

Investor Composition and Liquidity: An Analysis of Japanese Stocks

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Abstract

In the late 1990s, the Japanese government initiated a number of reforms that resulted in lower transaction costs and made the Japanese equity market more attractive for foreign institutions. Following these changes, foreign institutional holdings more than doubled, providing an opportunity to study how changes in the composition of investors affect market liquidity. Our analysis of a panel of firm-level ownership data indicates that Japanese stocks that are held more by foreign institutions tend to trade more actively, but are less liquid as measured by their quoted and effective bid-ask spreads, their short-term idiosyncratic volatilities and return reversals. To address endogeneity concerns we use index membership, the number of English news stories about Japanese companies, and their export to sales ratios as instruments for changes in foreign institutional holdings. We find that over the entire sample period, spreads and return reversals decrease less and idiosyncratic volatilities increase more for those stocks with higher foreign holdings.

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1. Introduction

The market microstructure literature explores two separate components that determine the liquidity of financial assets. The first is an adverse selection component, discussed in Glosten and Milgrom (1985) and Kyle (1985), which arises because of asymmetric information. The second is an inventory component, discussed in Stoll (1978) and Grossman and Miller (1988), which arises because market makers are exposed to risk when they make trades that offset the trades of investors who may be demanding liquidity.¹

As we explore in this paper, both components suggest that exogenous changes in the composition of investors can influence the liquidity of equity markets. On one hand, the adverse selection models suggest that the introduction of informed investors will lead market makers to widen bid-ask spreads. On the other hand, the inventory models suggest that the introduction of investors that tend to offset (or trade with) liquidity demanders will reduce (increase) bid-ask spreads.² In addition, the inventory based models predict that the introduction of investors that increase (or decrease) the volatility of the order flow, or equivalently the market makers' inventory, will increase (or decrease) the short-term volatility and negative serial correlation of market prices.³ In contrast, the adverse selection models, which assume that the market makers are risk neutral, predict no such influences on asset price dynamics.

Unfortunately, since we do not generally observe exogenous changes in the composition of investors, testing these predictions raises a number of challenges. In particular, since some investors prefer to hold more liquid securities, the causal relationship between investor composition and bid-ask spreads and short-term volatility can be difficult to unravel.

¹ For an in depth survey of the theoretical liquidity literature, see Vayanos and Wang (2012).

² In models that emphasize inventory costs (Amihud and Mendelson, 1980 and Shen and Starr, 2002), dealers tend to quote wider bid-ask spreads when order imbalances lead to larger absolute values of inventory positions and positive serial correlations in order flows increase the volatility of order imbalances. Choi, Salandro, and Shastri (1988) study how serially correlated order flows influence various empirical measures of liquidity.

³ See also De Long, Shleifer, Summers and Waldman (1990) who argue that institutions, which they describe as positive feedback traders, tend to destabilize markets.

This paper uses changes in the structure of the Japanese market in the late 1990s and early 2000s as a natural experiment that can potentially help us better understand how changes in investor composition can influence the liquidity and price patterns of individual stocks. A number of reforms were implemented over this time period that resulted in lower transaction costs and made the Japanese equity market more attractive for foreign institutions.⁴ As illustrated in Figure 1, the fraction of Japanese equities held by foreign institutions increased more than two-fold, from 11.7% to 27.4% between 1996 and 2007, and then subsequently stabilized.

The aggregate increase in foreign investment, per se, is not important for our identification. The key to our identification strategy is the observation that the growth in foreign ownership was not uniform across stocks. Although some of the variation in the growth of foreign ownership was related to size and other potential proxies for liquidity, there is also variation in the growth of foreign ownership that is plausibly exogenous with respect to operating changes that can influence a stock's liquidity. For example, foreign ownership grew more for the stocks of firms that appear in the English press. By exploiting this exogenous variation, we can test whether the growth in foreign institutions, which exhibit different trading styles and have access to different types of information than the investors they displaced, had a material effect on the liquidity and short-term return patterns of the stocks that they trade.

It is difficult to say whether foreign institutions are more or less informed than Japanese domestic investors. There are clear disadvantages associated with operating in a foreign culture; however, despite the difficulties associated with analyzing foreign companies, there is evidence that some larger foreign institutions may be informed. In fact, Japanese corporate law grants progressively more shareholder rights and potential access to firm-level information to investors with higher levels of shareholdings, providing an information advantage to large foreign institutions, at least relative to Japanese individual investors.⁵ Moreover, Hamao, Kutsuna, and Matos (2010) shows that

⁴ See Section 2.1 for a detailed description of the institutional background in Japan.

⁵ Shareholder rights progressively increase when shareholding ratio exceeds 1% of outstanding shares. For example, with over 3%, the shareholders have the right to request an inspection of books and elect someone to inspect firms' assets.

foreign investors in Japan tend to be associated with future shareholder activist events, which is consistent with these investors acquiring special information.

While we are agnostic about the relation between foreign institutions and the information environment,⁶ there are observable characteristics of the foreign institutions' trading styles that are also relevant. The first is that unlike domestic Japanese institutions, such as banks and business corporations who buy and hold equities for strategic purposes, foreign institutions in Japan tend to be active investors who frequently turn over their portfolios. Indeed, as we will be discussing later, foreign institutions appear to be the most active type of investors in Japan, which should give these investors the strongest preference for holding the more liquid stocks. The second, as discussed in Bae, Yamada and Ito (2008) and evidence we present later, foreign institutions show a strong tendency to buy past winners, which is in contrast to the contrarian behaviour of Japanese individuals. As discussed above, these differences in trading styles, which we consider exogenous,⁷ can affect the riskiness of market makers' inventories if foreign momentum investors, which effectively demand liquid, displace local contrarian investors, which effectively provide liquidity.

To examine the effect of changes in investor composition on bid ask spreads and return patterns, we start by estimating panel regressions with both firm and year fixed effects that control for the influence of year to year economy wide changes and unknown fixed firm characteristics. We find that higher institutional ownership (both domestic and foreign) is associated with both higher spreads and higher idiosyncratic volatility. Moreover, our regressions indicate that despite the fact that foreign institutions trade substantially more, their presence has a substantially more negative effect on liquidity than domestic institutions. Specifically, a one standard deviation increase in the holdings of foreign institutions at the expense of individual investors is associated with a

⁶ There is a separate literature that looks at how foreign institutions influence the corporate governance and in particular the disclosure policy of domestic firms. For instance, Braguinsky and Mityakov (2013) find evidence of improved transparency of Russian firms following foreign investments. This evidence predicts increased liquidity but has no prediction on the relation between foreign holdings and volatility. While we do not consider the impact of foreign institutions on corporate governance, our fresh evidence on reduced liquidity and increased volatilities following an increase in foreign holdings suggests that the mechanism we highlight is distinct from the channel emphasized in that literature.

⁷ It is possible that foreign institutions trade differently because they are evaluated relative to benchmarks. For a discussion of the relation between benchmarking and trading styles, see Cuoco and Kaniel (2011) and Buffa, Vayanos, and Woolley (2013), which are also discussed in Footnote 22.

subsequent increase in quoted spreads by 31.8 basis points, with a t -statistic of 10.15. In contrast, a one standard deviation increase in the holdings of domestic financial institutions and business corporations at the expense of individual investors is associated with a subsequent increase in quoted spreads by only 6.9 and 19.7 basis points, with t -statistics of 2.05 and 4.72 respectively. We obtain similar results using the effective bid-ask spreads.

Turning to the short-term volatility, we also find that foreign institutions have a stronger effect on idiosyncratic volatility than domestic institutions. Specifically, a one standard deviation increase in the holdings of foreign institutions at the expense of individual investors is associated with a subsequent proportional increase in idiosyncratic return volatility by 8.28 percent, with a t -statistic of 10.42. A one standard deviation increase in the holdings of domestic financial institutions and business corporations at the expense of individual investors also increases idiosyncratic volatility, but the effect is weaker. In addition, we find that the magnitude of the short-term return reversals, which decline on average over our time period, declines less for those stocks with higher foreign institutional holdings.

In contrast to our results on bid-ask spreads, which is consistent with both the adverse selection and the inventory channels, the relation between idiosyncratic volatility and foreign institutional holdings supports only the inventory channel, since adverse selection, by itself, has no effect on idiosyncratic volatility.

As we mentioned at the outset, there are endogeneity issues that can influence the interpretation of these results. While we do have tests that address the endogeneity issue directly, we think it is unlikely that our results are generated by causation running from liquidity to investor composition. First, our experimental design at least partially addresses this concern because we control for firm fixed effects as well as firm characteristics like size and book to market that are likely to be related to liquidity. More importantly, as we mentioned above, foreign institutions are likely to have the strongest preference for holding more liquid stocks, so these endogeneity issues should bias us against finding what we in fact find. However, while we do not think it is likely, it is possible that informed foreign institutions are attracted to stocks in years when expected

asymmetric information is high, which would provide an alternative explanation for our findings.

To address this endogeneity concern we examine the relation between changes in foreign institutional holdings and changes in bid-ask spreads and return patterns over the entire 1996 to 2007 sample period, using instruments for changes in foreign institutional holdings. The first instrument is firms' membership in the Nikkei 225 Index at the end of 1996. The idea is that foreign investors are particularly attracted to stocks in the Nikkei 225 Index, so that index membership is associated with larger increases in foreign institutional holdings when the Japanese market became more attractive to foreign investors. The second instrument is the number of English news stories about the Japanese firms reported in the Dow Jones News Wire (DJNW), an important source of information for foreign investors. Ideally, we would like to measure the news coverage in 1996, but since our news data start only from 2000 and the data set has relatively low coverage in the initial year, we use the news data in 2001 as our instrument. The last instrument is the export to sales ratio for Japanese firms in 1996.⁸

We find that all the instruments are reliably related to the change in foreign holdings over the cross-section during our sample period. Moreover, the instrumental variable regressions reveal a significant positive cross-sectional relation between changes in foreign institutional holdings over our sample period and changes in both bid-ask spreads and return patterns, which provide further support for our main thesis.

