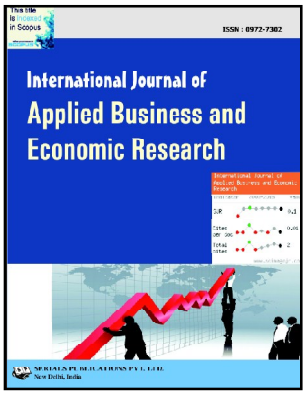

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Overpricing of Newly Issued Bonds : Korean Evidence

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Abstract: The pricing of newly issued bonds on the Korea capital market is investigated over the period 2006-2014. In surprise, we find that bonds with the credit ratings of investment grade earn an average of -5.0 basis points (bp) market excess return over the two days after the issue, practically higher than bid-ask spread. The overpricing is more pronounced in bonds with larger offering size, better credit ratings, and longer maturity, which suggests that the level of overpricing is associated with the information asymmetry of issuers. We also document that the overpricing is related to the short supply of safe assets and underwriting practice in Korea bond market.

Keywords: bond offering; initial return; overpricing

I. INTRODUCTION

The efficiency of capital raising process and the pricing of new securities are of interest to practitioners and academic researchers. It is well documented that the initial public offerings (IPO) of equity are generally underpriced. Even though debt financing is much larger than equity financing in most of capital markets, only a few empirical studies have been conducted on the pricing of new corporate bonds. For instance, firms in U.S. raised about $1.5 trillion in corporate debt markets in 2015 while they issued equity of $0.26 trillion. This paper examines the efficiency of the bond market capital raising process by investigating whether corporate bond offerings in Korea are underpriced or overpriced and if so, what factors drive the pricing.

Theoretical models have been developed to explain new issue price performance of various types of corporate securities. Specially, researchers focus on explaining the underpricing puzzle of equity IPO. Ex ante uncertainty about the value of the IPO firm and information asymmetric hypothesis can be applied to explain the pricing of new bonds as well as new equities. Ritter (1984) and Beatty and Ritter (1986) argue

that underpricing should increase in the ex-ante uncertainty about the price of new equity. Allen and Faulhaber (1989) and Welch (1989) suggest that underpricing can be a signaling mechanism for firm quality when issuers have better information than investors. IPO firms can sell securities on better terms in seasoned offerings after they build reputation by underpricing the IPO stocks. Rock's (1986) model assumes that some investors are more informed than others. He suggests that underpricing is necessary to make uninformed investors participate in new issue market and to compensate them for the winner's curse problem. Benveniste and Spindt (1989) and Chemmnur (1993) assume that investors are more informed than the issuing firms. They argue that underpricing is proposed to induce the information revelation from the informed investors in the book-building process.

Aftermarket illiquidity can be related to IPO underpricing. Ellul and Pagano (2006) develop a model in which some information asymmetry not resolved during offering stage creates an adverse selection problem in the aftermarket and leads to higher level of illiquidity. Their model suggests that there exists a positive relation between the underpricing and the bid-ask spread. Booth and Chua (1996) argue that IPOs are intentionally underpriced to promote ownership dispersion, which increases the aftermarket liquidity of the IPO stocks.

Recently, a few studies have investigated the initial returns of corporate straight debt offerings and the factors affecting the initial returns using U.S. data. Datta et al. (1997) find that IPOs of speculative grade debt are underpriced like equity IPOs while those rated investment grade are overpriced. Cai et al. (2007) find that underpricing occurs with speculative-grade debt IPOs and speculative-grade seasoned bond offerings. Their evidence suggests that information problems drive underpricing, but post-offering liquidity is not related to the underpricing. Yang (2015) documents that the underpricing of corporate bond offering holds for all rating classes including investment grade bonds and the degree of underpricing varies strongly with issue-specific and market-wide price uncertainty. These studies using U.S. data present conflicting evidence about whether the underpricing of bond offering holds for all rating classes, and the evidence is limited to the debt offerings of U.S. firms. In addition, it is not clear that the same factors related to IPO underpricing also have an impact on the corporate bond initial returns.

