

Table 2. Year by Year Frequency Distribution of Deferred Tax Assets to Book Value of Equity

DTA is defined as (Deferred Tax Assets – Deferred Tax Liabilities)/(Book Value of Equity) in percent.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DTA \leq -20	2.86	2.20	2.87	2.29	2.70	3.19	4.36	3.44	0.80	0.52
-20 < DTA \leq -15	0.62	0.81	1.38	0.76	1.35	1.12	2.18	2.86	0.60	0.72
-15 < DTA \leq -10	0.75	1.62	1.83	1.20	2.28	2.53	4.63	4.48	1.30	0.62
-10 < DTA \leq -5	1.74	2.78	2.87	1.74	3.84	4.69	8.90	9.16	4.29	2.69
-5 < DTA < 0	7.08	10.09	9.40	6.22	12.46	14.62	20.44	19.47	15.47	12.19
DTA = 0	1.49	0.93	0.34	0.55	0.42	0.19	0.09	0.19	0.50	1.14
0 < DTA \leq 5	46.58	35.73	30.85	28.79	35.31	34.58	32.24	33.87	40.82	39.05
5 < DTA \leq 10	21.61	24.83	24.89	27.59	20.98	20.34	13.35	14.12	20.36	22.52
10 < DTA \leq 15	8.94	9.63	11.12	13.74	8.72	8.15	7.08	6.58	7.88	10.64
15 < DTA \leq 20	4.72	6.03	6.54	7.09	5.30	4.97	3.18	2.96	4.99	4.96
20 < DTA	3.60	5.34	7.91	10.03	6.65	5.62	3.54	2.86	2.99	4.96

Table 3. Year-by-Year Frequency Distribution of Intrinsic Value Ratio

Intrinsic Value Ratio, VR, is defined as the $(V$ at hypothetical tax rate=35%)/(V at current corporate tax rate=40.87%).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
$VR \leq 0.8$	3.23	3.83	5.39	3.93	2.39	2.25	2.27	0.38	1.60	4.75
$0.80 < VR \leq 0.85$	0.75	0.70	0.69	1.09	0.52	0.66	0.27	0.29	0.50	1.45
$0.85 < VR \leq 0.90$	1.24	1.04	2.52	1.31	0.62	0.94	0.91	0.48	0.20	1.65
$0.90 < VR \leq 0.95$	2.61	2.32	4.59	3.49	1.77	1.03	1.45	0.95	1.50	4.86
$0.95 < VR \leq 1.00$	13.17	14.15	22.25	13.96	5.71	3.84	5.54	3.91	5.89	27.38
$1.00 < VR \leq 1.05$	16.52	14.15	15.71	8.62	6.02	5.34	6.45	5.53	7.19	13.33
$1.05 < VR \leq 1.10$	42.48	41.65	27.29	38.06	57.94	61.20	64.40	73.76	66.37	29.03
$1.10 < VR \leq 1.15$	13.04	11.83	11.01	14.83	14.43	14.71	11.35	10.11	9.08	9.19
$1.15 < VR \leq 1.20$	2.24	3.94	3.44	5.78	4.05	4.12	2.82	1.72	3.19	2.89
$1.20 < VR$	4.72	6.38	7.11	8.94	6.54	5.90	4.54	2.86	4.49	5.48

Table 4. Industry-wise Frequency Distribution of Intrinsic Value Ratio at the end of June 2009