While the idea that the types of investors trading a stock influence its liquidity has played a major role in the theoretical literature, it has attracted attention in the empirical literature only recently. The early studies on this issue examine how institutional ownership and block holdings influence liquidity in the U.S. market (e.g., Rubin, 2007; Heflin and Shaw, 2000; Brockman et al., 2009). These authors document a positive relation between institutional holdings and liquidity but a negative association between concentrated block holdings and liquidity. However, these papers are unable to address the inherent endogeneity of ownership and liquidity using exogenous events of ownership changes.

⁸ Our results are robust to excluding any one of the three instruments from the instrumental variable regressions.

Recent papers by Wei (2011) and Ng et al. (2011) study the relation between foreign institutions and liquidity over a sample of stocks from a number of different countries rather than just one. Ng et al. (2011) are mainly interested in distinguishing between the liquidity effects of equity investments by foreign institutions and direct foreign investments by foreign firms, but do not address the potential endogeneity issues. In contrast, Wei (2011) directly addresses the causality issue, but uses an instrument that is very different from ours. Specifically, he looks across a large number of countries and uses a change in the U.S. tax code as an exogenous instrument that can affect which international stocks are most attractive to U.S. institutional investors. The Wei (2011) results, which use an instrument for U.S. institutional holdings around the world, differ from our results, which exploit the unique institutional feature in one country (Japan).⁹

The rest of this paper is organized as follows. Section 2 introduces the institutional background in Japan and the summary statistics for our sample. Section 3 investigates the implications of foreign institutional holdings for subsequent turnover, liquidity, short-term volatility, and serial correlations. In Section 4, we use the membership in the Nikkei 225 Index, media coverage, and export ratio to instrument changes in foreign institutional holdings. Section 5 provides robustness checks and Section 6 concludes the paper.

2. Institutional Background and Summary Statistics

This section discusses some of the institutional features of the Japanese stock market along with changes that occurred in the 1990s and early 2000s. We then describe our data and sample.

2.1 Institutional Background

In the 1990s the Japanese government initiated a number of reforms that resulted in lower transaction costs and made the Japanese equity market more hospitable to foreign institutions. For instance, the government abolished fixed trading commissions in several

⁹ Wei (2011) used Lion Shares data that cover world-wide institutional holdings from 2000. Specifically for Japan, our data cover a longer time series (from 1996) and broader cross-section.

stages from 1994 to 1999. Specifically, in 1994, legislation made trading commissions negotiable for trades over 1 billion yen, with the amount dropping to 50 million yen in 1998, and fixed commissions for all trade sizes were abolished in October 1999. During the same period, the securities trading tax rate was reduced from 0.30% to 0.12% in 1996, to 0.06% in 1998, and was eliminated in 1999.

In November 1996 the Japanese government announced the “Japanese Big Bang,” which was aimed at globalizing the Japanese financial market and enhancing its fairness and competitiveness. Along with abolishing fixed trading commissions and securities trading taxes, other reforms introduced during the Big Bang were likely contributors to the expansion of foreign institutional investors in Japan. For example, the foreign exchange transaction law was amended on April 1, 1998 to allow market intermediaries and participants to offset the buy and sell orders of foreign exchange. Previously, market participants had to manage each order separately by paying bank commissions for each position. This amendment of the foreign exchange transaction law was particularly important for lowering the transaction costs of currency risk management of cross-border investments. Other major initiatives that might have contributed to the expansion of foreign institutional investors include the introduction of individual stock derivatives in December 1998, the introduction of regulated stock lending facilities for institutional investors in July 1997, and the allowance of large trades to be negotiated outside the stock exchange that became effective December 1998.¹⁰

Information disclosure by public corporations also improved as new market based accounting became widely applicable to public firms after April 2000. As a result, instead of using the acquisition value accounting system, Japanese firms started to value the financial assets they held in the form of cross-holdings based on their market values. Those measures lead to improved transparency in the Japanese financial market, and made it easier for foreign investors to apply the methodologies used for North American and European firms to evaluate Japanese companies.

The change in accounting standards may have had direct implications for the liquidity of Japanese stocks. Specifically, market based accounting, which discloses the market

¹⁰ Most of these initiatives were carried out as part of the Financial System Reform Law of 1998, a package of revisions of laws including the Banking Law, the Securities and Exchange Law, and the Insurance Business Law.

value of shares held by banks and business corporations, removes incentives to keep under-performing shares on their balance sheets, and because of the lower values, puts pressure on the banks to liquidate the shares to meet the capital adequacy required by the Bank of International Settlement (BIS). Finally, a new law (implemented in 2002), which imposed a limit on bank's share holdings, further forced many banks to sell shares which were held in excess of the new limit.¹¹

The idea that the above mentioned changes, which made the Japanese stock market more attractive to foreign institutions, also made the market more liquid should not be controversial. The question that we address is whether the increased presence of foreign institutions also had an independent effect on market liquidity and short-term return patterns. As we discuss below, we will be exploring this possibility by examining how the bid-ask spreads and short term return patterns of those stocks that were most favoured by foreign institutional investors changed relative to those of the stocks that were less favoured.

2.2 Sample Construction

Our sample consists of non-financial firms listed on the First and Second Sections of the Tokyo Stock Exchange (TSE). The data used in this study come from several sources. Ownership data, such as the number of shares held by foreign institutions, domestic financial institutions, business corporations, and individuals for each firm, are from the Nikkei NEEDS Corporate Financial Data Tape. We collect trades and quotes data from the Reuters Data Scope Tick History maintained by Thomson Reuters, which provides intraday time-stamped bid and ask prices, and transactions data starting in January 1996. We use this data set to construct quoted and effective spreads for our sample. Data for daily and monthly stock prices and returns as well as data on annual accounting information are obtained collectively from the Pacific-Basin Capital Market Research Centre (PACAP) files, Nikkei and Factset.¹² Data on weekly aggregate trading volume for each investor type come from the Tokyo Stock Exchange. Our data on English news

¹¹ Under the new Banks' Shareholding Restriction Law, banks can hold shares only up to the value of their core capital.

¹² We cross-checked the PACAP accounting and returns data with data from the Nikkei and Factset to verify the consistency and accuracy of our data sets when possible.

stories come from RavenPack News Analytics, which covers all news stories from the Dow Jones News Service.

An interesting feature of the Japanese data is the detailed description of ownership, as firms must report their shareholder profiles in their annual reports, using the following classifications: financial institutions, securities companies, business corporations, foreigners, individuals, or government. We use the item “Shares Owned by Foreigners” as proxy for the holdings of international institutional investors, because institutional holdings constitute the bulk of foreign ownership. Prior empirical evidence also suggests that foreigners as a group behave more like institutions (e.g., Dahlquist and Robertsson, 2001; Kang and Stulz, 1997). For comparison, we use “Shares Owned by Financial Institutions” and “Shares Owned by Business Corporations” to measure the holdings of domestic financial institutions and business corporations.¹³

Because most firms in Japan end their fiscal years at the end of March, we measure the investor ownership at the end of March for each year t . For a firm with a fiscal year-end before March, such as in January, the ownership information is measured in January of year t . For a firm with a fiscal year-end after March, such as in September, the ownership for year t uses information in September of year $t-1$. To summarize, we measure investor holdings for year t using the holdings information as of the fiscal year $t-1$ ending anywhere between the beginning of April of year $t-1$ and the end of March of year t . In our panel regressions predicting future liquidity (bid-ask spreads) and short-term return patterns, we use the information on investor composition in year t to predict the variables that are measured from April of year t to March of year $t+1$.

Our final sample covers a 12-year panel from 1996 to 2007 with 19,117 firm years. As we mentioned, the start date corresponds to the initiation of the Big Bang and the availability of spread data. We chose 2007 as the ending date because the level of foreign institutional holdings stabilized after that date, which also pre-dates the global financial crisis and the introduction of high frequency traders in Japan. The sample consists of

¹³ “Financial Institutions” include domestic commercial banks, trust banks, insurance companies, and mutual funds. As domestic commercial banks constitute a large proportion of the shares held by domestic financial institutions in our sample period and the change in the holdings of domestic financial institutions is driven by changes in the holdings of commercial banks, we use the terms domestic financial institutions and banks interchangeably in this paper.

2,283 distinct firms, with the annual number increasing from 1,333 to 2,002 over 1996–2007.

To measure liquidity, we compute the proportional quoted spread (QSPRD) as the difference between ask and bid quotes divided by the midquote and the proportional effective spread (ESPRD) as two times the difference between the trade execution price and the midquote scaled by the midquote. We average the tick-by-tick data at the 5-minute frequency and compute the average bid-ask spreads for each trading day, which form our annual liquidity variables.¹⁴

Figure 2 shows the evolution of the average bid-ask spreads for all stocks on an equally-weighted basis through our sample period. It indicates that during the phase when the Big Bang was implemented, both quoted and effective spreads trended up and peaked in 2000,¹⁵ probably reflecting episodes of external market turmoil that affected both the Japanese economy and the stock market. These episodes include the Asian financial crisis in 1997, the LTCM crisis in 1998, and the rise and burst of the Internet bubble 1999–2000. Starting in 2000, market illiquidity trended down and tended to stabilize toward the end of the sample.

2.3 Summary Statistics

Panel A of Table 1 shows the changing ownership structure of Japanese corporations during 1996–2007. In 1996 foreign institutions held less than 12% of the total market cap and their holdings jumped to more than 27% by 2007.¹⁶ The increase in foreign institutional holdings accompanies a decline in the holdings of domestic financial institutions from more than 39% in 1996 to less than 29% in 2007. The equity holdings by business corporations also declined, but to a lesser extent, from approximately 20% in

¹⁴ During our sample period there were no formal specialists or market makers in the Japanese market so the bid and ask prices are the best limit orders on the order book. It should also be noted that our sample period pre-dates the introduction of high frequency traders in Japan.

¹⁵ Ahn et al. (2007) find that both quoted and effective spreads declined significantly during the 6 month period around April 13, 1998 when the TSE lowered the minimum tick sizes. They report that spreads particularly declined for groups of stocks that had greater tick size reductions. Since Figure 1 uses 52 week moving average of equal-weighted spreads of all stocks, we do not observe noticeable gap in the figure around April 1998.

