Commonality in Liquidity: Effects of Monetary Policy and Macroeconomic Announcements

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Commonality in liquidity: Effects of monetary policy and macroeconomic announcements

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Abstract

After the recent financial crisis, few issues receive more attention than central banks’ actions or major macroeconomic announcements in markets. Motivated by this fact, we investigate the impact of specific macro-announcements on liquidity commonality in Turkey. Using a weighted spread constructed by a proprietary database of order flows, we reveal that among several developed countries, only U.S. monetary policy and macroeconomic announcements raise commonality in liquidity. Moreover, commonality is significantly affected (increased) only beyond the best price quotes, showing that researchers may obtain misleading results on commonality if they consider spread at the best price levels as a liquidity proxy.

Keywords: Commonality in liquidity, order book, monetary policy, macroeconomic announcements, market microstructure

JEL: D23, D82, G11, G12

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1 Introduction

With the improving technology and the increasing global interconnectedness in the last few decades, market participants have started to pay considerable attention to the concept of liquidity in financial markets. However, even though it has been realized that liquidity is an essential factor in the proper functioning of markets, less than enough effort was paid to studying and understanding different aspects of it before the global financial crisis of 2008.

Among these efforts, a specific group of studies has revealed a crucial property of liquidity: Accordingly, liquidity tends to co-move across different stocks, instead of being an individual feature of each security (Chordia et al., 2000; Huberman and Halka, 2001; Hasbrouck and Seppi, 2001). This implies the existence of a significant common component that influences firm-level liquidity; i.e., liquidity is subject to a spillover effect that influences other firms traded in the same stock exchange. In such an environment, it is crucial to understand this commonality effect and its main determinants in order to construct solid investment strategies and design robust securities market regulations. However, although the commonality literature is exhaustive for developed markets (Pastor and Stambaugh, 2003; Acharya and Pedersen, 2005; Sadka, 2006; Bekaert et al., 2007; Korajczyk and Sadka, 2008; Kamara et al., 2008), little research has been conducted on emerging ones (Brockman et al., 2009; Karolyi et al., 2012).

In this study, we focus on a specific potential source of commonality in liquidity, namely, monetary policy and macroeconomic announcements, in a leading emerging market, Turkey. In the literature, a limited line of research points at the monetary policy and the macroeconomic announcements as reasonable sources of the commonality in liquidity. For example, Chordia et al. (2001, 2005) find evidence for U.S. macroeconomic announcements and monetary policy giving rise to liquid-
ity commonality in the U.S. stock market. Similarly, Brockman et al. (2009) show that domestic and also U.S. macroeconomic announcements increase commonality in both developed and emerging stock markets. These studies were performed prior to the recent global financial crisis, and special attention is required to the subject now more than ever. In particular, the quantitative easing policies that have been launched by the Federal Reserve (Fed), and the expansionary monetary policies implemented in other major currency areas like eurozone and Japan affected all the markets around the world. Combined with the low yields in developed countries’ bond markets, excess liquidity environment has generated high capital inflows to emerging markets, leading to new financial structures. In the present case, few financial issues receive more attention in the press than macroeconomic announcements, central banks’ actions or what their governors say or might say about the economy, interest rates or the markets. Motivated by these facts, we investigate the impact of specific monetary policy decisions and macroeconomic announcements on the liquidity commonality in Borsa Istanbul, the stock exchange of Turkey.

With 237 USD bn. market capitalization and 431 USD bn. traded value at the end of 2013, equity market of Borsa Istanbul is ranked 6th in traded value among all emerging markets in the world. Moreover, it is ranked 3rd in the whole world with a share turnover velocity of 192.3% in the same year. These statistics show that there is a high level of trading activity at a global scale in Borsa Istanbul, and the fact that foreign ownership accounts for more than 60% of the free-float value in the last four years makes this study even more important, not only for domestic investors but also for foreign market participants.

Being one of the few studies on the commonality in liquidity in an emerging market, our work differs from the others in important perspectives. In most of the studies in the literature, the liquidity measures are based on the best bid and ask
quotes, such as the quoted or effective spread. The main problem with the best quotes is that when investors have large positions to trade, their orders will extend beyond best prices. Therefore, commonality beyond the best prices is a potential concern especially to any institutional investor that rebalances large positions across many stocks as the execution risk may be non-diversifiable.

