The Effect of Investor Sentiment toward an Exchange Merger on Liquidity*

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Abstract

This study investigates the relationships among an exchange merger, investor sentiment, and liquidity by analyzing data from the 2013 merger of the Tokyo Stock Exchange and Osaka Securities Exchange. In contrast to prior studies, this study considers the investor sentiment effect of the merger. Synergy and the investor sentiment effect occur in the short run with liquidity increases. The investor sentiment effect occurs more strongly in small stocks.

JEL classification: G40, G10, G19

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1 Introduction

Do exchange mergers increase liquidity because of investor sentiment? Investor sentiment is defined as optimism or pessimism about the future stock market (Baker and Wurgler, 2006). Exchange mergers have recently increased because of competition among exchanges. For example, there have been mergers involving the JPX, Euronext, OMX, NYSE-Euronext, and NASDAQ-OMX. There are various benefits from mergers. Exchange companies expect cost reductions, economies of scope, and increased market share. Regarding investors, it is said that an increase of liquidity. Illiquid stocks demand higher returns (Amihud and Mendelson, 1986). If liquidity is greater, investors can more rapidly buy or sell stocks, and listed companies expect to improve their ease of financing owing to increased liquidity. In contrast, regulatory authorities are concerned about market power arising from exchange mergers, because exchange companies may behave as monopolies, raising transaction costs. Therefore, there are many areas of interest in such an analysis, comprising both economic and regulatory issues that affect investors, listed companies, financial intermediaries, and the overall economy (Nielsson, 2009). However, little is known about the relationship between stock exchange mergers and liquidity.

This study considers two processes that increase liquidity. The first is synergy; cost reductions, economies of scope, economies of scale, and increased market share are examples of synergy. Although Arnold et al. (1999) find that exchange mergers increase liquidity and Nielsson (2009) shows that exchange mergers increase the liquidity of large firms and firms with foreign sales, prior studies suggest that there are various factors that increase liquidity from mergers. This study assumes that economies of scale and network externalities induce greater liquidity through lower transaction costs. The second process that increases liquidity is the investor sentiment effect. Previous studies do not consider the investor sentiment effect. However, this effect is important, because if investors believe that an exchange merger is a positive phenomenon, then liquidity will increase.

Most studies have analyzed exchange mergers in Europe. These analyses involve increases in the potential investor base due to cross-border mergers. Furthermore, the prior literature does not consider market structure, such as the trading system, tick size, and index demand, or the reputation effects from large exchange movements. Index demand and reputation effects increase liquidity. This study uses the events that occurred during the merger between the Tokyo Stock Exchange (TSE) and the Osaka Securities Exchange (OSE) for its analysis; therefore,This case study can exclude the increase in the potential investor base due to the cross-border nature of the merger. Moreover, this study uses firm data that exclude double listings on the OSE and TSE. The firm data can be considered in the market structure and can exclude the TSE's reputation effects and index demand, which affect liquidity.

The main result is that synergy and the investor sentiment effect resulting from mergers occur in the short run with liquidity increases. In particular, the investor sentiment effect occurs more strongly in small stocks. Exchange mergers do not necessarily increase liquidity in the long run.

The rest of the paper is organized as follows. Section 2 presents related literature and hypotheses development. Section 3 describes the data and method, and Section 4 presents the estimation results. Section 5 concludes.

2 Related Literature

Nielsson (2009) investigates Euronext stock exchange mergers and liquidity. She finds that liquidity increases among large firms and firms with foreign sales. Three reasons that liquidity increases are that each individual firm faces a larger pool of potential investors, and the market may deepen and lower transaction costs, since stock exchange mergers are likely to lead to increased liquidity. Arnold et al. (1999) find that US regional stock exchange mergers lead to liquidity increases that result from economies of scale. Considering the Euronext merger, Pagano and Padilla (2005) find that liquidity increases because of cost synergies.