¹⁶ The holdings of foreign institutions include the foreign direct investment (FDI). Due to institutional reasons, however, FDI into Japan was tiny as compared with foreign portfolio investments (FPI). According to the data from the Ministry of Finance of Japan, over the period 1996 to 2007, FDI was only 6.84% of FPI. Moreover, a large fraction of FDI flowed into private firms in Japan.

1996 to less than 17% in 2007. These drops in the holdings by domestic financial institutions and corporations are often referred to in the popular press as the unwinding of cross-holdings.

Panel A of Table 1 also shows the average (equally-weighted) fraction of shares owned by each type of investor over time. It indicates that equally-weighted foreign and domestic institutional holdings are generally lower than their value-weighted counterparts, which is consistent with institutions preferring to hold large stocks. The temporal pattern of increasing foreign institutional holdings but decreasing domestic institutional holdings also emerges when we examine equally-weighted holdings. Interestingly, equally-weighted holdings by individual investors increased substantially from 27% to 38% over the period 1996 to 2007. In combination with the fact that value-weighted holdings by individuals were flat in this period, the results indicate that individual investors increased their focus on small cap stocks during this time period.

Panel B of Table 1 describes the spreads and other summary statistics over our 12-year panel. The average quoted spread is 1.28%, with a standard deviation of 1.47%. The average effective spread is narrower, 1.11% with a standard deviation of 1.18%. The average idiosyncratic volatility (standard deviation of firm-specific daily returns) is 2.55% with a standard deviation of 1.77%. Panel C of Table 1 shows substantial correlations between the variables of interest, which are consistent with our expectation. For instance, short-term idiosyncratic volatility is positively correlated with both quoted and effective spreads. Moreover, foreign institutional ownership is positively correlated with firm size, with a correlation coefficient of 0.60, whereas firm size is negatively correlated with the quoted and effective bid-ask spreads with correlation coefficients of -0.57 and -0.59 respectively. These observations illustrate the importance of controlling for the influence of these stock characteristics when we examine the influence of investor composition on liquidity.

Finally, Panel D of Table 1 shows how annual changes in the holdings of each type of investors are related to contemporaneous and past stock returns. The results indicate that like domestic financial institutions, annual changes in the holdings of foreign institutions positively correlate with both contemporaneous and past stock returns, which is consistent with previous studies that show that institutions tend to buy past winners and

sell losers.¹⁷ Annual changes in the holdings of business corporations show a weaker but negative correlation with contemporaneous and past stock returns. In contrast, annual changes in the holdings of individuals show a large and negative correlation with contemporaneous and past stock returns, which is consistent with the evidence in the U.S. and around the world that individuals tend to be contrarian investors.¹⁸

3. Impact of Foreign Institutional Holdings on Liquidity

This section provides our analysis of the relation between foreign institutional holdings and liquidity. We start by estimating the relation between foreign institutional holdings and share turnover and then examine the relation between foreign institutional holdings and bid-ask spreads, short-term volatility, and return reversals.

3.1 Foreign Institutions and Trading Activities

As briefly mentioned in the preceding section, domestic institutions in Japan such as banks and corporations tend to hold equities for strategic purposes. For example, two companies may hold each other's shares to cement their business relationships, rather than for the purpose of profiting from short-term stock price fluctuations. A distinguishing feature of these strategically held shares, often referred to as the cross-holdings, is the stability of the share holdings. Since in our sample period (1996–2007) there was a substantial unwinding of cross-holdings by Japanese banks and business corporations, there was in fact a moderate increase in the turnover of domestic institutional portfolios, but the turnover was still quite low relative to the turnover exhibited by foreign investors.

¹⁷ Grinblatt, Titman and Wermers (1995) confirm that U.S. mutual funds do indeed tend to buy past winners and Froot, O'Connell, and Seasholes (2001) provide evidence of positive feedback trading of international institutions.

¹⁸ Kaniel, Saar and Titman (2008) observe that U.S. individual investors tend to be contrarian investors and argue that this tendency implies that they implicitly provide liquidity to institutions. The contrarian behavior of individual investors seems to be an international phenomenon. For instance, Grinblatt and Keloharju (2000) show individual investors are contrarians in the Finnish market. Choe, Kho, and Stulz (1999) report similar findings in Korea and Richards (2005) for six Asian emerging markets.

In Figure 3, we plot the annual portfolio turnover ratios, the sum of buys and sells divided by the initial portfolio value, for major investor types in Japan. For example, to compute the portfolio turnover ratio of foreign institutions ending 31 March 1997, we aggregate the value (in yen) of weekly buy and sell transactions for foreign investors in the past year, which is then divided by the value (in yen) of total holdings of Japanese equities by foreign institutions at the end of March 1996. As the figure illustrates, portfolio turnover ratios for domestic financial institutions and business corporations trended up in our sample period. However, despite this upward trend, the turnover ratios for domestic institutions are quite low relative to foreign institutions. For example, in 2007 the annual turnover ratio for domestic financial institutions is below 50% and that for business corporations is below 14%. In contrast, the turnover of foreign institutions in Japan is quite high, starting at about 114% in 1996 and increasing to 317% in 2007.¹⁹ The turnover ratio of the aggregate individual investor portfolio peaks in 2006, reaching 279%. It appears to share a common trend with that of the aggregate foreign investor portfolio.

While Figure 3 describes the turnover of the portfolios held by different types of investors, we are primarily interested in how these trading patterns influence the liquidity of individual stocks. As a first step, we examine the influence of the investor composition of individual stocks on their turnover. We do this with panel regressions using the level of foreign institutional holdings to predict a stock's future turnover ratio. The control variables in these regressions include firm size, quoted bid-ask spreads, volatilities, and past stock returns. These regressions also have firm and year fixed effects and report *t*-statistics based on standard errors clustered by firms.

The results of these regressions, presented in Panel A of Table 2, indicate that higher holdings by foreign institutions are associated with greater turnover. More specifically, Column 1 shows that a one standard deviation increase in the level of foreign institutional holdings, at the expense of domestic investors, is associated with an increase in the share turnover ratio by 6.33% (0.6330×0.1002) in the subsequent year. This effect is statistically significant with a *t*-statistic of 3.33. In contrast, the evidence in

¹⁹ These numbers are in line with the estimates in the US market, which is driven by institutional trading. For instance, French (2008) estimated that the annual portfolio turnover for the US market is 215% in 2007.

Column 2 reveals an insignificant relation between the percentage of shares held by domestic financial institutions and future turnover and Column 3 shows that an increase in the level of holdings by business corporations reduces future turnover.

Column 4 includes the holdings of foreign institutions, domestic financial institutions, and business corporations in the same regression. The slope coefficients of the holdings variables in this regression measure how an increase in the holdings of one particular type of institutions, at the expense of individual investor holdings, affects future turnover. The results indicate that changes in foreign institutional holdings, at the expense of individual investor holdings, has no significant effect on future trading volume, which is consistent with the evidence in Figure 3 that shows that these two types of investors have similar levels of portfolio turnover. By contrast, an increase in the holdings by domestic institutions, especially business corporations, at the expense of individual holdings, significantly reduces future turnover.

The coefficients of the control variables in these regressions are consistent with expectations. Stocks with lower bid-ask spreads, with higher volatilities, and past winners tend to have higher future trading volume. Interestingly, after controlling for the influence of bid-ask spreads, volatilities, and past returns, we find a negative association between firm size and trading volume.

3.2 Foreign Institutions, Liquidity, and Short-Term Return Patterns

The preceding subsection shows that an increase in foreign institutional holdings is associated with an increase in future trading activities. The intuition that we get from the cross-section, i.e., stocks with higher turnover tend to have tighter spreads, may lead us to expect that spreads will improve with increased foreign holdings. However, as we show below, we in fact observe a positive relation between spreads and foreign institutional holdings.

Our regressions, which predict both quoted and effective bid-ask spreads, control for the influence of stock characteristics such as firm size, turnover, return volatility, and stock returns in the past year. These 12-year panel regressions include both firm fixed effects, which control for the influence of unobserved firm characteristics, and time fixed effects, which capture the institutional changes we discussed previously that improved

the liquidity of the Japanese equity market in our sample period.²⁰ The standard errors are again clustered by firms.

Panel A of Table 3 presents the results for quoted bid-ask spreads. Column 1 shows that all else equal, an increase in the level of foreign institutional holdings at the expense of domestic investors predicts an increase in the quoted spreads. More specifically, a one standard deviation increase in foreign institutional holdings is associated with a subsequent increase in quoted spreads of 26.7 basis points, with a *t*-statistic of 10.34. By contrast, domestic institutions have a much weaker influence on liquidity. Column 2 shows that all else equal, a one standard deviation increase in the holdings by domestic financial institutions is associated with a subsequent decline in quoted spreads by 9.2 basis points, with a *t*-statistic of 3.49. Column 3 indicates that variation in the holdings of business corporations has no significant relation to future quoted spreads. Column 4 shows that an increase in the holdings by individuals is associated with a subsequent decline in quoted spreads.

In Column 5, we include the holdings of foreign institutions, domestic financial institutions, and business corporations in one regression. Since individual investors are not included in this regression, the slope coefficients for each of the investor types measure how an increase in each type's percentage holdings, which displaces holdings by individuals, predicts subsequent changes in spreads. The results indicate that a one standard deviation increase in the holdings of foreign institutions, at the expense of individual investors, is associated with a subsequent increase in quoted spreads by 31.7 basis points, with a *t*-statistic of 10.15. By contrast, a one standard deviation increase in the holdings of domestic financial institutions and business corporations, at the expense of individual investors, is associated with a subsequent increase in quoted spreads by only 6.9 and 19.7 basis points, with *t*-statistics of 2.05 and 4.72 respectively.

