creative commons
COMMONS DEED

저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:

저작자표시. 귀하는 원저작자를 표시하여야 합니다.

비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.

변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 이용허락규약(Legal Code)을 이해하기 쉽게 요약한 것입니다.

Disclaimer

dCollection

Ph.D. Dissertation

Individuals as Noise Traders

- Evidence from Korean Stock Listings -

잡음거래자로서의 개인투자자위험에 대한 고찰

August 2015

College of Business Administration
Graduate School
Seoul National University
Business Administration Major

Joung Hwa Choi

Abstract

Individuals as Noise Traders: Evidence from Korean Stock Listings

Joung Hwa Choi

College of Business Administration

The Graduate School

Seoul National University

Individual investors are deemed uninformed and are known to cause risks. This dissertation finds empirical evidence that such individuals are the source of noise trader risk that discounts the prices of Korean stock listings from their fundamental values. Using daily observations of 185 pairs of "old-type" preferred and common stocks listed on the Korea Stock Exchange (KSE) and Korea Securities Dealers Automated Quotations (KOSDAQ) from January 2000 until October 2014, I examine the time-varying effect of individual trading weight on the discount of preferred stocks that on average show higher proportions of individual trading than common listings. For a given pair of common and preferred stocks issued on identical assets in place, preferred stock discount has been known in the literature to be due to dual-class differences in dividend yield, voting rights, and liquidity. However, in this dissertation, the excess of the individual trading proportion of

preferred stocks compared with that of comparable common listings statistically and economically significantly explains the variation in preferred stock discount after controlling for firm-level characteristics, the aforementioned dual-class factors, size measures, etc. Because this finding is also robust with regard to either negligible or negative preferred stock discounts (premiums), it is specific evidence of noise trader risk from individual traders in preferred stocks.

This research sequentially expands the analysis to common stocks in order to investigate whether noise trader risk, when individual trading weight acts as its proxy, is priced in common equity returns in the Korean stock market. Based on a sample of 658 non-financial firms listed on the KSE and surviving during January 2000 to October 2014, the same sample period as before, this research finds that the excess return of sorted portfolios by individual trading weight (dense minus scarce—DMS), in addition to the conventional three factors of market excess return, the size factor (small minus big—SMB), and the book-to-market (B/M) factor (high minus low—HML), meaningfully accounts for common stock returns in both time-series and panel regressions. Interestingly, the size-controlled factor-mimicking portfolios of noise trader risk appear to determine conspicuously the returns of high individual trader density stocks. This means that noise trader risk disappears or is not priced when arbitrageurs are actively present.

In order to bolster this finding, three tests are conducted to identify systematic noise. First, the correlation between a value-weighted measure of the change of individual trading weight and the value-weighted market return shows a co-movement pattern. Second, a correlation analysis of the change of individual

trading weights of sample stocks yields a significantly positive association. Third, a principal component analysis of the change of individual trading weight confirms that the main principal components occupy sizable proportions of variances.

Overall, these results provide Korean evidence of the discount of asset prices due to individuals generating noise trader risk.

Keywords: Noise trader risk, Individuals, Preferred stock discount
Student Number: 2009-30885

Table of Contents

1 Introduction 1

2 Literature review and hypotheses development 4

2.1 Literature on noise trader risk 4

2.2 Literature on preferred stock discount 7

2.3 Hypotheses 8

3 Data and construction of variables 9

3.1 Data and variables of sample preferred stock listings 9

3.2 Data and variables of sample common stocks 18

4 Main results 23

4.1 NTR of preferred stocks 24

4.2 NRT of common stocks 29

5 Robustness tests 34

5.1 NTR under bull and bear market conditions 34

5.2 NTR of preferred stocks with high and low ITWs with regard to comparable common stocks 36

5.3 Endogeneity 37

5.4 Inclusion of new-type preferred stocks 38

6 Individuals as the source of systematic noise 40

7 Conclusion 43

References 45

List of Figures

Figure 1. Comparative dynamics of preferred stock discount and relative individual trading weight 49

Figure 1.1 Comparative dynamics of preferred stock discount and relative individual trading weight by market conditions for the full sample 49

Figure 1.2 Comparative dynamics of preferred stock discount and relative individual trading weight by market conditions 50

Figure 1.3 Comparative dynamics of preferred stock discount and relative individual trading weight by level of individual trading weight 52

Figure 1.4 Comparative dynamics of preferred stock discount and relative individual trading weight controlling for endogeneity 54

List of Tables

Table 1 Summary statistics for daily observations of common and preferred stock pairs 56

Table 2 Annual trends of preferred stock discount rate and main explanatory variables 57

Table 3 Correlation coefficients among main variables 59

Table 4 Summary statistics of non-financial common stock sample ... 61

Table 5 Decile by decile (100) portfolios sorted in ascending orders of firm size and individual trading weight 62

Table 6 Descriptive statistics and correlation coefficients 65

Table 7 Preferred stock discount against relative individual trading weight 66

Table 8 Fama-MacBeth cross-sectional regression results 69

Table 9. Panel regression results 70

Table 10 Time-series regressions of the excess returns of size-quintile by ITW-quintile (25) test portfolios onto FMPs 71

Table 11 Preferred stock discount against relative individual trading weight during bull markets 75

Table 12 Preferred stock discount against relative individual trading weight during bear markets 78

Table 13 Time-series regressions of the excess returns of size-quintile by ITW-quintile (25) test portfolios onto FMPs during bull markets 81

Table 14 Time-series regressions of the excess returns of size-quintile by ITW-quintile (25) test portfolios onto FMPs during bear markets 85

Table 15 Comparison of sample statistics for the subsamples by high ITW and low ITW 89

Table 16 Regressions of preferred stock discount with high individual trading weight 90

Table 17 Regressions of preferred stock discount with low individual trading weight 93

Table 18 Summary statistics for the closing prices of subsamples 96

Table 19 Preferred stock discount within the range of 30%-30% (premium) against relative individual trading weight 97

Table 20 Preferred stock premium against relative individual trading weight 100

Table 21 Comparison of sample statistics for new-type and old-type preferred and common stocks 103

Table 22 Preferred stock discount of old- against new-type preferred stocks and relative individual trading 104

Table 23 Systematic movement of individual trading weight 107

Abstract in Korean 109

1. Introduction

Individual investors in general have limited access to the inside, or fundamental, information of security issuers. There have been considerable evidence that individuals are uninformed traders. Individuals often tend to trade single stocks on an erroneous noise or invest in mutual funds at high fees rather than construct or hold a market portfolio (Jensen, 1968; Lease et al., 1974). In this regard, Kyle (1985) and Black (1986) label such individuals as "noise traders" because of their sub-optimal behavior.

Although the market influence of individuals has been rather neglected because of the use of the efficient market hypothesis (EMH) as a mainstream and dominant doctrine (Fama, 1970), De Long et al. (1990) theoretically show that noise trade risk (NTR) created by uninformed individual traders can limit the entrance of arbitrageurs; thus, associated stock listings can trade at persistent discounts against their fair values. Since De Long et al.'s (1990) seminal work, much scholastic effort has been devoted to shedding light on the role of retail investors as a systematic source of risk and on the effect of their sentiment on stock returns (Lee et al., 1991; Shleifer, 2000; Barber et al., 2009b; Kumar and Lee, 2006; Kang et al., 2013).

Although studies since De Long et al. (1990) have concentrated on the systematic patterns of individual traders and on the dynamic relationship between investor sentiment and stock returns, this dissertation focuses on how the trades of individual investors affect the pricing and returns of stocks listed on the Korean stock market. This research proposes individual trading weight (ITW) as a measure of

noise trader risk and a catalyst to improve the explanatory power of preferred stock discount or common stock returns in both time-series and cross-sectional dimensions.

The experiment begins with pairs of common and preferred stocks. I examine the time-varying effect of the relative ITW of preferred and common stocks on the relative discount of preferred and common stocks. Preferred stocks, on average, exhibit heavier individual trades than common listings. For a given pair of common and preferred stocks issued on identical assets in place, preferred stock discount (PSD) has been known in the literature to be largely due to the absence of voting rights. However, even with mainly non-volatile voting rights, market PSDs have shown large time-varying movements. Using 185 pairs of old-type preferred and common stocks listed on the Korea Stock Exchange (KSE) (169) and Korea Securities Dealers Automated Quotations (KOSDAQ) (16) from 2000[1] until 2014, the excess of the individual trading proportion of preferred stocks compared with that of comparable common listings (relative ITW) that are statistically and economically significant explains the variation in PSD after controlling for firm-level characteristics and dual-class factors. Because this finding is also robust with regard to either negligible or negative PSDs (premiums), it is specific evidence of NTR in preferred stocks. Thus, individuals in the Korean stock market deter the parity-convergence of common-preferred equity pairs. In other words, this is Korean evidence of informed traders' contribution to price discovery.

The analysis then expands to common stock listings. Based on a sample of 658 non-financial firms listed and surviving on the KSE during the sample period

[1] Trade-level investor information was made available from 2000.

from 2000 until 2014, a cross-sectional regression in accordance with Fama and MacBeth (1973) reveals that the ITW of prior months is positively associated with the common stock returns of subsequent months. This preliminary outcome remains robust after conducting multi-factor panel regressions after controlling for clustered errors with time- and firm-fixed effects. Accordingly, I construct 25 portfolios sorted by firm size and ITW, and estimate the excess returns of portfolios in terms of the proportions of individual traders (dense minus scarce—DMS). In time-series regressions, in addition to Fama and French's (1993) three factors of market (market excess return), SMB (small-minus-big size factor), and HML (high-minus-low book-to-market (B/M) valuation factor), the DMS (excess return of ordered portfolios by size-controlled ITW) meaningfully accounts for the returns of common stocks of high individual trader density. This implies that those common stocks with insufficient arbitrage or high individual trading proportions are relatively well priced against noise trader risk. However, the models that include DMS do not survive Gibbons, Ross, and Shankens's (GRS) (1989) F-test for the zero intercepts of 25 regression models at the 10% significance level.

These two analyses assume that individuals' trades are systematic and simultaneously influence all stocks. As a safety check, three simple statistics based on the change of ITW are provided in order to support evidence of individuals subject to co-movement. First, ITW as a main proxy variable for NTR shows a dynamic relation with sample stock returns according to significant correlation coefficients between the value-weighted measure of the change of ITW and the value-weighted stock return. Second, with regard to the issue of systematic movement, the average

estimate of correlation coefficients among the changes of ITWs of 320 complete trading stocks is significantly positive. Last, the variance explained by the main factors from a principal component analysis (PCA) of the changes of ITW is sufficiently large. These results provide additional evidence of systematic noise.

The rest of this dissertation is organized as follows. Section 2 provides a review of the literature on PSD and NTR from which I derive two hypotheses. Section 3 describes data sources and defines key variables. Section 4 investigates the NTR of preferred and common stocks. Section 5 implements robustness checks for the empirical results contingent upon market conditions and various subsamples of PSD. Section 6 offers simple tests of systematic noise and, finally, Section 7 concludes this research.

2. Literature review and hypotheses development

The objective of this research is to raise and test the hypotheses regarding the effects of individual traders on variations in PSD and common stock returns. Thus, the following literature review considers two fields: noise trader risk and PSD.

2.1. Literature on noise trader risk

The market influence of individual investors has been debated among researchers in behavioral finance and adherents of the EMH. Based on the thoughts and compilations of Friedman (1953) and Fama (1965), the EMH states that uninformed traders within a given market have restricted market influence. Also, the

EMH posits that any price deviation from the fair value will be eliminated by rational arbitrageurs' transactions with uninformed traders. Thus, a mispriced security will recover its fundamental value, and uninformed traders, following repetitively incurred losses, will disappear from the efficient market as a result. In a move away from the status quo, De Long et al. (1990) theoretically show that transaction risks generated by noise traders may prevent short-term, risk-averse, rational arbitrageurs from entering the market and exploiting price deviations; thus, stock mispricing can persist for a prolonged period.[2] Also, De Long et al. (1990) relate NTR to various

[2] In a two-period simple overlapping generations (OG) model, both arbitrageurs and noise traders face NTR in the subsequent generation upon liquidation of their earlier constructed combined portfolios of risk-free and risky assets. The implied asset price as a solution to a utility maximization problem ($MaxU = -e^{-(2\gamma)w}$) is as follows:

$$p_t = 1 + \frac{\mu(\rho_t - \rho^*)}{1+r} + \frac{\mu\rho^*}{r} - \frac{(2\gamma)\mu^2\sigma_\rho^2}{r(1+r)^2},$$

where

· w : period-end expected wealth, absolute risk aversion parameter

· μ : proportion of noise traders, : proportion of rational arbitrageurs

· r : risk-free rate (payoff of the risk free asset = 1)

· $\rho_t \sim N(\rho^*, \sigma_\rho^2)$: magnitude of misperception of fair value by noise traders

(1) $\frac{\mu(\rho_t-\rho^*)}{1+r}$: change in the price of a given risk asset due to the fair-value misperception of noise traders

(2) $\frac{\mu\rho^*}{r}$: price deviation from fair value with non-zero misperception

(3) $-\frac{(2\gamma)\mu^2\sigma_\rho^2}{r(1+r)^2}$: price discount due to NTR

The discount is larger with a higher proportion of noise traders () according to Term (3) or according to the pricing equation given a sufficiently small and positive magnitude of misperception $\left(\rho_t > 0 \text{ and } \mu > \frac{(1+r)(r\rho_t+\rho^*)}{(2\gamma)\sigma_\rho^2}\right)$.

market phenomena such as the excess volatility of asset prices, the mean reversion of stock returns, the closed-end fund (CEF) discount,[3] and the equity premium puzzle (Mehra and Proscott, 1985). Lee et al. (1991) empirically extend the NTR foundation of De Long et al.'s (1990) theory to explain the CEF discount. Elsewhere, Baker and Wurgler (2007) expound how investor sentiment dynamically provides impact to stock returns.

With the theoretical modeling of NTR and the empirical implications of dynamics between investor sentiment and stock returns, studies on specific countries such as Australia (Jackson, 2002) and Germany (Dorn et al., 2008) elucidate the systematic movement of individual investors. Other studies consider the propagation of structural market sentiment measured by buy-sell imbalances (BSIs) toward stock returns on the U.S. (Kumar and Lee, 2006) and Korean (Kang et al., 2013) exchanges. Also, Kaniel et al. (2008) explain the dynamic relation between net individual purchases and short-horizon returns while Barber et al. (2009b) define motion by individuals as a systematic noise and assert that investor sentiment is generated by psychological biases.

However, this dissertation focuses on the relation between the trades of individual investors and stock pricing in the Korean stock market. This research proposes ITW as a proxy for NTR and highlights its contribution to improving the

[3] The excess volatility of asset prices is due to the limits of arbitrage in the presence of NTR. The mean reversion of returns occurs when the unpredictability of noise traders' transactions follows a stationary process. CEF discount is observed in high-NTR assets commensurate with the risk premium of noise traders.

explanatory power of a specific case. I then sequentially expand the scope of analysis to common stocks in order to confirm whether NTR is priced in overall equity returns.

2.2. Literature on preferred stock discount

Zingales (1994, 1995) is a well-cited reference for PSD and elaborates on the voting rights premium of common stocks. The common shareholders of a given company not only have voting rights but also opportunities to gain private benefits with management control. PSD will be larger as these gains and privileges become more attainable, thus giving rise to a higher value for voting rights (Zingales, 1994). Zingales (1995) finds that the price deviations between common and preferred stocks are not substantial in countries such as the U.S. that have well separated corporate ownership and management, and highly diversified shareholder composition. Country-specific cases for Israel (Levy, 1983), the U.K. (Megginson, 1990), Switzerland (Horner, 1988), Korea (Kim et al., 1996; Chung and Kim, 1999), and 18 countries (Nenova, 2003) show varying PSDs[4] with differences in the voting rights premium due to the cross-border stratification of corporate governance. Further, Muravyev (2004) suggests liquidity as an additional factor of common stock premiums in Russia. Institutional changes that affect the private benefits of large shareholders in tandem with their ownership (Kim et al., 1996; Chung and Kim, 1999) and that take place in the market for reasons of corporate control (Kook and Chung,

[4] PSDs in various economies are as follows: 81.5% in Italy, 45.5% in Israel, 20% in Switzerland, 13.3% in the U.K., 3% (Zingales, 1995) or 5.4% (Lease et al., 1983) in the U.S., and 10% (Chung and Kim, 1999) or 48% (Nenova, 2003) in Korea.

1996), together with the liquidity of preferred stock listings (Chay and Moon, 2005; Han, 2010), appear to matter in the evaluation of voting rights and determination of PSD in Korea.

2.3. Hypotheses

When a higher proportion of individual traders in a stock listing implies a lower density of arbitrageurs, ITW can serve as a proxy for NTR. This research tests whether ITW is an effective risk factor for determining the returns of two asset classes: common-preferred arbitrage portfolios and common stocks. If ITW proportionately represents NTR, then those stock listings that are heavily traded by individuals will trade at discounted prices relative to their fair values. I approach this research issue in two ways. First, using a sample of common-preferred pairs, I investigate PSD due to the gap in the ITWs of comparable common and preferred stocks. A given pair of common and preferred equities, which share identical firm-level characteristics, can be compared by using ITW after controlling for voting rights, liquidity, fundamental and systematic risks, dual-class differences in dividend yield, etc. The relative price deviation of a preferred stock issue from its comparable common stock listing (PSD) is measured by the excess of the latter compared with the former and divided by the former. Thus, I propose the following hypothesis.

H1: A larger PSD is expected following a relative increase in the density of individuals' trading (ITW) in a preferred stock compared with that of a common stock peer after controlling for aggregate and idiosyncratic factors.

Second, the focus migrates to a sample of common stocks. The NTR is expected to be positively associated with common stock returns as a statistically and economically significant risk factor. This raises the second alternative hypothesis as follows.

H2: The return of a common stock will be higher as individual traders become denser, and ITW will, on average, be positively associated with common stock returns. Further, ITW, as a proxy for NTR, is a risk factor of pricing common stocks.

I follow De Long et al.'s (1990) approach in placing the homogeneity and systematic motions of noise traders.[5]

3. Data and construction of variables

3.1. Data and variables of sample preferred stock listings

The experiment begins with PSD. The daily prices of 185 pairs of common and preferred stocks listed on the KSE and KOSDAQ from January 2000 until October 2014 are procured from DataGuide. Other information on dividends, voting rights, trading volume and amount, and transaction information are also obtained

[5] Further discussions on, and tests of, systematic noise are considered in Section 6.

from DataGuide based on the pairs of "old-type" preferred and common stocks. "New-type" preferred stocks are excluded in the main analysis because of the "fewer" disadvantages faced by preferred equity holders such as minimum dividend yield, cumulative dividend options, and common convertibility.[6] I filtered out the first five trading days in each year in accordance with the January effect; those listings with fewer than 10 trading days or with the lowest 10% in trading volume; and common-preferred pairs with more than 10% PSD. Over the sample period, conglomerate information for the indexation of private benefits related to voting rights is procured from the Korea Fair Trade Committee (KFTC). The final sample consists of 185 pairs of common and preferred stocks traded on the KSE (169) and KOSDAQ (16) with a total of 347,235 firm-day observations.

[Insert Table 1 about here.]

Table 1 provides the descriptive statistics of the key characteristics of variables for the sample pairs of common-preferred stocks on a daily basis. The total market capitalization, trading amount, and trading volume of common stocks are about 17, 20, and 28 times those of preferred counterparts respectively. However, preferred stocks appear to be relatively more liquid by 33% based on turnover

[6] In Korea, "new-type" preferred stocks were first issued in 1996 to alleviate the pricing anomalies of under-liquid, "old-type" preferred stocks whose additional floatation is outlawed. The number of old-type preferred stocks (185) outnumbers that of new-type alternatives (56). Also, the inclusion of the latter in various robustness checks leaves the inferences herein largely intact (Section 5).

defined as trading volume normalized by the total outstanding preferred stock issues. In terms of ITW, preferred stocks (91%) are more densely transacted by individual traders than common issues. In contrast, allegedly informed institutional and foreign investors occupy 4.4% and 4.8% (0% median) of the average trades in preferred stocks as opposed to 13.1% and 10.5% for common listings respectively. This finding indirectly corroborates the theory about the limited opportunities for arbitrageurs to exploit seemingly substantial PSD.

3.1.1. PSD and key explanatory variables

With regard to the regression of PSD on ITW and others known to affect PSD (dividends, voting rights, and liquidity), the concerned variables are provided and characterized in the following sections.

3.1.1.1. Dependent variable

There are three known measures of PSD in the literature. First, Zingales (1994) and Kim et al. (1996) define PSD as the price difference of common and preferred stocks divided by the common stock price for their respective Italian and Korean studies: $\frac{\text{Common share price}-\text{Preferred share price}}{\text{Common share price}}$. Second, various country-specific cases for the U.S. (Cox and Roden, 2002), Russia (Muravyev, 2004), and Korea (Chay and Moon, 2005; Han, 2010), in relating the relative pricing of preferred stocks to voting rights, dividends, and liquidity, adopt the ratio of the prices of preferred to common listings as follows: $\frac{\text{Preferred share price}}{\text{Common share price}}$. Last, in their

analysis of institutional changes in voting rights, Kook and Chung (2000) use the relative premium of a given common stock to quantify the value of legal entitlement as follows: $\frac{\text{Preferred share price}-\text{Common share price}}{\text{Preferred share price.}}$, which may be overly unstable as a dependent variable because of the more volatile nature of preferred stock prices. Although the first and second gauges of PSD are equivalent, the purpose of this research is to identify a new risk factor in order to explain stock returns. Thus, I adhere to Zingales (1994) and Kim et al.'s (1996) convention as the dependent variable, which is also the return of common-preferred arbitrage. The PSD of a given common-preferred pair (i) in a given day (t) is defined as follows:

$$PSD_{i,t} = \frac{\text{Common share price}_{i,t}-\text{Preferred share price}_{i,t}}{\text{Common share price}_{i,t}}.$$

3.1.1.2. Explanatory variables

The discounts of preferred or premium common stocks have been largely explained by dual-class differences in dividends, voting rights, and liquidity in the literature. In this research, I introduce the density of individual traders as a proxy for NTR that contributes to the determination of the returns of common and preferred stock listings in addition to the aforementioned existing covariates.

3.1.1.2.1. Relative ITW

De Long et al. (1990) show that those stocks with high proportions of

individual traders can carry price discounts due to NTR. Assuming that ITW is a proxy for NTR, this research tests whether the excess ITW of preferred compared with common stocks can serve as a statistically and economically significant risk factor of PSD. The relative ITW of a given common-preferred pair (i) in a given day (t) is defined as follows:

$$RITW_{i,t} = \text{Indv. Trading weight of Preferred stock}_{i,t} - \text{Indv. Trading weight of Common stock}_{i,t}$$

$$= \frac{\text{Indv. trading volume of Preferred stock i,t}}{\text{Total trading volume of Preferred stock i,t}} - \frac{\text{Indv. trading volume of Common stock i,t}}{\text{Total trading volume of Common stock i,t}}.$$

Accordingly, extending the reasoning of De Long et al. (1990), preferred stocks with ITW higher than their common counterparts will trade at discounted prices relative to respectively associated common listings. As a result, PSD is expected to be larger as the difference between the ITWs of preferred and common stocks (RITW) becomes higher.

3.1.1.2.2. Dividend

Because Korean old-type preferred stocks tend to yield an additional 1% dividend (against a KRW 5,000 face value, and thus KRW 50 more), relative to common stocks upon payout decisions, the announcement of a dividend rather than the amount will affect the relative discount of preferred stocks. Thus, the dividend dummy variable in a given year (y) equals one if the payout took place in the prior year ($y-1$) of a common stock (i), because dividend payment is deemed a consistently credible signal, or zero otherwise. Thus:

$$Dividend_{i,y} = \begin{cases} 1 \text{ if divided was paid in period y} - 1 \\ 0 \ o.w. \end{cases}$$

PSD may contract until the announced dividend day because of a higher demand for the preferred stock issue. Thus, a dummy variable that will interact with the dividend dummy in regression models controls for five trading days prior to a given dividend day. The equation is as follows:

$$Dividend\ Drop_{i,t} = \begin{cases} 1 \text{ from} - 5 \text{ days until} - \text{day prior to dividend day t} \\ 0 \ o.w. \end{cases}$$

Should an additional 1% dividend of a preferred stock listing be similarly accepted in the subsequent period, there will be a relative rise in the preferred stock price and the increment will be pronounced closer to the dividend day. The interacted term of a dividend fall and payout dummies is expected to negatively affect PSD.