3 Hypotheses

According to Black (1986), as noise trading increases, so does market liquidity. With regard to the relationship between liquidity and investor sentiment, Baker and Stein (2004) suggest that in a market with short sales constraints, liquidity can be a sentiment indicator. High liquidity is a sign that the sentiment of noise investors is positive, and is a symptom of overvaluation. De Long et al. (1990) imply that high investor sentiment generates high liquidity. Liu's (2015) empirical analysis indicates that high investor sentiment increases liquidity. In summary, higher investor sentiment generates more noise trading, which in turn increases liquidity.

In psychological analysis, mood most strongly affects judgments about which people lack concrete information (Forgas, 1995). People who are in good moods tend to find positive material more available or salient (Isen et al., 1978), and engage in more use of simplifying heuristics to aid their decisions (Bless et al., 1996). Thus, this study assumes that exchange mergers are a positive phenomenon.

Hypothesis A: Liquidity increases owing to cost synergy.

Hypothesis B: If noise traders believe that merger events are a positive phenomenon, then liquidity increases because of the high investor sentiment.

Hypothesis C: If individual investors are noise traders, they buy small stocks, and the investor sentiment effect occurs more strongly in small stocks.

4 Data and Method

4.1 Data

The TSE announced its merger with the OSE on November 22, 2011. The Japan Exchange Group (JPX) was inaugurated on January 1, 2013, and the stock exchanges were integrated on July 16, 2013. This study uses daily data on common stocks of the TSE, excluding those double listed on the OSE, from July 1, 2010, to June 30, 2016; the data are provided by Nikkei NEEDS Financial QUEST (FQ). As mentioned above, this case study can exclude the increase in the potential investor base due to the cross-border nature of the merger. Moreover, the firm data can be considered in the market structure and can exclude the TSE's reputation effects and index demand, which affect liquidity.

4.2 Method

Like Baker and Wurgler (2006), this study creates an investor sentiment index. Instead of closed-end funds, this study considers exchange-traded funds (ETFs). ETFs are the average difference between the ETFs of the Tokyo Stock Price Index (TOPIX) type and the TOPIX provided by FQ. The initial public offering (IPO) market is often viewed as responsive to sentiment (Baker and Wurgler, 2006). IPO data are provided by each exchange company[1]. This study takes the number of IPOs, NIPOs, and VIX as measures of investor sentiment (Baker and Wurgler, 2007). This study also uses the Nikkei Stock Average Volatility Index and PBR provided by the FQ; PBR is viewed as responsive to sentiment (Li et al., 2016).

The first principal component of the four proxies is estimated.

$$SENTIMENT_t = 0.6768ETF_t + 0.6174NIPO_t + 0.3117VIX_t + 0.2522PBR_t$$

Fixed-effects regression is used to analyze the merger effect.

$$Y_{it} = \alpha + \beta_1 EVENT_{it} + \beta_2 SENTIMENT_{it} + \beta_3 Z_{it} + \eta_i + \lambda_t + \varepsilon$$

where Y_{it} indicates liquidity, which is turnover or ILLIQ. $EVENT_{it}$ is a dummy variable that indicates the merger event. Z_{it} denotes other control variables. The daily price index is unrelated to the merger but may influence liquidity. There is typically more stock market activity in economic upturns. Daily price index data are provided by NOWCAST. η_i and λ_t denote fixed effects and daily fixed effects.

[1]In particular, IPO data are provided by the JPX, Nagoya Stock Exchange, Fukuoka Stock Exchange, and Sapporo Securities Exchange.

5 Estimation Results

Table 1 presents the estimation results for turnover, which is defined as the number of shares traded relative to the number of outstanding shares. Event 1 indicates the day that the TSE announced its merger with the OSE. The coefficient of Event 1 is significantly positive, which implies that liquidity increases because of the announcement effect. Event 2 indicates the day that the JPX executed the stock exchange integration. The coefficient of Event 2 is significantly positive, which suggests that liquidity increases due to synergy. However, the coefficient of Event 3 is significantly negative. Event 3 is a dummy that takes a value of 1 for the year after the merger. Liquidity decreases the year after the merger. The coefficient of sentiment is significantly positive, indicating that investor sentiment increases liquidity. This suggests that synergy and investor sentiment occur in the short run, and liquidity decreases one year after the merger. Thus, hypotheses A and B of this study are supported. Surprisingly, the coefficient of the price index is significantly negative.