	#Firms	VR ≤ 0.8	0.80 < VR ≤ 0.85	0.85 < VR ≤ 0.90	0.90 < VR ≤ 0.95	0.95 < VR ≤ 1.00	1.00 < VR ≤ 1.05	1.05 < VR ≤ 1.10	1.10 < VR ≤ 1.15	1.15 < VR ≤ 1.20	1.20 < VR
Construction	68	4.41	0.00	4.41	0.00	14.71	7.35	38.24	14.71	7.35	8.82
Foods	47	4.26	2.13	2.13	4.26	12.77	10.64	38.30	12.77	2.13	10.64
Textiles&Apparels	31	6.45	0.00	0.00	12.90	38.71	16.13	16.13	6.45	3.23	0.00
Chemicals	88	0.00	3.41	3.41	3.41	29.55	14.77	27.27	7.95	3.41	6.82
Pharmaceutical	19	0.00	0.00	0.00	0.00	15.79	5.26	63.16	10.53	5.26	0.00
Glass&Ceramics Products	26	7.69	0.00	0.00	0.00	46.15	15.38	11.54	11.54	3.85	3.85
Iron&Steel	24	4.17	4.17	4.17	16.67	33.33	4.17	29.17	4.17	0.00	0.00
Metal Products	33	6.06	3.03	3.03	6.06	27.27	24.24	15.15	9.09	0.00	6.06
Machinery	88	4.55	1.14	1.14	12.50	23.86	6.82	30.68	7.95	2.27	9.09
Electric Appliances	107	4.67	0.93	1.87	0.93	43.93	17.76	24.30	1.87	2.80	0.93
Transportation Equipment	41	7.32	0.00	0.00	4.88	31.71	21.95	21.95	9.76	0.00	2.44
Precision Instruments	22	0.00	0.00	0.00	0.00	45.45	18.18	22.73	9.09	0.00	4.55
Other Products	37	0.00	0.00	0.00	5.41	40.54	13.51	18.92	8.11	5.41	8.11
Electric Power&Gas	19	5.26	0.00	0.00	0.00	15.79	47.37	26.32	5.26	0.00	0.00
Land Transportation	32	0.00	0.00	3.13	0.00	12.50	9.38	46.88	15.63	0.00	12.50
Warehousing	15	0.00	6.67	0.00	0.00	20.00	13.33	6.67	13.33	26.67	13.33
Wholesale Trade	92	5.43	1.09	1.09	7.61	20.65	7.61	35.87	11.96	3.26	5.43
Retail Trade	37	2.70	0.00	0.00	8.11	21.62	13.51	37.84	13.51	2.70	0.00
Services	67	10.45	2.99	0.00	5.97	14.93	11.94	38.81	8.96	1.49	4.48

Table 5. Summary of Firms' Characteristics at the end of June 2009

Definition of DTA and LCF are the same as in Tables 1 and 2. $\ln MV$ denotes the natural logarithm of market value of equity in million yen and B/M denotes the book-to-market ratio of the firm in percent. μ_{TI} and σ_{TI} are the drift term and volatility of taxable income divided by book value of equity in percent.

	DTA	LCF	$\ln MV$	B/M	μ_{TI}	σ_{TI}
$VR \leq 0.8$	5.91	6.90	9.93	152.97	-1.16	15.85
$0.80 < VR \leq 0.85$	5.02	3.27	10.70	122.12	-0.87	11.79
$0.85 < VR \leq 0.90$	5.20	4.54	10.64	126.32	-1.34	8.58
$0.90 < VR \leq 0.95$	4.41	2.71	10.21	149.91	-1.10	9.27
$0.95 < VR \leq 1.00$	4.54	5.66	10.10	154.23	-2.66	10.58
$1.00 < VR \leq 1.05$	7.84	4.07	10.63	146.35	-2.82	6.37
$1.05 < VR \leq 1.10$	5.69	1.43	10.54	124.45	1.12	5.34
$1.10 < VR \leq 1.15$	5.65	3.77	10.39	134.81	0.35	11.07
$1.15 < VR \leq 1.20$	5.96	7.34	10.27	128.18	-0.08	14.30
$1.20 < VR$	5.21	6.06	10.05	150.20	-0.50	14.49

Figure 1. Trend of Effective Statutory Corporate Tax Rates in Japan

The effective statutory tax rates for large corporations in Japan, including the national tax, the municipal tax, and the enterprise tax. The source is the National Tax Bureau and the uniform rate is assumed for the municipal tax rate.