Regarding emerging markets, the situation gets more problematic when best bid and ask quotes are used. Jain (2003) shows that larger and more developed stock markets tend to have lower relative tick sizes (absolute tick size divided by price) than smaller and less developed markets. If the tick size in a stock market is larger than it should be, then a possible outcome is that bid-ask spreads always stick to one tick. In that case, two stocks with different order book characteristics may seem very similar in terms of liquidity when one considers the absolute or the relative spreads only at the best price levels, yielding to possible misleading results on the level of systemic liquidity risk. In fact, size of the best bid-ask spread is one tick more than 98% of the time in this study; however, cost of trading significantly differs when we walk up the order book.

In our work, by using full order flow data of each stock, we construct a special weighted spread that measures the cost of round trip (buying and selling simultaneously) for a given amount of position. By using different positions to trade, we look for the effect of monetary policy and macroeconomic announcements on commonality in liquidity at the different levels of the order book. As a check for robustness, we also consider the commonality of buy and sell sides separately.

We reveal that among several developed countries, only U.S. monetary policy and macroeconomic announcements raise commonality in liquidity, suggesting that investors in Turkey are highly sensitive, not to the domestic economy or other developed economies, but only to the U.S. economy. Moreover, this significance is robust
with respect to the different sides of the order book. Interestingly, commonality is significantly affected (increased) only beyond the best price levels, showing that large tick sizes in emerging markets can lead to misleading results on commonality in liquidity if one considers spread at the best price levels as a liquidity proxy.

In the rest of this work, we introduce our liquidity measure and our sample selection methodology in Section 2. Section 3 contains the main empirical tests. Section 4 provides a small discussion on the sample period and the results of the previous studies. Finally, Section 5 concludes the paper with a brief summary.

2 Liquidity measure and sample selection

As a liquidity proxy, we use the Xetra Liquidity Measure (XLM) introduced by Deutsche Borse which measures the cost of trading for a given position size \( Q \) (money) at a specific time \( t \).\footnote{The same measure was previously used by Domowitz et al. (2005) and Rosch and Kaserer (2014) in the context of liquidity commonality.}

Consider the snapshot of the order book of a stock at time \( t \). Let \( a_i \) and \( b_i \) be the \( i^{th} \) best ask and bid prices respectively at that instant. Denote by \( P_{mid} \equiv (a_1 + b_1)/2 \) the mid price of \( a_1 \) and \( b_1 \) (so called fair price); \( LP \equiv (a_1 - b_1)/2P_{mid} \) the half of the bid-ask spread (so-called liquidity premium); \( b(n) = (\sum b_i n_i)/n \) where \( \sum n_i = n \), the weighted average bid-price at which the total of \( n \) shares can be sold; \( a(n) = (\sum a_i n_i)/n \) where \( \sum n_i = n \), the weighted average ask-price; \( AP_{bid}(Q) \equiv (b(1) - b(n))/P_{mid} \), where \( P_{mid} \times n = Q \) the size of the position in TL called the adverse price movement for the bid side; similarly \( AP_{ask}(Q) \equiv (a(1) - a(n))/P_{mid} \), called the adverse price movement for the ask side. Then, the liquidity measures
are calculated as the following;

\[ XLM_A(Q) = 100 \times (LP + APM_{ask}(Q)) \]
\[ XLM_B(Q) = 100 \times (LP + APM_{bid}(Q)) \]
\[ XLM_{RT}(Q) = XLM_A(Q) + XLM_B(Q) \]

where \( XLM_A(Q) \) (\( XLM_B(Q) \)) is the execution cost for ask (bid) side; i.e., buy (sell) order for a given position \( Q \), measured in points, and \( XLM_{RT}(Q) \) denotes the cost of round trip. For example, \( XLM_{RT}(25000) = 0.2 \) means that implicit cost for buying and selling a specific stock using a position of 25000 TL would have amounted to 50 TL.

Our sample period covers all orders coming to the stock exchange from January 4, 2010 to December 31, 2013.\(^2\) The main requirement of the \( XLM \) methodology is that a stock should be traded via continuous auction, therefore, we remove the stocks traded via single price auction from our sample. We only use the continuous trading period on each trading day, and take six snapshots of the order book of each stock at 10:00, 11:00, 12:00, 15:00, 16:00 and 17:00, and calculate the \( XLM \) (ask, bid and round trip) for five different position sizes of \( Q = 1000, 10000, 25000, 50000, 100000 \) TL. As we do not want to be affected by any initial public offering or delisting effect, we consider the stocks listed on the stock exchange during the whole sample period. The last criterion to be introduced is based on the position availability as it is not always possible to find a hypothetical order of size \( Q \), in particular when \( Q \) is large. Accordingly, we remove the stocks if the order book