In this research, we try to investigate whether the underpricing or overpricing of bond offerings occurs in emerging markets using Korean data. We analyze 2,654 newly issued bonds by 410 industrial companies over the period of 2006 to 2014. In surprise, we first find that newly issued corporate bonds are overpriced in the Korean domestic market. We find that the bonds earn an average of -5.0 basis points (bp) market excess return over the two days after the issue, practically higher than bid-ask spread. We then find that the corporate bond issuers in Korean market usually maintain the credit rating of investment grade and that the bonds with better credit ratings tend to be more overpriced. Bonds with AAA ratings earn -16.8 bp on average on the first trading date while those with BBB ratings earn -1.4 bp. The result is partly consistent with Datta et al.'s (1997) finding that bonds issued with investment grade are overpriced. We also document that the corporate bonds tend to be more overpriced as offering size gets larger and that short-term bonds with a maturity of one year or less than one year are underpriced but long-term bonds are overpriced. Institutional investors prefer buying longer-term bonds with larger offering size and better ratings, which tend to be issued by large firms with less information asymmetry. The information asymmetry partly explain the level of overpricing of the newly issued bonds.

We also argue that the intriguing results of overpricing are associated with distinctive features in Korean bond markets. The primary corporate bond market tends to be a seller's market in which there exist more institutional investors to buy newly issued bonds than firms to issue the bonds. The short supply of long-term bonds issued by large companies explains why bonds with longer maturities are more overpriced. We also find that the level of the overpricing is inversely related to the supply of Korea government bonds because corporations and government compete in raising capital thorough the bond issuance.

In addition, we argue that the overpricing of newly issued bonds in Korea is related to underwriting fee setting convention in Korea primary bond market. Due to the short supply of bonds and intense competition among local security firms, security firms underwrite corporate bonds at a low interest rate (higher price) in order to get the deals, and later sell unsold bonds at a high interest rate (lower price) to institutional investors in the secondary market. After the Korea government started regulating the underwriting process of corporate bonds in April, 2012, the overpricing has dramatically decreased.

In this research, we document that newly issued bonds with credit rating of investment grade in emerging markets can be overpriced using Korean data. Matsui (2006) finds that newly issued bonds in Japan over the period 1995-2000 tend to be overpriced and the overpricing is more pronounced for issues with better ratings. He argues that the important factor associated with the overpricing tendency is the underwriting process. We add to extant literature the evidence that the overpricing phenomenon of newly issued bonds has arisen due to the short supply of safe assets and the underwriting competition among securities firms. The institutions like insurance firms prefer investing in long-term bonds issued by industrial companies with less information asymmetry. When the issues of those companies do not satisfy the demand of the institutional investors, the overpricing of the newly issued bonds tends to occur. We also add the evidence that the level of overpricing is related to the information asymmetry on bond issuers as the information asymmetry theory is the main explanation for the underpricing phenomenon of equity IPOs.

II. DATA AND DESCRIPTIVE STATISTICS

We analyze Korea domestic corporate bond offerings listed in Bloomberg's fixed income league tables over the period of 2006-2014. Bloomberg's fixed income league tables contain the data on credit ratings at issue, coupon, maturity, issue amount, the names of underwriters and underwriting fee for each bond issue. We include bonds issued by only industrial firms in our sample and exclude private placements or bond issues that are not required to file registration statement with the Financial Supervisory Service (FSS) in Korea. Accordingly, the bonds in our sample are issued through book-building process. The sample consists of 2,654 bond offerings issued by 410 firms over the 9-year period. The data on prices in the secondary market are obtained from Korea Asset Pricing (KAP) which provides the daily closing prices of bonds. We use dirty prices to calculate the initial returns of newly issued bonds and then calculate market adjusted returns using KAP benchmark index returns.