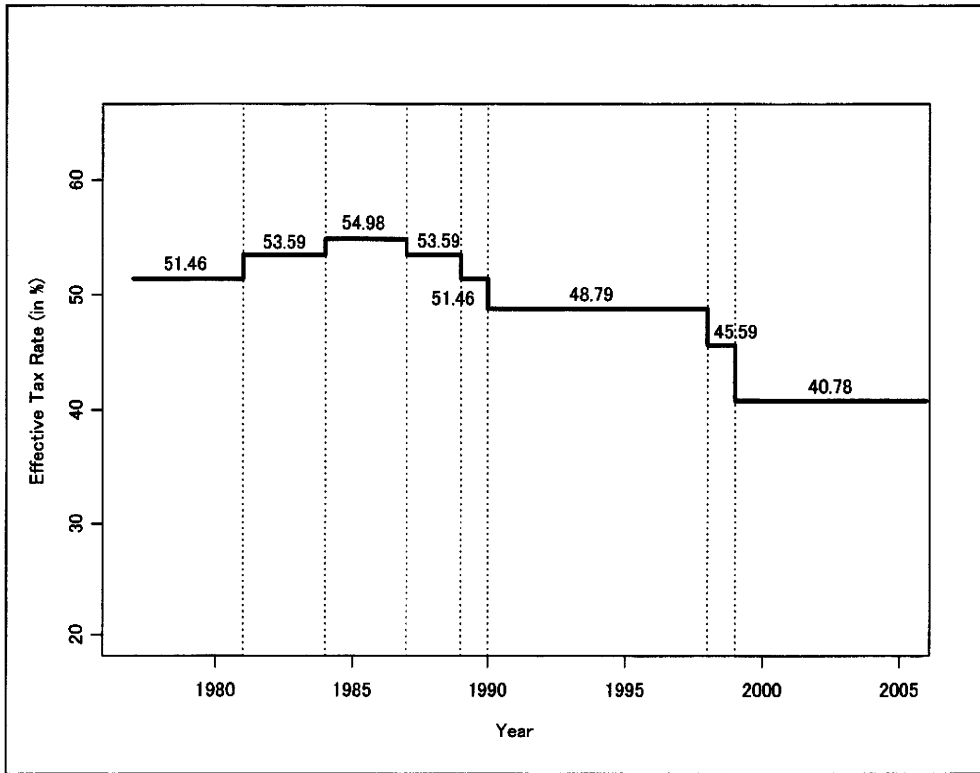
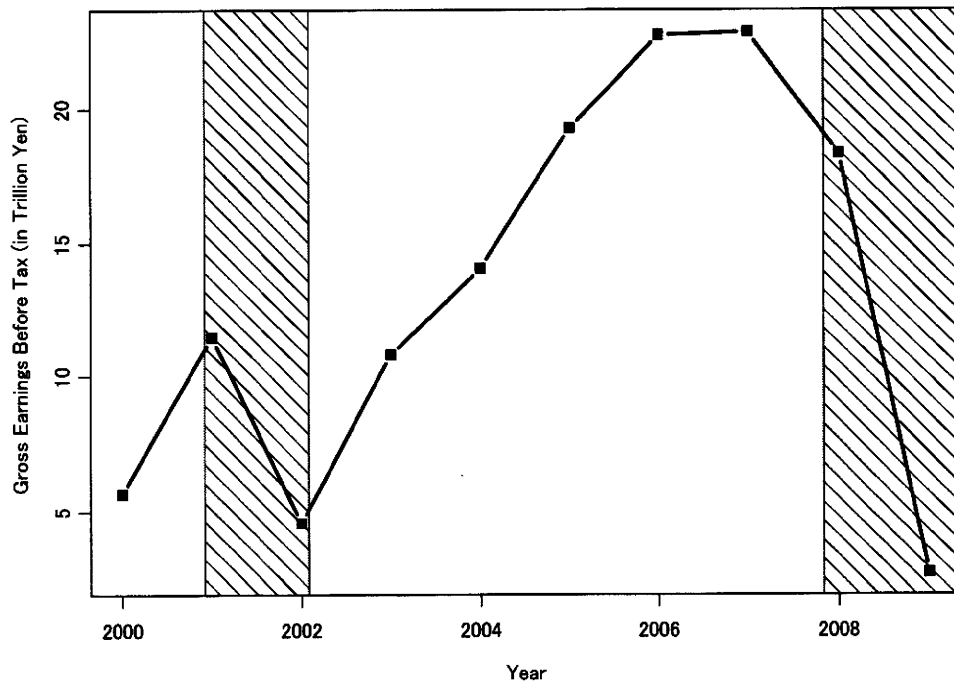