3.1.1.2.3. Value of voting rights

Zingales (1994, 1995) argues that the value of voting rights is influenced by the extent of private benefits via entitled management control and the probability of proxy fights. Large shareholders' voting rights will be deemed more expensive as the resulting privileges become larger. Also, proxy fights will occur as the large shareholders attempt to increase their stakes to absolute control ownership (exceeding 50%); however, the probability of further proxy fights will diminish afterwards.

Although many studies do not discuss the magnitude of private benefits because of the unavailability of direct measurement, this section follows the conglomerate dummy variable of Kim et al. (1996).[7] The percentage ownership of large shareholders is used to predict the probability of control transfer by Kim et al. (1996), Kook and Chung (2000), and Chay and Moon (2005).[8] However, the value of voting rights is non-linearly affected by the stake of large shareholders. As the ownership of large shareholders gradually increases, but is still far from absolute control, the value of voting rights will rise when proxy fights loom. As proxy fights are unlikely after gaining absolute control (a stake greater than 50%), voting rights will be regarded as less valuable when management stabilizes.

Since PSD is expected to be larger as the value of voting rights becomes higher, the relative discount of an average preferred stock listing is greater (1) for a KFTC-designated conglomerate affiliate whose private benefits are deemed larger than those of a non-conglomerate firm; (2) when a proxy fight is probable; (3) when the largest stake is high because a proxy fight is then likelier; and (4) when the interacted term of the largest stake and the absolute controlling stake is low because a proxy fight is then less likely. The variables discussed thus far pertaining to the value of the voting rights of a common stock (i) in a given day (t) and their expected signs are as follows:

---

[7] Kim et al. (1996) find that the PSD of a conglomerate affiliate is higher than that of other organizations. This is in line with Zingales's (1994) argument about the private benefits created by transferring wealth among the firms within a conglomerate.

[8] Zingales (1994, p.139) reports that the dummy variable of absolute controlling ownership is empirically equivalent to the Shapley value of proxy fights with two large shareholders.

$$Cheabol_i\ (+) = \begin{cases} 1 \text{ for a KFTC} - \text{designated conglomerate firm} \\ 0\ o.w. \end{cases},$$

$$Largest\ Stake_{i,t}\ (+) = \text{ Largest common share percentage ownership},$$

$$Absolute\ Control_{i,t}\ (-) = \begin{cases} 1 \text{ for largest comm. ownership } > 50\% \\ 0\ o.w. \end{cases}$$

$$\Longrightarrow Largest\ Stake \times Absolute\ Control\ (-).$$

3.1.1.2.4. Liquidity

Muravyev (2004), Chay and Moon (2005), and Han (2010) find that the relative liquidity of preferred compared with common stocks can be a significant explanatory variable of PSD in their Russian and Korean studies. The measures of liquidity are trading volume, relative turnover (trading volume normalized by the total number of outstanding stocks), and dollar volume. Amihud (2002) suggests the ratio of the absolute value of return to contemporaneous dollar volume as a gauge of illiquidity. PSD is expected to be larger as the relative turnover or dollar volume becomes lower, or as the relative Amihud ratio of preferred to common stocks becomes higher. The definitions of these relative measures of liquidity of a given common-preferred pair (i) on a given day (t) and their predicted signs with respect to PSD are as follows:

$$Relative\ Turnover_{i,t}\ (-)$$

$$= \frac{\text{Pref. stock trading volume}_{i,t}}{\text{Total no. of outstanding pref. shares}_{i,t}}$$

$$- \frac{\text{Comm. stock trading volume}_{i,t}}{\text{Total no. of outstanding comm. shares}_{i,t}},$$

$$Relative\ Dollar\ Volume_{i,t}\ (-) = \frac{\text{Preferred stock dollar volume}_{i,t}}{\text{Common stock dollar volume}_{i,t}},$$

$$Relative\ Amihud\ ratio_{i,t}\ (+)$$

$$= \frac{|\text{Preferred stock return}_{i,t}|}{\text{Pref. stock dollar volume}_{i,t}} - \frac{|\text{Common stock return}_{i,t}|}{\text{Comm. stock dollar volume}_{i,t}}.$$

[Insert Table 2 about here.]

Table 2 lists the annual estimates, means, and standard deviations of the dependent variable, PSD, and key explanatory variables of regressions to be implemented in later sections. Through the sample period, an average preferred stock listing trades at a substantial discount of 24.9% against its benchmark common stock; further, the discount rate varies over time with a trend. The important covariates also show time-series variations and appear to be possible explanatory factors of PSD.

[Insert Table 3 about here.]

In Table 3, which tabulates the pairwise correlation coefficients of PSD and other variables, one can note the high and statistically significant correlation between

PSD and ITW, suggesting that ITW is likely to be a strong risk factor of PSD. The dummy variable of the prior year's dividend payout and the interacted term of large common stock ownership and the absolute controlling stake dummy show unexpected, significantly possible correlations. Also, the relative Amihud measure reveals a negative association with PSD. Although other explanatory variables have expected signs with PSD, because these allegedly exogenous variables are also correlated, any judgment about their impacts on PSD awaits further regressions and robustness tests.

3.2. Data and variables of sample common stocks

This research continues by asking questions with regard to common stock listings, beginning with a sample of 2,136 non-financial firms listed on the KSE and KOSDAQ from January 2000 until October 2014. The prices, trades, and accounting information of sample common stocks are obtained from DataGuide by filtering out those listings with less than a year of transactions and with closing prices less than KRW 1,000 (about US$1). The final observations are for 92,603 firm-months. For the monthly risk-free rate, the one-year monetary stability bond (MSB) annual rate is divided by 12. The time-series of the one-year MSB rate is procured from the Bank of Korea's Economic Statistics System (ECOS).

[Insert Table 4 about here.]

According to Table 4, which provides the sample statistics, average KSE-

listed, KSE-surviving, and KOSDAQ-listed firms are worth KRW 968.4, 1,060.4, and 86.2 billion respectively in common stocks with individual trader proportions of 81.7%, 80.6%, and 94.2% respectively, suggesting that smaller firms are more heavily traded by individuals. For this reason, KOSDAQ listings are not included in the common stock sample because of their consistently high and invariant proportions of individual traders. NTR stemming from individuals leads to persistent discounts for which additional returns do not compensate. Also, delisted firms are not considered in the sample for stocks because imminent delistings are often wholly "infested" with uninformed individuals, thus rendering the inference of the effect of ITW on returns uninformative. Consequently, the final common stock sample comprises 658 non-financial firms that survived on the KSE through the sample period.

3.2.1. Variables for Fama-MacBeth cross-sectional and panel regressions

As a cross-sectional explanatory variable and proxy for NTR to explicate common stock returns, I use the closing ITW of the prior month $(t-1)$ for respective listings (i) as follows:

$$ITW_{i,t-1} = \frac{\text{Individual trading volume of common shares}_{i,t-1}}{\text{Total trading volume of common shares}_{i,t-1}},$$

where the dependent variable is the monthly return of associated common stocks.

With regard to panel regressions controlling for clustered errors, the

monthly excess returns of common stocks are regressed onto the prior month-end ITW and the Fama-French three factors. The market factor is the monthly excess returns of the value-weighted average of the Korea Composite Stock Price Index (KOSPI) and KOSDAQ indices over the monthly adjusted rate of one-year MSB $\left(R_{m,t} - R_{f,t}\right)$. The breakpoints of portfolio formation of the size (SMB) and valuation (HML) factors are entirely based on KSE-listed common stocks to prevent the estimates from being biased toward KOSDAQ-listed small capitalization stocks. The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations; B/M—small (below median) as opposed to big; and valuations—low (lowest 30%), high (highest 30%), and medium (the rest). As a result, the respective factors are the excess returns based on the monthly value (market capitalization)-weighted average returns of six implied portfolios. Given this, the SMB and HML factors in month t are estimated as follows:

$$SMB_t = Small_t \left(\frac{SH_t+SM_t+SL_t}{3}\right) - Big_t \left(\frac{BH_t+BM_t+BL_t}{3}\right),$$

$$HML_t = High_t \left(\frac{SH_t+BH_t}{2}\right) - Low_t \left(\frac{SL_t+BL_t}{2}\right).$$

With regard to panel regressions controlling for clustered errors with time- and firm-fixed effects, the monthly estimates of the Fama-French three factors disappear because of the monthly time-fixed effect.

3.2.2. Variables for time-series regressions

In order to construct factor portfolios based on ITW that proxies for NTR, identification of ITW characteristics and the appropriate control variables of the factor-mimicking portfolio (FMP) is required. Table 5 has the detailed estimates of ITW and firm size. Also, Table 5 shows the representative statistics of 100 (10 by 10) portfolios of the sample common stocks sorted by firm size and ITW, and rebalanced on a yearly basis.

[Insert Table 5 about here.]

Studying 100 portfolios in Panel A of Table 5 reveals that portfolios with smaller firm sizes have heavier weights on listings with higher proportions of individual trading. For example, for 10 portfolios with stocks of the smallest market capitalizations ($Size_{10}$), there is no observation with the lowest ITWs (ITW_{10}) as opposed to 3,452 with the highest ITWs (ITW_{100}). In contrast, for 10 portfolios with listings of the largest firm sizes ($Size_{100}$), one can find 4,227 estimates with the lowest ITWs (ITW_{10}) as opposed to no observation with the highest ITWs (ITW_{100}). Changes in average ITW and market capitalization among 100 portfolios sorted by individual trader density (ITW) and firm size can be seen in Panels B and C. Panel B shows an average downturn in ITW in ascending order of firm size while Panel C exhibits the reverse. Panel D summarizes the average returns of respective ITW-size portfolios. It shows that although the return becomes higher as market capitalization becomes lower, the pattern of return with respect to ITW is not readily discerned.

Since these average returns are not controlled for firm characteristics, the effects of ITW on common stock returns cannot be determined solely on univariate correlations.

Accordingly, firm size is used to control for the factor portfolios sorted by ITW. The six "ITW (3) by size (2)" portfolios are rebalanced on a yearly basis with monthly returns estimated using the value weights of market capitalizations at the ends of prior months. As a result, the excess return of portfolios that are dense and scarce with regard to individual traders (DMS), after controlling for size, is estimated as follows:

$$DMS_t = High_t \left(\frac{High_{ITW}Small_{size,t} + High_{ITW}Big_{size,t}}{2}\right) - Low_t \left(\frac{Low_{ITW}Small_{size,t} + Low_{ITW}Big_{size,t}}{2}\right).$$

[Insert Table 6 about here.]

Table 6 depicts the sample statistics of factor portfolios described hitherto. First, the factor portfolios of ITW (DMS) and value stock (HML) excess returns expose numerically significant non-zero returns in Panel A. Because the volatility, not magnitude, of portfolio returns is deemed more influential as an explanatory variable of single stock returns, the standard deviation estimates (3.9%-6.7%) of respective excess return factors (market, SMB, HML, and DMS) appear reasonable. With regard to the correlations of factor portfolio returns compared in Panel B, the

proportion of individual investors (ITW) still has a high correlation (0.518) with the market capitalization of listings even after controlling for firm size. This implies that the time-series patterns of respective arbitrage portfolio returns are largely similar apart from the negative association between firm size and ITW. Consequently, it is necessary to identify various pricing models with respect to size (SMB) and ITW (DMS) factors in multivariate regression (see Section 4.2).

The test assets for time-series regressions are organized in similar ways as those of Fama and French (1993) by sorting. The sample common stocks are arranged into quintile size and quintile ITW portfolios with cut-off values set at the end (size) and the average of the last month (ITW) of prior years respectively. Subsequently, the monthly returns of the resulting 25 portfolios are estimated by using the market-capitalization value weights obtained from the ends of prior months.

4. Main results

NTR in stock trades stems from short-term price uncertainty due to erroneous perceptions of uninformed traders. In general, mispriced stocks will be identified by informed traders or arbitrageurs, who will force their trades toward fair values. However, the presence of noise traders will prevent arbitrageurs from entering the market because of disequilibria with regard to the short-term nature of their portfolios; as a result, displaced stock prices will persist for a prolonged period (De Long et al., 1990).

This section provides the empirical test results of the two previously raised

hypotheses pertaining to NTR. First, this research focuses on whether the excess ITW of a given preferred stock listing compared with its comparable common equity determines PSD, after controlling for identical firm-level characteristics and dual-class differences of dividends, voting rights, and liquidity. Second, the focus migrates to the expanded sample of common stocks. This sequential analysis questions whether an increase in the proportion of individual traders (ITW), as a source of NTR, gives rise to higher returns of the common stocks of KSE-surviving firms and verifies whether ITW is a risk factor.

4.1. NTR of preferred stocks

Preferred stocks are not a burden on firm leverage nor do they dilute existing ownership. Instead, they cater for the needs of investors who favor high cash flows rather than those who are entitled to voting rights because of seniority in asset claims and cumulatively unpaid dividends. Thus, the price deviations between common and preferred stocks of identical fundamental values are known in the literature to be due to dual-class differences in dividends and voting rights, etc. Yet, because the additional cash flows to the preferred shareholders in Korea are marginal (an additional 1% dividend against a KRW 5,000 face value relative to common stocks), the voting rights premiums of common stocks have been considered the dominant source of persistent PSD. Most preferred stock listings trade at discounted prices[9] relative to common stocks whose premiums have been known to be due to

[9] Some preferred stocks trade with premiums relative to their comparable common equities because of speculation after the illiquidity of preferred stocks. This research excludes the

eligible voting rights (Zingales, 1994, 1995). Ubiquitously observed in numerous capital markets around the world, PSD not only structurally varies in the cross-section of sovereign differences in corporate governance but also fluctuates in time series. Korean-listed preferred stocks had traded at an average 10% discount against common equities in the 1990s but the disparity has broadened to a 20%–40% range beyond 2000.[10] As seen in Table 2, the moderate trend in the value of voting rights implies hidden elements of the time-varying discount rate of preferred equities. Accordingly, Muravyey (2004) and Chay and Moon (2005) argue that the relative liquidity differential between common and preferred stocks can be a significant explanatory factor.

As another source of PSD, I suggest that preferred stock listings are more heavily traded by individual investors than comparable common equities, as seen in Table 1. Thus, the relative pricing of common-preferred stock pairs with identical fundamentals and aggregate risk can be expounded by dual-class distinctions, including the relative difference in the density of individual traders. This section

---

outliers by filtering out pairs with preferred premiums and PSDs in the lowest 10% (PSD below 3.4%). These outliers are considered later in robustness tests.

[10] In the 1990s preferred stocks were actively traded in their early phase after introduction (Chay and Moon, 2005). The overall widening of PSD was also considered to be due to events that affected the value of voting rights such as the restriction of cross-preferred shareholding among firms in 1994, the exclusion of preferred stocks from index futures contracts in 1994, the enactment of coerced open stock purchase in 1996, and the relaxation of foreign ownership restrictions in 1997 (Kook and Chung, 2000). Since the sample period of this research begins in January 2000, the effects of institutional changes on PSD are considered.

affirms the NTR-pricing argument with specific evidence from PSD.

[Insert Table 7 about here.]

In Table 7, PSD is regressed onto the relative ITW after controlling for variables pertaining to dividends, voting rights, and liquidity (defined in Section 3.1) based on 185 pairs of common and old-type preferred equities traded from January 2000 until October 2014. As the density of individual traders is conspicuously inversely correlated with firm size (Table 5), the simple association between PSD and relative ITW may be noisy with uncontrolled size effect. Thus, in order to separate the role of firm size from the discount of preferred stocks due to the trading density of individuals, a relative measure of firm size is further controlled. For the relative size of a given preferred stock as opposed to its comparable common stock, the relative smallness (the inverse measure of size) is defined as

$$Relative\ Smallness\ of\ Preferred\ Stock_{i,t} = 1 - \left(\frac{\text{market cap. of pref. stock}_{i,t}}{\text{market cap. of comm. stock}_{i,t}}\right),$$

for a given firm (i) on trading day (t). I also control for market, firm size (SMB), and valuation (HML) because these are common risk factors that can affect PSD. Other than the yearly dummies of dividend information and conglomerate affiliation, every observation is obtained on a firm-day basis.

The finding pertaining to the NTR discount of preferred stocks in Model 1 shows that PSD becomes larger (0.203) as the preferred stock listings are traded by

individuals relatively more heavily. The discount increases as the relative market value of preferred stocks (1.412) with higher estimates of relative smallness reduces. This seemingly simple relation remains robust when controlling for the known determinants of PSD such as dividends (Model 3), voting rights (Model 4), and liquidity (Model 5), with economically strong and statistically significant coefficient estimates in the range 0.116–0.184. Model 6 provides a regression result that additionally controls for the Fama-French three factors. As seen in Model 5 compared with Model 6, controlling for the three factors of market, firm size (SMB), and valuation (HML) does not affect the extent and significances of the coefficients at all.

As a conventional model of preferred stock discount, Model 7 provides regression results with the same control variables of Model 8 without the firm-fixed effect. Thus, Model 7 provides results based on the traditional explanatory variables of PSD. According to these findings, PSD is statistically significantly narrower for those firms that paid dividends in prior fiscal years (-0.116). Additionally, the price deviations diminish for the pairs before their dividend drops (-0.003), albeit numerically and statistically weakly. With regard to the variable of voting rights, PSD is greater when large shareholder ownership (0.004) becomes higher as the value of voting rights for common equity holders rises. However, PSD wanes once an absolute controlling stake has been secured (-0.0012), a circumstance that depreciates voting rights. In this situation, neither coefficient estimate is statistically significant. The common shareholders of a chaebol-affiliated firm are deemed more privileged than their non-conglomerate peers because the former's voting rights are

evaluated more highly owing to heightened private benefits (0.188). The coefficient estimates of relative dollar volume and illiquidity (Amihud) measures are either statistically insignificant or have signs opposite to earlier predictions. The relative turnover variable has economically and statistically meaningful implications (-1.722): The price difference is less as the preferred stocks become relatively more liquid. However, when Model 8 controls for firm-fixed effects (on a monthly rather than daily basis) as a convention in panel regression, the significance disappears for the chaebol dummy (which is totally due to the firm-fixed effect). Further, the Amihud ratio and the signs of the coefficient changes are the opposite for the largest stake, although the interaction term with absolute control is statistically insignificant. Comparing the conventional Model 8 with Model 5, which additionally controls for the effect of relative ITW and the relative smallness on PSD with fixed effect, the only variable that retains statistical significance with appropriate signs among the variables in the literature is relative turnover (-1.328).

The empirical exercises with various combinations of models and controls presented in Table 7 suggest a tentative conclusion that the discount of preferred stocks is economically and statistically meaningfully affected by the relative weight of individual trading on preferred stocks rather than common equities. This "individuals as noise traders" argument provides an important clue to decomposing the sources of PSD by controlling for dual-class characteristics while canceling out the perfectly shared fundamentals of the issuers of common and preferred equities. This dissertation also contributes to the studies on PSD that have appeared since Zingales (1994, 1995) by identifying the population density of individual traders as

a new factor in the relative pricing of dual-class stocks. However, the sizable portion of discount yet to be explained by the models formulated thus far, namely $1 - R^2 = 0.882$ for Models 5 and 6 of Table 7, requires further scholastic attention.

Another line of thought is that preferred stocks may be more heavily traded by individual investors than common stock listings, although the two instrument types are much alike with identical underlying assets because the former costs less. This concern will be addressed in Section 5 by focusing on a subsample of preferred stocks trading at near-parity or with premiums in order to check for the robustness of hitherto empirical inferences cited in Table 7 after controlling for such endogeneity.

4.2. NTR of common stocks

4.2.1. Evidence of NTR from cross-sectional and panel regressions

Table 8 summarizes 177 cross-sectional Fama-MacBeth regressions of common stock returns onto the last month-end ITW from January 2000 until October 2014 based on 92,603 KSE-surviving firm-month observations. The coefficient estimate of the last month-end ITW is 0.002, which is statistically indifferent from zero. The t-statistics within parentheses are adjusted for robust standard errors in accordance with Newey and West (1987).

[Insert Table 8 about here.]

Even though the coefficient average is not significantly different from zero in Table 8, Table 9 shows the significant results of panel regressions of the monthly excess returns of sample common stocks, compared with the risk-free rate, onto ITW in addition to the Fama-French three factors of market, firm size (SMB), and valuation (HML) when controlled for clustered errors and firm- and time-fixed effects.

[Insert Table 9 about here.]

Individuals wield economically and numerically meaningful influences on common stock returns. The individual trader density factor is positively strong and significant through Models 1 to 5 with known determinants of stock returns (excess returns of market and small value stock portfolios), having controlled for month and firm-fixed effects. In other words, the returns of Korean common stocks are higher as the proportion of individual traders becomes heavier. Thus, the intensity of individual traders in stock trades (ITW) as a proxy for NTR is priced in common equity returns. The coefficient estimates in the panel regressions are in the range 0.003–0.024, which is in line with those of the cross-sectional regression in Table 8 (even though they are not significant). Models 1 to 4, which do not control for time- and firm-fixed effects, yield a coefficient output that is equivalent to the cross-sectional exercise with a firm-fixed effect as shown in Table 8.

4.2.2 Evidence of NTR from time-series regressions

Whether the excess return of portfolios sorted by ITW (DMS) can be an effective risk factor of common equity returns in addition to the Fama-French three factors is the next issue to address. Can these multi-factor time-series models price Korean common stocks? Table 10 answers this question by implementing time-series regressions of 25 test assets (explained in Section 3.2) onto the monthly returns of an FMP. As seen in Table 6, the returns of ITW (DMS) and firm size (SMB) factor portfolios are highly and positively correlated with a correlation coefficient estimate of 0.518. Accordingly, various multi-factor models with these two factors are identified and tested for their fitness in Table 10.

[Insert Table 10 about here.]

In Panel A of Table 10, the returns of 25 test assets sorted by individual trader proportion and firm size are regressed in time series onto the excess returns of market portfolios and ITW (DMS). Although market and individual trader (DMS) factors are statistically significant when associated with the common stock returns of test assets, numerically valid and non-zero intercepts (α) may weaken the full aptitude of these models to explain the monthly returns of sample stocks. Replacing the ITW (DMS) factor with highly correlated SMB stock excess return in Panel B still yields a statistically strong intercept estimate, suggesting a possible structural deficiency of the models shown in Panel A for Korean-listed common equity returns.

Panels C and D consist of the fitted results of three factor time-series models whose regressands are the excess returns of market portfolio, value

companies (HML), and alternating individual-heavy listings (DMS) and small stocks (SMB) respectively. Even though the influence of value stock excess return in either panel seems to diminish among high noise trader groups, the market, value, individual (Panel C), and size (Panel D) factors are statistically significant in general. Especially in Panel C, the weakened intercept appears meaningful.

Panel E implements regressions onto the market, individual (DMS), and firm size (SMB) factors and shows that the intercept term is marginalized to a certain extent. The signs for the coefficient of the excess return of individual-dense compared with scarce stocks (DMS) are now either weak or even negative for trades with a lower proportion of individual traders. This suggests that NTR created by uninformed individuals is absent in test assets that are traded relatively heavily by informed investors or rational arbitrageurs and is mainly priced in test assets that are transacted relatively intensely by noise traders. Thus, the inclusion of both factors in the regression models is deemed valid.

Panel F presents the time-series regression outputs of four-factor models with the independent variables of market, size (SMB), valuation (HML), and individual weight (DMS). Having augmented the value stock excess return (HML) to the variables of the models specified in Panel E, the sign and significance of individual intensity is similar to the results in Panel E; however, the significances of intercepts are meaningfully reduced. As one can note from Panels E and F, where I control for the size factor (SMB), the individual trader factor (DMS) is not well priced on stocks with high proportions of rational investors and arbitrageurs. Thus, NTR is not only generated by systematic movements of uninformed individual

investors; it is also created by the trades of stock listings with dense populations of individuals. Further, NTR no longer exists among the test assets of intense informed traders as noise-induced price uncertainty is resolved. This empirical inference is in line with De Long et al.'s (1990) definition of, and prediction regarding, NTR and lends support to using ITW as a proxy for such uncertainty.