Column 6 shows that a one standard deviation increase in the holdings of foreign institutions, at the expense of domestic financial institutions, is associated with a subsequent increase in quoted spreads by 27.3 basis points, with a *t*-statistic of 11.24. Column 7 shows that a one standard deviation increase in the holdings by foreign

²⁰ For example, time fixed effects should capture such events as the reduction in tick size effective 13 April 1998.

institutions, at the expense of domestic business corporations, is associated with a subsequent increase in quoted spreads by 21.2 basis points, with a t -statistic of 7.75.

The relationships between other stock characteristics and future bid-ask spreads are consistent with intuition. For example, larger stocks and stocks with higher turnover tend to have lower quoted spreads, whereas stocks with lower past returns tend to have higher subsequent quoted spreads. Panel B, which shows the results for effective spreads, reveals consistent relations between the holdings of each type of investors and future liquidity.

Panel C of Table 3 presents the results of regressions that explore the relation between idiosyncratic volatility and foreign institutional ownership. These regressions are essentially identical to those in Panels A and B, except that idiosyncratic volatility rather than bid-ask spreads is the dependent variable. We measure idiosyncratic volatility as the natural log of the standard deviation of the residuals from a regression of daily stock returns on contemporaneous and five lagged market returns in each year (we require that a stock have at least 50 non-missing daily returns in a given year to be included in the sample).

The results reported in this panel are consistent with those found in the previous panels. All else equal, an increase in the holdings of a stock by foreign institutions predicts an increase in the stock's idiosyncratic volatility in the subsequent year. In contrast, an increase in the holdings of individuals predicts a decline in the subsequent idiosyncratic volatility. As a result, although an increase in the holdings of domestic institutions per se has no relation to the idiosyncratic volatility in the next year, it increases idiosyncratic volatility when domestic institutions replace individuals.

Finally, in Panel D of Table 3 we estimate the effect of foreign institutions on the first-order autocorrelation in daily stock returns during the subsequent year. We find that individual stocks are more negatively autocorrelated when they have higher foreign institutional holdings. This result is consistent with the hypothesis that the expansion of foreign institutions is associated with lower liquidity through the inventory channel.

4. Direction of Causation: Instrumenting for Foreign Institutional Holdings

As mentioned in the introduction, we must be cognizant of endogeneity issues when we interpret the relation between investor composition and liquidity. Specifically, we would like to rule out the possibility that the results are generated because of causation running from liquidity to investor composition. To address this endogeneity concern, we examine the relation between changes in the foreign institutional holdings of individual stocks and their liquidity over the entire 1996 to 2007 sample period using three instruments for changes in foreign institutional holdings.

The first instrument is firms' membership in the Nikkei 225 Index at the end of 1996. The idea is that foreign investors, who are more likely to be evaluated relative to a benchmark, may be particularly attracted to stocks in the Nikkei 225 Index. The second instrument is the number of English news stories about the Japanese firms reported in the Dow Jones News Wire (DJNW), which is an important source of information for foreign investors. Ideally, we would like to measure the news coverage in 1996, but since our news data start only in 2000 and the data set has relatively low coverage in its initial year, we use this information in 2001 as our proxy.²¹ The last instrument is the export to sales ratio of Japanese firms in 1996. Kang and Stulz (1997) show that foreign investors tend to tilt their portfolios toward firms with large export ratios.

We are assuming that these instruments have no direct relation to firm fundamentals that may have influenced changes in liquidity and short-term return patterns over our sample period.²² Although we present the results that include all the three instrumental variables, our results are robust to excluding any one of the three instruments in the regressions.

Column 1 of Table 4 presents the estimates of our first stage regression, which establishes that a stock's membership in the Nikkei 225, the number of English news

²¹ Using the 2001 data creates a bias if the Dow Jones News Wire chooses to report on companies because of their holdings by institutional investors. While there is likely to be some causality running from holdings to news reporting, it is unlikely to significantly influence our results.

²² An increased tendency of investors to benchmark in our sample period should be classified as a change in the characteristics of investor composition rather than a change in firm fundamentals. The analysis by Cuoco and Kaniel (2011) and Buffa, Vayanos, and Woolley (2013) on how benchmarking can influence trading, and as a result, the short-term return patterns of index constituents, is consistent with our broader views on the impact of trading styles on return patterns.

stories about the stock, and the export ratio are all associated with larger increases in holdings by foreign institutions from 1996 to 2007. This evidence suggests that these three variables provide reliable instruments for increases in foreign holdings for our cross-sectional analysis of the effect of foreign holdings on liquidity. In the second stage, we use the Limited Information Maximum Likelihood (LIML) estimator with heteroskedasticity-consistent standard errors to gauge the effect of changes in investor composition on changes in our liquidity and return pattern measures from 1996 to 2007.²³

The results, as shown in Columns 2 and 3 of Table 4, indicate that a larger increase in the holdings of foreign institutions is associated with a larger increase in both quoted and effective spreads from 1996 to 2007. The results in Columns 4 to 6 show that, despite a positive correlation between changes in foreign institutional holdings and trading volume, a larger increase in the holdings of foreign institutions is associated with a larger increase in both idiosyncratic volatility and short-term return reversals over the 1996–2007 sample period. The evidence in these regressions is thus consistent with our previous evidence that the greater participation of foreign institutional investors leads to reduced liquidity and increased short-term volatility.

5. Robustness Tests

This section provides robustness tests. In particular, we control for the variation in future trading volume directly in the tests of the predictive power of foreign institutional holdings for liquidity, use alternative measures of short-term volatility, and perform subsample analyses for Japanese stocks that were never in the Nikkei 225 Index during the period from 1996 to 2007. Our findings are robust to these changes in the research design.

²³ Stock, Wright, and Yogo (2002) argue that the LIML estimator have superior statistical properties than the two-stage least squares (2SLS) estimator. Our results remain unchanged if we use the 2SLS estimator.

5.1 Controlling for Future Trading Volume

We have shown that a rise in the holdings of foreign institutions associates with an increase in subsequent trading volume but a decline in liquidity, which suggests that the amount of trading activities cannot fully capture the notion of liquidity. In this subsection, we provide more direct evidence. Specifically, we run panel regressions similar to those in Table 3, except that we replace the past turnover ratio with the turnover ratio in the year after we measure bid-ask spreads. The results in Table 5 show that although bid-ask spreads and the turnover ratio have a negative contemporaneous correlation, the influence of foreign institutions on subsequent bid-ask spreads remains largely unchanged.

5.2 Alternative Measures of Short-Term Volatility

We have used the natural log of the standard deviation of regression residuals of daily stock returns on contemporaneous and five lagged market returns for each year as our primary measure of short-term volatility. We have also used alternative measures of short-term volatility. Specifically, as in Schwert (1989), we use the natural log of the sum of squared daily returns in each year as an alternative estimator of short-term volatility (we require that a stock have at least 50 non-missing daily returns in a given year to be included in the sample). We also estimate short-term volatility as the natural log of the standard deviation of regression residuals of weekly stock returns on contemporaneous and lagged market returns for each year as another measure of volatility. Unreported results reveal a similar pattern; an increase in the holdings of foreign institutions strongly predicts an increase in short-term volatility in the subsequent year.

5.3 Stocks not in the Nikkei 225 Index

The previous results indicate that membership in the Nikkei 225 has significant influence on the holdings of foreign institutions and thus on Japanese stock liquidity. In this subsection we ask whether the effect of foreign institutions goes beyond the Nikkei 225 constituents. To answer this question, we construct a sample of Japanese stocks that were never in the Nikkei 225 Index during the period from 1996 to 2007. Then we re-estimate the panel regressions using the holdings of different types of investors to predict future bid-ask spreads. Unreported results indicate a large and significant impact of foreign

institutional holdings on liquidity for this smaller sample. In other words, the impact of foreign institutions on liquidity is pervasive.

6. Conclusions

Liquidity is a concept that is elusive, yet quite important. Starting with Amihud and Mendelson (1986), researchers have noted that there is a relation between liquidity and expected rates of return, but the actual determinants of liquidity have not been well understood. In theory, the liquidity of an asset is determined by the nature of the asset, e.g., is it easy to value the asset, as well as by the nature of the investors, e.g., do the investors have short versus long time horizons and do they tend to be informed or uninformed? While defining the nature of an asset may be straightforward, identifying the nature of the investors that participate in the market is somewhat circular. More liquid stocks attract investors who may be less informed and have shorter investment horizons, but the presence of these investors makes these stocks more liquid.

In this paper we exploit the liberalization of the Japanese market to foreign institutions to shed light on the importance of investor composition on bid-ask spreads and short-term return patterns. In the sample period we consider, 1996–2007, foreign institutional holdings more than doubled, but more importantly for our identification strategy, there were significant cross-sectional differences in the growth in foreign institutional investor holdings. We find that the turnover of those stocks that foreign institutions prefer increased over this time period, reflecting the fact that the foreign investors tend to have shorter trading horizons. However, despite the higher turnover, the stocks preferred by foreign institutions showed less significant declines in bid-ask spreads and short-term return reversals and greater increases in idiosyncratic volatility.

The bid-ask spread results are consistent with two potential channels that can link investor composition to liquidity. The first possibility is that the foreign investors are relatively more informed than the domestic investors, requiring market makers to post higher spreads to offset the greater risk of adverse selection. The second possibility is that the higher spreads reflect the fact that the increased presence of foreign institutions, which tend to be positive feedback traders, increases the volatility of the order flow faced

by market makers. This second possibility is also consistent with the observed relation between foreign holdings and idiosyncratic volatility and return reversals.

It should be emphasized that our motivation takes differences in the trading styles of different types of investors as exogenous. To better understand why the composition of investors influences return patterns and liquidity, one would like to have a better understanding of why the trading styles of different investor types differ. One can, of course, attribute different behavioral biases to individuals and institutions, and the fact that institutions are much larger, and as a result tend to split up their trades over days, and sometimes even months, is clearly relevant. In addition, as we briefly mentioned, the tendency of institutions to benchmark may play a role. While these issues are beyond the scope of the present study, they can potentially be addressed with higher frequency holdings data for individual institutions.

