

Yong-Cheol Kim

Clemson University

René M. Stulz

Ohio State University

Is There a Global Market for Convertible Bonds?*

I. Introduction

American firms can issue dollar-denominated convertible bonds either in the United States or offshore in the Eurobond market. This article shows that, prior to 1984, the stock price reaction to announcements of a convertible issue in the domestic market was significantly negative, while the reaction to Eurobond issues was smaller in absolute value and not consistently negative. After 1984, the stock price reaction to announcements of a convertible issue is the same for domestic and offshore issues. These results are consistent with a substantial decrease in the degree of segmentation between domestic and offshore markets for convertible bonds after 1984.

One possible explanation of this apparent decline in market segmentation finds some empirical support. After July 1984, U.S. tax law no longer required withholding of 30% of interest due to foreign holders of domestically issued

Prior to 1984, the stock price reaction to announcements of a convertible issue in the domestic market was significantly negative, while the reaction to issues on the Eurobond market was smaller in absolute value and not consistently negative. After 1984, this difference in stock price reactions seems to have disappeared. The difference in abnormal returns before 1984 cannot be explained by existing signaling models of convertible bond issues. It is consistent, however, with the hypothesis that American firms captured some of the tax advantage of Eurobonds relative to domestic bonds before the change in U.S. withholding taxes in July 1984.

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convertible bonds. This reduced the potential tax advantage to foreign investors of offshore bonds over domestically issued bonds. To the extent that issuing firms were able to capture part of this tax advantage before 1984, there should have been a relatively more favorable stock price reaction to issuing offshore—a reaction that would have disappeared after 1984. However, for this tax law change to provide the whole explanation, the tax advantage of issuing offshore debt before 1984 would have had to equal nearly the amount of withholding required on domestically issued bonds, and issuing firms would have had to capture virtually all of this advantage from holders of offshore bonds.

An alternative hypothesis is that the differential stock price reaction to onshore and offshore issues of convertible debt before 1984 reflected systematic differences between the types of firms issuing convertible debt in these markets. Estimates of the effects of a variety of issue and firm characteristics on stock price reactions to convertible bond issues, however, are not consistent with the hypothesis that differences in these characteristics explain the magnitude of the differential reaction to offshore and onshore issues prior to 1984 or the disappearance of the differential after 1984. The signaling model of Brennan and Kraus (1987) predicts that the stock price reaction to a convertible debt issue is positively related to the ratio of conversion price to the stock price.¹ We find that this ratio is negatively related to abnormal returns for firms issuing on the Eurobond market before 1984 and positively related to abnormal returns for firms issuing on the domestic market.

This article is organized as follows. In Section II, we discuss the conditions under which withholding taxes could make it advantageous for U.S. firms to issue on the Eurobond market and provide evidence on the difference between the stock price reaction to the announcement of domestic and Eurobond convertible issues. In Section III, we investigate the extent to which the stock price reaction differential between onshore and offshore issues before 1984 can be explained by the tax advantage of Eurobonds and by differences in issue and firm characteristics. Concluding remarks are provided in Section IV.

II. The Abnormal Returns to Issuing Domestic and Eurobond Convertible Debt

A. Withholding Taxes and Market Segmentation

The tax treatment of bonds issued offshore differs from the tax treatment of bonds issued in the United States for foreign investors but not

1. We thank Art Raviv for drawing our attention to the role of the conversion price. Kim (1990) obtains a similar prediction but with a model where the signaling cost results from the increased risk borne by insiders with a fixed investment in the firm's common stock as the equity component of the convertible debt falls.

for issuing firms. Convertible Eurobonds are bearer bonds that are not subject to U.S. withholding taxes. Typically, investors do not receive full credit from their home country for foreign withholding taxes. Convertible domestic bonds are registered bonds that, if issued before July 1984, are subject to a U.S. withholding tax for foreign investors. Consequently, for bonds issued before July 1984, foreign investors prefer to hold Eurobonds, *ceteris paribus*. For foreign investors to hold domestic bonds, their pretax expected return must exceed the pretax expected return of comparable offshore bonds.

Domestic investors cannot purchase Eurobonds within 90 days of their issuance because of a Securities and Exchange Commission (SEC) prohibition. Consequently, bonds issued offshore can only be bought by a specific clientele, namely, foreign residents able to access the international bond market. The withholding tax on bonds issued onshore before July 1984 had the effect of reducing the availability of substitutes for dollar-denominated convertible Eurobond debt. Hence, if the withholding tax significantly affected the investment choices of foreign investors, their demand for offshore dollar-denominated convertible bonds would have been downward sloping before July 1984. Further, the removal of the withholding tax should have made the foreign investors' demand for these bonds more elastic.