Finally, Panel G examines the overall explanatory power of all time-series models exposed in Panels A through F by Gibbons et al.'s (1989) GRS F-test, which verifies the joint null hypothesis of intercepts (α) and the average monthly excess returns as equal to zero. Given that the number of observations (monthly returns) has to match in order for all test assets to implement the GRS F-test, I exclude three test assets that are either low in ITW and small in firm size (ITW_{20} and $Size_{20}/Size_{40}$) or high in ITW and large in firm size (ITW_{100} and $Size_{100}$) and whose firm-months are 22, 82, and 12. Also, the missing values of test assets with less than 166 firm-month observations are multiply imputed (Dempster et al., 1977; van Dyk and Meng, 2001) in order to minimize information loss. In Panel G, "N" denotes the number of months used in each regression model for the GRS F-test, "$|\alpha|$" is the average absolute value of the intercept (excess return) estimates of test assets. "F_{GRS}" is the implied F-statistic, and "Avg. R^2" is the average coefficient of determination (R^2) of 22 time-series regression models fitted in the test. The results show that three- or four-factor models that include DMS with HML have a lower average absolute value of monthly excess returns than two-factor specifications. One three-factor identification in Panel C that controls for individual trader density (DMS) and value factor (HML), and a four-factor model in Panel F, yield similar monthly excess returns (0.003 and 0.004

respectively). The average model fitness ($R^2 = 0.754$) is highest for the four-factor equation with respect to the excess returns of market portfolio, heavy-individual (DMS), small (SMB), and undervalued (HML) stocks. However, since all the models listed in Panel G are rejected for the null hypothesis at a 10% significance level, these pricing rules do not sufficiently explain the returns of the test assets.

5. Robustness tests

This section executes various robustness tests on the empirical results pertaining to the determinants of the respective returns of common-preferred arbitrage portfolios and common stocks discussed in Section 4.

5.1. NTR under bull and bear market conditions

When the proportion of individual traders acts as a proxy for the price of NTR, this price can be contingent upon market conditions. The uncertain state of the market can, again, be represented by the market (KOSPI) return. When the excess proportions of individuals with regard to preferred compared with common equity pairs acts as a proxy for the preferred stock evidence of NTR, such evidence is deemed robust to switching regimes of market status as described in Tables 11 and 12.

[Insert Tables 11 and 12 about here.]

Individuals' impacts on the discount of preferred stocks are constantly visible even if the sample period is regrouped by market conditions. However, the relative pricing of common-preferred equity pairs is stimulated more by individual traders with increased magnitudes in their coefficient estimates in bear markets. It seems that market sensitivity with respect to NTR measured by ITW intensifies in a pessimistic environment. Based on Panel A in Models 5 and 6, model fitness is superior during down markets ($R^2 = 0.124$) compared with up markets ($R^2 = 0.114$).

The time-series regressions of common stock returns with the excess return factor portfolio sorted by the density of individuals (DMS) presented in Table 10 are re-implemented, with subsamples of bull and bear markets whose results are abstracted, in Tables 13 and 14 respectively.

[Insert Tables 13 and 14 about here.]

As can be seen in Tables 13 and 14, ITW that proxies for NTR continues to be economically and statistically influential in determining the common stock returns of test assets with a high density of individual traders regardless of market conditions. Comparing both market contingencies based on the most informative models in Panel F, the individual factor (DMS) appears to be stronger and has a more significant impact on common equity returns in bull markets, although some estimates still remain meaningful in bear markets.

5.2. NTR of preferred stocks with high and low ITWs with regard to comparable common stocks

NTR pricing of PSD can switch regimes whether ITW is "high and stable" or "low and volatile." In this regard, I separate the sample of preferred stocks into high and low in terms of the ITWs of comparable common stocks. Table 15 shows the means and standard deviations of the ITWs of the high and low subgroups. Those common equities with high ITWs appear low in volatility and are mostly small stocks. Also, noise trading is concentrated on low-capitalization listings (Lee et al., 1991; Kumar and Lee, 2006; Kaniel et al., 2008). This finding is in line with the habitat hypothesis that there is a distinct type of stock that is traded largely by individuals. On average, if the ITWs of comparable preferred stocks of high-ITW common equities are high as well, then the dual-class difference in ITW (relative ITW) is deemed small.

[Insert Table 15 about here.]

Tables 16 and 17 replicate Table 7 with subsamples of high and low in the ITWs of common stocks. Although there are low estimates of relative ITWs, NTR is significantly priced on stocks that are heavily transacted by informed traders. This attests that NTR is generated in stocks of consistently high intensity of individual investors whose discounts are larger than those of relatively low individual trades. However, model fitness appears higher in the low-ITW sample ($R^2 = 0.237$, Table 17) than in the high-ITW sample ($R^2 = 0.196$) based on Models 5 and 6 in Tables

16 and 17.

[Insert Tables 16 and 17 about here.]

5.3. Endogeneity

As aforementioned, when Korean individual traders, compared with institutional and foreign investors, face capital restrictions, they may opt for preferred stocks rather than common equities given identical fundamental values and information. In other words, instead of the discount of preferred stocks being caused by individuals' heavy participation, these “small” traders might have been attracted to these relatively affordable assets. In order to safety-check this endogeneity issue, the sample is now reduced to those “underrepresented” preferred stock listings whose discounts are within 30% or even negative (premiums).

[Insert Table 18 about here.]

Table 18 compares the representative statistics of the subsample with those of the full sample of 185 common-preferred stock pairs. It is conjectured that the premiums of preferred stocks occur mostly among low-priced (small) common equities. This requires the relative smallness of preferred stocks as opposed to common stocks to be controlled. Tables 19 and 20 re-implement regressions based on prior models and control for the subsamples of pairs within 30% disparity and of relative premiums on preferred stocks respectively.

[Insert Tables 19 and 20 about here.]

Even if analyses are restricted to either small stocks (or high ITW) or embrace the possibility of endogeneity, a relative gain in the density of individual traders, on average, depreciates preferred stock listings, as the overall model fits reveal. Cross-referencing of Tables 7, 19, and 20 shows that the relative pricing of dual-class pairs at near parity is still statistically significantly influenced by the intensity of individuals after controlling for the relative size (smallness) of trades, albeit at diminished magnitudes. Surprisingly, for those pairs with premiums on the preferred stock side, these factors conspicuously contribute even more to the determination of the relative price deviation with correct signs. These relatively rare, preferred stock premiums may be due to the strengthened investor sentiment of uninformed individuals, which may render the market entry of arbitrageurs more difficult. In terms of Models 5 and 6 of Table 20, model fitness has improved from the prior full sample ($R^2 = 0.118$) case to the premiums-only subsample exercise ($R^2 = 0.249$). Overall, these robustness verifications vindicate that the NTR pricing of common-preferred arbitrage portfolio return (PSD) via individual trades is neither specific to market conditions nor subsamples but tends to be binding regardless of investment circumstances.

5.4. Inclusion of new-type preferred stocks

Anther robustness trial is targeted at new-type preferred stocks whose

conditions related to dividends and voting rights are distinct from old types. Table 21 summarizes the sample statistics of new-type preferred stock listings. Although these issues were introduced to alleviate the conspicuous anomalies of existing preferred stocks partly due to illiquidity, the daily trading volume is, on average, still far behind that of existing old-type preferred listings. Yet, as these new-types are embedded with cumulative dividend and common-stock convertibility options, their disparity is noticeably less than the old ones.

[Insert Tables 21 and 22 about here.]

Table 22 is a replication of Table 7 based on the augmented sample with new-type preferred stocks. The primary (new type I dummy) and secondary (new type Ⅱ dummy) issues of new-type preferred stocks, following existing old-type preferred stock listings, are indexed as dummy variables. In Models 5 and 6, having included the size variables and controlled for time- and firm-fixed effects, individual traders persist playing a role in discounting the dual-class issues and magnitudes of the coefficient estimates of relative ITW; further, size variables have remained or slightly expanded. Concerns that the signs and significances of the variables pertaining to dividends, voting rights, and liquidity may revert or weaken after adding new-type preferred stock listings to the sample appear overdone. In particular, the chaebol dummy and relative turnover, which is irrelevant to the corporate article, still retain their higher impact (high coefficient estimates). In Model 7, without controlling for the firm-fixed effect, the primary issues (new type I dummy) of new-

type preferred stocks are deemed to alleviate the overall discount of preferred stock listings because of their reinforced dual-class benefits such as cumulative dividend and convertibility entitlements. Because of a lack of observations, the secondary (new type Ⅱ dummy) issues are statistically ineffective at reducing the price gap of common-preferred equity pairs.

6. Individuals as the source of systematic noise

The two research questions that this research answers pertaining to the roles of individual traders in pricing Korean-listed common and preferred stocks are based on an assumption that individuals' movements are systematic. Numerous studies report evidence for the systematic motions of individual investors. For example, Kang et al. (2013) show this by using the correlations of the BSIs of individuals extracted from their transactions in KSE-listed stocks from February 2001 until January 2009 as a proxy for market sentiment. From another perspective, this current research empirically tests the NTR of individuals (De Long et al., 1990) by associating the densities of individual investors with the returns of common and preferred stock listings.

In order to demonstrate that my analyses exhibited herein are in line with, and contribute to, the literature, I execute three tests based on Kumar and Lee (2006) and Kaniel et al. (2008). First, I examine the correlation between the value-weighted changes of the respective ITWs of 658 surviving common stock listings and the value-weighted stock returns. Second, I estimate 51,040 pair-wise correlation

coefficients of the changes of ITWs based on 320 stocks with 178 full sets of monthly returns through the sample period.[11] Third, I conduct a principal component analysis of the changes of the respective ITWs of the same 320 stocks with full sets of 178 monthly returns, and review the percentage of variance that is explained by the first five principal components.

[Insert Table 23 about here.]

Panel A of Table 23 displays the summary statistics of the value-weighted index of 658 common stock listings. The change of ITW of each stock is defined as the average of daily ITW of stock i during month t minus that during the prior month $t-1$. The return of stock i in month t is one minus the price at the beginning of the month divided by the price at the end of the month. According to Kumar and Lee (2006), market-orthogonal change in ITW ("ΔITW (ortho.)"; ε_{it}) and market-orthogonal stock returns ("stock returns (ortho.)"; η_{it}) are obtained from the following regressions, respectively ():

$$\Delta ITW_{it} = b_0 + b_1 Market_t + \varepsilon_{it},$$
$$Return_{it} = b_0 + b_1 Market_t + \eta_{it},$$

[11] Because there are only 73 listings with 178 full monthly returns, the panel data based on 320 stocks with more than 170 monthly returns were multiply imputed (Dempster et al., 1977; van Dyk and Meng, 2001) for missing observations.

where $Market_t$ is the monthly return of KOSPI. The purpose of these regressions is to remove the common component in investor trading that is due to overall market movements.

As seen in Panel B, the change in the representative proportion of individual traders (ΔITW) and the value-weighted returns appears positively correlated (0.198); however, the correlation coefficient decreases (0.115) and the significance disappears when the common dependence on the market factors is removed from the regressions. The constructed index based on sample stocks listed and surviving on the KSE and the KOSPI, the market index of the KSE, is highly correlated (0.989).

Panel C exhibits the average of 320 fully traded stocks' pair-wise correlations. First, the average of 51,040 pair-wise correlations of 320 fully traded stocks' ΔITW is statistically significantly positive (0.047) even if the average is lower than that of stock returns (0.261). The size of the coefficient average even slightly increases (0.048) when common market factors are controlled. Compared with the average of market-orthogonalized stock returns (0.089), the coefficient average of market-orthogonalized ΔITW is statistically significantly meaningful.

Panel D implements a principal component analysis of the change of ITW (ΔITW) of 320 fully traded stocks and shows that the first five factors explain 68.4% of the total variance of the density of individual traders. When the common market factor is controlled for the movements of ITW, the variance proportion explained by the first factor increases from 36.5 to 44.4, a similar result to that in Panel C. The first five factors explain 74.4% of the total variance of market-orthogonalized ΔITW. A summation of the results in Panel B through D shows that the ITWs of

respective stocks tend to share systematic motions.

In sum, the attestations in Table 23 are that the proportions of individual traders (ITWs) are a simple and robust proxy for NTR and a yardstick for judging the systematic motions of individuals in the Korean stock market.

7. Conclusion

This dissertation finds empirical evidence for individuals as the source of NTR. From the analyses herein, the proportion of individual traders is an important risk factor in determining the persistent discount of stocks. The empirical inferences are drawn from two types of asset return: PSD and common stock returns. First, ITW explains the arbitrage return of common-preferred equity pairs (PSD) of identical fundamentals. An increase in the excess ITW of preferred compared with common stocks increases the discount of preferred equities. Further, the statistical significance of this finding remains binding even after controlling for conventional explanatory variables such as size variables and dual-class differences in dividend yield, voting rights, and liquidity. This shows that NTR created by the misperception of individuals is priced in the Korean stock market. However, because the study uses just 241 pairs of comparable common and preferred stocks (185 pairs without new-type preferred issues), the robustness of the first results could be questioned. Thus, the focus moves to another sample of 658 non-financial common stocks listed and surviving on the KSE. Individuals in the Korean stock market are found to deter the parity-convergence of common-preferred equity pairs. In other words, this is Korean

supportive evidence of informed traders' contribution to price discovery.

Unlike the discount rates of preferred stocks, common stock returns do not convey the degree of underpricing. Thus, I construct FMPs following Fama and French (1992, 1993) and show that ITW sequentially affects common equity returns with the empirical outcomes of Fama-Macbeth cross-sectional and panel regressions. Also, time-series regressions using the excess return of portfolios of individual-dense as opposed to scarce stocks (DMS) as a fourth factor alongside the existing three factors of market, firm size (SMB), and valuation (HML) show that the individual factor (DMS) effectively explains the return of assets with high proportions of individual investors who deter arbitrageurs. This lends support to the NTR argument of De Long et al. (1990), which predicts that noise itself creates risk. However, GRS F-tests suggest that the individual factor (DMS) augmented models fall short of consistently explaining the pricing of common stocks in Korea.

Hitherto, discussions in this dissertation are based on two assumptions posited in the literature: individuals as noise traders and the systematic co-movement of individuals (Jensen, 1968; Lease et al, 1974; Kyle, 1985; Black, 1986; Lee et al., 1991; Shleifer, 2000; Barber et al., 2009b; Kumar and Lee, 2006; Kang et al., 2013). For the second postulation, I conduct three simple tests for its empirical validity as a safety check, and find that the time-increments of ITWs are dynamically associated with stock returns. Thus, individuals show systematic co-movements.

References

Amihud, Yakov, 2002, Illiquidity and stock returns: Cross-section and time-series effects, Journal of financial markets 5, 31-56.

Baker, Malcolm, and Jeffrey Wurgler, 2007, Investor sentiment in the stock market, (National Bureau of Economic Research Cambridge, Mass., USA).

Barber, Brad M, Terrance Odean, and Ning Zhu, 2009, Systematic noise, Journal of Financial Markets 12, 547-569.

Black, Fischer, 1986, Noise, The Journal of Finance 41, 529-543.

Chay, Jong-Bom, and Pan-Soo Moon, 2005, Discount pricing of preferred stocks to common stocks: The role of liquidity premiums (in Korean), The Korean journal of finance 18 (2), 263-287.

Chung, Kee H, and Jeong-Kuk Kim, 1999, Corporate ownership and the value of a vote in an emerging market, Journal of Corporate Finance 5, 35-54.

Cox, Steven R., and Dianne M. Roden, 2002, The source of value of voting rights and related dividend promises, Journal of Corporate Finance 8, 337-351.

Dempster, Arthur P, Nan M Laird, and Donald B Rubin, 1977, Maximum likelihood from incomplete data via the em algorithm, Journal of the royal statistical society. Series B (methodological) 1-38.

Dorn, Daniel, Gur Huberman, and Paul Sengmueller, 2008, Correlated trading and returns, The Journal of Finance 63, 885-920.

Fama, Eugene F., 1965, The behavior of stock-market prices, The Journal of

Business 38, 34-105.

Fama, Eugene F., 1970, Efficient capital markets: A review of theory and empirical work*, The journal of Finance 25, 383-417.

Fama, Eugene F, and Kenneth R French, 1993, Common risk factors in the returns on stocks and bonds, Journal of financial economics 33, 3-56.

Fama, Eugene F., and James D. MacBeth, 1973, Risk, return, and equilibrium: Empirical tests. The Journal of Political Economy 81, 607-636.

Friedman, Milton, 1953, The methodology of positive economics, Essays in positive economics 3.

Gibbons, Michael R., Stephen A. Ross, and Jay Shanken, 1989, A test of the efficiency of a given portfolio, Econometrica 57, 1121-1152.

Han, Bong Hee, 2010, Preferred stock price and trade liquidity, Korean journal of business administration 23, 1-22 (In Korean).

Horner, Melchior R, 1988, The value of the corporate voting right: Evidence from switzerland, Journal of banking & finance 12, 69-83.

Jackson, Andrew, 2002, Noise trader risk exists... But the noise traders are not who you think they are, EFMA 2003 Helsinki Meetings.

Jensen, Michael C, 1968, The performance of mutual funds in the period 1945–1964, The Journal of finance 23, 389-416.

Kang, Jangkoo, Kyung Yoon Kwon, and Myoung Hwa Sim, 2013, Retail investor sentiment and stock returns , The Korean journal of financial management 30, 35-68 (In Korean).

Kaniel, Ron, Gideon Saar, and Sheridan Titman, 2008, Individual investor trading

and stock returns, The Journal of Finance 63, 273-310.

Kim, Joung Kook, Sang Soo Park, and Do Sung Choi, 1996, Empirical ananlysis on preferred stock discount, The Korean journal of finance association 9 (1), 65-96 (In Koean).

Kook, Chan Pyo, and Gyun Hwa Jung, 1996, The Determinants of ownership structure in Korea - Using linear structural relationships, The Korean journal of finance association 9 (2), 249-285 (In Korean).

Kook, Chan Pyo, and Gyun Hwa Jung, 2000, The Value of Voting Right in Relation to the Policy Changes about the Corporate Control Market, The Korean journal of financial studies 27 (1), 1-33 (In Korean).

Kumar, Alok, and Charles Lee, 2006, Retail investor sentiment and return comovements, The Journal of Finance 61, 2451-2486.

Lease, Ronald C, Wilbur G Lewellen, and Gary G Schlarbaum, 1974, The individual investor: Attributes and attitudes, The Journal of Finance 29, 413-433.

Lease, Ronald C, John J McConnell, and Wayne H Mikkelson, 1983, The market value of control in publicly-traded corporations, Journal of Financial Economics 11, 439-471.

Lee, Charles, Andrei Shleifer, and Richard H Thaler, 1991, Investor sentiment and the closed-end fund puzzle, The Journal of Finance 46, 75-109.

Levy, Haim, 1983, Economic evaluation of voting power of common stock, The Journal of Finance 38, 79-93.

Long, J. Bradford De, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, 1990, Noise trader risk in financial markets, Journal of Political

Economy 98, 703-738.

Megginson, William L, 1990, Restricted voting stock, acquisition premiums, and the market value of corporate control, Financial Review 25, 175-198.

Mehra, Rajnish, and Edward C Prescott, 1985, The equity premium: A puzzle, Journal of monetary Economics 15, 145-161.

Muravyev, Alexander, 2004, The puzzle of dual class stock in russia: Explaining the price differential between common and preferred shares.

Nenova, Tatiana, 2003, The value of corporate voting rights and control: A cross-country analysis, Journal of Financial Economics 68, 325-351.

Newey, Whitney K and Kenneth D West, 1987, A Simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix". Econometrica 55 (3), 703–708.

Van Dyk, David A, and Xiao-Li Meng, 2001, The art of data augmentation, Journal of Computational and Graphical Statistics 10.

Zingales, L, 1994, The value of the voting right: A study of the milan stock exchange experience, Review of Financial Studies 7, 125-148.

Zingales, Luigi, 1995, What determines the value of corporate votes?, The Quarterly Journal of Economics 110, 1047-1073.

Figure 1 Comparative dynamics of preferred stock discount and relative individual trading weight

These figures show the trends of the preferred stock discount and relative individual trading weight from the 185 pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. Figure 1.1 presents the trends of discount and relative individual trading weight in full sample. Figure 1.2 is for those trends with the samples under different market conditions. Figure 1.3 compares the trends of two groups with subsamples by high and low ITW of comparable common shares. Figure 1.4 provides the trends of two subsamples with preferred stock listings whose discounts are within 30% or negative (premiums). For the figures of 1.3 and 1.4, the axis on the left-hand side of the graph is for preferred stock discount rate, and the one on the right-hand side is for relative individual trading weight. Daily based price discount rates and relative individual trading weights of each pair are averaged into quarterly basis.