Retail (small) trade imbalances move stock prices and forecast future returns, suggesting that retail trade moves markets. Retail (individual) investor trades are most likely to be especially influential among small stocks (Barber et al., 2009). Thus, to investigate liquidity, this study investigates the market of small stocks. MOTHERS (markets of the high-growth and emerging stocks) have many small stocks.

Table 2 show the estimation results of the turnover of MOTHERS. The coefficient of Event 1 is significantly positive, implying that liquidity increases due to the announcement effect. The coefficient of Event 2 is significantly positive. This suggests that liquidity increases due to synergy. However, the coefficient of Event 3 is negative, although it is not significant. Liquidity decreases after one year. This implies that synergy and investor sentiment occur in the short run, and liquidity decreases one year after the merger. The coefficient of the price index is significantly negative, while the coefficient of sentiment is significantly positive. Investor sentiment increases liquidity. Moreover, the coefficient of sentiment in Table 2 is larger than the coefficient of sentiment in Table 1. This suggests that investor sentiment occurs more strongly among small stocks, which are more likely to be traded by individual investors. Thus, hypothesis C of this study is supported.

As a robustness check, this study uses the ILLIQ illiquidity indicator (Amihud, 2002). This is a daily absolute return to the yen trading volume on the day. ILLIQ is defined as follows.

$$ILLIQ_t = Average\left(\frac{|r_t|}{Volume_t}\right)$$

Table 3 shows the estimation results of ILLIQ. The coefficient of Event 1 is significantly negative, which implies that liquidity increases due to the announcement effect. The coefficient of Event 2 is significantly negative, indicating that liquidity

increases due to synergy. However, the coefficient of Event 3 is significantly positive; liquidity decreases after one year. The coefficient of sentiment is significantly negative, which means that investor sentiment raises liquidity. These results suggest that synergy and investor sentiment occur in the short run, and liquidity decreases one year after the merger.

Table 4 presents the estimation results of taking the log of turnover and sentiment. The events show similar results as those in Table 1. The coefficient of Log sentiment is significantly positive, which suggests sentiment increases liquidity.

For a further robustness check, this study uses sentimet2, which excludes VIX, because high VIX equates to high turnover. The first principal component of the three proxies is estimated.

$$SENTIMENT2_t = 0.7015ETF_t + 0.6442NIPO_t + 0.3048PBR_t$$

Table 5 shows the estimation results of turnover in Sentimet2. The coefficient of Event 1 is significantly positive, implying that liquidity increases due to the announcement effect. The coefficient of Event 2 is significantly positive. This suggests that liquidity increases due to synergy. However, the coefficient of Event 3 is significantly negative, and liquidity decreases after one year. This implies that synergy and investor sentiment occur in the short run, and liquidity decreases one year after the merger. The coefficient of the price index is significantly negative. The coefficient of VIX is significantly positive, while the coefficient of sentiment is significantly positive, and. Investor sentiment increases liquidity.

To confirm endogeneity, the lag of sentiment is used. Table 6 shows the estimation results using the lag of sentiment. The events show similar results as those in Table 1. The coefficient of Sentimentlag is significantly positive, which suggests sentiment increases liquidity.

Table 7 shows the estimation results of turnover in each of the variables. The events show similar results as those in Table 1. The coefficients of ETF, NIPO, VIX, and PBR are significantly positive. These values suggest each variable increases liquidity.

6 Conclusion

This study investigates the relationships among an exchange merger, investor sentiment, and liquidity by analyzing data from the 2013 merger of the TSE and OSE. In contrast to prior studies, this study considers the investor sentiment effect due to an exchange merger. Synergy and the investor sentiment effect occur in the short run with liquidity increases. The investor sentiment effect occurs more strongly in small stocks. An exchange merger does not necessarily increase liquidity in the long run. Regulatory authorities should carefully consider these results when considering mergers. Moreover, exchange companies may mislead investors about liquidity increases over the long term.