\(^2\)Luckily, Borsa Istanbul uses the same trading technology since the 1990’s, and only the trading hours were extended in the sample period. Therefore we don’t have to take changes in rules or trading engine into account. For a discussion on how technology effects liquidity in financial markets, see Yilmaz et al. (2015).
does not carry the required positions more than 2\% of the whole sample period. This criterion leaves us 133 stocks to analyze. For these stocks, in times the order book does not carry the required position, a hypothetical order book is constructed as if there were infinite orders at the last price levels in the order book. Since at least one bid and ask were present all the time, such a construction was not a problem. Finally, the daily liquidity measure for a stock is constructed by taking the arithmetic mean of the corresponding six intraday values.\(^3\)

Through the rest of this study, we denote $XLM_A$, $XLM_B$ and $XLM_{RT}$ by $A$, $B$ and $RT$ to simplify notations, and we will use $Q_1, Q_2, Q_3, Q_4, Q_5$ to denote the position sizes $Q = 1000, 10000, 25000, 50000, 100000$ TL respectively. For example, $Q_1.A$, $Q_3.RT$ and $Q_4.B$ would mean $XLM_A(1000)$, $XLM_{RT}(25000)$ and $XLM_B(50000)$ respectively. Overall, we have fifteen different daily liquidity measures per stock.

3 Results

We begin with analyzing the effects of (scheduled and unscheduled) monetary policy committee meetings, therefore interest rate announcements by selected central banks. The list naturally includes the Central Bank of the Republic of Turkey (CBRT), the Fed and the European Central Bank (ECB). In addition, the Bank of Japan (BOJ) and the Swiss National Bank (SNB) are included since their currencies are always considered as safe haven, thus, their decisions may have significant impact on the global capital flight structure. Finally, we consider the Bank of England (BOE) since U.K. based investors are ranked first in aggregate foreign trades, and

\(^3\)The choice of the calculation frequency solely depends on the computational burden. For randomly selected five stocks, the measure was also calculated at fifteen minutes intervals. The daily averages were the same to the second decimal point.
ranked second in aggregate foreign ownership in Borsa Istanbul.

In our sample period, there were 32, 48, 48, 57, 17 and 49 number of monetary policy committee meetings by the Fed, ECB, BOE, BOJ, SNB and CBRT respectively. As in the cases of Chordia et al. (2001) and Brockman et al. (2009), we use a three-day event window (2,-1,0) to measure the liquidity impact of the announcement in order to capture pre-announcement portfolio rebalancing. Similar to Brockman et al. (2009), we employ the “simple and direct measure of synchronicity” of Morck et al. (2000). In particular, we measure the co-movement of liquidity for each trading day by first counting the number of stocks with positive and negative changes in their daily liquidity measure and then dividing the larger of these two numbers by their total. Then, we average daily co-movement percentages first across all trading days (first column, Panel A of Table 1), then across only those trading days in event window (columns 2-7, Panel A of Table 1). The mean comparison of the whole sample and the event window is based on a one-tail, two-sample t-test for differences in means. Further, the t-statistics are corrected for unequal variances whenever appropriate using the Satterthwaite (1941) approximation. Panel A of Table 1 reports the summary results for the responses of liquidity co-movements to interest rate announcements.

Interestingly, the results in Panel A of Table 1 show that the interest rate announcements do not significantly increase liquidity co-movements at the best price.

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4Fed meetings occur between 19:30 and 21:30 in Turkey’s local timezone. Therefore, the event day for a Fed meeting is taken as the next day of the original meeting day. The event window was alternatively selected as (-3,-2-1,0); (-1,0); (0); (-1,0,1) and (0,1). Although the results do not differ much, the clearest picture was observed in the original choice.
levels. In fact when $Q_1$ is the position size to trade, liquidity co-movements in event window are not even higher than the sample average except on the announcement dates by Fed and the ECB. The most probable reason for this situation is the fact that bid-ask spreads stick to one tick in Borsa Istanbul for most of the time. However, the difference comes up as we walk up the order book; i.e., interest rate announcements by Fed significantly increase co-movements between cost of trading the positions $Q_2$, $Q_3$, $Q_4$ and $Q_5$. This picture shows that a liquidity analysis based on best prices can be misleading, and also suggests that tick sizes in Borsa Istanbul are larger than they should be since they do not allow the information to be reflected at best price quotes.