Figure 1.1 Comparative dynamics of preferred stock discount and relative individual trading weight by market conditions for the full sample

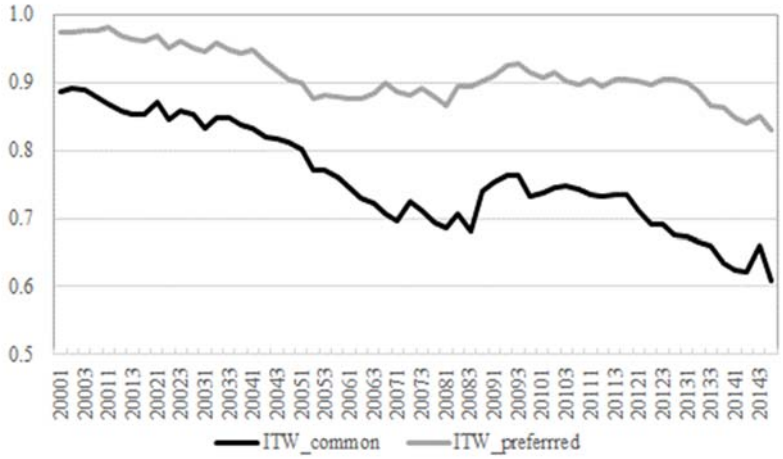

Figure 1.2 Comparative dynamics of preferred stock discount and relative individual trading weight by market conditions

Figure 1.2.1 Bull markets

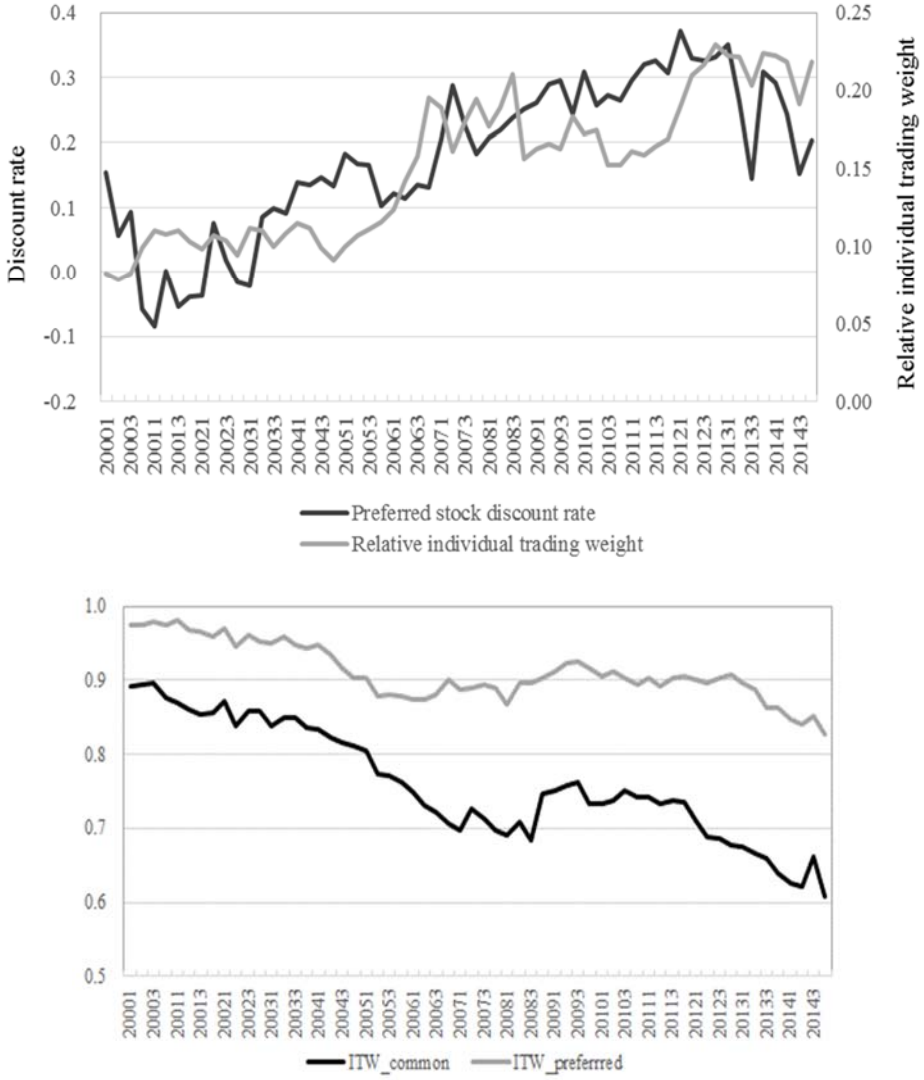

Figure 1.2.2 Bear markets

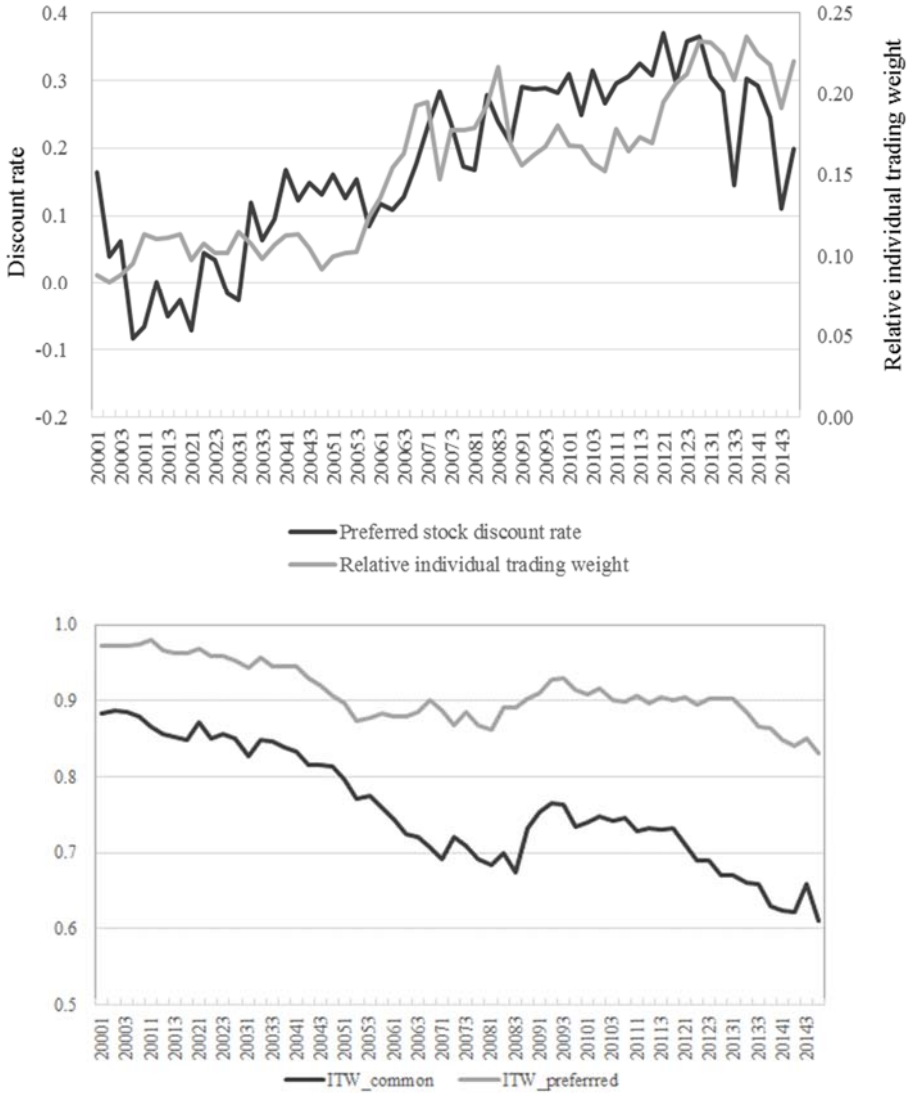

Figure1.3 Comparative dynamics of preferred stock discount and relative individual trading weight by level of individual trading weight

Figure 1.3.1 High ITW

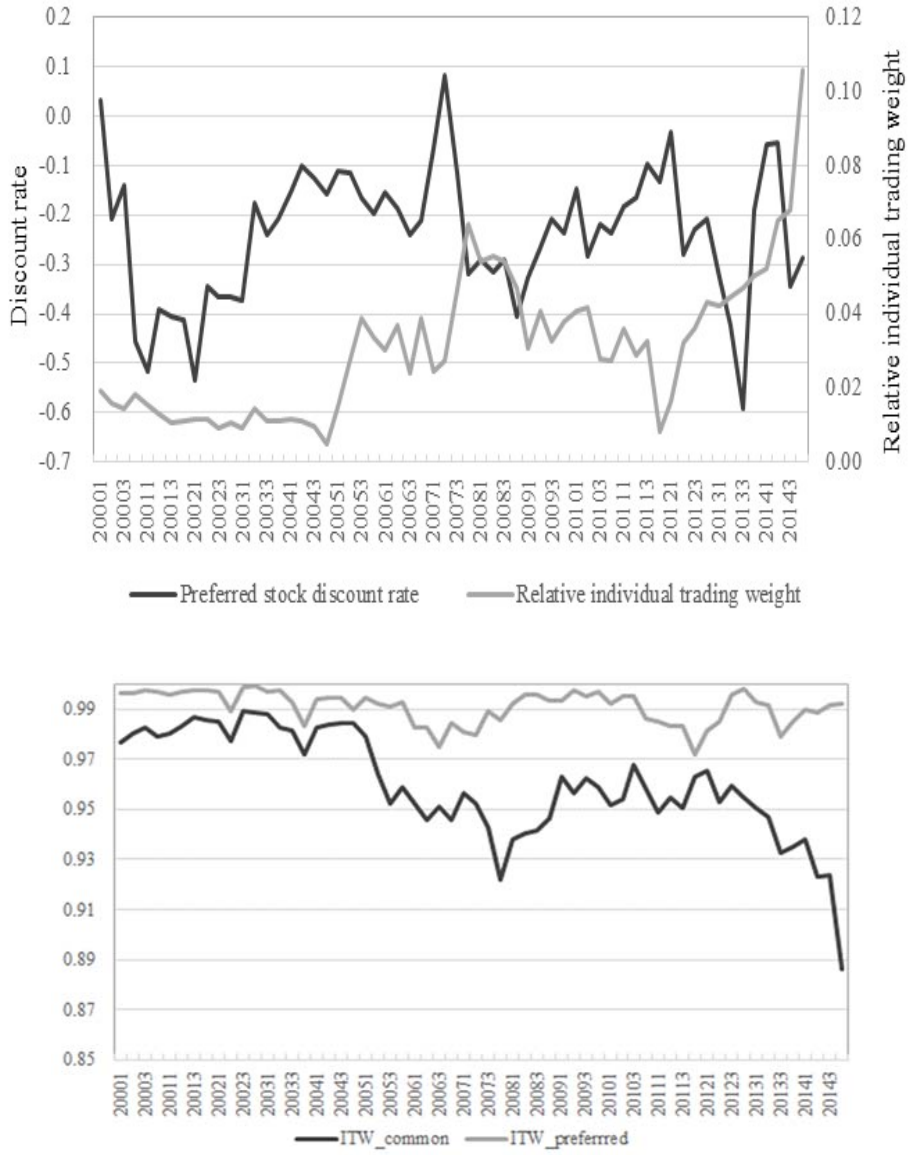

Figure 1.3.2 Low ITW

Figure 1.4 Comparative dynamics of preferred stock discount and relative individual trading weight controlling for endogeneity

Figure 1.4.1 Preferred stock discount within the range of 30% and -30% (premium)

Figure 1.4.2 Preferred stock premium

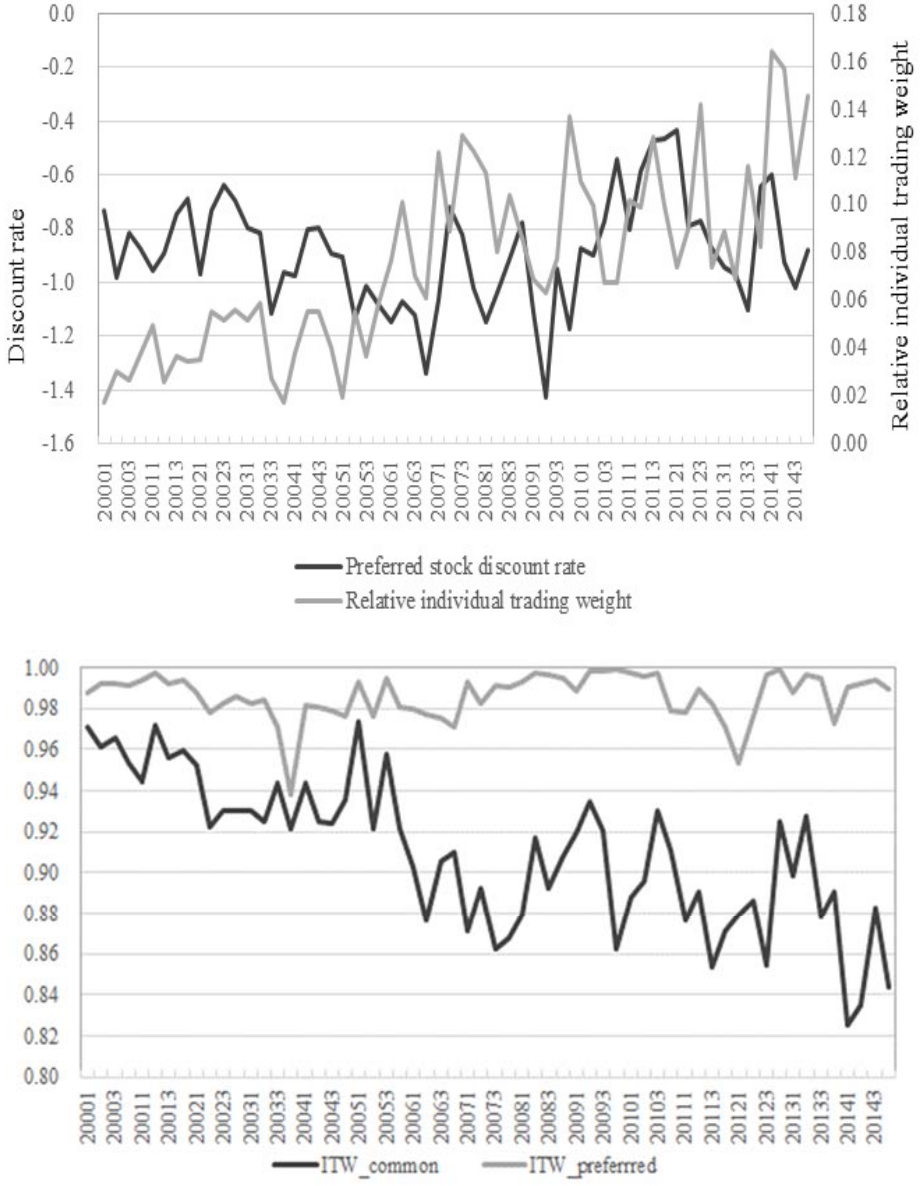

Table 1 Summary statistics for daily observations of common and preferred stock pairs

This table is based on the pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. Those listings with trading days under the January effect, i.e. the first 5 trading days in any year, listings with less than 10 trading days or of lowest 10% in trading volume, and common-preferred pairs with higher than 10% in PSD are excluded from this sample. The final sample consists of 185 pairs of common and preferred shares traded on the KSE (169) and Kosdaq (16) with a total of 347,235 firm-day observations. Market capitalization, trading volume, and trading amount is in KRW billion, KRW thousand, and KRW million, respectively. Turnover is the ratio of the trading amount over the number of outstanding shares. The individual trading weight (ITW) is the ratio of the individual trading volume of shares over the total trading volume of shares.

	Return (incl. div yield)		Market value (KRW billion)			Trading volume (KRW thousand)			Trading amount (KRW million)			Turnover (%)			Investor trading weight (%)					
	Preferred	Common	Preferred (A)	Common (B)	(B/A)	Preferred (A)	Common (B)	(B/A)	Preferred (A)	Common (B)	(B/A)	Preferred (A)	Common (B)	(B/A)	Preferred stock			Common stock		
															Individual	Institution	Foreign	Individual	Institution	Foreign
Mean	0.09%	0.04%	158	2,694	(17.1)	34	702	(20.5)	514	14,585	(28.4)	1.94%	1.61%	(0.8)	90.9%	4.4%	4.8%	76.3%	13.1%	10.5%
Median	0.00%	0.00%	6	231	(39.8)	4	170	(38.2)	27	1,498	(54.9)	0.36%	0.57%	(1.6)	100.0%	0.0%	0.0%	86.0%	7.2%	3.5%
Std. Dev.	4.41%	3.98%	1,211	12,174	(10.1)	143	2,644	(18.5)	3,385	41,973	(12.4)	6.35%	4.87%	(0.8)	19.2%	11.3%	13.3%	25.1%	15.0%	15.0%
Min	-95.2%	-94.9%	0.009	0.137	(15.2)	0.060	0.001	(0.0)	0.010	0.008	(0.9)	0.00%	0.00%	(0.0)	0%	0%	0%	0%	0%	0%
Max	133.3%	70.4%	26,601	229,787	(8.6)	10,786	205,995	(19.1)	484,385	1,582,893	(3.3)	483.23%	445.47%	(0.9)	100%	100%	100%	100%	100%	99.9%

Table 2 Annual trends of preferred stock discount rate and main explanatory variables

As the dependent variable, preferred stock discount (PSD) is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders'stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not: Chaebol dummy is applied. The measures of liquidity are dollar volume and turnover (trading volume normalized by total number of outstanding shares). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. For the relative measure of liquidity variables, relative dollar volume is trading amount of preferred shares over that of common shares. Relative Amihud ratio and relative turnover are the excesses of preferred over common shares. The individual trading weight (ITW) is the ratio of the individual trading volume of common shares over the total trading volume of common shares. Annual values are the averages of daily estimates.

Year	Dep. variable	Dividend group		Voting rights group				Liquidity group			Relative individual trading weight
	Preferred stock discount	Dividend	Dividend Drop	Largest stake	Absolute control	Proxy fight	Cheabol	Relative dollar volume	Relative Amihud ratio	Relative turnover	
2000	0.160	0.097	0.022	15.96	0.000	0.000	0.349	0.338	0.060	0.015	0.090
2001	0.043	0.922	0.021	18.74	0.008	0.000	0.387	0.262	0.018	0.014	0.111
2002	0.068	0.962	0.022	19.01	0.015	0.000	0.387	0.179	0.025	0.006	0.103
2003	0.136	0.973	0.022	33.34	0.180	0.004	0.411	0.190	0.096	-0.009	0.106
2004	0.227	0.977	0.022	35.39	0.192	0.006	0.453	0.196	0.207	-0.010	0.109
2005	0.215	0.977	0.021	36.64	0.218	0.004	0.448	0.097	0.081	-0.007	0.105
2006	0.237	0.991	0.023	35.95	0.183	0.000	0.480	0.284	0.077	-0.006	0.155
2007	0.314	0.988	0.022	37.44	0.192	0.002	0.491	0.371	0.046	0.004	0.173
2008	0.276	0.996	0.022	38.50	0.212	0.001	0.529	0.332	0.070	0.000	0.178
2009	0.366	0.993	0.021	39.22	0.228	0.000	0.538	0.187	0.062	-0.004	0.170
2010	0.353	0.990	0.022	39.94	0.250	0.000	0.548	0.487	0.029	0.019	0.163
2011	0.331	0.999	0.022	41.23	0.266	0.000	0.555	0.624	0.018	0.008	0.160
2012	0.387	1.000	0.022	41.50	0.277	0.004	0.573	0.575	0.037	-0.001	0.211
2013	0.351	1.000	0.024	40.58	0.242	0.012	0.578	0.316	0.024	0.009	0.218
2014	0.268	1.000	0.003	40.80	0.239	0.012	0.572	0.266	0.020	0.006	0.213
Mean	0.249	0.924	0.021	34.28	0.180	0.003	0.487	0.313	0.058	0.003	0.151
Std.Dev.	0.108	0.230	0.005	8.813	0.094	0.004	0.077	0.150	0.049	0.009	0.044

Table 3 Correlation coefficients among main variables

As the dependent variable, preferred stock discount (PSD) is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Chaebol dummy is 1 if sample firms are affiliated with conglomerates (Korea Fair Trade Committee-designated) or 0 if not. The measures of liquidity are dollar volume and turnover (trading volume normalized by total number of outstanding shares). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. For the relative measure of liquidity variables, relative dollar volume is trading amount of preferred shares over that of common shares. Relative Amihud ratio and relative turnover are the excesses of preferred over common shares. The individual trading weight (ITW) is the ratio of the individual trading volume of common shares over the total trading volume of common shares. All estimates are in a daily frequency. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable (Expected sign for dependent variable)	Dep. variable	Dividend group		Voting rights group				Liquidity variables			Relative individual trading weight
	Preferred stock discount	Dividend	Dividend drop	Largest stake	Largest stake × Absolute control	Proxy fight	Chaebol	Relative dollar volume	Relative Amihud ratio	Relative turnover	
Preferred stock discount	1										
Dividend (-)	0.034***	1									
Dividend × Dividend drop (-)	-0.003*	-0.005**	1								
Largest stake (+)	0.062***	0.069***	-0.001	1							
Largest stake × Absolute control (-)	0.014***	0.015***	0.003	0.796***	1						
Proxy fight (+)	0.023***	0.017***	0.000	0.028***	-0.029***	1					
Chaebol (+)	0.188***	0.073***	0.001	-0.134***	-0.178***	-0.049***	1				
Relative dollar volume (-)	-0.007***	-0.001	-0.002	0.026***	0.026***	0.000	-0.022***	1			
Relative Amihud ratio (+)	-0.048***	-0.002	-0.001	0.019***	0.026***	-0.003	-0.058***	-0.030***	1		
Relative turnover (-)	-0.133***	-0.044***	-0.003	0.049***	0.031***	0.019***	-0.038***	0.052***	-0.025***	1	
Relative ITW (+)	0.209***	0.085***	-0.004**	-0.035***	-0.074***	0.034***	0.265***	-0.022***	-0.042***	-0.028***	1

Table 4 Summary statistics of non-financial common stock sample

The estimates are given on a monthly basis based on the non-financial stock listings collected from January 2000 until October 2014. Numerical values in parentheses below the number of firms (Firm obs.) are firm-month observations. Numerical values in parentheses below the estimates are the standard errors. Average return is the sample mean of the monthly returns of listings in respective groups. The market return of the full sample is the monthly excess return of the value-weighted average of KOSPI and Kosdaq indices. The risk-free rate is the monthly adjusted rate of 1 year monetary stability bond (MSB). The time-series of 1 year MSB is procured from the Bank of Korea's Economic Statistics System (ECOS). The average of market values at the end of each month of respective sample groups are in the unit of billion won. The individual trading weight (ITW) is the ratio of the individual trading volume of common shares over the total trading volume of common shares. ITW is the monthly average of daily ITW of each common stock

	Firm obs.	Average return	Market return	Risk-free rate	Market value	ITW
Full sample	2,136	0.27%	0.30%	0.02%	482.2	88.6%
	(232,437)	(0.184)	(0.068)	(0.000)	(3,717.0)	(0.183)
KSE	811	0.65%	0.19%	0.02%	968.4	81.7%
	(104,329)	(0.162)	(0.070)	(0.000)	(5,505.4)	(0.228)
[KSE surviving]	658	0.77%	0.22%	0.02%	1,060.4	80.6%
	(92,603)	(0.152)	(0.069)	(0.000)	(5,830.0)	(0.232)
Kosdaq	1,325	-0.03%	0.39%	0.02%	86.2	94.2%
	(128,108)	(0.201)	(0.066)	(0.000)	(188.1)	(0.107)

Table 5 Decile by decile (100) portfolios sorted in ascending orders of firm size and individual trading weight

This table shows the representative statistics of 100 (10 by 10) portfolios of sample common shares (658 KSE surviving firms) sorted by firm size and individual trading weight (ITW) in respective ascending orders and rebalanced on a yearly basis. For example, Size10 and Itw10 are the groups of smallest and least individual-heavy common stockts, respectively. In Panel D, the observations are the quarterly averages of monthly returns.