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Table 1: Parameter Estimates of Turnover

Event1 ($\times 10^{-1}$)	0.022^{***}	(0.003)
Event2 ($\times 10^{-1}$)	0.028^{***}	(0.004)
Event3 ($\times 10^{-1}$)	-0.007^{*}	(0.004)
Sentiment($\times 10^{-2}$)	0.017^{***}	(0.002)
Price index	-0.116^{***}	(0.012)
Constant ($\times 10^{-1}$)	0.011^{***}	(0.003)
Fixed effect	Yes	
Trend	Yes	
N	$2,895,625$	

Robust standard errors are in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Parameter Estimates of Turnover in MOTHERS

event1	0.007^{***}	(0.002)
event2	0.017^{***}	(0.004)
event3	-0.003	(0.003)
Sentiment ($\times 10^{-2}$)	0.056^{***}	(0.012)
Price index	-0.577^{***}	(0.106)
Constant	0.001	(0.002)
Fixed effect	Yes	
Trend	Yes	
N	$249,003$	

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Parameter Estimates of ILLIQ

Event1 ($\times 10^{-8}$)	-0.095^{***}	(0.034)
Event2 ($\times 10^{-8}$)	-0.236^{***}	(0.020)
Event3 ($\times 10^{-8}$)	0.063^{***}	(0.013)
Sentiment ($\times 10^{-8}$)	-0.002^{**}	(0.001)
Price index($\times 10^{-8}$)	8.710^{***}	(0.744)
Constant ($\times 10^{-8}$)	0.970^{***}	(0.050)
Fixed effect	Yes	
Trend	Yes	
N	$2,822,752$	

Robust standard errors are in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Parameter Estimates of Log Turnover

Event1($\times 10^{-1}$)	0.012^{***}	(0.002)
Event2 ($\times 10^{-1}$)	0.018^{***}	(0.003)
Event3 ($\times 10^{-1}$)	-0.007^{**}	(0.003)
Log sentiment($\times 10^{-1}$)	0.034^{***}	(0.003)
Price index	-0.095^{***}	(0.009)
Constant	-0.005^{***}	(0.001)
Fixed effect	Yes	
Trend	Yes	
N	$2,895,625$	

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Parameter Estimates of Turnover in Sentimet2

Event1 ($\times 10^{-1}$)	0.022^{***}	(0.003)
Event2 ($\times 10^{-1}$)	0.027^{***}	(0.004)
Event3 ($\times 10^{-1}$)	-0.008^{**}	(0.004)
Sentiment2 ($\times 10^{-2}$)	0.018^{***}	(0.002)
VIX ($\times 10^{-2}$)	0.004^{***}	(0.001)
Price index	-0.114^{***}	(0.012)
Constant ($\times 10^{-1}$)	0.013^{***}	(0.003)
Fixed effect	Yes	
Trend	Yes	
N	$2,895,625$	

Robust standard errors are in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Parameter Estimates of Turnover in Sentimentlag

Event1 ($\times 10^{-1}$)	0.021^{***}	(0.003)
Event2 ($\times 10^{-1}$)	0.027^{***}	(0.004)
Event3 ($\times 10^{-1}$)	-0.007^{*}	(0.004)
Sentiment lag ($\times 10^{-2}$)	0.016^{***}	(0.002)
Price index	-0.114^{***}	(0.012)
Constant ($\times 10^{-1}$)	0.012^{***}	(0.003)
Fixed effect	Yes	
Trend	Yes	
N	$2,892,887$	

Robust standard errors are in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Parameter Estimates of Turnover in Each Variables

Event1 ($\times 10^{-1}$)	0.015^{***}	(0.002)
Event2 ($\times 10^{-1}$)	0.023^{***}	(0.004)
Event3 ($\times 10^{-1}$)	-0.008^{**}	(0.004)
ETF ($\times 10^{-3}$)	0.022^{***}	(0.007)
NIPO ($\times 10^{-3}$)	0.124^{***}	(0.030)
VIX ($\times 10^{-3}$)	0.032^{***}	(0.008)
PBR ($\times 10^{-3}$)	0.223^{***}	(0.066)
Price index	-0.096^{***}	(0.012)
Constant ($\times 10^{-1}$)	0.017^{***}	(0.003)
N	$2,895,625$	

Robust standard errors are in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$