Table 1 presents descriptive statistics on our sample data. The table shows the number of bond offerings and the mean, median, standard deviation (SD), 25th percentile, and 75th percentile of offering size, maturity, credit ratings, underwriting fee, and underwriting reputation and competition. The mean (median) offering size of 2,654 bond issues is 93.42 (70) billion won and the mean (median) maturity is 3.55 (3.00) years. The bond issues have one of 10 investment credit ratings, AAA, AA+, AA, AA-, A+, A,

A-, BBB+, BBB, or BBB-. The variable of CREDIT RATING has a value of 1 for bonds with BBB- rating, 2 for bonds with BBB, and 10 for bonds with AAA, etc. The mean (median) of 5.66 (6.00) for credit ratings indicates that the bonds have A or A+ ratings on average. The mean (median) coupon rate (COUPON) is about 4.7% (4.2%).

Table I
Descriptive Statistics

This table presents descriptive statistics of 2,654 domestic corporate bond offerings over the period of 2006 – 2014 which are issued by 410 unique Korean industrial firms. The data on the bond issues are collected form Bloomberg's fixed income league tables. Private placements are excluded to avoid samples that could mislead underpricing. Bonds price data in the secondary market are obtained from Korea Asset Pricing (KAP) which provides the daily closing price after pricing date. The table shows the number of bond issues and the mean, median, standard deviation (SD), 25th percentile, and 75th percentile of each variable.

Variable	*Descriptive Statistics*					
	N	*Mean*	*Median*	*SD*	*25%*	*75%*
OFFERING SIZE	2,654	93.42	70	75.97	40	120
MATURITY	2,654	3.55	3.00	1.80	3.00	5.00
CREDIT RATING	2,654	5.66	6.00	2.37	4.00	7.00
COUPON	1,721	4.57	4.23	1.482	3.48	5.15
REPUTATION[a]	1,733	8.62	8.40	4.75	5.10	11.90
COMPETITION[a]	1,733	1.87	1.00	1.22	1.00	2.00
FEE	2,654	29	30	11	25	30

[a.] Underwriter market share related data is only available for the period of 2010-2014 in Bloomberg.

Bloomberg provides the data on underwriters' market share for the period over 2010-2014. Therefore, we have to use the sample of 1,733 bonds issued over the 5 years if our analysis includes underwriter reputation and underwriter competition variables. The underwriter reputation (REPUTATION) is measured by the lead underwriter's market share each year in Korea bond market and the underwrite competition (COMPETITION) is measured by the number of security firms participating in the underwriting syndicate for each bond issue. The mean underwriter reputation is 8.62% and the mean underwrite competition is 1.87 underwriters. The mean (median) underwriting fee (FEE) is 29bp for 2,654 bond issues.

III. EMPIRICAL FINDINGS

To test whether newly issued corporate bonds in Korea are under- or over-priced, we measure the initial returns of newly issued bond using market-adjusted return following Cai et al. (2007). They calculate bond initial returns by deducting benchmark index returns from the raw returns of individual bonds. We use Korea Asset Pricing (KAP) credit indices as benchmarks. These indices are broken down by local credit ratings and maturity. The KAP provides a total of 60 investment-grade credit bond indices, including 6 maturity ranges (0.25-1, 1-2, 2-3, 3-5, 5-10, and 10+ years) for each of 10 credit rating ranges (AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB, and BBB-). Each index is a total return index which is composed of

market price return (capital gain/loss + accrued interest) plus the return from coupon received plus reinvestment profit (profit of received coupon). Bond index calculation is based on daily fair price of bonds provided by Korea Asset Pricing. In the case of equity market, most literatures use the first-day closing market excess return as the initial return of equity IPO. However, some bonds do not have any secondary trading activity over the couple of days after the issue. Therefore, we calculate cumulative market adjusted returns up to five days after the issue for our sample bonds. In this research, we calculate the initial returns of bond offerings as follows:

(1) Bond return over n days for individual bond i starting on the issue day t is

$$BR_{i,n} = P_{t+n} - P_t / P_t \quad (1)$$

where is the return for a new bond issue over n days and both and are dirty prices (clean price + accrued interest).

(2) Cumulative index return over the n days starting on the issue day t is

$$CR_{i,n} = (INDEX_{t+n} - INDEX_t) / INDEX_t \quad (2)$$

where is the cumulative index return on the Korea Asset Pricing Index for bonds of the same rating and maturity for the n days that also start on day t.