Panel A. Observations

	Size10	Size20	Size30	Size40	Size50	Size60	Size70	Size80	Size90	Size100	Total
ITW10	.	.	.	12	12	130	575	1,191	2,402	4,227	8,549
ITW20	.	22	82	94	124	568	1,307	2,209	2,147	1,925	8,478
ITW30	12	105	201	352	720	969	1,531	1,701	1,666	1,246	8,503
ITW40	141	181	435	771	1,034	1,499	1,631	1,284	1,008	471	8,455
ITW50	230	414	701	1,005	1,402	1,649	1,114	990	667	321	8,493
ITW60	416	783	1,201	1,395	1,456	1,195	925	608	334	135	8,448
ITW70	666	1,213	1,398	1,546	1,432	1,040	718	283	139	56	8,491
ITW80	1,504	1,566	1,658	1,211	1,092	817	380	143	82	10	8,463
ITW90	2,010	2,095	1,546	1,286	790	399	228	95	.	.	8,449
ITW100	3,542	2,128	1,249	808	405	220	43	.	12	.	8,407
Total	8,521	8,507	8,471	8,480	8,467	8,486	8,452	8,504	8,457	8,391	84,736

Panel B. Average ITW

	Size10	Size20	Size30	Size40	Size50	Size60	Size70	Size80	Size90	Size100	Avg.
ITW10	.	.	.	0.782	0.668	0.657	0.543	0.480	0.438	0.358	0.561
ITW20	.	0.849	0.803	0.814	0.749	0.709	0.626	0.589	0.574	0.557	0.696
ITW30	0.631	0.823	0.792	0.820	0.799	0.744	0.697	0.675	0.672	0.641	0.729
ITW40	0.883	0.903	0.907	0.849	0.822	0.780	0.760	0.758	0.718	0.710	0.809
ITW50	0.933	0.912	0.878	0.864	0.845	0.829	0.843	0.837	0.828	0.765	0.853
ITW60	0.962	0.937	0.914	0.900	0.890	0.882	0.883	0.871	0.832	0.846	0.892
ITW70	0.970	0.948	0.935	0.929	0.932	0.925	0.918	0.899	0.892	0.884	0.923
ITW80	0.974	0.967	0.960	0.956	0.951	0.940	0.943	0.939	0.908	0.877	0.942
ITW90	0.980	0.971	0.963	0.966	0.962	0.954	0.950	0.937	.	.	0.960
ITW100	0.982	0.975	0.975	0.963	0.967	0.958	0.963	.	0.900	.	0.960
Avg.	0.914	0.921	0.903	0.884	0.859	0.838	0.812	0.776	0.751	0.705	0.833

Panel C. Average size (KRW billion)

	Size10	Size20	Size30	Size40	Size50	Size60	Size70	Size80	Size90	Size100	Avg.
ITW10	.	.	.	115	103	142	236	450	1,243	12,731	2,146
ITW20	.	32	40	58	79	152	231	423	1,301	5,717	893
ITW30	27	26	53	59	82	139	224	419	1,235	4,843	711
ITW40	21	37	47	67	97	147	224	420	1,482	4,084	662
ITW50	22	34	51	77	105	156	211	410	1,177	4,407	665
ITW60	18	35	57	72	104	139	218	376	1,107	2,978	510
ITW70	22	36	54	73	98	140	213	372	855	3,724	559
ITW80	24	38	49	75	99	137	193	274	644	4,155	569
ITW90	21	36	51	67	94	118	181	337	.	.	113
ITW100	22	36	46	69	97	127	208	.	126	.	91
Avg.	22	34	50	73	96	140	214	387	1,019	5,330	692

Panel D. Average size (KRW billion)

	Size10	Size20	Size30	Size40	Size50	Size60	Size70	Size80	Size90	Size100	Avg.
ITW10	.	.	.	0.013	-0.023	0.013	0.011	0.006	0.009	0.011	0.0058
ITW20	.	-0.008	0.008	0.012	0.023	0.012	0.015	0.010	0.012	0.005	0.0101
ITW30	0.022	0.006	0.010	0.013	0.019	0.012	0.002	0.009	0.014	0.002	0.0110
ITW40	0.013	0.017	0.018	0.008	0.009	0.013	0.015	0.009	0.011	0.004	0.0117
ITW50	0.023	0.006	0.011	0.015	0.015	0.014	0.015	0.000	0.007	0.017	0.0123
ITW60	0.012	0.016	0.018	0.012	0.009	0.008	0.005	-0.002	0.001	-0.014	0.0064
ITW70	0.011	0.009	0.011	0.007	0.006	0.006	-0.001	0.000	-0.008	0.034	0.0074
ITW80	0.016	0.007	0.010	0.007	0.003	0.002	-0.006	0.000	-0.018	-0.036	-0.0015
ITW90	0.016	0.012	0.004	0.012	0.004	-0.005	-0.018	-0.031	.	.	-0.0007
ITW100	0.019	0.018	0.010	0.010	0.008	0.011	-0.018	.	0.020	.	0.0098
Avg.	0.017	0.009	0.011	0.011	0.007	0.009	0.002	0.000	0.005	0.003	0.007

Table 6 Descriptive statistics and correlation coefficients

The excess return of portfolios that are dense and scarce in individual traders (dense-minus-scarce, DMS) is estimated controlling for firm-level characteristics as follows:

$$DMS_t = High\left(\frac{ItwHigh \times SizeSmall_t + ItwHigh \times SizeBig_t}{2}\right) - Low\left(\frac{ItwLow \times SizeSmall_t + ItwLow \times SizeBig_t}{2}\right).$$

The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). As a result, the respective factors are the excess returns based on monthly value (market capitalization)-weighted average returns of the 6 implied portfolios as follows:

$$SMB_t = Small\left(\frac{SH_t + SM_t + SL_t}{3}\right) - Big\left(\frac{BH_t + BM_t + BL_t}{3}\right),$$

$$HML_t = High\left(\frac{SH_t + BH_t}{2}\right) - Low\left(\frac{SL_t + BL_t}{2}\right)$$

***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Descriptive statistics for monthly factor-mimicking portfolio returns

Factors	Mean	t-value	Std. error	Median	Months
DMS	-1.40% ***	(-3.80)	4.75%	-1.03%	166
Market	0.70%	(1.34)	6.67%	1.00%	166
SMB	-0.38%	(-1.03)	4.67%	-0.35%	166
HML	1.76% ***	(5.78)	3.93%	1.25%	166

Panel B. Correlation between factor-mimicking portfolio returns

Factors	DMS	Market	SMB	HML
DMS	1			
Market	0.290***	1		
SMB	0.518***	-0.055	1	
HML	-0.161**	-0.170**	-0.188**	1

Table 7. Preferred stock discount against relative individual trading weight

These regressions are performed on the full pairs of dividual tradinerred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. As the dependent variable, preferred stock discount (PSD) is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the individual trading weight (ITW) is the ratio of the individual trading volume of shares over the total trading volume of shares, and the relative ITW is ITW of preferred stock minus ITW of common stock. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.203***	0.184***	0.182***	0.124***	0.116***	0.116***		
	(5.965)	(4.985)	(4.922)	(3.806)	(3.595)	(3.594)		
Relative smallness		1.412**	1.459**	2.863***	2.776***	2.776***		
		(2.378)	(2.425)	(3.388)	(3.585)	(3.585)		
Dividend dummy			-0.114**	-0.123	-0.129	-0.130	-0.116	-0.086
			(-2.120)	(-1.155)	(-1.319)	(-1.319)	(-1.608)	(-0.931)
Dividend dummy			-0.002	0.000	-0.001	-0.001	-0.003	-0.004
× Dividend fall (t-5 to t-1)			(-0.674)	(-0.099)	(-0.412)	(-0.259)	(-0.368)	(-1.115)
Largest stake				-0.001	-0.001	-0.001	0.004	-0.001
				(-0.372)	(-0.291)	(-0.292)	(1.156)	(-0.391)
Largest stake				0.0000	-0.0001	-0.0001	-0.0012	0.0002
× Absolute control				(0.003)	(-0.050)	(-0.050)	(-0.710)	(0.150)
Chaebol dummy							0.188**	.
							(2.606)	.
Relative dollar volume					0.001	0.001	0.001	0.000
					(0.707)	(0.706)	(0.482)	(-0.069)
Relative Amihud ratio					0.001	0.001	-0.005**	0.001
					(1.409)	(1.410)	(-2.587)	(1.090)
Relative turnover					-1.280***	-1.280***	-1.722***	-1.328***
					(-9.714)	(-9.714)	(-7.501)	(-10.376)
Market						0.132***		
						(4.782)		
SMB						0.145***		
						(3.554)		
HML						0.124*		
						(1.970)		
Constant	0.441***	-0.868	-0.902	-2.223***	-2.132***	-2.131***	0.279**	0.478**
	(8.422)	(-1.539)	(-1.579)	(-2.781)	(-2.906)	(-2.904)	(2.342)	(2.484)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.062	0.077	0.079	0.081	0.118	0.118	0.078	0.081
N	347,235	347,235	347,235	279,525	279,525	279,500	279,525	279,525

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.136***	0.089***	0.087***	0.055**	0.048*	0.048*		
	(5.303)	(3.523)	(3.456)	(2.069)	(1.909)	(1.906)		
Common ITW	-0.266***	-0.141***	-0.141***	-0.073*	-0.071*	-0.071*		
	(-5.079)	(-2.987)	(-2.982)	(-1.684)	(-1.686)	(-1.688)		
Log of preferred market cap.		-0.136***	-0.137***	-0.233***	-0.230***	-0.230***		
		(-2.705)	(-2.720)	(-3.119)	(-3.216)	(-3.217)		
Log of common market cap.		0.217***	0.217***	0.318***	0.310***	0.310***		
		(4.470)	(4.462)	(4.931)	(5.098)	(5.097)		
Dividend dummy			-0.077	-0.107	-0.114	-0.114	-0.135*	-0.084
			(-1.237)	(-0.978)	(-1.115)	(-1.116)	(-1.833)	(-0.911)
Dividend dummy			-0.003	-0.001	-0.001	-0.001	-0.007	-0.003
× Dividend fall (t-5 to t-1)			(-0.849)	(-0.186)	(-0.328)	(-0.219)	(-0.898)	(-0.913)
Largest stake				-0.002	-0.002	-0.002	0.004	-0.001
				(-0.765)	(-0.696)	(-0.696)	(1.153)	(-0.339)
Largest stake				0.0000	0.0000	0.0000	-0.0010	0.0001
× Absolute control				(0.384)	(0.333)	(0.333)	(-0.774)	(0.146)
Chaebol dummy							0.140*	.
							(1.886)	.
Preferred dollar volume					-0.001	-0.001	-0.003	-0.001
					(-0.980)	(-0.978)	(-0.949)	(-0.638)
Preferred Amihud ratio					0.003***	0.003***	-0.007**	0.002*
					(3.546)	(3.546)	(-2.535)	(1.839)
Preferred turnover					-1.191***	-1.191***	-2.299***	-1.296***
					(-8.526)	(-8.526)	(-9.423)	(-10.566)
Common dollar volume					0.303	0.303	1.044	0.521*
					(1.420)	(1.422)	(1.650)	(1.771)
Common Amihud ratio					0.002***	0.002***	0.001***	0.001***
					(7.727)	(7.732)	(3.621)	(6.725)
Common turnover					1.258***	1.259***	-0.645	1.355***
					(4.755)	(4.755)	(-1.109)	(4.797)
Market						0.069**		
						(2.396)		
SMB						0.101***		
						(2.614)		
HML						0.058		
						(0.978)		
Constant	0.556***	-0.321	-0.310	-0.742***	-0.700***	-0.699***	0.336***	0.470**
	(8.667)	(-1.535)	(-1.487)	(-2.854)	(-2.818)	(-2.813)	(3.039)	(2.439)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.063	0.117	0.117	0.160	0.196	0.196	0.108	0.083
N	347,235	347,235	347,235	279,525	279,525	279,500	279,525	279,525

Table 8 Fama-MacBeth cross-sectional regression results

This table shows the results of Fama-MacBeth cross-sectional regression of monthly common stock returns regressed onto the last-month-end individual trading weight (IWT). The coefficient estimates are the averages of Fama-MacBeth coefficients. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Estimates
ITW (last month end)	0.002
	(0.297)
Constant	0.007
	(1.028)
R^2	0.012
N	177

Table 9. Panel regression results

On a panel basis, the excess returns of common stock returns over risk-free rate (R_{it}-R_{ft}) are regressed onto the last-month-end individual trading weight (IWT), market premium (R_{mt}-R_{ft}), size premium (small-minus-big, SMB), and value premium (high-minus-low, HML). Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5
ITW (last month end)	0.003*	0.006***	0.006***	0.004***	0.024***
	(1.847)	(4.160)	(4.029)	(2.893)	(8.945)
Market		0.896***	0.939***	0.990***	
		(68.570)	(71.433)	(75.326)	
SMB			0.426***	0.504***	
			(27.391)	(32.930)	
HML				0.458***	
				(27.483)	
Constant	0.006***	0.000	0.001	-0.006***	-0.055***
	(4.414)	(0.335)	(0.465)	(-4.668)	(-7.597)
Time and firm fixed effect	No	No	No	No	Yes
R^2	0.000	0.168	0.193	0.208	0.224
N	91,546	91,546	91,546	91,546	91,546

Table 10 Time-series regressions of the excess returns of size-quintile by ITW-quintile (25) test portfolios onto FMPs

The dependent variable is the excess returns of size-quintile by ITW-quintile (25) test portfolios. For example, Size10 and Itw10 are the groups of smallest and least individual-heavy common stocks, respectively. For explanatory variables, the individual factor is the excess returns of portfolios that are dense and scarce in individual traders (dense-minus-scarce, DMS). The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). Panel G examines the overall explanatory capabilities of all time-series models exposed in Panels A through F by Gibbons et al.'s (1989) GRS F-test which verifies the joint null hypothesis of intercepts (α) or average monthly excess returns all equal to zeros. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Model: Market + DMS

ITW	Size	N	Constant	Market	DMS	R^2
ITW20	Size20	22	-0.022	0.752**	0.192	0.285
	Size40	82	0.005	0.536***	0.131	0.270
	Size60	166	0.012**	0.840***	0.168	0.417
	Size80	166	0.008**	0.750***	0.182**	0.610
	Size100	166	-0.002*	0.910***	-0.187***	0.940
ITW40	Size20	142	0.014	0.780***	0.054	0.205
	Size40	166	0.010**	0.695***	0.164*	0.505
	Size60	166	0.010***	0.757***	0.163**	0.587
	Size80	166	0.006	0.984***	0.293***	0.740
	Size100	166	-0.002	1.285***	0.047	0.818
ITW60	Size20	166	0.010**	0.774***	0.455***	0.544
	Size40	166	0.012***	0.721***	0.421***	0.612
	Size60	166	0.010***	0.935***	0.381***	0.709
	Size80	166	0.005	1.017***	0.406***	0.743
	Size100	166	-0.007	0.999***	0.386***	0.533
ITW80	Size20	166	0.003	0.808***	0.507***	0.581
	Size40	166	0.004	0.899***	0.421***	0.732
	Size60	166	0.003	0.916***	0.616***	0.785
	Size80	166	0.002	0.964***	0.722***	0.549
	Size100	118	0.002	1.460***	0.934***	0.376
ITW100	Size20	166	0.009**	0.743***	0.575***	0.611
	Size40	166	0.008**	0.769***	0.689***	0.707
	Size60	166	0.005	0.640***	0.746***	0.534
	Size80	154	-0.009	0.669***	1.197***	0.381
	Size100	12	0.02	0.077	0.489	0.096

Panel B. Model: Market + SMB

ITW	Size	N	Constant	Market	SMB	R^2
ITW20	Size20	22	-0.027	0.798**	0.154	0.284
	Size40	82	0.005	0.577***	0.366**	0.302
	Size60	166	0.011**	0.891***	0.427***	0.458
	Size80	166	0.006**	0.799***	0.282***	0.633
	Size100	166	0.000	0.863***	-0.212***	0.947
ITW40	Size20	142	0.015*	0.792***	0.516***	0.248
	Size40	166	0.009***	0.749***	0.498***	0.607
	Size60	166	0.010***	0.812***	0.548***	0.711
	Size80	166	0.003	1.061***	0.402***	0.765
	Size100	166	-0.003	1.291***	-0.09	0.819
ITW60	Size20	166	0.006	0.897***	0.724***	0.647
	Size40	166	0.007**	0.833***	0.661***	0.722
	Size60	166	0.006**	1.034***	0.535***	0.756
	Size80	166	0.000	1.121***	0.530***	0.778
	Size100	166	-0.012**	1.094***	0.391***	0.535
ITW80	Size20	166	-0.002	0.943***	0.783***	0.691
	Size40	166	0.000	1.012***	0.667***	0.826
	Size60	166	-0.004	1.066***	0.574***	0.776
	Size80	166	-0.007	1.139***	0.665***	0.539
	Size100	118	-0.014	1.636***	-0.263	0.341
ITW100	Size20	166	0.003	0.896***	0.887***	0.77
	Size40	166	0.001	0.941***	0.771***	0.755
	Size60	166	-0.004	0.822***	0.718***	0.53
	Size80	154	-0.026***	0.935***	0.499**	0.235
	Size100	12	0.022	0.110	0.328	0.068

Panel C. Model: Market + DMS + HML

ITW	Size	N	Constant	Market	DMS	HML	R^2
ITW20	Size20	22	-0.024	0.716**	0.283	0.345	0.29
	Size40	82	-0.002	0.517***	0.195	0.469**	0.31
	Size60	166	0.000	0.896***	0.240**	0.716***	0.508
	Size80	166	-0.001	0.792***	0.236***	0.535***	0.702
	Size100	166	-0.002	0.907***	-0.190***	-0.033	0.941
ITW40	Size20	142	0.005	0.763***	0.168	0.578**	0.236
	Size40	166	0.002	0.731***	0.210***	0.452***	0.568
	Size60	166	0.004	0.789***	0.203***	0.401***	0.636
	Size80	166	-0.002	1.021***	0.340***	0.466***	0.787
	Size100	166	-0.007*	1.305***	0.073	0.253***	0.828
ITW60	Size20	166	0.004	0.806***	0.496***	0.402***	0.578
	Size40	166	0.005	0.754***	0.464***	0.419***	0.661
	Size60	166	0.004	0.963***	0.417***	0.358***	0.737
	Size80	166	-0.001	1.043***	0.439***	0.330***	0.764
	Size100	166	-0.01	1.010***	0.400***	0.135	0.535
ITW80	Size20	166	0.001	0.816***	0.518***	0.112	0.583
	Size40	166	-0.001	0.922***	0.451***	0.295***	0.752
	Size60	166	-0.001	0.936***	0.642***	0.257***	0.799
	Size80	166	-0.006	1.002***	0.771***	0.486***	0.578
	Size100	118	0.002	1.461***	0.935***	0.007	0.376
ITW100	Size20	166	0.006	0.755***	0.590***	0.148	0.616
	Size40	166	0.003	0.794***	0.721***	0.313***	0.729
	Size60	166	0.003	0.651***	0.761***	0.143	0.538
	Size80	154	-0.014	0.691***	1.232***	0.277	0.387
	Size100	12	-0.001	0.284	0.432	0.551	0.292

Panel D. Model: Market + SMB + HML

ITW	Size	N	Constant	Market	SMB	HML	R^2
ITW20	Size20	22	-0.030	0.783**	0.244	0.363	0.290
	Size40	82	-0.002	0.578***	0.417**	0.494**	0.346
	Size60	166	-0.003	0.978***	0.563***	0.818***	0.574
	Size80	166	-0.004	0.862***	0.381***	0.595***	0.742
	Size100	166	0.001	0.856***	-0.222***	-0.061**	0.949
ITW40	Size20	142	0.002	0.810***	0.667***	0.746***	0.300
	Size40	166	-0.001	0.809***	0.592***	0.566***	0.703
	Size60	166	0.001	0.868***	0.635***	0.526***	0.793
	Size80	166	-0.007**	1.118***	0.491***	0.537***	0.826
	Size100	166	-0.007**	1.316***	-0.052	0.230***	0.827
ITW60	Size20	166	-0.003	0.953***	0.812***	0.529***	0.705
	Size40	166	-0.002	0.890***	0.751***	0.536***	0.799
	Size60	166	-0.002	1.082***	0.610***	0.448***	0.798
	Size80	166	-0.007**	1.165***	0.599***	0.413***	0.81
	Size100	166	-0.015**	1.114***	0.421***	0.181	0.539
ITW80	Size20	166	-0.006	0.968***	0.823***	0.239**	0.703
	Size40	166	-0.007***	1.055***	0.735***	0.410***	0.864
	Size60	166	-0.010***	1.100***	0.628***	0.319***	0.796
	Size80	166	-0.017***	1.199***	0.758***	0.562***	0.577
	Size100	118	-0.012	1.616***	-0.285	-0.116	0.341
ITW100	Size20	166	-0.002	0.927***	0.936***	0.292***	0.788
	Size40	166	-0.007**	0.986***	0.841***	0.416***	0.792
	Size60	166	-0.008	0.845***	0.755***	0.219*	0.54
	Size80	154	-0.029***	0.957***	0.532***	0.195	0.238
	Size100	12	-0.003	0.393	0.472	0.670	0.346

Panel E. Model: Market + DMS + SMB

ITW	Size	N	Constant	Market	DMS	SMB	R^2
ITW20	Size20	22	-0.024	0.766**	0.139	0.061	0.286
	Size40	82	0.004	0.598***	-0.067	0.399*	0.302
	Size60	166	0.010*	0.916***	-0.112	0.488***	0.460
	Size80	166	0.007**	0.792***	0.03	0.266***	0.633
	Size100	166	-0.001	0.884***	-0.095***	-0.160***	0.951
ITW40	Size20	142	0.009	0.891***	-0.356	0.719***	0.262
	Size40	166	0.007*	0.789***	-0.177**	0.595***	0.616
	Size60	166	0.007**	0.863***	-0.221***	0.668***	0.725
	Size80	166	0.004	1.040***	0.091	0.352***	0.767
	Size100	166	-0.001	1.259***	0.144*	-0.169**	0.822
ITW60	Size20	166	0.007	0.884***	0.057	0.693***	0.648
	Size40	166	0.008**	0.820***	0.06	0.629***	0.723
	Size60	166	0.008**	1.010***	0.107	0.477***	0.759
	Size80	166	0.002	1.088***	0.148*	0.449***	0.782
	Size100	166	-0.009	1.041***	0.236	0.262*	0.542
ITW80	Size20	166	-0.001	0.924***	0.083	0.738***	0.693
	Size40	166	0.001	0.999***	0.056	0.637***	0.827
	Size60	166	0.001	0.971***	0.417***	0.348***	0.810
	Size80	166	0.000	1.026***	0.495***	0.395***	0.568
	Size100	118	0.005	1.262***	1.576***	-1.108***	0.417
ITW100	Size20	166	0.004	0.874***	0.095	0.835***	0.771
	Size40	166	0.005*	0.860***	0.358***	0.576***	0.782
	Size60	166	0.002	0.711***	0.485***	0.454***	0.575
	Size80	154	-0.008	0.631***	1.322***	-0.219	0.385
	Size100	12	0.021	0.101	0.38	0.159	0.107

Panel F. Model: Market + DMS + SMB + HML

ITW	Size	N	Constant	Market	DMS	SMB	HML	R^2
ITW20	Size20	22	-0.027	0.740*	0.184	0.133	0.404	0.292
	Size40	82	-0.002	0.582***	-0.012	0.423**	0.492**	0.346
	Size60	166	-0.005	1.002***	-0.106	0.621***	0.817***	0.576
	Size80	166	-0.004	0.854***	0.034	0.362***	0.595***	0.743
	Size100	166	0.000	0.878***	-0.095***	-0.170***	-0.061**	0.952
ITW40	Size20	142	-0.001	0.884***	-0.27	0.813***	0.707***	0.308
	Size40	166	-0.003	0.848***	-0.173**	0.686***	0.564***	0.711
	Size60	166	-0.002	0.917***	-0.217***	0.753***	0.525***	0.807
	Size80	166	-0.006*	1.096***	0.095	0.439***	0.538***	0.828
	Size100	166	-0.006	1.283***	0.146*	-0.131	0.231***	0.831
ITW60	Size20	166	-0.003	0.939***	0.061	0.779***	0.530***	0.705
	Size40	166	-0.001	0.876***	0.064	0.716***	0.537***	0.800
	Size60	166	0.000	1.057***	0.110	0.550***	0.449***	0.801
	Size80	166	-0.005	1.131***	0.151*	0.516***	0.414***	0.814
	Size100	166	-0.012*	1.060***	0.237*	0.292**	0.183	0.547
ITW80	Size20	166	-0.005	0.949***	0.085	0.777***	0.240**	0.704
	Size40	166	-0.007**	1.042***	0.059	0.703***	0.411***	0.865
	Size60	166	-0.004	1.004***	0.419***	0.400***	0.322***	0.831
	Size80	166	-0.01	1.085***	0.500***	0.487***	0.566***	0.607
	Size100	118	0.009	1.209***	1.602***	-1.173***	-0.263	0.42
ITW100	Size20	166	-0.001	0.905***	0.097	0.883***	0.293***	0.79
	Size40	166	-0.002	0.904***	0.361***	0.644***	0.419***	0.82
	Size60	166	-0.001	0.734***	0.487***	0.490***	0.223*	0.585
	Size80	154	-0.012	0.657***	1.332***	-0.182	0.250	0.390
	Size100	12	-0.002	0.380	0.150	0.400	0.647	0.352

Panel G. GRS F-test

Model	N	| a |	F_{GRS}	Avg. R^2
(Model 1) Market + DMS	166	0.007	1.534 *	0.645
(Model 2) Market + SMB	166	0.005	1.963 **	0.698
(Model 3) Market + DMS+HML	166	0.003	1.551 *	0.676
(Model 4) Market + SMB+HML	166	0.006	2.274 ***	0.743
(Model 5) Market + DMS+SMB	166	0.025	1.482 *	0.708
(Model 6) Market + DMS+SMB+HML	166	0.004	1.513 *	0.754

Table 11. Preferred stock discount against relative individual trading weight during bull markets

This table replicates Table 7 for a subsample under bull markets. These regressions are performed on the full pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. As the dependent variable, preferred stock discount (PSD) is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the individual trading weight (ITW) is the ratio of the individual trading volume of shares over the total trading volume of shares. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.197***	0.177***	0.175***	0.120***	0.111***	0.111***		
	(5.891)	(4.847)	(4.799)	(3.716)	(3.493)	(3.494)		
Relative smallness		1.473**	1.521**	2.875***	2.795***	2.795***		
		(2.459)	(2.506)	(3.366)	(3.546)	(3.546)		
Dividend dummy			-0.117**	-0.131	-0.137	-0.137	-0.124*	-0.093
			(-2.135)	(-1.222)	(-1.382)	(-1.382)	(-1.718)	(-1.004)
Dividend dummy			-0.004	-0.001	-0.002	-0.002	0.004	-0.004
× Dividend fall (t-5 to t-1)			(-1.047)	(-0.467)	(-0.706)	(-0.550)	(0.517)	(-1.240)
Largest stake				-0.001	-0.001	-0.001	0.004	-0.001
				(-0.569)	(-0.469)	(-0.469)	(1.218)	(-0.599)
Largest stake				0.000	0.000	0.000	-0.001	0.000
× Absolute control				(0.102)	(0.042)	(0.042)	(-0.777)	(0.241)
Chaebol dummy							0.187**	.
							(2.587)	.
Relative dollar volume					0.001**	0.001**	0.001	0.000
					(2.018)	(2.016)	(0.943)	(0.735)
Relative Amihud ratio					0.001	0.001	-0.005**	0.001
					(1.279)	(1.278)	(-2.218)	(1.012)
Relative turnover					-1.206***	-1.206***	-1.584***	-1.254***
					(-9.418)	(-9.417)	(-6.884)	(-10.122)
Market						0.070		
						(1.226)		
SMB						0.150**		
						(2.399)		
HML						0.140**		
						(1.998)		
Constant	0.428***	-0.936	-0.972*	-2.230***	-2.140***	-2.139***	0.279**	0.485**
	(8.148)	(-1.788)	(-1.739)	(-2.799)	(-2.718)	(-2.712)	(3.122)	(2.385)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.061	0.077	0.079	0.081	0.114	0.114	0.074	0.077
N	185,434	185,434	185,434	151,246	151,246	151,246	151,246	151,246