It should also be noted that the inventory-based explanation for idiosyncratic volatility and return reversals is based on models with risk averse market makers, who only partially offset the trades from liquidity demanding investors. The fact that these liquidity suppliers, who presumably hold diversified portfolios, act as though they are averse to idiosyncratic risk is somewhat of a challenge to explain. However, any explanation of the observed negative serial correlations requires risk averse market makers, and as long as market makers are risk averse, spreads and the magnitude of idiosyncratic volatility and return reversals will depend on the trading styles of the investor community.²⁴

²⁴ The presence of return reversals should attract additional capital to market making, leading the magnitude of return reversals to diminish with time. The magnitude of return reversals has in fact declined significantly in Japan as well as in the United States (see, for example, Nagel (2012) for recent U.S. evidence), however, short term reversals still exist in both markets. While this evidence is consistent with the Duffie (2010) characterization of slow moving capital, the magnitude of these reversals is still somewhat surprising.

References

- Ahn, H., Cai, J., Chan, K., Hamao, Y., 2007. Tick size change and liquidity provision on the Tokyo Stock Exchange. *Journal of the Japanese and International Economies* 21, 173–194.
- Amihud, Y., H. Mendelson, 1980. Dealership market: market making with inventory. *Journal of Financial Economics* 8, 31–53.
- Amihud, Y. and H. Mendelson, 1986. Asset pricing and the bid-ask spread. *Journal of Financial Economics* 17, 223–249.
- Anderson, T. W., H. Rubin. 1950. The asymptotic properties of estimates of the parameters of a single equation in a complete system of stochastic equations. *Annals of Mathematical Statistics* 21, 570–582.
- Avramov, D., T. Chordia, A. Goyal, 2006. The impact of trades on daily volatility. *Review of Financial Studies* 19, 1241–1277.
- Braguinsky, S., S. Mityakov, 2013. Foreign corporations and the culture of transparency: evidence from Russian administrative data. *Journal of Financial Economics*, forthcoming.
- Brockman, P., Chung D.Y., Yan, X., 2009. Block ownership, trading activity, and market liquidity. *Journal of Financial and Quantitative Analysis* 44, 1403–1426.
- Buffa, A., D. Vayanos, P. Woolley, 2013. Asset management contracts and equilibrium prices. Unpublished Working Paper.
- Choi, J., D. Salandro, K. Shastri, 1988, On the estimation of bid-ask spreads: theory and evidence. *Journal of Financial and Quantitative Analysis* 23, 219–230.
- Choe, H., Kho, B.C., Stulz, R., 1999. Do foreign investors destabilize stock markets? The Korean experience in 1997. *Journal of Financial Economics* 54, 227–264.
- Cuoco, D., R. Kaniel, 2011. Equilibrium prices in the presence of delegated portfolio management. *Journal of Financial Economics* 101, 264–269.
- Dahlquist, M., Robertsson, G., 2001. Direct foreign ownership, institutional investors, and firm characteristics. *Journal of Financial Economics* 59, 413–440.
- DeLong, J., Shleifer, A., Summers, L., Waldmann, R., 1990. Noise trader risk in financial Markets. *Journal of Political Economy* 98, 703–738.
- Duffie, D., 2010. Asset price dynamics with slow-moving capital. *Journal of Finance* 65, 1238–1268.
- French, K., 2008. Presidential Address: The Cost of Active Investing. *Journal of Finance* 63, 1537–1573.
- Glosten, L. R., Milgrom, P. R., 1985. Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics* 14, 71–100.
- Grinblatt, M., Keloharju, M., 2000. The investment behavior and performance of various investor-types: a study of Finland’s unique data set. *Journal of Financial Economics* 55, 43–67.
- Grinblatt, M., Titman, S., Wermers, R., 1995. Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior. *American Economic Review* 85, 1088–1105.

- Grossman, S. J., Miller, M. H., 1988. Liquidity and market structure. *Journal of Finance* 43, 617–637.
- Heflin, F., Shaw, K. W., 2000. Block ownership and market liquidity. *Journal of Financial and Quantitative Analysis* 35, 621–633.
- Kang, J., Stulz, R.M., 1997. Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. *Journal of Financial Economics* 46, 3–28.
- Kaniel, R., G. Saar, Titman, S., 2008. Individual investor sentiment and stock Returns. *Journal of Finance* 63, 273–310.
- Kyle, A., 1985. Continuous auctions and insider trading. *Econometrica* 53, 1315–1335.
- Nagel, S., 2012. Evaporating liquidity. *Review of Financial Studies* 25, 2005–2039.
- Ng, L., Wu, F., Yu, J., Zhang, B., 2011. Foreign investor heterogeneity and stock liquidity around the world, Unpublished Working Paper.
- Richards, A., 2005. Big fish in small ponds: the trading behavior and price impact of foreign investors in Asian emerging equity markets. *Journal of Financial and Quantitative Analysis* 40, 1–27.
- Rubin, A., 2007. Ownership Level, Ownership concentration and liquidity, *Journal of Financial Markets* 10, 219–248.
- Schwert, G. W., 1989. why does stock market volatility change over time? *Journal of Finance* 44, 1115–1153.
- Shen, P., Starr, R., 2002. Market-makers' supply and pricing of financial market liquidity. *Economics Letters* 76, 53–58.
- Stock, J. H., Wright, J. H., Yogo, M., 2002. Survey of weak instruments and weak identifications in generalized method of moments. *Journal of Economics and Business Statistics* 20, 518–529.
- Stoll, H. R., 1978. The supply of dealer services in securities markets. *Journal of Finance* 33, 1133–51.
- Vayanos, D., J. Wang, 2012. Liquidity and asset prices under asymmetric information and imperfect competition. *Review of Financial Studies* 25, 1339–1365.
- Vayanos, D., P. Woolley, 2013. An institutional theory of momentum and reversal. *Review of Financial Studies* 26, 1087–1145.
- Wei, C., 2011. Do foreign institutions improve stock liquidity? Unpublished Working Paper.

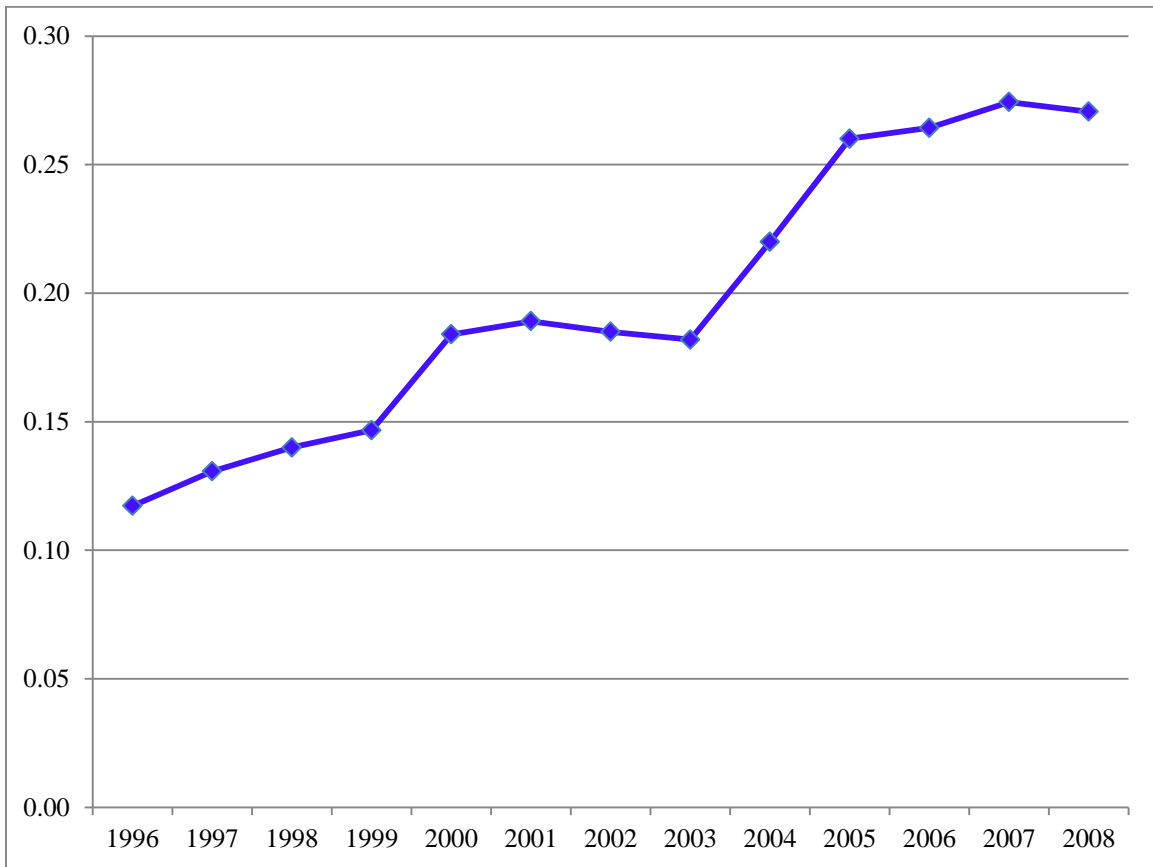


Figure 1 Fraction of Japanese Equities (Market Cap) Owned by Foreign Institutions

This figure plots the fraction of the market cap for stocks listed on the Tokyo Stock Exchange owned by foreign institutions from 1996 to 2008.

