assets) and then divide them into 4 groups equally, from lowest size to highest size. Column 1, 2, 3 and 4 report the effect of tick size on retained earnings in each of the 4 groups, respectively. Refer to Table 1 for detailed variable definitions. Standard errors are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% (2-tail) test levels, respectively.

Independent Variables	1	2	3	4
Size	0. 948***	-0. 272	-0. 279	0. 194
	(0. 323)	(0. 201)	(0. 182)	(0. 372)
D	-0. 148**	0. 031	0. 011	-0. 009
	(0. 056)	(0. 027)	(0. 029)	(0. 037)
Constant	-11. 143***	3. 687	4. 196	-2. 950
	(3. 799)	(2. 632)	(2. 607)	(5. 834)
No. of Obs.	43	42	42	42
R^2	0.361	0.104	0.101	0.014