Figure 2. Expansion and Contraction Period and the Trend of Corporate Earnings before tax in Japan

The solid line is the sum of earnings before corporate tax for the sample firms and the shaded area is the contraction period as defined by the Cabinet Office of Japan.



Ownership structure, liquidity, and firm value:
Effects of the investment horizon

Jun Uno¹ and Naoki Kamiyama²

¹ Waseda University, Graduate School of Finance, Accounting and Law. This research is supported by the Financial Service and Innovation Management Research Project, sponsored by the Ministry of Education, Culture, Sports, Science and Technology, FY2008. Correspondence to Jun Uno, 1-4-1 Nihombashi, Chuo-ku, Tokyo 103-0027, Japan; Tel. 81-3-3272-6798; fax 81-3-3272-6783; e-mail juno@waseda.jp.

² Deutsche Securities Inc.

We benefited from the comments and suggestions of Yakov Amihud, Marti G. Subrahmanyam, and Hung Wan Kat. We thank participants at Nippon Finance Association Annual Meeting 2009, The 22nd Australasian Finance and Banking Conference, Asian Finance Association Conference 2010, and 13th Conference of Swiss Society for Financial Market Research.

Abstract

A firm's ownership structure influences both its liquidity and value. This paper investigate the above relation by introducing a new measure of latent investment horizon, a weighted average investment horizon computed from the firm's ownership structure and the average investment horizon of various investor categories. We find that the latent investment horizon explains differences in liquidity and firm value among firms listed on the Tokyo Stock Exchange. Empirical results indicate that the longer the investment horizon, the lower the firm's liquidity and value. In addition, concentrated ownerships by insider and cross-holding shareholders can lead to inferior liquidity and firm value.

JEL Classification: G10, G32

Keywords: Ownership structure, liquidity, monitoring, corporate governance, market microstructure

1. Introduction

This paper investigates how ownership structure is related to a firm's market liquidity and value. If the market liquidity of the firm's shares declines due to concentrated ownership, the value of the firm is expected to decrease. According to Bhide (1993) and Holmstrom and Tirole (1993), illiquidity may result from increased asymmetric information. On the other hand, large shareholder faces liquidity constraint to unwind her holdings so that she ought to strengthen monitoring the firm's management and contributes to increase a firm's value. There is a trade-off between illiquidity and level of corporate governance.

Maug (1998) and Kahn and Winton (1998) suggest that greater liquidity can be an opportunity for large shareholders to increase their profit by monitoring the firm's management. They mention the case where a large shareholder chooses to buy more shares when the firm's performance is expected to improve as a result of monitoring activities. The greater the liquidity, the more shares can be bought in the market due to lower transaction costs. Thus, a higher concentration of ownership does not necessarily mean a trade-off between corporate governance and illiquidity. This differs from past views such as in Bhide (1993), where a stock's high liquidity renders large shareholders less aggressive in their monitoring and more likely to sell shares when they find poor performance of the firm's management.

Thus prior theoretical literature address the impact of concentrated ownership on a firm's market liquidity and value, but does not consider shareholders' investment horizons which differ substantially among shareholders. When a firm has many shareholders with a longer (shorter) investment horizon, its market liquidity diminishes (increases). In this study we

investigate the relation between the average investment horizon of the entire ownership and a firm's liquidity as well as value that Amihud and Mendelson (1986) predicts.

Atkins and Dyl's (1997) study on the relation between investor average holding period and liquidity is similar to ours. They find a strong correlation between a stock's share turnover and bid-ask spread. Our paper differs from theirs in the following regards.