A curious case is that the interest rate announcements by the Turkey’s own central bank do not have a significant impact on liquidity commonality at any level in the order book. Moreover, the difference between the impact powers of Fed and the other central banks shows the increased importance of the Fed decisions on investor sentiment after the global financial crisis, and stresses on the potential challenges faced with other central banks when one clearly dominates the others.

The results on Fed’s and ECB’s interest rate announcements motivate us further to analyze the impact of macroeconomic news on commonality in liquidity. This time we focus on unemployment (UN), gross domestic product (GDP) and inflation (INF) announcements of Turkey, U.S. and eurozone. During the sample period, there were 48 unemployment, 16 GDP and 48 inflation announcements for each of these countries/region, and Panel B of Table 1 shows that the qualitative results are very similar to the interest rate announcements. For example, although the liquidity

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5 U.S. announces 3 different GDP values in each of the 3 months following the past quarter, where the second and third month announcements are the revisions of the announced value in the first month. A similar situation also exists in the eurozone. In this case, we only consider the first announcements.
co-movement on these announcement dates is larger than whole sample average at
best price levels, none of these differences are significant. This further strengthens
our claim on tick sizes being larger than they should be. As we walk up the order
book, only U.S. GDP announcements create a consistent positive significant impact
on liquidity commonality (for position sizes Q2, Q3 and Q4 to trade). So we see
that not only Turkey’s own interest rate announcements, but also disclosure of its
other major macroeconomic variables does not make a significant impact on the
commonality in liquidity.

Overall, the results show that among several domestic and global macroeconomic
variables, liquidity commonality in Borsa Istanbul is significantly affected only by the
interest rate decisions and GDP announcements of U.S.; suggesting that investors
in this market are highly sensitive, not to the Turkish economy or other developed
economies, but only to the U.S. economy. Moreover, this significance is robust with
respect to different sides of the order book according to Table 1. In addition, since
the significance is only observed beyond the best price levels, we can suspect that
large tick sizes can lead to misleading results on commonality in liquidity in emerging
markets if one considers spreads at the best price levels as a liquidity measure.

4 Discussion

4.1 Sample period and sample size

Due to the period that the data covers, this study can only focus on the new normal
period which is characterized by the quantitative easing policies and financial crisis
effects, which disables us to know which factors (related to developed countries’
macro news and monetary policies) drive the significant changes in commonality
in liquidity during normal times. On the other hand, when the order book data
is involved, the leading studies (Domowitz et al., 2005; Kempf and Mayston, 2008; Corwin and Lipson, 2011) use only one year of data or less to examine commonality in liquidity (but not the effects of macro news and/or monetary policy announcements); whereas, our sample covers four years of data. Moreover, these studies cover 19, 30 and 100 stocks respectively, while this study analyzes 133 stocks, which makes it a study with one of the largest sample size in the literature.

4.2 Comparing with previous studies

As we mentioned in Section 1, the number of studies on the effects of macro news and monetary policy decisions on commonality in liquidity is very limited. The previous works by Chordia et al. (2001, 2005) and Brockman et al. (2009) use quoted spread (and percentage quoted spread), effective spread (and percentage effective spread), and depth (and USD depth) at best prices.\(^6\)

The importance of our study arises at this point: According to our analysis, the spreads at best prices stick to one tick more than 98% of the time in our sample. Therefore, if we were to use quoted or effective spread as a liquidity measure, then we would have the same value for an individual stock whenever we measure liquidity. In that case, there would not be a change in the degree of commonality.

On the other hand, if we were to use percentage quoted or percentage effective spread, then since the spread at best prices stick to one tick most of the time in our sample, we would be mostly measuring the commonality in the \(1/(\text{mid-price})\), instead of the commonality in liquidity. In fact, the smallest amount \(Q_1\), which is 1000 TL in our measure, corresponds to less than 400 USD according to the parity during the sample period, and this amount of money can be found at best

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\(^6\)The issue of how to measure liquidity has been discussed in a number of prior papers. For example, see Sarr and Lybek (2002); Spiegel (2008).
price levels most of the time for any stock in our sample. Therefore, our measure $XLM(1000)$ actually works almost as a percentage quoted or percentage effective spread in this case. Now, if we look at the results in Table 1, no macro news or monetary policy decisions seem to have an impact if we use $XLM(1000)$ to measure liquidity, which would be misleading considering the results on the commonality in liquidity deep down the order book. In fact, Brockman et al. (2009) state that there are some emerging countries that macroeconomic news do not have an impact on commonality in liquidity. They don’t give specific names, but one of these countries could be Turkey. In this case, the contradiction between our results and theirs would emphasize the significance of our study and the importance of liquidity beyond the best prices.