(3) Market adjusted return over n days for individual bond i is

$$MAR_{i,n} = BR_{i,n} - CR_{i,n} \quad (3)$$

We report the mean and median market adjusted return of the sample in Table 2. Panel A shows the number of bond offerings and market adjusted returns of total sample over the first trading date, two trading days, and five trading days. The mean (median) market adjusted return on the first trading date is -5.1 bp (-1.7 bp) and the average overpricing does not disappear until day 5 after the issue. Then, we examine the overpricing of bond offerings across offering size, maturity, and credit ratings. We divide the sample into four groups based on offering size and report the market adjusted return on the first trading date in Panel B.

The result shows that the average overpricing increases as the offering size gets larger. The smallest offerings earn an average of -3.3bp on the first trading date while the largest offerings earn -7.4bp. We then examine the initial returns across credit ratings. We find in Panel C that 154 bond issues with AAA ratings earn -16.8 bp on the first trading date, which indicates that the bonds are highly overpriced compared to bonds with other investment grades. In comparison, 534 bond issues with BBB ratings (BBB+, BBB, or BBB- ratings) earn -1.4 bp. Next, Panel D reports the initial returns of bond offerings with maturities of one year or less than one year, one to three years, three to five years, and longer than five years. The result shows that the short-term bonds with a maturity of one year or less than one year are underpriced on the first trading day, but the long-term bonds with a maturity of more than one year are overpriced. The results in Table 2 suggest that corporate bonds issued by Korean industrial firms are overpriced and bond issues with larger offer size, better ratings, and longer maturities tend to be more overpriced.

Table II
Initial Returns

The table presents the initial returns (market adjusted returns in basis points) of 2,654 bond offerings issued by 410 firms. Market Adjusted Return (MAR) on date t is calculated as follows using Korea Asset pricing's index return on date t, where the index is matched by maturity and rating. $BR_{i,n}$ is the return for bond over n days for new issues and $CR_{i,n}$ over n days is the cumulative return on the Korea Asset Pricing index for bonds of the same rating and maturity for the n days that also start on day t.

$$MAR_{i,n} = BR_{i,n} - CR_{i,n}$$

Panel A reports the mean, median, and standard deviation of initial returns on the first trading date (Day 0), the first two days, and the first 5 days. Panel B, C, and D report the initial returns by offering size, credit ratings, and maturity on the first trading date, respectively.

Trade days	*Panel A: Initial returns for whole sample*			
	Number	*Mean*	*Median*	*Standard Deviation*
Day 0	2,654	-5.1	-1.7	1.32
Days 0 to 1	2,654	-5.0	-1.6	1.44
Days 0 to 4	2,654	-3.6	-0.5	2.40

Size group	*Panel B: Initial returns by offering size*				
	Number	*Mean*	*Median*	*Max*	*Min*
Group 1 (Smallest)	723	-3.3	-1.0	65.2	-55.1
Group 2	629	-3.6	-1.2	62.3	-52.9
Group 3	628	-5.6	-1.8	47.1	-56.1
Group 4 (Largest)	674	-7.4	-3.1	60.5	-59.8

Credit rating	*Panel C: Initial returns by credit rating*				
	Number	*Mean*	*Median*	*Max*	*Min*
AAA	154	-16.8	-18.1	17.5	-56.1
AA	853	-4.6	-1.1	60.5	-59.8
A	1,113	-5.4	-2.1	62.3	-55.1
BBB	534	-1.4	-0.3	65.2	-52.9

Maturity(year)	*Panel D: Initial returns by maturity*				
	Number	*Mean*	*Median*	*Max*	*Min*
≤ 1	184	4.6	2.3	65.2	-4.0
> 1, ≤ 3	1,627	-5.5	-1.8	62.3	-59.8
> 3, ≤ 5	654	-6.4	-2.6	32.4	-56.1
> 5	189	-4.9	-2.4	30.0	-44.9

Surprisingly, we find that newly issued bonds in Korea are overpriced. One possible answer for the intriguing result of overpricing may stem from distinctive features of the Korea primary bond market. First of all, the bond market is a seller's market, a market in which there is more demand for the newly issued bonds than supply. In Korea, only large industrial companies with credit ratings of investment grade, which are usually affiliates of big business groups such as Samsung, LG, Hyundai Motors, etc., can access to bond markets. However, the new corporate bonds issued by the large companies with better ratings do not satisfy the institutional investors' demand. The bond investors' high demand for longer bonds issued by firms with less information asymmetry leads to the overpricing.