First, we use the latent investment horizon instead of turnover. Turnover, the authors' proxy for the shareholders' investment horizon, is observed ex post and therefore deviates from the ex ante average holding period of the firm's ownership structure, because turnover is largely affected by short-term trading activity and informational events such as quarterly reports and takeover bids. Our paper focuses on how ownership structure affects stock liquidity. We need a proxy for the ex ante average holding period of shareholders that is not computed from a realization of mixed trading interests. Second, we use a liquidity measure such as Amihud's (2002) *ILLIQ* in addition to the bid-ask spread. *ILLIQ* is reflected by not only the bid-ask spread but also market impact and thus represents a wider scope of liquidity, which is relevant for both small individuals and large institutional investors as an indicator of transaction cost.

For the ex ante investment horizon, this study calculates a weighted average investment horizon of a firm's shareholders for Japanese companies listed in the First and Second Sections of the Tokyo Stock Exchange (TSE). We follow Mahanti et al. (2008), who were the first to use latent liquidity to estimate transaction cost of corporate bonds. In their study, the authors estimate the investment horizon of corporate bondholders using data from custodian banks. In our case, however, there are no corresponding data available from custodian banks. Therefore, we estimate the latent investment horizon of each stock from the ownership ratio

and the market wide investment horizon of investor category, such as foreigners, banks, and individuals. The average investment horizon of each investor category is computed from the aggregate amount of the holding and the total trading volume of TSE-listed companies.

By considering the average investment horizon of the ownership structure, we can address cases in the real economy where, under the same concentrated ownership, a firm's market liquidity and value are higher because the weighted average investment horizon of its shareholders is shorter than others. We show that a firm's weighted average investment horizon is highly correlated with market liquidity and firm value. We expect that the shorter the investment horizon, the higher the liquidity and value of the firm. Additionally, there are two distinct categories of large shareholders in Japan: foreigners and cross-holders (mochiai). These investors are opposites in terms of investment horizon and monitoring management. We shed some light on specific investor categories and whether the size of their presence affects firm liquidity and value.

Our results are summarized as follows: (1) The longer the latent investment horizon, the lower the liquidity. (2) Longer investment horizon leads to lower firm value. (3) Investor category has a distinct effect on liquidity, with foreigners impacting positively and cross-holders negatively. The results imply that ownership structure relates to a firm's liquidity and value. Our results indicate that the higher the proportion of short horizon shareholders, the higher the firm's liquidity and value. On the other hand, a firm with a high proportion of infrequent investors who do not monitor management and facilitate the entrenchment of current management results in lower firm liquidity and value. Based upon these results, strengthening cross-holding is an inferior corporate policy, since it ultimately impairs the liquidity of the entire market.

The remainder of this paper is organized as follows. Chapter 2 proposes a new approach to the relation between ownership and liquidity, with a brief overview of previous work. The data and sample stocks are described in Chapter 3. Chapter 4 presents our empirical results and Chapter 5 gives our conclusions.

2. A New Approach and Hypotheses

2.1 Prior research

A firm's ownership concentration influences its liquidity and value. We argue that the manner in which ownership structure affects liquidity depends upon a weighted average investment horizon of the firm's shareholders. If the average investment horizon of the firm is longer, then the illiquidity of its shares is more severe.

Amihud and Mendelson (1986) model predicts that illiquid stocks are owned by investors with longer investment horizon. If these investors do not actively monitor a firm's management and they do not trade, the firm's share liquidity remains low. As suggested by Maug (1998), and Kahn and Winton (1998), if a firm's shareholders commit to monitoring management, they trade frequently to maximize their profits from their private information and thus contribute to improve the stock's liquidity.

Bhide (1993) and Holmstrom and Tirole (1993) demonstrate a negative correlation between ownership concentration and firm liquidity. When the founding shareholder owns all of a firm's shares, there is no liquidity. If the founding shareholder sells off a small part of the shares, liquidity improves but monitoring incentives are decreased gradually. This is due to a free rider problem in which minority shareholders enjoy the monitoring efforts of a large shareholder. On the other hand, the informational advantage of large shareholders who

commit to monitoring increases information asymmetry among investors, causing lower liquidity. Thus, a trade-off exists between liquidity and monitoring. Neither of the authors considers the investment horizon of the firm's shareholders.