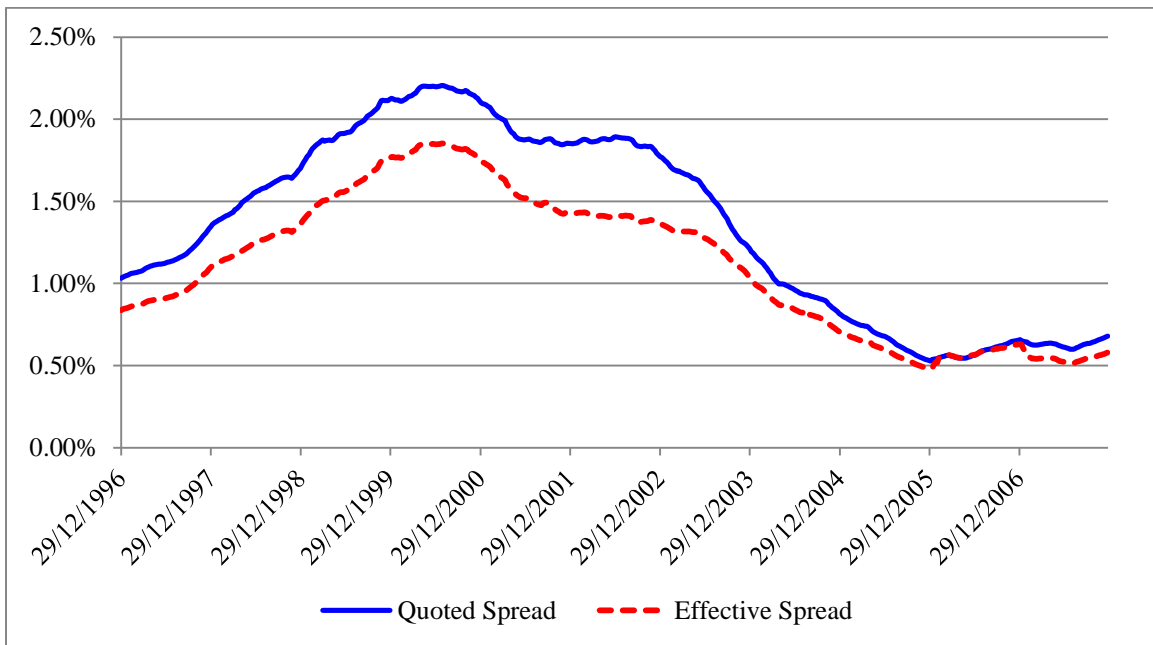


Figure 2 Proportional Quoted and Effective Bid-Ask Spreads in Japan

This figure plots the equal-weight average bid-ask spreads for stocks listed on the Tokyo Stock Exchange from 1996 to 2007. The blue solid line tracks the quoted spread and the red dotted line tracks the effective spread. The spreads are averaged over the past 52 weeks.

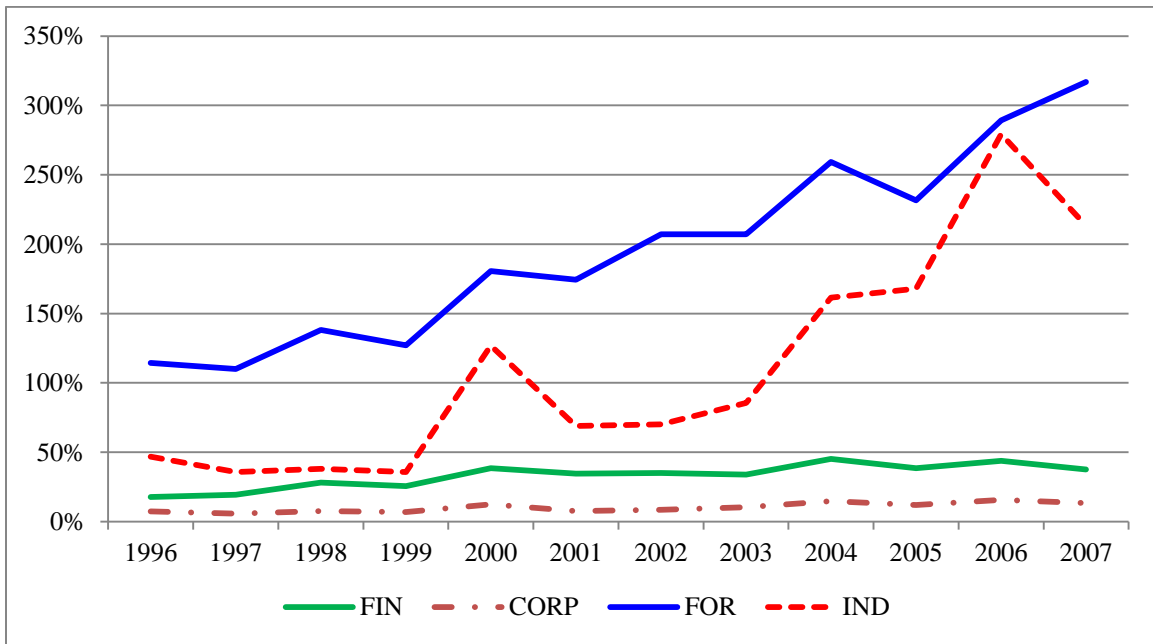


Figure 3 Portfolio Turnover Ratios for Major Investor Types in Japan

This figure plots the annual portfolio turnover ratios for domestic financial institutions (solid green), business corporations (dotted dark red), foreign investors (solid red), and individual investors (dotted blue) from 1996 to 2007. The portfolio turnover ratio is defined as the trading volume in yen (buy plus sell) divided by the total yen holdings for each investor type at the beginning of the period. The data come from the Tokyo Stock Exchange.

Table 1
Descriptive Statistics

This table shows the summary statistics for the ownership structure in Japan and other stock characteristics. Panel A presents the fraction of market cap and the average (mean) fraction of shares owned by each type of investors for each year 1996–2007. Panel B shows the summary statistics for the liquidity variables and other stock characteristics. Panel C presents the correlation coefficients among stock characteristics. Panel D shows the correlations between annual changes in holdings of each type of investors and (contemporaneous and lagged) stock returns. *FOR*, *FIN*, *CORP*, and *IND* stand for foreign institutions, domestic banks, business corporations, and individuals. The stock characteristics include two proxies for the bid-ask spreads, the quoted bid-ask spread deflated by the midquote *QSPRD* and the effective spread (two times the difference between the trade execution price and the midquote) scaled by the midquote and weighted based on the size of trades *ESPRD*, as well as the standard deviation of regressions residuals of daily stock returns on contemporaneous and five lagged market returns *IV*, the natural log of market cap *Size*, the turnover ratio in the past year *Turnover*, the return volatility in the past year *VOL*, and the annual stock return in the past year *Return*.

Panel A: Investor Composition in Japan

Year	Fraction of Market Cap Owned				Average (Mean) Fraction of Shares Owned			
	FOR	FIN	CORP	IND	FOR	FIN	CORP	IND
1996	0.117	0.392	0.199	0.209	0.066	0.319	0.291	0.269
1997	0.131	0.399	0.193	0.197	0.066	0.317	0.291	0.280
1998	0.14	0.399	0.187	0.188	0.064	0.306	0.291	0.301
1999	0.147	0.389	0.202	0.185	0.060	0.295	0.291	0.318
2000	0.184	0.334	0.232	0.177	0.067	0.266	0.291	0.341
2001	0.189	0.367	0.199	0.189	0.067	0.254	0.285	0.359
2002	0.185	0.366	0.197	0.196	0.063	0.249	0.284	0.367
2003	0.182	0.353	0.19	0.213	0.062	0.239	0.283	0.377
2004	0.22	0.316	0.178	0.227	0.086	0.229	0.264	0.382
2005	0.26	0.313	0.165	0.219	0.100	0.225	0.256	0.376
2006	0.264	0.296	0.171	0.218	0.121	0.225	0.260	0.353
2007	0.274	0.289	0.165	0.214	0.122	0.199	0.259	0.384

Panel B: Summary Statistics of Stock Characteristics

	Mean	Std Dev	Skewness	Kurtosis	10 th Pctl	25 th Pctl	50 th Pctl	75 th Pctl	90 th Pctl
<i>QSPRD</i>	0.0128	0.0147	2.9414	12.6949	0.0022	0.0038	0.0078	0.0160	0.0294
<i>ESPRD</i>	0.0111	0.0118	2.8200	12.1544	0.0022	0.0036	0.0073	0.0137	0.0248
<i>IV</i>	0.0255	0.0177	18.9359	611.1856	0.0136	0.0172	0.0226	0.0303	0.0401
<i>FOR</i>	0.0806	0.1002	2.2026	6.6982	0.0032	0.0102	0.0412	0.1164	0.2120
<i>FIN</i>	0.2810	0.1472	0.2717	-0.6646	0.0906	0.1655	0.2691	0.3885	0.4863
<i>CORP</i>	0.2765	0.1809	0.6716	-0.4291	0.0715	0.1292	0.2381	0.3980	0.5524
<i>IND</i>	0.3405	0.1670	0.6752	0.2129	0.1406	0.2126	0.3219	0.4394	0.5719
<i>Size</i>	10.4697	1.6276	0.5208	0.1745	8.5464	9.3234	10.2692	11.4738	12.7273
<i>Turnover</i>	0.6145	1.0978	7.9493	113.9804	0.0689	0.1469	0.3154	0.6576	1.3047
<i>VOL</i>	0.1075	0.0909	16.6861	495.3192	0.0494	0.0661	0.0913	0.1287	0.1766
<i>Return</i>	0.0009	0.4123	0.4971	5.6359	-0.4637	-0.2395	-0.0096	0.2240	0.4765

Panel C: Correlation Coefficients of Stock Characteristics

	$QSPRD_{t+1}$	$ESPRD_{t+1}$	$Log(IV_{t+1})$	FOR_t	FIN_t	$CORP_t$	IND_t	$Size_t$	$Turnover_t$	VOL_t
$ESPRD_{t+1}$	0.98									
$Log(IV_{t+1})$	0.54	0.55								
FOR_t	-0.33	-0.35	-0.20							
FIN_t	-0.29	-0.31	-0.22	0.22						
$CORP_t$	0.28	0.28	0.14	-0.37	-0.54					
IND_t	0.16	0.19	0.15	-0.38	-0.43	-0.36				
$Size_t$	-0.57	-0.59	-0.44	0.6	0.52	-0.29	-0.52			
$Turnover_t$	-0.2	-0.2	0.04	0.12	-0.01	-0.18	0.09	0.07		
VOL_t	0.11	0.12	0.36	-0.04	-0.12	0.01	0.12	-0.13	0.21	
$Return_t$	-0.22	-0.23	-0.28	0.12	0.04	-0.03	-0.07	0.2	0.19	0.18

Panel D: Trading Styles of Different Types of Investors

	$Return_t$	$Return_{t-1}$	$DFOR_t$	$DFIN_t$	$DCORP_t$
$Return_{t-1}$	-0.010				
$DFOR_t$	0.254	0.054			
$DFIN_t$	0.274	0.127	-0.163		
$DCORP_t$	-0.042	-0.037	-0.241	-0.291	
$DIND_t$	-0.421	-0.118	-0.420	-0.427	-0.337

Table 2
Are Foreign Institutions Active Traders?
Foreign Institutional Holdings and Subsequent Share Turnover

This table presents the panel regressions using the fraction of shares owned by foreign institutions (FOR), domestic financial institutions (FIN), and domestic business corporations (CORP) to forecast turnover in the subsequent year over the period 1996–2007. The control variables include the natural log of market cap *Size*, the average quoted bid-ask spread (*QSPRD*), the return volatility in the past year *VOL*, and the annual stock return in the past year *Return*. The regressions include fixed firm effects and year dummies. The *t*-statistics, below the coefficient estimates, are based on standard errors clustered by firms.