Secondly, the overpricing of newly bond issues in Korea might be related to the underwriting fee setting convention by securities firms. Due to the short supply of corporate bonds and the intense competition among security firms, bond issuers gain the upper hand in the issuing process, thereby undermining the underwriters' role in the firm valuation and risk assessment. Prior to submitting the registration statement, the issuers obtain the information concerning the institutional investors' expected price and quantity of issues through security firms. The information is used to finalize the issuers' decision at their most favorable price. The overpricing practice has arisen where security firms underwrite corporate bonds at a low interest rate (higher price) in order to get the deals, and later sell unsold bonds at a high interest rate (lower price) to institutional investors in secondary market. Security firms do this practice at their immediate expenses with hopes of gaining profit from future deals. Korea Financial Supervisory Service (FSS) has recognized the need to take this problem seriously. In order to improve the transparency of the bond primary market, the government implemented the demand forecasting system on April 17th of 2012. It was intended to prevent security firms from underwriting corporate bond issues at a low interest rate for the issuers' favor, and then selling the bonds at a higher rate to investors in the secondary market. On October 1st of 2013, the system was reinforced for further improvement. For instance, the desired interest rate range proposed by the issuer and the underwriter is required to correctly reflect the firm's value and market situation, where the upper bound of the desired rate range should exceed the average interest rate rated by the top three bond pricing agencies in Korea.

Table 3 presents the number of corporate bond offerings, the mean and median of initial returns of the corporate bonds on the first trading date, and the net issue amount of Korea Treasury Bond (in billion won) year by year. We find that the initial returns of newly issued corporate bonds tend to be more negative (or more overpriced) when the supply of Korean Treasury Bond decreases. Specifically, the overpricing has increased to -10.5bp in 2008 when the repayment amount of government debt is higher than the issuance amount. In 2011, the overpricing is noticeable when the supply of the government bond is significantly decreased from the previous year. The results suggest that the suppliers of corporate bonds tend to compete with Korean government to meet the institutional investors' demand for safe assets. We also find that bonds earns positive initial returns (or are underpriced) in 2013 and 2014, which is related to the regulation on the underwriting practice implemented in April 2012 as explained in the previous paragraph. In short, the results in Table 3 suggest that the overpricing phenomenon is related to the supply of safe assets and the underwriting practice in Korea primary bond market.

Table III
Initial Returns of Corporate Bond Issues and Net Issue Amount of Korea Treasury Bond

The table presents the mean and median initial returns (Market Adjusted Return) of corporate bond offerings and the net issue amount of Korea Treasury Bond year by year. Market Adjusted Return on date t is calculated as follows using the date t Korea Asset pricing's index return, where the index is matched by maturity and rating. $BR_{i,n}$ is the return for bond over n days for new issues and $CR_{i,n}$ over n days is the cumulative return on the Korea Asset Pricing index for bonds of the same rating and maturity for the n days that also start on day t.

$$MAR_{i,n} = BR_{i,n} - CR_{i,n}$$

Year	*Initial returns of corporate bond issues*			*Net issue amount of Korea Treasury Bond*
	Number	*Mean*	*Median*	*(KRW billion)*
2006	157	-4.2	-3.0	37,369
2007	209	-7.7	-4.2	8,294
2008	185	-10.5	-6.4	-14,011
2009	370	-3.4	-2.4	48,105
2010	305	-6.6	-3.0	43,046
2011	419	-10.9	-5.9	31,024
2012	421	-4.7	-1.0	28,673
2013	290	0.8	1.0	46,235
2014	298	1.8	1.1	42,474