Kahn and Winton (1998) and Maug (1998) argue that large shareholders might not release their ownership when market liquidity is high. While a large shareholder continues monitoring management to improve the firm's value, more shares can be bought to maximize profit. The decision on how many shares to add depends upon market liquidity or transaction costs. The authors also point out that for monitoring to remain profitable, it is crucial that the monitoring information be accurate. They do not, however, examine the investment horizon of large shareholders.

A small number of empirical studies have been carried out on the trade-off between liquidity and corporate governance. Gaspar and Massa (2007) empirically examine the trade-off between monitoring and liquidity. They show that informed ownership improves governance and induces value-enhanced decisions, but reduces liquidity due to increased adverse selection cost. Rubin (2007) finds that liquidity is positively correlated to total institutional holdings but negatively correlated to institutional block holdings. The level of institutional holdings proxies for trading activity, and the concentration of ownership, such as block holdings, proxies for adverse selection costs. Sarin and et al. (2000) analyze ownership concentration by insiders and by institutional investors. They report decreased liquidity in both cases: by insiders from increased asymmetric information and by institutional investors from inventory costs. Garvey and Swan (2002) empirically verify Holmstrom and Tirole's (1993) hypothesis with a sample of 1,500 U.S. companies and report that high liquidity has a positive impact on shareholder value.

Atkins and Dyl's (1997) study, which is similar to ours, on the relation between investor average holding period and the bid-ask spread for NASDAQ and New York Stock Exchange stocks finds strong evidence that the turnover ratio, computed by dividing a firm's number of outstanding shares by its annual trading volume, is related to the bid-ask spread. The authors do not consider ownership structure, so they do not examine whether higher turnover is due to a firm's ownership structure or not. It is important to distinguish latent liquidity from trading volume. Therefore, we introduce a new measure of the weighted average investment horizon to determine the level of liquidity for individual stocks.

Effects from investment horizon of institutional investors have mixed results. Yan and Zhang (2007) conclude that short-term institutions are better informed based upon the facts that short-term institution's trading is positively related to future stock return and earnings surprises. On the other hand, Gaspar et al. (2005) and Chen et al. (2007) report that higher holdings by long-term investors are associated with improvement of post-event performance in case of takeover and merger & acquisitions.

With regards to foreign investors, Tesar and Werner (1995) find that the turnover rate on equity held by non-residents is higher than the overall turnover rate on the domestic market. Foreigners respond to changes in economic conditions by making frequent and sizable shifts in their holdings of foreign securities, even though much of this activity has little impact on net investment position. According to Nitta's (2000) analysis of data from 1988 to 1997, a positive correlation exists between the ratio of foreign ownership and management performance measures such as return on equity (ROE), but a negative correlation is observed in the case of the cross-holding ownership ratio and management performance.

In Japan, foreigners and cross-holding shareholders are important constituents in ownership structure. Foreigners typically have a shorter investment horizon and are apt to monitor management, they expect to contribute improvement of liquidity and value, whereas cross-holding shareholders typically have a longer investment horizon and are less active in monitoring management. We expect that the larger the percentage of foreign ownership, the higher the firm value; on the other hand, the larger the percentage of cross-holding owners, the lower the firm value. The Japanese market provides an ideal data set to test the previously proposed hypothesis.

2.2 Hypotheses

We test the following hypotheses with respect to the relation of ownership structure, liquidity and firm value.

H1: The longer the investment horizon, the lower the liquidity. If a firm has many long-term investors, they will trade infrequently such that the liquidity of the stock will remain low.

H2: The higher the ownership concentration, the lower the liquidity. Ownership concentration is to strengthen information asymmetry, which increases transaction costs, reduce liquidity³. The proxy of concentration is top30 ownership. We separate the top30 ownership into insider and non-insider portion to investigate the effect of which is greater.