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.141***	0.088***	0.087***	0.056**	0.047*	0.047*		
	(5.335)	(3.457)	(3.400)	(2.043)	(1.838)	(1.837)		
Common ITW	-0.251***	-0.127***	-0.127***	(0.065)	(0.063)	-0.064		
	(-4.880)	(-2.741)	(-2.753)	(-1.522)	(-1.527)	(-1.528)		
Log of preferred market cap.		-0.145***	-0.146***	-0.241***	-0.238***	-0.238***		
		(-2.812)	(-2.833)	(-3.192)	(-3.279)	(-3.279)		
Log of common market cap.		0.226***	0.226***	0.322***	0.315***	0.315***		
		(4.606)	(4.599)	(4.932)	(5.068)	(5.067)		
Dividend dummy			-0.079	-0.117	-0.124	-0.124	-0.143*	-0.092
			(-1.255)	(-1.060)	(-1.191)	(-1.191)	(-1.934)	(-0.984)
Dividend dummy × Dividend fall (t-5 to t-1)			-0.003	-0.001	-0.001	0	-0.001	-0.003
			(-0.872)	(-0.184)	(-0.237)	(-0.136)	(-0.072)	(-1.018)
Largest stake				-0.003	-0.002	-0.002	0.004	-0.001
				(-0.948)	(-0.862)	(-0.862)	(1.228)	(-0.547)
Largest stake × Absolute control				0.0010	0.0000	0.0000	-0.0010	0.0000
				(0.481)	(0.423)	(0.423)	(-0.843)	(0.237)
Chaebol dummy							0.139*	.
							(1.865)	.
Preferred dollar volume					-0.001	-0.001	-0.004	-0.001
					(-1.025)	(-1.023)	(-0.885)	(-0.625)
Preferred Amihud ratio					0.002***	0.002***	-0.007**	0.002*
					(3.224)	(3.222)	(-2.036)	(1.819)
Preferred turnover					-1.109***	-1.109***	-2.162***	-1.225***
					(-8.060)	(-8.059)	(-8.745)	(-10.191)
Common dollar volume					0.334	0.335	1.121*	0.557*
					(1.511)	(1.511)	(1.740)	(1.855)
Common Amihud ratio					0.002***	0.002***	0.001***	0.002***
					(7.200)	(7.195)	(3.042)	(8.755)
Common turnover					1.172***	1.172***	-0.66	1.261***
					(4.606)	(4.606)	(-1.133)	(4.675)
Market						0.029		
						(0.521)		
SMB						0.099*		
						(1.830)		
HML						0.049		
						(0.735)		
Constant	0.527***	-0.374*	-0.362*	-0.752***	-0.703***	-0.702***	0.341***	0.476**
	(8.148)	(-1.788)	(-1.739)	(-2.799)	(-2.718)	(-2.712)	(3.122)	(2.385)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.061	0.119	0.120	0.162	0.194	0.194	0.103	0.079
N	185,434	185,434	185,434	151,246	151,246	151,246	151,246	151,246

Table 12. Preferred stock discount against relative individual trading weight during bear markets

This table replicates Table 7 for a subsample under bear markets. These regressions are performed on the full pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. As the dependent variable, preferred stock discount (PSD) is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the individual trading weight (ITW) is the ratio of the individual trading volume of shares over the total trading volume of shares. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.209***	0.192***	0.190***	0.130***	0.122***	0.122***		
	(6.020)	(5.117)	(5.036)	(3.877)	(3.678)	(3.677)		
Relative smallness		1.341**	1.387**	2.846***	2.751***	2.751***		
		(2.263)	(2.310)	(3.411)	(3.627)	(3.627)		
Dividend dummy			-0.111**	-0.113	-0.120	-0.120	-0.107	-0.077
			(-2.076)	(-1.067)	(-1.233)	(-1.233)	(-1.457)	(-0.838)
Dividend dummy			0.001	0.003	0.001	0.001	-0.008	-0.002
× Dividend fall (t-5 to t-1)			(0.171)	(0.468)	(0.150)	(0.144)	(-0.867)	(-0.414)
Largest stake				0.000	0.000	0.000	0.004	0.000
				(-0.137)	(-0.080)	(-0.081)	(1.079)	(-0.141)
Largest stake				0.000	0.000	0.000	-0.001	0.000
× Absolute control				(-0.127)	(-0.171)	(-0.170)	(-0.629)	(0.030)
Chaebol dummy							0.189***	.
							(2.623)	.
Relative dollar volume					0.000	0.000	0.001	-0.001
					(-0.113)	(-0.113)	(0.173)	(-0.408)
Relative Amihud ratio					0.001	0.001	-0.005**	0.001
					(0.987)	(0.988)	(-2.413)	(0.785)
Relative turnover					-1.365***	-1.365***	-1.888***	-1.412***
					(-9.618)	(-9.619)	(-7.894)	(-10.146)
Market						0.216***		
						(3.829)		
SMB						0.084		
						(1.399)		
HML						0.062		
						(0.659)		
Constant	0.450***	-0.794	-0.827	-2.214***	-2.120***	-2.115***	0.279**	0.469**
	(8.733)	(-1.409)	(-1.449)	(-2.816)	(-2.963)	(-2.957)	(2.333)	(2.540)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.064	0.078	0.080	0.081	0.124	0.124	0.084	0.086
N	161,801	161,801	161,801	128,279	128,279	128,254	128,279	128,279

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.130***	0.088***	0.086***	0.055**	0.048*	0.048*		
	(5.169)	(3.530)	(3.450)	(2.076)	(1.962)	(1.958)		
Common ITW	-0.284***	-0.159***	-0.158***	-0.083*	-0.080*	-0.080*		
	(-5.277)	(-3.231)	(-3.210)	(-1.844)	(-1.846)	(-1.848)		
Log of preferred market cap.		-0.126**	-0.127**	-0.225***	-0.221***	-0.221***		
		(-2.564)	(-2.573)	(-3.019)	(-3.129)	(-3.131)		
Log of common market cap.		0.207***	0.206***	0.313***	0.305***	0.305***		
		(4.284)	(4.276)	(4.912)	(5.118)	(5.117)		
Dividend dummy			-0.076	-0.094	-0.101	-0.101	-0.127*	-0.075
			(-1.211)	(-0.872)	(-1.014)	(-1.015)	(-1.694)	(-0.817)
Dividend dummy			-0.001	0.001	-0.001	-0.001	-0.012	-0.002
× Dividend fall (t-5 to t-1)			(-0.210)	(0.102)	(-0.127)	(-0.128)	(-1.181)	(-0.318)
Largest stake				-0.001	-0.001	-0.001	0.003	0.000
				(-0.550)	(-0.501)	(-0.502)	(1.060)	(-0.089)
Largest stake				0.0000	0.0000	0.0000	-0.0010	0.0000
× Absolute control				(0.262)	(0.219)	(0.220)	(-0.689)	(0.024)
Chaebol dummy							0.140*	.
							(1.903)	.
Preferred dollar volume					-0.001	-0.001	-0.003	-0.001
					(-0.936)	(-0.935)	(-1.004)	(-0.637)
Preferred Amihud ratio					0.003***	0.003***	-0.008***	0.002*
					(3.196)	(3.197)	(-3.572)	(1.687)
Preferred turnover					-1.281***	-1.281***	-2.463***	-1.375***
					(-8.712)	(-8.711)	(-9.751)	(-10.405)
Common dollar volume					0.272	0.273	0.967	0.483*
					(1.312)	(1.317)	(1.556)	(1.660)
Common Amihud ratio					0.001***	0.001***	0.001**	0.001***
					(6.040)	(6.038)	(2.431)	(6.775)
Common turnover					1.368***	1.368***	-0.633	1.476***
					(4.835)	(4.836)	(-1.073)	(4.854)
Market						0.105		
						(1.567)		
SMB						0.037		
						(0.630)		
HML						0.004		
						(0.047)		
Constant	0.587***	-0.264	-0.254	-0.731***	-0.696***	-0.693***	0.333***	0.461**
	(9.022)	(-1.250)	(-1.204)	(-2.911)	(-2.926)	(-2.909)	(2.985)	(2.493)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.066	0.114	0.115	0.157	0.198	0.198	0.116	0.088
N	161,801	161,801	161,801	128,279	128,279	128,254	128,279	128,279

Table 13 Time-series regressions of the excess returns of size-quintile by ITW-quintile (25) test portfolios onto FMPs during bull markets

This table replicates Table 10 for a subsample under bull markets. The dependent variable is the excess returns of size-quintile by ITW-quintile (25) test portfolios. For example, Size10 and ITW10 are the groups of smallest and least individual-heavy common stockts, respectively. For explanatory variables, the individual factor is the excess returns of portfolios that are dense and scarce in individual traders (dense-minus-scarce, DMS). The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). Panel G examines the overall explanatory capabilities of all time-series models exposed in Panels A through F by Gibbons et al.'s (1989) GRS F-test which verifies the joint null hypothesis of intercepts (α) or average monthly excess returns all equal to zeros. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Model: Market + DMS

ITW	Size	N	Constant	Market	DMS	R^2
ITW20	Size20	15	-0.026	0.840	-0.075	0.172
	Size40	44	0.017	0.320	0.004	0.018
	Size60	92	0.025*	0.662***	-0.040	0.120
	Size80	92	0.016**	0.614***	0.032	0.270
	Size100	92	0.005**	0.812***	-0.228***	0.878
ITW40	Size20	80	-0.023	1.468***	0.181	0.170
	Size40	92	0.018*	0.552***	0.078	0.151
	Size60	92	0.013	0.679***	0.091	0.268
	Size80	92	0.012	0.873***	0.358***	0.477
	Size100	92	-0.001	1.251***	0.027	0.672
ITW60	Size20	92	0.013	0.698***	0.377***	0.290
	Size40	92	0.015*	0.637***	0.463***	0.323
	Size60	92	0.014	0.889***	0.394***	0.405
	Size80	92	0.014*	0.852***	0.491***	0.465
	Size100	92	-0.015	1.076***	0.507***	0.385
ITW80	Size20	92	-0.001	0.860***	0.489***	0.329
	Size40	92	0.004	0.894***	0.387***	0.490
	Size60	92	0.005	0.886***	0.675***	0.632
	Size80	92	0.002	0.913***	0.784***	0.399
	Size100	60	-0.041*	2.165***	1.617***	0.600
ITW100	Size20	92	0.013	0.673***	0.701***	0.450
	Size40	92	0.007	0.782***	0.645***	0.496
	Size60	92	0.019*	0.439***	0.699***	0.301
	Size80	86	-0.036*	0.996***	0.821***	0.237
	Size100	6	0.057	-0.150	0.178	0.077

Panel B. Model: Market + SMB

ITW	Size	N	Constant	Market	SMB	R^2
	Size20	15	-0.024	0.803	0.088	0.173
	Size40	44	0.020	0.359	0.552*	0.106
ITW20	Size60	92	0.026**	0.703***	0.407***	0.185
	Size80	92	0.015**	0.635***	0.147	0.291
	Size100	92	0.007***	0.764***	-0.189***	0.866
	Size20	80	-0.022	1.510***	0.619**	0.226
	Size40	92	0.018**	0.616***	0.481***	0.302
ITW40	Size60	92	0.012*	0.748***	0.513***	0.472
	Size80	92	0.008	0.957***	0.380***	0.505
	Size100	92	-0.001	1.250***	-0.032	0.673
	Size20	92	0.010	0.811***	0.610***	0.44
	Size40	92	0.010	0.770***	0.703***	0.529
ITW60	Size60	92	0.010	0.990***	0.490***	0.468
	Size80	92	0.008	0.971***	0.550***	0.53
	Size100	92	-0.021*	1.179***	0.387***	0.365
	Size20	92	-0.006	1.007***	0.788***	0.51
	Size40	92	0.000	1.005***	0.586***	0.638
ITW80	Size60	92	-0.002	1.029***	0.574***	0.609
	Size80	92	-0.007	1.062***	0.511***	0.321
	Size100	60	-0.055**	2.422***	0.785**	0.455
	Size20	92	0.006	0.852***	0.861***	0.645
	Size40	92	0.001	0.948***	0.798***	0.672
ITW100	Size60	92	0.011	0.606***	0.755***	0.392
	Size80	86	-0.046**	1.154***	0.388	0.174
	Size100	6	0.041	-0.062	-0.041	0.02

Panel C. Model: Market + DMS + HML

ITW	Size	N	Constant	Market	DMS	HML	R^2
	Size20	15	-0.025	0.857	-0.123	-0.130	0.173
	Size40	44	0.013	0.131	0.034	0.696**	0.113
ITW20	Size60	92	0.015	0.683***	0.06	0.669***	0.248
	Size80	92	0.008	0.630***	0.104	0.482***	0.439
	Size100	92	0.006**	0.810***	-0.236***	-0.052	0.881
	Size20	80	-0.026	1.378***	0.256	0.458	0.188
	Size40	92	0.010	0.568***	0.152	0.496***	0.270
ITW40	Size60	92	0.007	0.691***	0.148	0.383***	0.352
	Size80	92	0.005	0.889***	0.431***	0.494***	0.599
	Size100	92	-0.006	1.261***	0.076	0.324***	0.719
	Size20	92	0.006	0.713***	0.447***	0.471***	0.383
	Size40	92	0.008	0.651***	0.529***	0.441***	0.413
ITW60	Size60	92	0.008	0.901***	0.448***	0.367***	0.458
	Size80	92	0.008	0.863***	0.545***	0.357***	0.52
	Size100	92	-0.019	1.084***	0.543***	0.240	0.400
	Size20	92	-0.002	0.863***	0.500***	0.076	0.331
	Size40	92	-0.001	0.905***	0.437***	0.338***	0.545
ITW80	Size60	92	0.001	0.895***	0.718***	0.286***	0.669
	Size80	92	-0.005	0.927***	0.847***	0.422**	0.442
	Size100	60	-0.041*	2.169***	1.619***	0.019	0.600
	Size20	92	0.009	0.681***	0.736***	0.239*	0.473
	Size40	92	0.004	0.789***	0.675***	0.199*	0.513
ITW100	Size60	92	0.017*	0.443***	0.716***	0.115	0.306
	Size80	86	-0.040**	1.010***	0.884***	0.298	0.247
	Size100	6	0.050	-0.061	0.225	0.208	0.304

Panel D. Model: Market + SMB + HML

ITW	Size	N	Constant	Market	SMB	HML	R^2
	Size20	15	-0.027	0.795	0.148	0.186	0.175
	Size40	44	0.016	0.176	0.557**	0.699**	0.202
ITW20	Size60	92	0.013	0.764***	0.585***	0.828***	0.374
	Size80	92	0.006	0.675***	0.262***	0.540***	0.495
	Size100	92	0.008***	0.758***	-0.205***	-0.073**	0.873
	Size20	80	-0.027	1.402***	0.739***	0.637*	0.261
	Size40	92	0.007	0.664***	0.620***	0.651***	0.499
ITW40	Size60	92	0.003	0.788***	0.629***	0.541***	0.633
	Size80	92	-0.001	0.999***	0.501***	0.569***	0.661
	Size100	92	-0.006	1.274***	0.037	0.323***	0.717
	Size20	92	-0.001	0.856***	0.741***	0.613***	0.591
	Size40	92	0.000	0.814***	0.831***	0.595***	0.686
ITW60	Size60	92	0.002	1.025***	0.590***	0.465***	0.551
	Size80	92	0.001	1.005***	0.648***	0.456***	0.616
	Size100	92	-0.025**	1.200***	0.447***	0.282	0.384
	Size20	92	-0.01	1.024***	0.839***	0.237*	0.526
	Size40	92	-0.008	1.040***	0.686***	0.466***	0.738
ITW80	Size60	92	-0.008	1.056***	0.651***	0.358***	0.664
	Size80	92	-0.015	1.096***	0.609***	0.461**	0.37
	Size100	60	-0.059**	2.466***	0.846**	0.179	0.457
	Size20	92	-0.001	0.881***	0.944***	0.392***	0.706
	Size40	92	-0.005	0.973***	0.871***	0.341***	0.719
ITW100	Size60	92	0.007	0.623***	0.804***	0.231*	0.411
	Size80	86	-0.050**	1.177***	0.441*	0.234	0.18
	Size100	6	0.033	0.070	0.101	0.234	0.235

Panel E. Model: Market + DMS + SMB

ITW	Size	N	Constant	Market	DMS	SMB	R^2
	Size20	15	-0.032	0.896	-0.370	0.343	0.187
	Size40	44	0.018	0.417	-0.256	0.662**	0.123
ITW20	Size60	92	0.021*	0.783***	-0.457**	0.645***	0.229
	Size80	92	0.014**	0.651***	-0.095	0.196*	0.296
	Size100	92	0.005**	0.792***	-0.160***	-0.106***	0.891
	Size20	80	-0.025	1.555***	-0.330	0.791**	0.235
	Size40	92	0.014	0.677***	-0.351**	0.664***	0.346
ITW40	Size60	92	0.008	0.811***	-0.363***	0.703***	0.527
	Size80	92	0.010	0.928***	0.169	0.291***	0.516
	Size100	92	0.000	1.238***	0.072	-0.069	0.674
	Size20	92	0.009	0.815***	-0.026	0.624***	0.440
	Size40	92	0.011	0.768***	0.013	0.697***	0.529
ITW60	Size60	92	0.011	0.970***	0.116	0.430***	0.472
	Size80	92	0.011	0.935***	0.205	0.444***	0.543
	Size100	92	-0.016	1.111***	0.387**	0.186	0.393
	Size20	92	-0.006	1.012***	-0.031	0.804***	0.510
	Size40	92	0.000	1.003***	0.012	0.580***	0.638
ITW80	Size60	92	0.003	0.949***	0.458***	0.336***	0.679
	Size80	92	0.001	0.942***	0.684***	0.154	0.404
	Size100	60	-0.040*	2.114***	1.750***	-0.228	0.603
	Size20	92	0.008	0.814***	0.218*	0.747***	0.660
	Size40	92	0.003	0.914***	0.195*	0.697***	0.684
ITW100	Size60	92	0.015	0.550***	0.319**	0.589***	0.420
	Size80	86	-0.036*	0.986***	0.857**	-0.055	0.237
	Size100	6	0.079	-0.367	0.577	-0.365	0.275

Panel F. Model: Market + DMS + SMB + HML

ITW	Size	N	Constant	Market	DMS	SMB	HML	R^2
	Size20	15	-0.032	0.894	-0.366	0.347	0.020	0.187
	Size40	44	0.014	0.230	-0.223	0.652**	0.684**	0.215
ITW20	Size60	92	0.008	0.842***	-0.443**	0.814***	0.822***	0.415
	Size80	92	0.005	0.690***	-0.086	0.307***	0.539***	0.499
	Size100	92	0.007***	0.786***	-0.161***	-0.121***	-0.075**	0.899
	Size20	80	-0.03	1.444***	-0.292	0.888***	0.620*	0.268
	Size40	92	0.003	0.723***	-0.340***	0.796***	0.646***	0.541
ITW40	Size60	92	-0.001	0.849***	-0.354***	0.813***	0.537***	0.686
	Size80	92	0.001	0.968***	0.179*	0.409***	0.571***	0.673
	Size100	92	-0.006	1.261***	0.077	-0.003	0.324***	0.719
	Size20	92	-0.001	0.859***	-0.016	0.749***	0.612***	0.592
	Size40	92	0.001	0.811***	0.023	0.819***	0.595***	0.686
ITW60	Size60	92	0.003	1.003***	0.124	0.526***	0.466***	0.555
	Size80	92	0.003	0.968***	0.212*	0.538***	0.458***	0.631
	Size100	92	-0.021*	1.132***	0.392**	0.244	0.287*	0.413
	Size20	92	-0.010	1.029***	-0.027	0.853***	0.237*	0.526
	Size40	92	-0.007	1.036***	0.019	0.676***	0.466***	0.738
ITW80	Size60	92	-0.003	0.975***	0.464***	0.411***	0.363***	0.736
	Size80	92	-0.007	0.976***	0.692***	0.251	0.470***	0.455
	Size100	60	-0.039*	2.096***	1.761***	-0.257	-0.067	0.603
	Size20	92	0.002	0.842***	0.224**	0.828***	0.395***	0.721
	Size40	92	-0.003	0.938***	0.200**	0.767***	0.344***	0.732
ITW100	Size60	92	0.011	0.567***	0.323**	0.637***	0.235*	0.44
	Size80	86	-0.040**	1.009***	0.885***	-0.002	0.298	0.247
	Size100	6	0.063	-0.201	0.416	-0.188	0.141	0.334

Panel G. GRS F-test

	Model	N	$\lvert \alpha \rvert$	F_{GRS}	Avg. R^2
(Model 1)	Market + DMS	92	0.011	1.090	0.411
(Model 2)	Market + SMB	92	0.010	1.197	0.495
(Model 3)	Market + DMS+HML	92	0.008	1.011	0.472
(Model 4)	Market + SMB+HML	92	0.007	1.244	0.590
(Model 5)	Market + DMS+SMB	92	0.009	1.045	0.518
(Model 6)	Market + DMS+SMB+HML	92	0.005	1.092	0.614

Table 14 Time-series regressions of the excess returns of size-quintile by ITW-quintile (25) test portfolios onto FMPs during bear markets

This table replicates Table 10 for a subsample under bear markets. The dependent variable is the excess returns of size-quintile by ITW-quintile (25) test portfolios. For example, Size10 and ITW10 are the groups of smallest and least individual-heavy common stockts, respectively. For explanatory variables, the individual factor is the excess returns of portfolios that are dense and scarce in individual traders (dense-minus-scarce, DMS). The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). Panel G examines the overall explanatory capabilities of all time-series models exposed in Panels A through F by Gibbons et al.'s (1989) GRS F-test which verifies the joint null hypothesis of intercepts (α) or average monthly excess returns all equal to zeros. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Model: Market + DMS

ITW	Size	N	Constant	Market	DMS	R^2
ITW20	Size20	7	0.035	1.402	1.583	0.161
	Size40	38	0.006	0.485**	0.314	0.337
	Size60	74	0.002	0.648***	0.405**	0.309
	Size80	74	0.012	0.779***	0.322***	0.528
	Size100	74	-0.006**	0.870***	-0.142***	0.852
ITW40	Size20	62	0.005	0.533**	0.031	0.104
	Size40	74	0.014**	0.763***	0.231**	0.529
	Size60	74	0.021***	0.921***	0.200*	0.574
	Size80	74	0.010	1.119***	0.197*	0.651
	Size100	74	0.000	1.318***	0.059	0.642
ITW60	Size20	74	0.017*	0.874***	0.511***	0.467
	Size40	74	0.021***	0.911***	0.338***	0.641
	Size60	74	0.009	0.927***	0.367***	0.679
	Size80	74	0.012*	1.230***	0.270**	0.704
	Size100	74	0.006	1.242***	0.222	0.420
ITW80	Size20	74	0.008	0.850***	0.519***	0.579
	Size40	74	0.005	0.904***	0.455***	0.651
	Size60	74	0.003	0.946***	0.550***	0.675
	Size80	74	0.017	1.251***	0.602***	0.454
	Size100	58	0.000	1.519**	0.312	0.155
ITW100	Size20	74	0.011	0.863***	0.421***	0.492
	Size40	74	0.009	0.751***	0.737***	0.659
	Size60	74	0.000	0.608***	0.790***	0.463
	Size80	68	0.010	0.718**	1.560***	0.498
	Size100	6	-0.063	-0.613	1.539	0.426