Next, we run multivariate ordinary least squared (OLS) regressions to examine what factors explain the cross-sectional difference of the initial returns of newly issued bonds. We report the results in Table 4. In models (1), (2), and (3), offering size, maturity, and credit rating are main independent variables to explain the initial returns, respectively. The variable of credit rating has a value of 1 for bonds with BBB- rating, 2 for bonds with BBB, etc. The coefficients on offering size, maturity, and credit ratings are all negative and statistically significant at 1% confidence level. The results suggest that the bonds with larger offering size, longer maturity, and better credit ratings have more negative initial returns (or are more overpriced), which corroborates the results presented in Table 2. In all the regressions, we include a dummy variable (APR 2012), which has a value of 1 if bonds are offered before the regulation change on underwriting process in Korea bond market and 0 otherwise. The negative and significant coefficient on APR 2012 indicates that the overpricing has significantly decreased after the regulation change in April, 2012.

Table IV
Multivariate Analysis of Initial Returns

This table presents the results of multivariate ordinary least squared (OLS) regressions which examine what factors explain the cross-sectional difference of the initial returns of newly issued bonds. In models (1), (2), and (3), offering size, maturity, and credit rating are main explanatory variables to explain the initial returns, respectively. The variable of credit rating has a value of 1 for bonds with AAA rating, 2 for bonds with AA+, etc. Fee indicates underwriting fee in basis points. Underwriter reputation is the market share of the lead underwriter, and underwriter competition means the number of underwriters participating in each deal. KTB is the net issue amount of Korea Treasury Bond. Bid-ask spread is measured at the closing of the first trading date. A dummy variable, APR 2012 dummy, has a value of 1 if bonds are offered before the regulation change in April 2012 on underwriting process in Korea bond market and 0 otherwise.

Variable	*Multivariate Analysis of Initial Returns*						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7) Standardized*
CONSTANT	0.027***	0.065***	0.083***	0.140***	0.126***	0.121***	0.140***
	(4.66)	(8.27)	(9.83)	(11.52)	(9.53)	(9.42)	(11.52)
OFFERING SIZE	-0.0002***			-0.0001**	-0.0001***	-0.0001***	-0.052**
	(-7.43)			(-2.55)	(-3.46)	(-3.47)	(-2.55)
MATURITY		-0.015***		-0.006***	-0.004***	-0.002	-0.078***
		(-9.92)		(-3.48)	(-2.86)	(-1.31)	(-3.48)
CREDIT RATING			-0.013***	-0.010***	-0.007***	-0.008***	-0.173***
			(-11.47)	(-7.11)	(-4.60)	(-4.98)	(-7.11)
FEE				-0.136***	-0.125***	-0.118***	-0.107***
				(-5.74)	(-5.73)	(-5.65)	(-5.74)
REPUTATION					-0.0007	-0.0005	
					(-1.28)	(-0.97)	
COMPETITION					-0.0001	-0.0004	
					(-0.08)	(-0.19)	
KTB				0.0001***	0.0001*	0.0001	0.054***
				(2.95)	(1.83)	(0.83)	(2.95)
BIDASK SPREAD						-0.004	
						(-0.93)	
APR 2012	-0.077***	-0.091***	-0.089***	-0.094***	-0.098***	-0.096***	-0.306***
	(-13.52)	(-15.57)	(-15.43)	(-16.21)	(-17.88)	(-17.75)	(-16.21)
F Value	116.82<.0001	139.90<.0001	157.47<.0001	65.50<.0001	54.91<.0001	49.43<.0001	65.50<.0001
Adjusted R^2	0.080	0.094	0.105	0.127	0.199	0.211	0.127
Observations	2,654	2,654	2,654	2,654	1,733	1631	2,654

Note 1) Statistical significance at the 0.01, 0.05, and 0.1 levels are denoted by ***, **, and *, respectively.

Note 2) Underwriter market share related data is only available over the period of 2010-2014 in Bloomberg.