H3: We test whether investor category who owns large amount of shares affects size and direction of impact on liquidity. When high cross-holding ratio is associated with high top30 ratio, we expect an increase in illiquidity, whereas when high foreign ownership ratio is associated with high top30 ratio, we expect decrease in illiquidity. Because foreigners are

³ A definition of *Insider* is shares held by insiders within top thirty shareholders. That of *Top30* extracts insiders' share ownership from that of top thirty shareholders.

short horizon investors and sensitive to management entrenchment, their large presence reduces negative impact on liquidity caused by concentration itself. Cross-holders are opposite to foreigners with respect to investment horizon and monitoring management.

H4: For firm value, the shorter the horizon, the higher the value due to positive liquidity effect.

H5: Presence of large shareholders creates tradeoff between monitoring and liquidity because there are two countervailing effects, negative effect from asymmetric information and positive effect from monitoring. Which factor has larger effect on corporate value is an empirical question. Considering investor categories who own large proportion of a firm and whose investment horizon is significantly different, we may point out factors strongly related to firm value.

3. The Data

We use four years of data on First and Second Section companies on the TSE, from 2004 to 2007. The sample includes 1,657 to 1,686 stocks for which liquidity and cross-holding data are fully available. As shown in Figure I, the cross-holding structure of Japanese companies changed rapidly during this period. The Program for Financial Revival implemented in 2002 accelerated the unwinding of cross-holding by banks, while the presence of foreign investors rose.

3.1 Investment horizon

A firm's investment horizon is estimated from two sources of the data. First, the investment horizons of an investor group are computed from the aggregated market data provided by the TSE. Each investor group's investment horizon is the total trading volume during the year divided by the average portfolio market value at the start and end of each year. The data source for stock ownership by investor group is the TSE's Share Ownership Survey. The trading amount of each investor group is compiled by the TSE and published annually in its Investment Trends by Investor Group.⁴ There are four investor categories used at this stage of the estimation: foreigners, individuals, non-financial corporations, and a group of financial institutions (trust banks, insurance companies, and banks).⁵ The following is the equation for an investor group j 's investment horizon in year t :

$$(1) \text{ InvestmentHorizon}_t^j = \frac{(\text{portfolio market value}_t^j + \text{portfolio market value}_{t-1}^j) \times \frac{1}{2}}{\text{total yen trading volume}_t^j}$$

(Table 1 around here)

Table 1 shows the average investment horizon for each investor group at the aggregate level. A non-financial corporation's investment horizon (*Horizon*) is 5 to 7 years and an insurance company's *Horizon* is 15 to 21 years, which is the most inactive among six investor categories in Table 1. The *Horizon* of foreigners is 0.2 to 0.4 year, which means they trade two to five

⁴ The original monthly data frequency was converted into fiscal years. The ownership survey covers seven local markets in Japan, whereas trading volume covers three major markets. The volume on four local exchanges account for about 0.01% of total trading volume in the entire market.

⁵ In the classification of financial institutions, the investor categories in annual reports do not match the three subgroups available in the TSE statistics, such as commercial banks, insurance companies, and trust banks. Therefore, we take an average of the investment horizons for commercial banks, insurance companies, and trust banks as the investment horizon for financial institutions when computing the investment horizons of the TSE-listed companies.

times a year. The *Horizon* of individuals is 0.3 to 0.5 year. The finding that foreigners' *Horizon* is shorter than that of domestic investors is consistent with Tesar and Werner (1995). The authors report turnover rates in domestic equity held by foreign residents for five major countries—including the United States, the United Kingdom, and Japan—and find that foreign investors transact at a significantly higher rate than domestic investors.

Next, we compute *Horizon* for firm k in year t as follow:

$$(2) \quad \textit{Horizon}_t^k = \sum_{j=1}^4 w_{k,t}^j \times \textit{Horizon}_t^j$$

where j represents one of four investor categories, foreigners, individuals, non-financial corporations, and financial institutions; $w_{k,t}^j$ is a firm j 's ownership ratio obtained from the company's annual report; and $\textit{Horizon}_t^k$ is the market-wide investment horizon by investor group. The data source for ownership structure was QUICK's AMSUS. Thus, the investment horizons for all listed firms are estimated based upon companies' ownership structure⁶.