Panel B. Model: Market + SMB

ITW	Size	N	Constant	Market	SMB	R^2
	Size20	7	-0.083	-0.555	-0.389	0.013
	Size40	38	0.005	0.629***	0.099	0.311
ITW20	Size60	74	-0.004	0.727***	0.494***	0.325
	Size80	74	0.006	0.829***	0.476***	0.58
	Size100	74	-0.003	0.854***	-0.248***	0.892
	Size20	62	0.002	0.480**	0.408*	0.145
	Size40	74	0.008	0.772***	0.514***	0.646
ITW40	Size60	74	0.016**	0.910***	0.573***	0.707
	Size80	74	0.006	1.130***	0.414***	0.699
	Size100	74	0.001	1.372***	-0.203	0.653
	Size20	74	0.007	0.933***	0.888***	0.603
	Size40	74	0.014**	0.954***	0.562***	0.725
ITW60	Size60	74	0.001	0.973***	0.620***	0.782
	Size80	74	0.007	1.264***	0.455***	0.744
	Size100	74	0.002	1.273***	0.352*	0.433
	Size20	74	-0.002	0.929***	0.782***	0.684
	Size40	74	-0.004	0.955***	0.806***	0.815
ITW80	Size60	74	-0.005	1.069***	0.572***	0.665
	Size80	74	0.007	1.352***	0.843***	0.497
	Size100	58	0.012	1.879***	-1.305**	0.223
	Size20	74	0.001	0.882***	0.930***	0.717
	Size40	74	-0.001	0.922***	0.735***	0.624
ITW100	Size60	74	-0.009	0.810***	0.658***	0.381
	Size80	68	-0.004	1.196***	0.623*	0.219
	Size100	6	-0.059	-0.740	0.803	0.311

Panel C. Model: Market + DMS + HML

ITW	Size	N	Constant	Market	DMS	HML	R^2
	Size20	7	0.133	2.806	2.703	-2.034	0.205
	Size40	38	0.007	0.552**	0.372	0.384	0.365
ITW20	Size60	74	-0.006	0.815***	0.423***	0.759***	0.425
	Size80	74	0.005	0.922***	0.337***	0.651***	0.657
	Size100	74	-0.005*	0.867***	-0.143***	-0.014	0.852
	Size20	62	0.002	0.618**	0.137	0.584*	0.148
	Size40	74	0.010	0.851***	0.240**	0.399***	0.587
ITW40	Size60	74	0.017**	1.029***	0.211**	0.488***	0.644
	Size80	74	0.005	1.225***	0.208**	0.483***	0.706
	Size100	74	-0.002	1.348***	0.062	0.137	0.645
	Size20	74	0.014	0.941***	0.518***	0.308	0.484
	Size40	74	0.016**	1.012***	0.349***	0.458***	0.701
ITW60	Size60	74	0.005	1.006***	0.376***	0.359***	0.716
	Size80	74	0.008	1.311***	0.279***	0.368***	0.732
	Size100	74	0.006	1.248***	0.222	0.024	0.420
	Size20	74	0.006	0.892***	0.524***	0.192	0.587
	Size40	74	0.003	0.954***	0.460***	0.225	0.663
ITW80	Size60	74	0.000	0.997***	0.555***	0.231	0.687
	Size80	74	0.01	1.409***	0.618***	0.717**	0.502
	Size100	58	-0.001	1.548**	0.308	0.127	0.156
	Size20	74	0.011	0.872***	0.422***	0.038	0.492
	Size40	74	0.004	0.868***	0.750***	0.531***	0.720
ITW100	Size60	74	-0.002	0.650***	0.794***	0.191	0.469
	Size80	68	0.008	0.751**	1.563***	0.158	0.500
	Size100	6	-0.247*	-1.310	-0.526	2.330*	0.936

Panel D. Model: Market + SMB + HML

ITW	Size	N	Constant	Market	SMB	HML	R^2
	Size20	7	-0.107	-0.963	-0.501	1.273	0.061
	Size40	38	0.005	0.705***	0.144	0.331	0.332
ITW20	Size60	74	-0.013	0.902***	0.543***	0.795***	0.452
	Size80	74	-0.001	0.980***	0.519***	0.689***	0.724
	Size100	74	-0.002	0.847***	-0.250***	-0.033	0.893
	Size20	62	-0.003	0.620***	0.532**	0.693**	0.209
	Size40	74	0.003	0.870***	0.542***	0.443***	0.717
ITW40	Size60	74	0.010*	1.029***	0.607***	0.540***	0.792
	Size80	74	0.000	1.244***	0.446***	0.518***	0.762
	Size100	74	0.000	1.397***	-0.196	0.115	0.656
	Size20	74	0.003	1.016***	0.911***	0.377**	0.628
	Size40	74	0.009*	1.064***	0.594***	0.502***	0.796
ITW60	Size60	74	-0.003	1.062***	0.645***	0.408***	0.829
	Size80	74	0.003	1.352***	0.481***	0.404***	0.777
	Size100	74	0.002	1.284***	0.355*	0.05	0.433
	Size20	74	-0.004	0.983***	0.798***	0.250*	0.698
	Size40	74	-0.007	1.018***	0.824***	0.287***	0.836
ITW80	Size60	74	-0.008	1.127***	0.589***	0.266*	0.68
	Size80	74	-0.001	1.523***	0.892***	0.780***	0.553
	Size100	58	0.011	1.890***	-1.302**	0.052	0.223
	Size20	74	0.000	0.907***	0.937***	0.114	0.72
	Size40	74	-0.007	1.048***	0.771***	0.576***	0.695
ITW100	Size60	74	-0.012	0.859***	0.672***	0.224	0.389
	Size80	68	-0.005	1.228***	0.633*	0.153	0.22
	Size100	6	-0.211**	-1.101*	0.388	1.882**	0.962

Panel E. Model: Market + DMS + SMB

ITW	Size	N	Constant	Market	DMS	SMB	R^2
	Size20	7	0.016	0.863	1.583	-0.388	0.175
	Size40	38	0.007	0.467**	0.384	-0.110	0.34
ITW20	Size60	74	-0.002	0.658***	0.232	0.363*	0.340
	Size80	74	0.007	0.790***	0.13	0.404***	0.587
	Size100	74	-0.003	0.864***	-0.033	-0.230***	0.893
	Size20	62	0.000	0.566**	-0.233	0.556*	0.158
	Size40	74	0.008	0.778***	-0.018	0.524***	0.647
ITW40	Size60	74	0.015**	0.939***	-0.099	0.628***	0.711
	Size80	74	0.006	1.130***	0.000	0.414***	0.699
	Size100	74	0.003	1.308***	0.212	-0.322**	0.665
	Size20	74	0.009	0.897***	0.121	0.820***	0.607
	Size40	74	0.015**	0.925***	0.096	0.508***	0.728
ITW60	Size60	74	0.002	0.943***	0.099	0.564***	0.786
	Size80	74	0.008	1.242***	0.073	0.414***	0.745
	Size100	74	0.003	1.251***	0.074	0.31	0.434
	Size20	74	0.000	0.869***	0.201*	0.669***	0.697
	Size40	74	-0.003	0.926***	0.098	0.751***	0.818
ITW80	Size60	74	-0.001	0.956***	0.379***	0.360***	0.709
	Size80	74	0.01	1.270***	0.273	0.690***	0.506
	Size100	58	0.018	1.428**	1.299*	-1.890***	0.269
	Size20	74	0.001	0.890***	-0.029	0.947***	0.717
	Size40	74	0.004	0.764***	0.529***	0.438***	0.708
ITW100	Size60	74	-0.003	0.617***	0.650***	0.293	0.480
	Size80	68	0.014	0.692**	1.727***	-0.369	0.509
	Size100	6	-0.062	-0.581	1.268	0.520	0.501

Panel F. Model: Market + DMS + SMB + HML

ITW	Size	N	Constant	Market	DMS	SMB	HML	R^2
	Size20	7	0.114	2.385	2.613	-0.222	-1.872	0.209
	Size40	38	0.008	0.537**	0.422	-0.080	0.376	0.367
ITW20	Size60	74	-0.010	0.834***	0.225	0.417**	0.793***	0.466
	Size80	74	0.000	0.943***	0.123	0.450***	0.687***	0.73
	Size100	74	-0.003	0.857***	-0.033	-0.232***	-0.032	0.894
	Size20	62	-0.004	0.665***	-0.142	0.616**	0.659**	0.213
	Size40	74	0.003	0.876***	-0.022	0.554***	0.443***	0.717
ITW40	Size60	74	0.009*	1.060***	-0.104	0.665***	0.542***	0.796
	Size80	74	0.000	1.246***	-0.004	0.449***	0.519***	0.762
	Size100	74	0.002	1.333***	0.211	-0.314**	0.112	0.668
	Size20	74	0.005	0.980***	0.118	0.845***	0.375**	0.631
	Size40	74	0.010*	1.037***	0.092	0.542***	0.501***	0.799
ITW60	Size60	74	-0.002	1.034***	0.095	0.592***	0.407***	0.832
	Size80	74	0.003	1.331***	0.070	0.441***	0.403***	0.778
	Size100	74	0.002	1.262***	0.074	0.313	0.049	0.434
	Size20	74	-0.002	0.924***	0.199*	0.686***	0.247*	0.711
	Size40	74	-0.006	0.989***	0.095	0.770***	0.286***	0.839
ITW80	Size60	74	-0.004	1.014***	0.376***	0.378***	0.262*	0.723
	Size80	74	0.001	1.443***	0.267	0.742***	0.777***	0.563
	Size100	58	0.019	1.419**	1.302*	-1.894***	-0.041	0.269
	Size20	74	0.000	0.916***	-0.030	0.954***	0.114	0.72
	Size40	74	-0.002	0.890***	0.524***	0.476***	0.569***	0.777
ITW100	Size60	74	-0.006	0.664***	0.648***	0.308	0.216	0.488
	Size80	68	0.012	0.719**	1.726***	-0.360	0.131	0.510
	Size100	6	-0.243*	-1.272	-0.736	0.461	2.295*	0.995

Panel G. GRS F-test

	Model	N	$\lvert\alpha\rvert$	F_{GRS}	Avg. R^2
(Model 1)	Market + DMS	74	0.010	1.218	0.577
(Model 2)	Market + SMB	74	0.006	1.197	0.641
(Model 3)	Market + DMS+HML	74	0.007	1.279	0.615
(Model 4)	Market + SMB+HML	74	0.005	1.202	0.686
(Model 5)	Market + DMS+SMB	74	0.005	1.092	0.657
(Model 6)	Market + DMS+SMB+HML	74	0.004	1.114	0.701

Table 15 Comparison of sample statistics for the subsamples by high ITW and low ITW

This table compares the representative statistics of the subsamples of the full sample of 185 common-preferred share pairs. These subsamples are based on the size of average of ITW on comparing common stocks. The breakpoint of the subsamples is the median value of average ITW on comparing common shares.

	No. of issuers (firm-day obs.)	Common shares				Preferred				Relative ITW (pref. to com.)	
		ITW		Market Value		ITW		Market Value			
		Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Full sample	185 (347,235)	0.763	0.251	2,694.1	12,174.5	0.909	0.192	157.9	1,210.8	0.145	0.209
High ITW	92 (120,955)	0.966	0.067	103.1	162.8	0.993	0.044	2.9	4.3	0.027	0.076
Low ITW	93 (226,280)	0.655	0.247	4,079.1	14,897.2	0.864	0.223	240.8	1,493.4	0.209	0.229

Table 16. Regressions of preferred stock discount with high individual trading weight
This table replicates Table 7 for a subsample with preferred stock discount (PSD) with high individual trading weight (ITW) whose original sample is comprised of the full pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. As the dependent variable, PSD is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the ITW is the ratio of the individual trading volume of shares over the total trading volume of shares. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.378***	0.368***	0.360***	0.359***	0.340***	0.340***		
	(2.966)	(2.907)	(2.872)	(3.387)	(3.244)	(3.244)		
Relative smallness		1.359*	1.454*	4.300***	4.124***	4.123***		
		(1.845)	(1.890)	(3.251)	(3.366)	(3.365)		
Dividend dummy			-0.204*	-0.374	-0.366	-0.366	-0.337*	-0.201
			(-1.801)	(-1.528)	(-1.590)	(-1.591)	(-1.950)	(-1.025)
Dividend dummy			-0.009	-0.005	-0.009	-0.008	-0.017	-0.011
× Dividend fall (t-5 to t-1)			(-0.844)	(-0.435)	(-0.841)	(-0.700)	(-0.879)	(-0.948)
Largest stake				-0.007**	-0.007*	-0.007*	0.012*	-0.005
				(-2.062)	(-1.960)	(-1.960)	(1.784)	(-1.351)
Largest stake				0.0020	0.0020	0.0020	-0.0030	0.0020
× Absolute control				(0.896)	(0.864)	(0.864)	(-0.714)	(0.881)
Chaebol dummy							-0.095	.
							(-0.344)	.
Relative dollar volume					0.001	0.001	0.002	0.001
					(1.060)	(1.059)	(0.918)	(0.655)
Relative Amihud ratio					0.000	0.000	-0.002	0.000
					(0.313)	(0.315)	(-1.666)	(-0.224)
Relative turnover					-1.090***	-1.090***	-1.494***	-1.169***
					(-8.645)	(-8.638)	(-6.066)	(-8.991)
Market						0.207***		
						(2.988)		
SMB						0.394***		
						(3.968)		
HML						0.261		
						(1.459)		
Constant	0.479***	-0.774	-0.86	-3.299**	-3.142***	-3.139***	-0.004	0.603
	(5.120)	(-1.083)	(-1.153)	(-2.593)	(-2.666)	(-2.663)	(-0.015)	(1.040)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.125	0.137	0.140	0.173	0.196	0.196	0.075	0.158
N	120,955	120,955	120,955	88,145	88,145	88,140	88,145	88,145

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.112	0.114	0.115	0.171**	0.170**	0.170**		
	(1.253)	(1.451)	(1.470)	(2.327)	(2.345)	(2.345)		
Common ITW	-0.500***	(0.245)	(0.244)	-0.211*	(0.176)	-0.176		
	(-2.930)	(-1.565)	(-1.565)	(-1.677)	(-1.501)	(-1.502)		
Log of preferred market cap.		(0.103)	(0.107)	-0.241**	-0.231**	-0.231**		
		(-1.259)	(-1.329)	(-2.235)	(-2.222)	(-2.222)		
Log of common market cap.		0.214***	0.212***	0.403***	0.398***	0.398***		
		(3.082)	(3.062)	(4.596)	(4.767)	(4.766)		
Dividend dummy			-0.093	-0.27	-0.269	-0.269	-0.334*	-0.206
			(-0.822)	(-1.155)	(-1.211)	(-1.211)	(-1.882)	(-1.050)
Dividend dummy × Dividend fall (t-5 to t-1)			-0.011	-0.005	-0.009	-0.008	-0.015	-0.011
			(-1.128)	(-0.430)	(-0.811)	(-0.711)	(-0.767)	(-0.966)
Largest stake				-0.010***	-0.010***	-0.010***	0.01	-0.005
				(-2.885)	(-2.849)	(-2.849)	(1.563)	(-1.374)
Largest stake × Absolute control				0.0030	0.0030	0.0030	-0.0020	0.0020
				(1.022)	(0.982)	(0.982)	(-0.594)	(0.892)
Chaebol dummy							-0.145	.
							(-0.527)	.
Preferred dollar volume					-0.026	-0.026	0.412***	-0.079
					(-0.559)	(-0.559)	(4.070)	(-1.375)
Preferred Amihud ratio					0.001**	0.001**	-0.004	0.001
					(2.295)	(2.295)	(-1.557)	(0.720)
Preferred turnover					-0.997***	-0.997***	-3.098***	-0.914***
					(-4.933)	(-4.927)	(-6.799)	(-4.458)
Common dollar volume					(1.545)	-1.544	4.701	1.046
					(-1.266)	(-1.265)	(0.901)	(0.550)
Common Amihud ratio					0.002***	0.002***	0.002***	0.001***
					(6.060)	(6.058)	(2.945)	(5.633)
Common turnover					1.039***	1.039***	0.15	1.180***
					(3.927)	(3.927)	(0.244)	(3.976)
Market						0.126*		
						(1.835)		
SMB						0.259***		
						(2.839)		
HML						0.156		
						(0.918)		
Constant	0.863***	-0.04	-0.034	-0.586	-0.61	-0.608	0.028	0.604
	(4.670)	(-0.126)	(-0.108)	(-1.112)	(-1.200)	(-1.196)	(0.126)	(1.048)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.126	0.160	0.160	0.234	0.257	0.257	0.098	0.159
N	120,955	120,955	120,955	88,145	88,145	88,140	88,145	88,145

Table 17. Regressions of preferred stock discount with low individual trading weight
This table replicates Table 7 for a subsample with preferred stock discount (PSD) with low individual trading weight (ITW) whose original sample is comprised of the full pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. As the dependent variable, PSD is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the ITW is the ratio of the individual trading volume of shares over the total trading volume of shares. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.166***	0.140***	0.140***	0.094***	0.087***	0.087***		
	(5.422)	(4.175)	(4.173)	(3.402)	(3.102)	(3.102)		
Relative smallness		1.772***	1.771***	2.117***	2.109***	2.108***		
		(3.126)	(3.126)	(3.443)	(3.608)	(3.608)		
Dividend dummy			0.012	0.023	0.010	0.010	-0.011	0.008
			(0.239)	(0.359)	(0.184)	(0.184)	(-0.185)	(0.133)
Dividend dummy			-0.003	0.000	0	0.000	-0.008	-0.003
× Dividend fall (t-5 to t-1)			(-1.193)	(-0.076)	(0.076)	(0.159)	(-1.571)	(-1.241)
Largest stake				0.003*	0.003*	0.003*	0.002	0.002
				(1.669)	(1.715)	(1.714)	(1.141)	(1.628)
Largest stake				-0.0010	-0.0010	-0.0010	-0.0010	-0.0010
× Absolute control				(-1.021)	(-1.071)	(-1.070)	(-1.109)	(-0.741)
Chaebol dummy							0.04	.
							(1.062)	.
Relative dollar volume					-0.002*	-0.002*	-0.006**	-0.004***
					(-1.824)	(-1.821)	(-2.485)	(-2.929)
Relative Amihud ratio					-0.002**	-0.002**	-0.007**	-0.003***
					(-2.346)	(-2.350)	(-2.386)	(-3.836)
Relative turnover					-1.066***	-1.066***	-1.918***	-1.089***
					(-6.047)	(-6.048)	(-5.897)	(-6.291)
Market						0.107***		
						(5.925)		
SMB						0.039		
						(1.482)		
HML						0.064**		
						(2.313)		
Constant	0.357***	-1.285**	-1.286**	-1.577***	-1.559***	-1.558***	0.504***	0.444***
	(7.131)	(-2.458)	(-2.457)	(-2.731)	(-2.838)	(-2.836)	(9.360)	(6.810)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.140	0.168	0.168	0.204	0.237	0.237	0.141	0.182
N	226,280	226,280	226,280	191,380	191,380	191,360	191,380	191,380

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.116***	0.078***	0.078***	0.029	0.025	0.025		
	(4.197)	(3.245)	(3.215)	(1.500)	(1.299)	(1.297)		
Common ITW	-0.217***	-0.082***	-0.082***	-0.050*	-0.044*	-0.044*		
	(-5.160)	(-2.664)	(-2.652)	(-1.908)	(-1.860)	(-1.861)		
Log of preferred market cap.		-0.144**	-0.144**	-0.194**	-0.192**	-0.192**		
		(-2.091)	(-2.102)	(-2.413)	(-2.447)	(-2.449)		
Log of common market cap.		0.225***	0.225***	0.278***	0.272***	0.272***		
		(3.458)	(3.459)	(4.156)	(4.200)	(4.201)		
Dividend dummy			0.008	0.022	0.009	0.009	-0.010	0.007
			(0.138)	(0.410)	(0.218)	(0.218)	(-0.177)	(0.120)
Dividend dummy			-0.004	0.000	0.000	0.000	-0.009*	-0.003
× Dividend fall (t-5 to t-1)			(-1.508)	(-0.226)	(-0.094)	(-0.097)	(-1.834)	(-1.320)
Largest stake				0.003	0.003	0.003	0.002	0.002
				(1.276)	(1.287)	(1.287)	(1.112)	(1.662)
Largest stake				0.0000	0.0000	0.0000	-0.0010	-0.0010
× Absolute control				(-0.410)	(-0.432)	(-0.432)	(-1.116)	(-0.722)
Chaebol dummy							0.041	.
							(1.097)	.
Preferred dollar volume					-0.001	-0.001	0.001	0.000
					(-0.693)	(-0.694)	(0.467)	(-0.045)
Preferred Amihud ratio					(0.001)	-0.001	-0.008**	-0.004***
					(-0.720)	(-0.721)	(-2.416)	(-4.022)
Preferred turnover					-0.976***	-0.976***	-1.956***	-1.114***
					(-4.694)	(-4.695)	(-5.960)	(-6.422)
Common dollar volume					0.179	0.179	-0.119	0.429
					(0.953)	(0.952)	(-0.454)	(1.407)
Common Amihud ratio					(0.002)	-0.002	-0.008**	-0.005**
					(-1.169)	(-1.168)	(-2.460)	(-2.458)
Common turnover					0.366	0.366	1.353*	-0.126
					(0.890)	(0.889)	(1.735)	(-0.190)
Market						0.045**		
						(2.533)		
SMB						-0.007		
						(-0.280)		
HML						0.016		
						(0.659)		
Constant	0.442***	-0.562**	-0.563**	-0.731***	-0.687***	-0.687***	0.508***	0.447***
	(8.913)	(-2.109)	(-2.113)	(-3.370)	(-3.283)	(-3.281)	(9.431)	(6.736)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.143	0.255	0.255	0.341	0.369	0.369	0.142	0.188
N	226,280	226,280	226,280	191,380	191,380	191,360	191,380	191,380

Table 18 Summary statistics for the closing prices of subsamples

This table compares the representative statistics of the subsamples of the full sample of 185 common-preferred share pairs.