	(1)	(2)	(3)	(4)
<i>FOR_t</i>	0.633 (3.33)			-0.0580 (-0.27)
<i>FIN_t</i>		0.288 (1.78)		-0.387 (-2.14)
<i>CORP_t</i>			-1.491 (-8.84)	-1.625 (-8.24)
<i>Size_t</i>	-0.0855 (-3.49)	-0.0663 (-2.69)	-0.0646 (-2.83)	-0.0472 (-1.83)
<i>QSPRD_t</i>	-12.25 (-13.40)	-11.63 (-13.13)	-11.22 (-13.09)	-11.19 (-12.78)
<i>VOL_t</i>	0.739 (4.17)	0.749 (4.22)	0.723 (4.03)	0.715 (4.00)
<i>Return_t</i>	0.265 (13.12)	0.258 (12.96)	0.265 (13.46)	0.259 (13.06)
<i>Firm fixed effects</i>	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.442	0.441	0.449	0.450
Observations	19,097	19,097	19,097	19,097

Table 3
The Impact of Foreign Institutional Holdings on Subsequent Bid-Ask Spreads and Short-Term Return Patterns

This table presents the panel regressions using the fraction of shares owned by foreign institutions (FOR), domestic financial institutions (FIN), domestic business corporations (CORP), and individuals (IND) to forecast the average bid-ask spreads in the subsequent year over the period 1996–2007. We use two proxies for the bid-ask spreads: the quoted bid-ask spread deflated by the midquote *QSPRD* (Panel A) and the effective spread (two times the difference between the trade execution price and the midquote) scaled by the midquote and weighted based on the size of trades *ESPRD* (Panel B). We also use the idiosyncratic volatility, which is measured as the natural log of the standard deviation of the regression residuals of daily stock returns on contemporaneous and five lagged market returns for each year (Panel C). Our last dependent variable is the first-order autocorrelation coefficient in daily stock returns for each year (Panel D). The control variables include the natural log of market cap *Size*, the turnover ratio in the past year *Turnover*, the return volatility in the past year *VOL* (in Panels A and B), and the annual stock return in the past year *Return*. The regressions include fixed firm effects and year dummies. The *t*-statistics, below the coefficient estimates, are based on standard errors clustered by firms.

Panel A: Quoted Spread							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>FOR_t</i>	0.0267 (10.34)				0.0317 (10.15)	0.0273 (11.24)	0.0212 (7.75)
<i>FIN_t</i>		-0.00623 (-3.49)			0.00471 (2.05)		-0.00579 (-2.68)
<i>CORP_t</i>			0.00187 (1.02)		0.0109 (4.72)	0.00651 (3.13)	
<i>IND_t</i>				-0.0146 (-6.66)		-0.00438 (-1.87)	-0.0105 (-4.36)
<i>Size_t</i>	-0.00470 (-14.86)	-0.00327 (-10.99)	-0.00351 (-12.70)	-0.00467 (-13.00)	-0.00504 (-13.26)	-0.00503 (-13.07)	-0.00506 (-13.14)
<i>Turnover_t</i>	-0.000191 (-2.09)	-0.000278 (-3.07)	-0.000255 (-2.92)	-0.000158 (-1.80)	-8.80e-05 (-1.01)	-0.000107 (-1.23)	-0.000134 (-1.52)
<i>VOL_t</i>	-0.00178 (-1.71)	-0.00166 (-1.54)	-0.00156 (-1.44)	-0.00149 (-1.35)	-0.00172 (-1.62)	-0.00175 (-1.64)	-0.00178 (-1.67)
<i>Return_t</i>	-0.000819 (-3.51)	-0.00128 (-5.46)	-0.00121 (-5.17)	-0.000902 (-3.74)	-0.000782 (-3.26)	-0.000783 (-3.23)	-0.000770 (-3.19)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.370	0.358	0.358	0.363	0.373	0.373	0.372
<i>Observations</i>	19,117	19,117	19,117	19,117	19,117	19,117	19,117

Panel B: Effective Spread

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>FOR_t</i>	0.0207 (9.77)				0.0245 (9.61)	0.0218 (11.08)	0.0162 (7.35)
<i>FIN_t</i>		-0.00563 (-4.01)			0.00296 (1.63)		-0.00543 (-3.23)
<i>CORP_t</i>			0.00196 (1.40)		0.00870 (4.96)	0.00599 (3.74)	
<i>IND_t</i>				-0.0112 (-6.42)		-0.00270 (-1.44)	-0.00839 (-4.49)
<i>Size_t</i>	-0.00392 (-16.03)	-0.00278 (-12.22)	-0.00299 (-14.21)	-0.00389 (-14.05)	-0.00415 (-14.04)	-0.00414 (-13.77)	-0.00416 (-13.86)
<i>Turnover_t</i>	-0.000255 (-3.29)	-0.000324 (-4.22)	-0.000302 (-4.09)	-0.000231 (-3.13)	-0.000175 (-2.37)	-0.000187 (-2.56)	-0.000212 (-2.83)
<i>VOL_t</i>	-0.00108 (-1.30)	-0.00100 (-1.16)	-0.000907 (-1.05)	-0.000858 (-0.98)	-0.00104 (-1.23)	-0.00106 (-1.25)	-0.00109 (-1.28)
<i>Return_t</i>	-0.000720 (-3.74)	-0.00109 (-5.65)	-0.00103 (-5.34)	-0.000787 (-3.96)	-0.000705 (-3.57)	-0.000707 (-3.53)	-0.000695 (-3.49)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.378	0.367	0.366	0.371	0.380	0.380	0.380
<i>Observations</i>	19,117	19,117	19,117	19,117	19,117	19,117	19,117

Panel C: Idiosyncratic Volatility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>FOR_t</i>	0.690 (9.84)				0.826 (10.42)	0.595 (7.61)	0.576 (7.06)
<i>FIN_t</i>		-0.0529 (-1.06)			0.216 (3.54)		-0.0351 (-0.58)
<i>CORP_t</i>			-0.0282 (-0.49)		0.240 (3.66)	0.0102 (0.17)	
<i>IND_t</i>				-0.419 (-7.18)		-0.254 (-3.76)	-0.274 (-3.93)
<i>Size_t</i>	-0.0999 (-11.65)	-0.0674 (-7.80)	-0.0697 (-8.60)	-0.103 (-10.31)	-0.113 (-11.66)	-0.116 (-11.43)	-0.115 (-11.57)
<i>Turnover_t</i>	0.0107 (4.36)	0.00857 (3.70)	0.00844 (3.58)	0.0119 (4.67)	0.0132 (5.01)	0.0124 (4.79)	0.0124 (4.84)
<i>Return_t</i>	0.0202 (2.85)	0.0104 (1.48)	0.0115 (1.64)	0.0198 (2.78)	0.0233 (3.27)	0.0241 (3.36)	0.0238 (3.32)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.508	0.499	0.499	0.504	0.509	0.509	0.509
Observations	19,377	19,377	19,377	19,377	19,377	19,377	19,377

Panel D: First-Order Autocorrelations in Daily Stock Returns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>FOR_t</i>	-0.134 (-5.77)				-0.123 (-4.67)	-0.170 (-6.40)	-0.134 (-5.08)
<i>FIN_t</i>		0.0628 (3.05)			0.0393 (1.65)		0.0284 (1.18)
<i>CORP_t</i>			0.0212 (1.09)		0.00410 (0.18)	-0.0427 (-1.81)	
<i>IND_t</i>				0.00884 (0.45)		-0.0554 (-2.29)	-0.0189 (-0.82)
<i>Size_t</i>	0.0296 (9.91)	0.0211 (7.24)	0.0238 (8.50)	0.0244 (7.72)	0.0275 (8.43)	0.0265 (8.09)	0.0269 (8.22)
<i>Turnover_t</i>	0.00128 (1.11)	0.00176 (1.54)	0.00184 (1.60)	0.00161 (1.40)	0.00139 (1.20)	0.00127 (1.10)	0.00146 (1.27)
<i>Return_t</i>	0.0346 (2.37)	0.0343 (2.27)	0.0334 (2.24)	0.0333 (2.20)	0.0351 (2.41)	0.0350 (2.41)	0.0351 (2.42)
<i>Volatility_t</i>	0.00212 (0.73)	0.00487 (1.67)	0.00376 (1.29)	0.00379 (1.30)	0.00280 (0.96)	0.00310 (1.06)	0.00289 (0.99)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.123	0.121	0.120	0.120	0.123	0.123	0.123
Observations	19,096	19,096	19,096	19,096	19,096	19,096	19,096

Table 4
Changes in Foreign Institutional Holdings and Changes in Spreads and Short-Term Volatility 1996 to 2007: Instrumental Variable Regressions

This table presents the relation between changes in foreign institutional holdings and changes in the bid-ask spreads for individual stocks during the period from 1996 to 2007, using instrumental variable regressions. The dependent variables include changes in quoted and effective bid-ask spreads $\Delta QSPRD$ and $\Delta ESPRD$, changes in idiosyncratic volatility ΔIV , changes in first-order autocorrelations of daily stock returns $\Delta \rho$, and changes in firms' turnover ratio, from 1996 to 2007. The control variables include the natural log of market cap $Size$, the book-to-market ratio BM_t , the turnover ratio $Turnover$, return volatility VOL , and the return in the past year $Return$, as measured in 1996. In Column 1, we report the first-stage regressions. The instruments include the membership of Nikkei 225 Index in 1996, the natural log of one plus the number of news stories on individual firms in 2001 covered by the Dow Jones News Wire, and firms' export to sales ratio. We use the Limited Information Maximum Likelihood (LIML) estimator with heteroskedasticity-consistent standard errors.