Regarding the dimension of depth, our measure covers it and more as we are able to consider the depth not only at the best prices but also the depth throughout the whole order book.

5 Conclusion

In this study, we investigate the effects of monetary policy and macroeconomic announcements on the liquidity commonality in an emerging market. In doing that, we use a special weighted spread that measures the cost of trading for a given amount of position that lets us to analyze commonality in liquidity at different levels of the order book.

We reveal that among several domestic and global macroeconomic variables, liquidity commonality is significantly affected (increased) only by the interest rate decisions and GDP announcements of U.S.; suggesting that investors in the sample market are highly sensitive, not to the domestic economy or other developed economies, but only to the U.S. economy. This difference shows the increased im-
portance of the Fed decisions on investor sentiment after the global financial crisis, and stresses on the potential challenges faced with other central banks when one clearly dominates the others.

From the upside, even the large institutional traders in Turkey are not prone to systemic liquidity risk during the monetary policy and major macroeconomic announcements except a few specific cases. On the other hand, the significant increase in commonality due to the announcements is found only beyond the best price levels which would probably lead to underestimating the level of systemic liquidity risk for large portfolio rebalances during the major U.S. announcements if only best quotes were used.

A by-product of our analysis is that the size of the best bid-ask spread is one price tick for almost all the time, however, cost of trading significantly differs as we walk up the order book. Combining this with the above-mentioned results suggests that tick sizes in sample period are larger than they should be since they do not allow the information to be reflected at the best price quotes. Large tick size is a common feature in emerging markets, therefore researchers should carefully interpret their results on liquidity commonality if they consider spreads at the best price levels as a liquidity proxy in emerging markets.

References


respectively. stand for the cost of buying (ask side), selling (bid side) and round tripping (buying and selling simultaneously) a given amount of position $Q_t$ at the 10% and 5% confidence levels, respectively, in a one-tail, two sample trading days and across days with the abovementioned macro-announcements. Here, *, and ** cells indicate that the test statistic is significant then dividing the larger of these two numbers by their total. Then, for each liquidity measure, the co-movement measure is averaged across all

Macroeconomic news releases are obtained from Bloomberg. The co-movement measure is computed for each trading day by first counting the announcements, a three-day event window is used covering Day 2 to Day 0, where Day 0 is the day on which the macroeconomic release is made.

Table 1

PANEL A: Commonality and monetary policy committee meetings

<table>
<thead>
<tr>
<th>Whole sample</th>
<th>Fed</th>
<th>ECB</th>
<th>BOE</th>
<th>BOJ</th>
<th>SNB</th>
<th>CBRT</th>
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</thead>
<tbody>
<tr>
<td>$Q_{1,A}$</td>
<td>67.63%</td>
<td>69.05%</td>
<td>68.00%</td>
<td>67.05%</td>
<td>66.64%</td>
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<td>$Q_{1,B}$</td>
<td>67.27%</td>
<td>68.69%</td>
<td>67.56%</td>
<td>66.64%</td>
<td>66.22%</td>
<td>66.95%</td>
</tr>
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<td>$Q_{2,A}$</td>
<td>64.73%</td>
<td>66.00%*</td>
<td>65.45%</td>
<td>64.58%</td>
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<td>64.16%</td>
<td>66.18%**</td>
<td>63.85%</td>
<td>63.22%</td>
<td>63.51%</td>
<td>63.54%</td>
</tr>
<tr>
<td>$Q_{2,RT}$</td>
<td>63.78%</td>
<td>65.55%**</td>
<td>63.76%</td>
<td>63.08%</td>
<td>62.98%</td>
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<tr>
<td>$Q_{3,A}$</td>
<td>63.62%</td>
<td>65.01%*</td>
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<td>64.90%**</td>
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<td>64.94%*</td>
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<td>63.26%</td>
<td>64.87%*</td>
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<td>64.87%**</td>
<td>62.14%</td>
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<td>65.30%*</td>
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<td>65.01%**</td>
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<td>64.00%**</td>
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PANEL B: Commonality and macroeconomic announcements