	Full Sample (185 firms and 347,235 obs)			Preferred stock discount within ± 30% (156 firms and 82,039 obs)			Preferred stock premium (125 firms and 55,507 obs)		
	Preferred	Common	Discount	Preferred	Common	Discount	Preferred	Common	Discount
Mean	21,371	42,276	0.237	18,758	23,985	0.105	10,972	8,172	-0.889
Median	6,250	9,560	0.420	4,695	5,500	0.144	4,400	2,915	-0.548
Std.Dev.	62,444	117,544	0.630	71,762	94,036	0.154	24,394	24,504	0.885
Min	100	100	0.987	125	100	0.300	100	100	0.000
Max	1,169,000	2,500,000	-3.374	1,165,000	1,474,000	-0.300	389,500	325,000	-3.374

Table 19. Preferred stock discount within the range of 30% -30% (premium) against relative individual trading weight

This table replicates Table 7 for a subsample with preferred stock discount (PSD) within range of 30% and -30% (premium) whose original sample is comprised of the full pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. As the dependent variable, PSD is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the ITW is the ratio of the individual trading volume of shares over the total trading volume of shares. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.056***	0.049***	0.049***	0.042**	0.041**	0.041**		
	(3.393)	(2.910)	(2.883)	(2.297)	(2.188)	(2.191)		
Relative smallness		1.292***	1.296***	1.859***	1.836***	1.836***		
		(2.723)	(2.695)	(3.473)	(3.454)	(3.454)		
Dividend dummy			-0.007	-0.070**	-0.069**	-0.069**	-0.016	-0.056**
			(-0.247)	(-2.251)	(-2.239)	(-2.239)	(-0.603)	(-2.287)
Dividend dummy			-0.004	-0.003	-0.004	-0.004	0.006	-0.004
× Dividend fall (t-5 to t-1)			(-1.203)	(-1.042)	(-1.231)	(-1.212)	(0.937)	(-1.215)
Largest stake				-0.001	-0.001	-0.001	-0.002	-0.001
				(-1.114)	(-1.110)	(-1.110)	(-1.515)	(-1.147)
Largest stake				0.0010	0.0010	0.001	0.001***	0.001
× Absolute control				(1.208)	(1.218)	(1.217)	(2.712)	(1.574)
Chaebol dummy							-0.042	.
							(-1.557)	.
Relative dollar volume					(0.001)	-0.001	-0.001	-0.001
					(-0.906)	(-0.924)	(-0.587)	(-1.641)
Relative Amihud ratio					0.000	0.000	-0.002***	0.000
					(-0.431)	(-0.429)	(-4.427)	(-0.487)
Relative turnover					-0.209***	-0.209***	-0.079	-0.225***
					(-9.277)	(-9.281)	(-1.372)	(-9.270)
Market						0.083***		
						(3.140)		
SMB						0.032		
						(0.913)		
HML						0.083*		
						(1.874)		
Constant	0.168***	-1.014**	-1.017**	-1.550***	-1.524***	-1.524***	0.106	0.175***
	(7.967)	(-2.303)	(-2.284)	(-3.118)	(-3.089)	(-3.089)	(0.759)	(2.968)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.079	0.129	0.129	0.157	0.168	0.168	0.073	0.107
N	82,039	82,039	82,039	59,121	59,121	59,116	59,121	59,121

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.045***	0.019	0.019	0.009	0.009	0.009		
	(3.653)	(0.965)	(0.965)	(0.456)	(0.429)	(0.430)		
Common ITW	-0.064**	-0.061***	-0.061***	-0.050**	-0.048**	-0.048**		
	(-2.547)	(-2.733)	(-2.700)	(-2.184)	(-2.089)	(-2.091)		
Log of preferred market cap.		-0.081***	-0.081***	-0.139***	-0.139***	-0.139***		
		(-2.886)	(-2.875)	(-4.481)	(-4.489)	(-4.489)		
Log of common market cap.		0.074**	0.074**	0.135***	0.135***	0.135***		
		(2.365)	(2.357)	(3.888)	(3.900)	(3.899)		
Dividend dummy			-0.001	-0.065**	-0.063**	-0.063**	-0.019	-0.056**
			(-0.018)	(-2.014)	(-2.008)	(-2.009)	(-0.719)	(-2.325)
Dividend dummy			-0.003	-0.002	-0.003	-0.003	0.003	-0.0050
× Dividend fall (t-5 to t-1)			(-0.921)	(-0.715)	(-0.923)	(-0.896)	(0.422)	(-1.245)
Largest stake				-0.002	-0.002	-0.002	-0.001	-0.001
				(-1.482)	(-1.479)	(-1.479)	(-1.468)	(-1.153)
Largest stake				0.001	0.001	0.001	0.001**	0.001
× Absolute control				(1.442)	(1.452)	(1.452)	(2.529)	(1.569)
Chaebol dummy							-0.054**	.
							(-2.065)	.
Preferred dollar volume					0.001	0.001	0.002	0.000
					(0.994)	(0.995)	(0.857)	(0.114)
Preferred Amihud ratio					0.000	0.000	-0.002***	0.000
					(-0.373)	(-0.371)	(-4.756)	(-0.518)
Preferred turnover					-0.224***	-0.224***	-0.215***	-0.239***
					(-8.912)	(-8.910)	(-4.368)	(-8.725)
Common dollar volume					(0.065)	-0.065	0.216	-0.112
					(-0.798)	(-0.794)	(0.793)	(-0.922)
Common Amihud ratio					0.000	0.000	0.001	0.000
					(0.163)	(0.166)	(1.413)	(0.360)
Common turnover					0.216***	0.216***	-0.377***	0.185***
					(4.318)	(4.305)	(-4.057)	(3.913)
Market						0.071***		
						(2.740)		
SMB						0.026		
						(0.666)		
HML						0.058		
						(1.280)		
Constant	0.186***	-0.014	-0.014	-0.249*	-0.247*	-0.247*	0.116	0.175***
	(5.333)	(-0.119)	(-0.120)	(-1.800)	(-1.793)	(-1.791)	(0.849)	(2.996)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.079	0.127	0.127	0.212	0.223	0.223	0.106	0.107
N	82,039	82,039	82,039	59,121	59,121	59,116	59,121	59,121

Table 20. Preferred stock premium against relative individual trading weight

This table replicates Table 7 for a subsample with preferred stock premium whose original sample is comprised of the full pairs of "old type" preferred and common shares listed on the KSE and Kosdaq from January 2000 until October 2014.As the dependent variable, PSD is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the ITW is the ratio of the individual trading volume of shares over the total trading volume of shares. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively**.**

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.773**	0.774**	0.771**	0.604**	0.571**	0.571**		
	(2.595)	(2.562)	(2.552)	(2.282)	(2.223)	(2.224)		
Relative smallness		1.001	1.001	9.414***	9.162***	9.161***		
		(0.828)	(0.824)	(3.052)	(3.102)	(3.102)		
Dividend dummy			-0.179*	-0.497**	-0.518**	-0.519**	0.11	0.11
			(-1.720)	(-1.994)	(-2.103)	(-2.105)	(0.394)	(0.480)
Dividend dummy			0.001	-0.004	-0.008	-0.007	-0.004	-0.005
× Dividend fall (t-5 to t-1)			(0.068)	(-0.159)	(-0.351)	(-0.277)	(-0.104)	(-0.218)
Largest stake				0.007	0.006	0.006	0.011**	0.004
				(1.057)	(1.025)	(1.024)	(2.255)	(0.762)
Largest stake				-0.0060	-0.0060	-0.006	-0.004	-0.005
× Absolute control				(-1.632)	(-1.593)	(-1.592)	(-1.258)	(-1.406)
Chaebol dummy							0.216	.
							(1.121)	.
Relative dollar volume					0.001	0.001	0.005	-0.008
					(0.144)	(0.138)	(0.699)	(-1.529)
Relative Amihud ratio					0.003**	0.003**	0.001	0.004**
					(2.608)	(2.614)	(0.356)	(2.020)
Relative turnover					-0.687***	-0.688***	-0.604***	-0.826***
					(-5.516)	(-5.515)	(-3.536)	(-5.984)
Market						0.331**		
						(2.464)		
SMB						0.619***		
						(3.319)		
HML						0.775***		
						(3.146)		
Constant	-0.297	-1.226	-1.212	-8.199***	-7.940***	-7.935***	-0.412***	1.024***
	(-1.404)	(-1.102)	(-1.083)	(-2.746)	(-2.777)	(-2.776)	(-6.630)	(4.977)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.124	0.128	0.129	0.238	0.249	0.249	0.101	0.178
N	55,507	55,507	55,507	37,674	37,674	37,671	37,674	37,674

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.409***	0.375**	0.375**	0.370**	0.351**	0.351**		
	(2.872)	(2.085)	(2.067)	(2.508)	(2.222)	(2.225)		
Common ITW	-0.937**	-0.743**	-0.743**	-0.521*	-0.497*	-0.498*		
	(-2.495)	(-2.038)	(-2.034)	(-1.870)	(-1.774)	(-1.775)		
Log of preferred market cap.		-0.239***	-0.240***	-0.525***	-0.518***	-0.518***		
		(-2.721)	(-2.746)	(-3.610)	(-3.650)	(-3.650)		
Log of common market cap.		0.321***	0.319***	0.647***	0.630***	0.630***		
		(3.071)	(3.038)	(4.689)	(4.808)	(4.806)		
Dividend dummy			-0.092	-0.163	-0.223	-0.224	0.112	0.057
			(-0.783)	(-1.112)	(-1.421)	(-1.425)	(0.364)	(0.236)
Dividend dummy			-0.004	-0.005	-0.008	-0.006	-0.007	0.0000
× Dividend fall (t-5 to t-1)			(-0.243)	(-0.258)	(-0.356)	(-0.267)	(-0.184)	(-0.009)
Largest stake				0.006	0.006	0.006	0.014***	0.004
				(0.915)	(0.947)	(0.946)	(2.999)	(0.815)
Largest stake				-0.006*	-0.0060	-0.0060	-0.0050	-0.0050
× Absolute control				(-1.678)	(-1.628)	(-1.627)	(-1.659)	(-1.371)
Chaebol dummy						0.087	.	
						(0.404)	.	
Preferred dollar volume					-0.034	-0.034	0.053	-0.072
					(-0.854)	(-0.854)	(1.073)	(-1.357)
Preferred Amihud ratio					0.004***	0.004***	0.001	0.004**
					(3.291)	(3.297)	(0.295)	(2.174)
Preferred turnover					-0.499**	-0.499**	-0.849***	-0.544***
					(-2.230)	(-2.229)	(-3.763)	(-3.084)
Common dollar volume					2.799*	2.801*	6.504***	3.829**
					(1.907)	(1.905)	(2.890)	(2.264)
Common Amihud ratio					0.000	0.000	0.009	-0.004
					(-0.077)	(-0.076)	(1.170)	(-0.728)
Common turnover					0.813**	0.813**	-0.315	0.904***
					(2.516)	(2.515)	(-0.428)	(2.800)
Market						0.268**		
						(2.067)		
SMB						0.539***		
						(2.878)		
HML						0.473*		
						(1.806)		
Constant	0.229	-0.909**	-0.896*	-1.712**	-1.656**	-1.652**	-0.413***	0.985***
	(0.696)	(-2.016)	(-1.979)	(-2.460)	(-2.435)	(-2.427)	(-5.945)	(4.737)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.125	0.182	0.182	0.340	0.356	0.356	0.123	0.187
N	55,507	55,507	55,507	37,674	37,674	37,671	37,674	37,674

Table 21 Comparison of sample statistics for new-type and old-type preferred and common stocks

This table shows the comparison of the primary (New type I) and secondary (New type II) issues of new-type preferred, and common shares in Korea traded from January 2000 until October 2014. “New type” preferred shares were first introduced in 1996 to alleviate pricing anomalies of under-liquid, “old type” preferred stocks whose additional floatation is outlawed. These new-types are embedded with cumulative dividend and common-share convertibility options.

Preferred stock type	No. of issuers	Traded listings per day	Market value (KRW billion)			Trading volume (KRW thousand)			Investor trading weight (%)						Preferred stock discount	
			Preferred (A)	Common (B)	(B/A)	Preferred (A)	Common (B)	(B/A)	Preferred stock			Common stock			Equal-weighted	Value-weighted
									Indiv.	Inst.	Foreign	Indiv.	Inst.	Foreign		
Old type	185	97.0	158	2,694	(17.1)	34.3	701.7	(20.5)	90.9%	4.4%	4.8%	76.3%	13.1%	10.5%	0.252	0.427
New type I	46	14.3	176	2,536	(14.4)	30.2	851.7	(28.2)	91.6%	3.8%	3.8%	78.0%	12.3%	9.8%	-0.110	0.392
New type II	10	4.2	36	6,857	(189.1)	11.2	795.1	(70.9)	92.0%	4.1%	4.0%	64.5%	18.7%	16.8%	0.204	0.554

Table 22. Preferred stock discount of old against new-type preferred stocks and relative individual trading

This table replicates Table 7 by performing regressions on the full pairs of old and new-type preferred, and common shares listed on the KSE and Kosdaq from January 2000 until October 2014. As the dependent variable, PSD is the price difference of common over preferred divided by the common share price (Zingales, 1994; Kim et al., 1996). For explanatory variables, the ITW is the ratio of the individual trading volume of shares over the total trading volume of shares. The relative smallness of a given preferred stock is 1 minus the ratio of the market capitalizations of preferred over common shares. For dividend-related variables, the dividend dummy variable (Dividend) of a given period equals one if payout took place in the previous period, for dividend payment is deemed a credible and consistent signal, or zero otherwise. 5 trading days prior to a given dividend day (Dividend Drop) are controlled for with a dummy variable which will be interacted with the dividend dummy in regression models for PSD may contract until the announced dividend day due to a higher demand for the preferred share issue. For voting rights-related variables, absolute control is gained by a shareholder with more than a 50% stake. The value of voting rights is non-linearly affected by large shareholders' stake. As the ownership of large shareholders gradually increases far from absolute control stake, the value of voting rights will rise upon more likely proxy fights. However, as the probability of proxy fights lowers after the gain of absolute control (over 50% stake), voting rights will be valued less by then upon stabilization of management. Sample firms are whether affiliated with conglomerates (Korea Fair Trade Committee-designated) or not. The measures of liquidity are trading volume, turnover (trading volume normalized by total number of outstanding shares), and dollar volume (KRW). Amihud (2002) suggests the ratio of the absolute value of return over contemporaneous dollar volume (KRW 100 million) as a gauge of illiquidity. All relative measures are the excesses of preferred over common shares, where the originally estimated (Table 5) relative dollar volume and relative Amihud ratio are divided by 10. The market factor (Market) is the monthly excess returns of the value-weighted average of KOSPI and Kosdaq indices over the monthly adjusted rate of 1 year monetary stability bond (MSB). The size (SMB) and valuation (HML) buy-and-hold portfolios are annually rebalanced at the end of every June based on the last year-end market capitalizations and B/M: small (below median) versus big; and valuations: low (lowest 30%), high (highest 30%), and medium (the rest). The log of common share market capitalization (KRW billion) is controlled for. Standard errors are adjusted for clustering at the firm level, and the corresponding t-statistics are presented in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression results with relative measures of preferred over common stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Relative ITW	0.215***	0.195***	0.193***	0.132***	0.123***	0.123***		
	(6.386)	(5.428)	(5.375)	(4.265)	(4.062)	(4.063)		
Relative smallness		1.597***	1.639***	3.101***	3.018***	3.018***		
		(2.692)	(2.731)	(3.748)	(3.946)	(3.945)		
Dividend dummy			-0.105**	-0.099	-0.103	-0.103	-0.061	-0.066
			(-2.298)	(-1.127)	(-1.269)	(-1.269)	(-0.773)	(-0.856)
Dividend dummy			0.002	0.004	0.002	0.003	0.002	0.000
× Dividend fall (t-5 to t-1)			(0.450)	(0.998)	(0.716)	(0.909)	(0.223)	(-0.044)
Largest stake				-0.001	0.000	0.000	0.001	0.000
				(-0.297)	(-0.171)	(-0.172)	(0.264)	(-0.177)
Largest stake				0.000	0.000	0.000	0.000	0.000
× Absolute control				(-0.374)	(-0.449)	(-0.448)	(-0.032)	(-0.233)
Chaebol dummy							0.166**	
							(2.538)	
Relative dollar volume					-0.001	-0.001	-0.002	-0.001
					(-0.744)	(-0.744)	(-0.673)	(-0.955)
Relative Amihud ratio					0.000	0.000	-0.005***	0.000
					(0.541)	(0.543)	(-3.065)	(0.211)
Relative turnover					-1.224***	-1.224***	-1.661***	-1.271***
					(-10.714)	(-10.713)	(-8.435)	(-11.434)
Market						0.156***		
						(5.735)		
SMB						0.173***		
						(4.363)		
HML						0.137**		
						(2.451)		
New type I	.	.	.	.	.	.	-0.315***	.
	.	.	.	.	.	.	(-2.955)	.
New type II	.	.	.	.	.	.	-0.070	.
	.	.	.	.	.	.	(-0.517)	.
Constant	0.394***	-1.097*	-1.126*	-2.516***	-2.425***	-2.424***	0.271**	0.427**
	(8.422)	(-1.935)	(-1.967)	(-3.201)	(-3.332)	(-3.330)	(2.295)	(2.452)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.053	0.071	0.072	0.076	0.111	0.111	0.087	0.07
N	413,514	413,514	413,514	331,768	331,768	331,738	331,768	331,768

Panel B. Regression results with level terms of common and preferred stocks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Preferred ITW	0.142***	0.084***	0.083***	0.058**	0.050**	0.050**		
	(5.910)	(3.576)	(3.517)	(2.324)	(2.149)	(2.147)		
Common ITW	-0.283***	-0.137***	-0.137***	-0.055	-0.054	-0.054		
	(-5.424)	(-3.033)	(-3.022)	(-1.371)	(-1.398)	(-1.401)		
Log of preferred market cap.		-0.153***	-0.154***	-0.236***	-0.234***	-0.234***		
		(-3.294)	(-3.306)	(-3.487)	(-3.608)	(-3.608)		
Log of common market cap.		0.245***	0.245***	0.334***	0.327***	0.327***		
		(5.359)	(5.352)	(5.745)	(5.920)	(5.920)		
Dividend dummy			-0.074	-0.087	-0.091	-0.091	-0.078	-0.064
			(-1.370)	(-0.964)	(-1.082)	(-1.082)	(-0.992)	(-0.834)
Dividend dummy			0.001	0.002	0.002	0.002	-0.003	0.001
× Dividend fall (t-5 to t-1)			(0.197)	(0.635)	(0.534)	(0.665)	(-0.410)	(0.170)
Largest stake				-0.002	-0.002	-0.002	0.001	0.0000
				(-0.955)	(-0.862)	(-0.862)	(0.342)	(-0.125)
Largest stake				0.000	0.000	0.000	0.000	0.000
× Absolute control				(0.134)	(0.072)	(0.073)	(-0.109)	(-0.232)
Chaebol dummy							0.111	
							(1.652)	
Preferred dollar volume					-0.001	-0.001	-0.004	-0.001
					(-1.091)	(-1.089)	(-1.011)	(-0.853)
Preferred Amihud ratio					0.002*	0.002*	-0.007***	0.001
					(1.934)	(1.935)	(-3.051)	(0.795)
Preferred turnover					-1.138***	-1.138***	-2.193***	-1.244***
					(-9.533)	(-9.533)	(-10.276)	(-11.729)
Common dollar volume					0.279	0.279	1.436**	0.531**
					(1.582)	(1.585)	(2.210)	(2.168)
Common Amihud ratio					0.002***	0.002***	0.001***	0.001***
					(7.751)	(7.755)	(2.935)	(6.669)
Common turnover					1.210***	1.210***	-0.686	1.285***
					(4.960)	(4.960)	(-1.321)	(4.919)
Market						0.079***		
						(2.822)		
SMB						0.114***		
						(3.033)		
HML						0.07		
						(1.350)		
New type I	.	.	.	.	.	.	-0.313***	.
	.	.	.	.	.	.	(-3.093)	.
New type II	.	.	.	.	.	.	-0.099	.
	.	.	.	.	.	.	(-0.825)	.
Constant	0.520***	-0.498**	-0.489**	-0.921***	-0.872***	-0.871***	0.328***	0.420**
	(8.537)	(-2.493)	(-2.451)	(-3.843)	(-3.793)	(-3.787)	(3.001)	(2.408)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.055	0.121	0.122	0.162	0.195	0.195	0.117	0.072
N	413,514	413,514	413,514	331,768	331,768	331,738	331,768	331,768

Table 23 Systematic movement of individual trading weight

Panel A displays the summary statistics of the value-weighted index of 658 KSE surviving common stock listings. The change of individual trading weight of each stock is defined as the month-on-month change of monthly average of daily ITW. The stock return is monthly basis. ΔITW (ortho.) and stock returns (ortho.) means market-orthogonal ΔITW and stock returns obtained from the following regressions :

$$\Delta ITW_{it} = b_0 + b_1 Market_t + \varepsilon_{it},$$
$$Return_{it} = b_0 + b_1 Market_t + \eta_{it},$$

Panel B provides the correlation coefficients of the full sample of 658 firms. Panel C exhibits the average of the pair-wise correlations of the changes of respective ITW (ΔITW) and the returns of 320 stocks. Panel D implements principal component analyses.

Panel A. Summary statistics for value-weighted measures of the full sample of 658 firms

	N	Mean	S.D	Min	Max
Value-weighted ΔITW	178	-0.30%	3.15%	-29.28%	7.46%
Value-weighted ΔITW (ortho.)	178	-0.47%	55.01%	-541.49%	168.57%
Value-weighted stock returns	178	0.15%	6.82%	-25.59%	16.53%
Value-weighted stock returns (ortho.)	178	-0.57%	1.12%	-4.64%	2.70%
KOSPI return	178	0.36%	6.93%	-26.31%	20.25%

Panel B. Correlation coefficients of the full sample of 658 firms

	Value-weighted ΔITW	Value-weighted ΔITW (ortho.)	Value-weighted Stock returns	Value-weighted stock returns (ortho.)	KOSPI return
Value-weighted ΔITW	1				
Value-weighted ΔITW (ortho.)	0.975***	1			
Value-weighted stock returns	0.198***	-0.004	1		
Value-weighted stock returns (ortho.)	0.168**	0.115	0.408***	1	
KOSPI return	0.190**	-0.016	0.989***	0.304***	1

Panel C. Average correlations of 320 fully-traded stocks returns and the changes of the ITW

	obs.	Mean	Std.Dev.	t-value
ΔITWs	43,414	0.047***	0.137	71.7
ΔITWs (ortho.)	43,414	0.048***	0.156	63.6
Stock returns	43,414	0.261***	0.104	520.0
Stock returns (ortho.)	43,414	0.089***	0.106	174.9

Panel D. Principal component analysis: variance contribution by factors (%)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	**Factors 1- 5**
ΔITWs	36.5	12.4	6.7	6.6	6.1	68.4
ΔITWs (ortho.)	44.4	11.0	6.5	6.3	6.2	74.4
Stock returns	30.7	17.5	16.8	16.0	14.4	95.5
Stock returns (ortho.)	14.1	13.8	12.7	10.7	9.7	60.9

Abstract in Korean

잡음거래자로서의 개인투자자위험에 대한 고찰

개인투자자집단은 외국인 및 기관투자자집단에 비해 정보가 부족하며 따라서 개인투자자집단의 거래가 집단적이고 체계적인 경우 시장 내 위험(noise trader risk)을 발생시키는 것으로 알려져 있다. 본 논문에서는 이러한 잡음거래자(noise trader)로서의 개인투자자집단이 국내 주식시장에서 가격과 기대수익에 미치는 영향에 대해 고찰해본다. 이를 위해 2000년 1월부터 2014년 10월까지 유가증권시장(169개) 및 코스닥시장(16개)에 상장되어 거래된 185개 보통주-우선주 쌍을 분석한 결과 우선주의 보통주 대비 상대적 개인투자자거래비중이 우선주 할인율에 유의한 영향을 미치는 것으로 나타났다. 우선주 할인에 관한 기존 문헌에 따르면, 동일한 기업가치를 근거로 발행된 우선주와 보통주의 가격 차이는 주로 보통주의 의결권 가치로 설명되어 왔다. 또한 양 주식간 배당 특성의 차이와 유동성의 차이도 우선주 할인율에 대한 유의한 설명변수가 됨이 밝혀져 있다. 그러나 본 논문의 결과에 따르면 기존에 알려진 이러한 변수들을 통제한 이후에도 양 주식간 개인투자자거래비중의 차이가 양 주식의 가격 차이인 우선주 할인율을

설명하는 유의한 변수가 되며, 내생성을 다양하게 통제한 표본에서도 동일한 결과가 유지되는 것으로 나타났다. 이러한 결과는 우선주 표본에서의 개인투자자거래에 따른 잡음거래자위험(noise trader risk)의 증거가 될 수 있다.

한편, 보통주 시장에서의 개인투자자위험을 분석하기 위해서는 동일한 표본 기간 동안 유가증권시장에 상장되어 거래된 658개 비금융 보통주를 표본으로 하였다. 코스닥 시장에 상장되어 거래되거나 표본 기간 중 상장 폐지된 주식의 경우 개인투자자거래비중이 매우 높을 뿐만 아니라 개인투자자거래비중의 변동성이 매우 낮아 개인투자자거래비중의 변화에 따른 유의미한 분석결과를 기대하기 어렵다. 해당 보통주 표본을 대상으로 개인투자자거래가 기대수익률에 미치는 영향을 분석해 본 결과 개인투자자거래비중이 높을수록 수익률이 유의하게 상승하는 것으로 나타났으며, 특히 Factor mimicking portfolio 구성을 통한 factor test를 한 결과 개인투자자 거래비중이 높은 검증자산을 대상으로 요인포트폴리오의 유의성이 크게 나타나 잡음거래자위험에 대한 보상이 통계적으로 유의미하게 이루어지는 것으로 판단되었다. 한편 다양한 multifactor model 에 대한 GRS test를 해 본 결과, 모두 1% 유의수준에서는 기각되어 국내 주식수익률을 설명하는 가격결정모형으로는 부족하다는 결론을 얻었다.

.....

주요어: 잡음거래자위험, 개인투자자집단, 우선주 할인율

학 번: 2009-30885