⁶ The following example illustrates the computation of equation (2). In 2007 Sony Corporation's ownership ratios $w_{k,t}^j$ of foreigners, individuals, non-financial corporations, and financial institutions were 50.73, 23.11, 3.10, and 21.57%, respectively. Using the $\textit{Horizon}_t^j$ and $w_{k,t}^j$, we compute the weighted average of Sony's investment horizon, which is about 2.8 years:

A weighted average of Horizon

$$\begin{aligned} &= 0.217 \times 50.73\% + 0.373 \times 23.11\% + 6.77 \times 3.1\% + \frac{1}{3} \times (0.959 + 16.659 + 15.650) \times 21.57\% \\ &= 0.11008 + 0.08620 + 0.20987 + 2.39197 = 2.8 \text{ year} \end{aligned}$$

We use the NEEDS database as an additional source of data on large individual shareholders such as the founder (owner) of a firm and, national and local governments on the top 30 shareholders list. We use these data to adjust the above computation. Since neither a founder (owner) nor a government trade like ordinary individual investors, we assign the longest investment horizon among six sub-investor categories in the same year to their ownership category.

3.2 Ownership structure

3.2.1 Ownership concentration by insiders and non-insiders

Our measure of ownership concentration is the sum of the top 30 shareholders' holdings divided by the total number of shares outstanding. In addition, we partition block-holdings into its two major components, insiders' and non-insiders' equity holdings⁷. Higher concentration by insiders may be a signal of weak governance, whereas concentration by non-insider serves as a proxy for the probability that informed investors participate in the market. The concentration by non-insiders strengthens the severity of adverse selection costs.

3.2.2 Investor category ownership ratio

Equity holding by an investor category is computed as the number of shares owned by each investor category divided by the total number of shares outstanding. Foreign and individuals investor are used in a regression analysis.

⁷ Rubin (2007) uses insider and institutional block holdings to measure concentration. Hartzell and Starks (2003) use a measure that is the top five non-insider institutional investors' holdings divided by the total number of institutional holdings.

3.2.3 Cross-holding

Our measure of cross-holding shareholders is the Mochiai holding ratio of each stock, estimated by the NLI Research Institute. The Mochiai holding occurs when two listed companies mutually hold shares, confirmed through disclosed materials.⁸ An average Mochiai ratio is around 9% and the maximum is above 50%.⁹

3.3 Liquidity

Total trading cost consists of bid-ask spread and market impact cost. Goyenko et.al.(2009) suggests that reliable proxy for spread and market impact are different. We select Amihud (2002)'s illiquidity measure¹⁰ for the proxy of market impact and quoted spread¹¹ for the proxy of adverse selection cost.

3.3.1 Market impact measure

Amihud measure is the monthly average of the absolute daily return divided by the daily yen volume. We eliminate stocks traded less than 10 days per month. Here, *ILLIQ* shows the relation between price change and volume; it is a rough estimate of spread plus market impact cost. We use the average relative illiquidity (*RILLIQ*) for each fiscal year:

$$(3) \quad ILLIQ_{iy} = \frac{1}{D_{iy}} \sum_{t=1}^{D_{iy}} \frac{|R_{iyd}|}{VOL_{iyd}}$$

⁸ Alternative measure is the Antei (=stable) holding, where the ownership of a firm's shares by banks and life insurance companies is disclosed but the firm's holdings of counterparty shares cannot be confirmed by disclosed materials. Our choice of cross-holding measure does not affect the empirical results. Refer to Nitta (2002) for details.

⁹ Nitta (2002) shows that the higher the cross-holding ratio, the worse the various managerial indices, such as the ROE.

¹⁰ This measure is one of best measure as a proxy for market impact, according to Goyenko et.al.(2009)

¹¹ Quoted spread is widely used as a proxy for adverse selection costs such as Atkins and Dyl (1997) and Rubin (2007).