In models (4) to (7) of Table 4, we include offering size, maturity, and credit ratings in the same regressions. The coefficients on the variables are not qualitatively different. We also include the variable of underwriting fee and net issue amount of Korea Treasury Bond (KTB) in the regressions. The negative and significant coefficient on the variable of fee indicates that the bond issues are more overpriced when issuers pay more fees to underwriters, which suggests that the initial returns are related to underwriter competition. The positive and significant coefficient on the variable of KTB indicates that corporation bonds and government bonds are substitutes in the supply market of safe assets, which is consistent with the result of Table 3. We include the variables of underwriter reputation (REPUTATION) and underwriter competition (COMPETITION) in model (5) and find that the coefficients on the variables are not significant.

We also include the bid-ask spread in model (6) of Table 4, which is measured at the close of the first trading date. We find that the coefficient on the variable is not significant, which suggests that the aftermarket liquidity is not associated with initial returns in Korea bond market. The result is consistent with Cai *et al.*

(2007) but not consistent with Ellul and Pagano's (2006) model in which the initial return and the bid-ask spread have a positive relation. In addition, we present standardized coefficients in model (7) indicating which independent variables have large effects on the dependent variable. We find that the credit ratings and the regulation change on underwriting process in April, 2012 are most significantly related to initial returns.

Our sample of 2,654 bond issues is made by only 410 unique firms, which means that the sample is an unbalanced panel data. Therefore, we report the results of fixed effect regressions and regression with clustered standard errors in Table 5. We find that the coefficients on our main explanatory variables are qualitatively same as those in Table 4 in one-way fixed regressions by industry or year. The coefficients from the regression with clustering by issuer and year corroborate the results in Table 2, 3, and 4. Bonds with larger offering size, longer maturity, and better credit ratings have more negative initial returns or are more overpriced. Also, the overpricing of the newly issued bonds is related to the supply of safe assets and the underwriting practice in Korea primary bond market.

Table V
Fixed-Effect Regressions and OLS with Clustered Standard Errors

This table presents the results of one-way fixed effect regressions and OLS with clustered standard errors which examine what factors explain the cross-sectional difference of the initial returns of newly issued bonds. In models (1), (2), and (3), offering size, maturity, and credit rating are main explanatory variables to explain the initial returns, respectively. The variable of credit rating has a value of 1 for bonds with BBB- rating, 2 for bonds with BBB, etc. Fee indicates underwriting fee in basis points. KTB is the net issue amount of Korea Treasury Bond. A dummy variable, APR 2012, has a value of 1 if bonds are offered before the regulation change in April 2012 on underwriting process in Korea bond market and 0 otherwise.

Variables	*Fixed Effect Regressions and Clustering*		
	Fixed Effect Regression by Industry	*Fixed Effect Regression by Year*	*OLS with Clustered Standard Errors by Issuer & Year*
CONSTANT	0.134***	0.160***	0.140***
	(7.45)	(11.59)	(10.11)
OFFERING SIZE	-0.0001***	-0.0001**	-0.0001**
	(-3.80)	(-2.47)	(-2.06)
MATURITY	-0.004**	-0.005***	-0.006***
	(-2.64)	(-2.90)	(-2.88)
CREDIT RATING	-0.009***	-0.011***	-0.010***
	(-5.47)	(-7.30)	(-5.61)
FEE	-0.143***	-0.124***	-0.136***
	(-6.01)	(-5.23)	(-4.70)
KTB	0.0001***	0.0001	0.0001**
	(3.19)	(0.09)	(2.49)
APR 2012	-0.093***	-0.013***	-0.094***
	(-16.02)	(-4.35)	(-15.36)
R-square	0.181	0.153	0.129
Observations	2,654	2,654	2,654

IV. CONCLUSIONS

Using Korean data, we examine the pricing efficiency of corporate bond issues and find that the bonds earn an average of -5.0 bp over the two days after the issue, practically higher than bid-ask spread. The overpricing is more pronounced in longer-term bond issues with larger offering size and better credit ratings, which suggests that the level of overpricing is associated with the information asymmetry on bond issuers. Our evidence also suggests that the overpricing phenomenon of newly issued bonds appears to be related to the short supply of the bonds and the underwriting competition among securities firms in Korea bond market.

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