<table>
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<th>Whole sample</th>
<th>Turkey</th>
<th>U.S.</th>
<th>Eurozone</th>
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<tr>
<td>$Q_{1,A}$</td>
<td>Unemployment 67.67%</td>
<td>GDP 68.65%</td>
<td>Inflation 68.86%</td>
</tr>
<tr>
<td>$Q_{1,B}$</td>
<td>Unemployment 67.73%</td>
<td>GDP 68.86%</td>
<td>Inflation 66.96%</td>
</tr>
<tr>
<td>$Q_{1,RT}$</td>
<td>Unemployment 67.16%</td>
<td>GDP 68.34%</td>
<td>Inflation 66.60%</td>
</tr>
<tr>
<td>$Q_{2,A}$</td>
<td>Unemployment 64.97%</td>
<td>GDP 66.70%*</td>
<td>Inflation 64.88%</td>
</tr>
<tr>
<td>$Q_{2,B}$</td>
<td>Unemployment 64.07%</td>
<td>GDP 66.25%*</td>
<td>Inflation 63.69%</td>
</tr>
<tr>
<td>$Q_{2,RT}$</td>
<td>Unemployment 63.40%</td>
<td>GDP 65.80%*</td>
<td>Inflation 63.50%</td>
</tr>
<tr>
<td>$Q_{3,A}$</td>
<td>Unemployment 63.52%</td>
<td>GDP 66.03%*</td>
<td>Inflation 63.49%</td>
</tr>
<tr>
<td>$Q_{3,B}$</td>
<td>Unemployment 62.97%</td>
<td>GDP 65.10%*</td>
<td>Inflation 62.92%</td>
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<tr>
<td>$Q_{3,RT}$</td>
<td>Unemployment 62.66%</td>
<td>GDP 65.43%*</td>
<td>Inflation 62.88%</td>
</tr>
<tr>
<td>$Q_{4,A}$</td>
<td>Unemployment 62.89%</td>
<td>GDP 64.98%*</td>
<td>Inflation 62.65%</td>
</tr>
<tr>
<td>$Q_{4,B}$</td>
<td>Unemployment 62.24%</td>
<td>GDP 64.75%*</td>
<td>Inflation 62.33%</td>
</tr>
<tr>
<td>$Q_{4,RT}$</td>
<td>Unemployment 62.32%</td>
<td>GDP 65.95%*</td>
<td>Inflation 62.85%</td>
</tr>
<tr>
<td>$Q_{5,A}$</td>
<td>Unemployment 62.60%</td>
<td>GDP 64.95%</td>
<td>Inflation 62.62%</td>
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<td>Unemployment 61.07%</td>
<td>GDP 63.84%</td>
<td>Inflation 62.00%</td>
</tr>
<tr>
<td>$Q_{5,RT}$</td>
<td>Unemployment 62.55%</td>
<td>GDP 65.60%</td>
<td>Inflation 63.17%</td>
</tr>
</tbody>
</table>

The columns show the liquidity co-movement measure averaged across all trading days over the whole sample period and across event days on which four separate types of macroeconomic news are released: Panel A reports the results for interest rate settings of U.S. Federal Reserve (Fed), European Central Bank (ECB), Bank of England (BOE), Bank of Japan (BOJ), Swiss National Bank (SNB) and the Central Bank of the Republic of Turkey (CBRT).

Panel B reports the results for the release of unemployment, GDP and inflation data of U.S., Turkey and eurozone. To capture the effects of the announcements, a three-day event window is used covering Day 2 to Day 0, where Day 0 is the day on which the macroeconomic release is made. Macroeconomic news releases are obtained from Bloomberg. The co-movement measure is computed for each trading day by first counting the number of firms with positive change in the daily liquidity measure and the number of firms with negative change in the daily liquidity measure, then dividing the larger of these two numbers by their total. Then, for each liquidity measure, the co-movement measure is averaged across all trading days and across days with the abovementioned macro-announcements. Here, *, and ** cells indicate that the test statistic is significant at the 10% and 5% confidence levels, respectively, in a one-tail, two sample t-test for difference in means between the average of the co-movement measure on macro event days and the unconditional sample average. The t-statistics are corrected for unequal variances whenever appropriate using the Satterthwaite approximation.

$Q_1$, $Q_2$, $Q_3$, $Q_4$ and $Q_5$ refer to the amounts of 1000, 10000, 25000, 50000 and 100000 TL respectively, whereas the liquidity measures $A$, $B$ and $RT$ stand for the cost of buying (ask side), selling (bid side) and round tripping (buying and selling simultaneously) a given amount of position respectively.