	ΔFOR	$\Delta QSPRD$	$\Delta ESPRD$	ΔIV	$\Delta \rho$	$\Delta Turnover$
ΔFOR		0.0483 (2.30)	0.0481 (2.44)	2.370 (2.35)	-0.809 (-2.85)	8.897 (2.29)
$Size$	0.0151 (4.58)	-0.00207 (-2.88)	-0.00241 (-3.80)	-0.0138 (-0.45)	0.0328 (3.56)	-0.0251 (-0.20)
BM	0.0157 (2.86)	-0.00148 (-2.00)	-0.00148 (-2.12)	-0.0623 (-1.72)	0.0161 (1.39)	-0.521 (-2.96)
$Turnover$	-0.00165 (-0.27)	0.00198 (4.33)	0.00124 (3.48)	0.0450 (1.63)	0.00168 (0.15)	
VOL	0.0897 (1.08)	-0.0169 (-1.68)	-0.0147 (-1.80)		0.187 (1.15)	3.511 (2.02)
$Return$	0.00462 (0.27)	-0.00199 (-1.25)	-0.00249 (-1.65)	-0.405 (-4.44)	0.0268 (0.70)	-0.316 (-0.80)
$Nikkei\ 225$	0.0298 (2.95)					
$Media\ Coverage$	0.00574 (2.12)					
$Export\ Ratio$	0.0874 (4.27)					
$Industry\ dummies$	Y	Y	Y	Y	Y	Y
$Adj.\ R-squared$	0.179					
Observations	1,152	1,152	1,152	1,152	1,152	1,152

Table 5
Foreign Institutional Holdings and Subsequent Spreads and Short-Term Return
Patterns: Controlling for Future Turnover

This table presents the panel regressions using the fraction of shares owned by foreign institutions (FOR), domestic financial institutions (FIN), domestic business corporations (CORP), and individuals (IND) to forecast the average bid-ask spreads and other proxies for liquidity in the subsequent year controlling for the turnover ratio in the next year over the period 1996–2007. We use two proxies for the bid-ask spreads: the quoted bid-ask spread deflated by the midquote $QSPRD$ (Panel A) and the effective spread (two times the difference between the trade execution price and the midquote) scaled by the midquote and weighted based on the size of trades $ESPRD$ (Panel B). We also use the idiosyncratic volatility, which is measured as the natural log of the standard deviation of the regression residuals of daily stock returns on contemporaneous and five lagged market returns for each year (Panel C). The last dependent variable is the first-order autocorrelation coefficient in daily stock returns for each year (Panel D). The control variables include the natural log of market cap $Size$, the turnover ratio in the next year $Turnover$, the return volatility in the past year VOL , and the annual stock return in the past year $Return$. The regressions include firm fixed effects and year dummies. The t -statistics, below the coefficient estimates, are based on standard errors clustered by firms.

Panel A: Quoted Spread							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FOR_t	0.0270 (10.46)				0.0310 (10.05)	0.0273 (11.28)	0.0221 (8.08)
FIN_t		-0.00628 (-3.55)			0.00371 (1.65)		-0.00523 (-2.43)
$CORP_t$			0.000798 (0.44)		0.00910 (4.01)	0.00546 (2.63)	
IND_t				-0.0138 (-6.35)		-0.00386 (-1.66)	-0.00919 (-3.82)
$Size_t$	-0.00478 (-15.49)	-0.00335 (-11.51)	-0.00359 (-13.27)	-0.00466 (-13.32)	-0.00502 (-13.66)	-0.00504 (-13.39)	-0.00506 (-13.52)
$Turnover_{t+1}$	-0.000696 (-9.59)	-0.000694 (-9.35)	-0.000685 (-9.38)	-0.000623 (-8.73)	-0.000637 (-9.09)	-0.000642 (-9.12)	-0.000653 (-9.20)
VOL_t	-0.00187 (-1.90)	-0.00189 (-1.79)	-0.00176 (-1.68)	-0.00156 (-1.49)	-0.00170 (-1.73)	-0.00174 (-1.76)	-0.00181 (-1.81)
$Return_t$	-0.000700 (-3.01)	-0.00119 (-5.10)	-0.00110 (-4.76)	-0.000814 (-3.39)	-0.000668 (-2.80)	-0.000665 (-2.75)	-0.000659 (-2.74)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.375	0.363	0.362	0.367	0.377	0.377	0.377
<i>Observations</i>	19,117	19,117	19,117	19,117	19,117	19,117	19,117

Panel B: Effective Spread

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>FOR_t</i>	0.0211 (9.95)				0.0241 (9.56)	0.0220 (11.19)	0.0171 (7.76)
<i>FIN_t</i>		-0.00565 (-4.06)			0.00222 (1.25)		-0.00491 (-2.94)
<i>CORP_t</i>			0.00105 (0.75)		0.00730 (4.20)	0.00515 (3.20)	
<i>IND_t</i>				-0.0106 (-6.10)		-0.00226 (-1.21)	-0.00727 (-3.89)
<i>Size_t</i>	-0.00401 (-16.87)	-0.00287 (-12.93)	-0.00308 (-14.98)	-0.00390 (-14.51)	-0.00417 (-14.62)	-0.00418 (-14.21)	-0.00420 (-14.40)
<i>Turnover_{t+1}</i>	-0.000668 (-10.87)	-0.000667 (-10.68)	-0.000657 (-10.74)	-0.000612 (-10.17)	-0.000621 (-10.46)	-0.000624 (-10.49)	-0.000634 (-10.54)
<i>VOL_t</i>	-0.00128 (-1.59)	-0.00131 (-1.53)	-0.00119 (-1.40)	-0.00104 (-1.24)	-0.00116 (-1.45)	-0.00118 (-1.47)	-0.00124 (-1.53)
<i>Return_t</i>	-0.000621 (-3.24)	-0.00101 (-5.29)	-0.000939 (-4.93)	-0.000714 (-3.61)	-0.000609 (-3.09)	-0.000607 (-3.04)	-0.000602 (-3.03)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.384	0.373	0.372	0.376	0.386	0.386	0.386
<i>Observations</i>	19,117	19,117	19,117	19,117	19,117	19,117	19,117

Panel C: Idiosyncratic Volatility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>FOR_t</i>	0.445 (12.88)				0.581 (13.44)	0.454 (10.82)	0.208 (4.97)
<i>FIN_t</i>		-0.187 (-5.05)			0.0689 (1.59)		-0.324 (-7.35)
<i>CORP_t</i>			0.224 (5.91)		0.359 (8.54)	0.216 (4.90)	
<i>IND_t</i>				-0.376 (-10.68)		-0.187 (-4.33)	-0.437 (-10.53)
<i>Size_t</i>	-0.0387 (-10.66)	-0.0182 (-4.75)	-0.0266 (-7.63)	-0.0558 (-12.22)	-0.0458 (-10.25)	-0.0538 (-11.59)	-0.0522 (-11.34)
<i>Turnover_{t+1}</i>	0.106 (18.67)	0.108 (18.64)	0.111 (18.66)	0.111 (18.80)	0.110 (18.56)	0.110 (18.72)	0.109 (18.80)
<i>Return_t</i>	0.582 (6.84)	0.566 (6.90)	0.567 (6.94)	0.573 (6.93)	0.581 (6.88)	0.580 (6.89)	0.572 (6.88)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.552	0.544	0.544	0.551	0.555	0.555	0.555
Observations	19,377	19,377	19,377	19,377	19,377	19,377	19,377

Panel D: First-Order Autocorrelations in Daily Stock Returns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>FOR_t</i>	-0.136 (-5.85)				-0.113 (-4.25)	-0.171 (-6.43)	-0.148 (-5.61)
<i>FIN_t</i>		0.0649 (3.17)			0.0548 (2.31)		0.0200 (0.84)
<i>CORP_t</i>			0.0403 (2.08)		0.0313 (1.41)	-0.0262 (-1.11)	
<i>IND_t</i>				-0.00565 (-0.29)		-0.0638 (-2.62)	-0.0402 (-1.74)
<i>Size_t</i>	0.0302 (10.12)	0.0217 (7.44)	0.0247 (8.81)	0.0239 (7.53)	0.0272 (8.35)	0.0265 (8.02)	0.0268 (8.13)
<i>Turnover_{t+1}</i>	0.00964 (7.90)	0.00965 (7.95)	0.00986 (8.10)	0.00964 (7.96)	0.00987 (8.09)	0.00980 (8.05)	0.00985 (8.11)
<i>Return_t</i>	0.0338 (2.50)	0.0343 (2.42)	0.0337 (2.43)	0.0332 (2.35)	0.0351 (2.61)	0.0345 (2.59)	0.0348 (2.61)
<i>Volatility_t</i>	-6.25e-05 (-0.02)	0.00286 (0.98)	0.00155 (0.53)	0.00203 (0.70)	0.000789 (0.27)	0.000963 (0.33)	0.000873 (0.30)
<i>Firm fixed effects</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year dummies</i>	Y	Y	Y	Y	Y	Y	Y
<i>Clustered S.E.</i>	Y	Y	Y	Y	Y	Y	Y
<i>Adj. R-squared</i>	0.130	0.128	0.128	0.128	0.131	0.131	0.131
Observations	19,096	19,096	19,096	19,096	19,096	19,096	19,096