If the demand for dollar-denominated Eurobond convertible debt is imperfectly elastic, then the extent to which issuing firms can capture some of the tax advantage of Eurobonds depends crucially on the elasticity of their supply of such bonds. If the supply of Eurobonds by firms is perfectly elastic, all of the tax advantage accrues to foreign investors. However, because Eurobonds are issued through foreign financing subsidiaries, covenants attached to these bonds are more expensive to enforce. The advantage from issuing on the Eurobond market should therefore fall and eventually become negative as the risk of the issuing firm increases. Consequently, only the least risky firms are expected to issue on the Eurobond market. As a firm issues more debt, its risk increases and it finds the Eurobond market less attractive. Consequently, the supply of Eurobonds is not perfectly elastic, and the tax advantage of Eurobonds is likely to be divided between issuers and investors.

For the issuers of Eurobonds who can capture some of the tax advantage of these bonds, issuing convertible debt on the Eurobond market is a positive net present value project relative to issuing the same debt on the domestic market. If the issue is unexpected and the firm's existing debt is riskless, its announcement² increases the value of the issuing firm's equity by the gain from issuing on the Eurobond market.²

2. It is reasonable to question, however, whether the issue would be unanticipated. If the yield advantage is 150 basis points, should not firms issue on the Eurobond market and invest in securities? If the demand curve for Eurobonds is downward sloping, the differential vanishes as more bonds are issued. Firms that observe a high yield differen-

Since the stock price reaction, in this case, capitalizes the yield advantage from issuing on the Eurobond market, investigating the abnormal stock returns associated with Eurobond issues offers a potentially powerful test of the segmentation hypothesis because a small yield advantage can have a significant stock price effect. For instance, consider the extreme case where Eurobond investors pay no taxes, so that the tax advantage of Eurobonds equals the withholding tax. In this case, a foreign investor would be indifferent between a domestic issue with a coupon of 10% and a Eurobond issue with a coupon of 7%. Suppose now that the issue has a maturity of 25 years, the net proceeds equal 10% of the firm's common stock, the coupon on an equivalent domestic issue would be 10%, and one-third of the tax advantage accrues to the issuing firm (so that the coupon on the Eurobond issue is 9%). In this case, a firm that unexpectedly issues on the Eurobond market would see its shares increase by almost 1% relative to having issued on the domestic market because of its ability to capture some of the tax advantage of Eurobonds. In our sample, a 1% difference in stock price reactions between firms issuing on the Eurobond and on the domestic markets would be statistically significant.³

B. The Data

The raw data for the offshore convertible issues are collected from various sources. The *Corporate Financing Directory* issued by the Investment Dealer's Digest lists the new issues of Eurobonds from 1966 to 1982. From 1983, the *International Credit Week* published by Standard and Poor's also lists new issues of Eurobonds. The *International Bond Manual* for 1987 lists convertible Eurobonds outstanding in 1987 that were issued by U.S. companies. The above sources are used to obtain data on each issue. For each issue, we checked the Wall Street Journal Index, and then, if relevant, the *Journal* itself. For each issue, we also checked the *Financial Times* because the *Financial Times* follows the Eurobond market more systematically than the *Wall Street Journal*. We use as the announcement date the earliest date on

tial and decide to try to issue on the Eurobond market may therefore end up not issuing because the favorable differential no longer exists. Since these firms will have incurred costs in preparing the issue, firms do not face a riskless arbitrage opportunity if the Eurobond market is partially segmented.

3. An alternative test would be to compute the domestic value of Eurobonds and compare that value to the price at which the bonds are sold. Unfortunately, existing empirical evidence suggests that this approach would not be powerful enough. For instance, in the example just discussed, the Eurobond issue would be worth 11% less on the domestic market than on the Eurobond market. This pricing difference would be less than one and a half times the standard deviation of the price estimates obtained for fixed-rate callable domestic debt by Jones, Mason, and Rosenfeld (1985) using a continuous-time pricing model.

TABLE 1 Summary Data for New Offerings

Year	Eurobond Issues			Domestic Issues		
	Average Gross Proceeds	Average Maturity	Number of Issues	Average Gross Proceeds	Average Maturity	Number of Issues
1965	31.67	20.00	3	...	...	...
1966	20.00	17.50	6	...	...	...
1967	33.40	17.00	5	...	...	...
1968	34.08	19.00	25	...	...	...
1969	18.08	17.50	12	...	...	...
1970	20.00	20.00	1	36.07	22.50	8
1971	35.00	18.33	3	39.21	22.00	31
1972	34.72	15.33	18	54.09	23.64	11
1973	47.50	16.50	6	105.00	22.50	2
1974	0	0	0	87.50	25.00	2
1975	0	0	0	76.92	25.00	13
1976	15.00	7.00	1	77.79	22.14	7
1977	42.50	17.50	2	80.00	20.00	4
1978	28.75	13.75	4	42.17	21.67	6
1979	38.33	15.00	3	43.00	21.00	11
1980	32.95	15.35	20	58.96	23.40	55
1981	38.33	15.00	12	79.38	23.06	34
1982	50.00	17.00	3	62.09	23.21	33
1983	50.00	15.00	6	59.40	21.73	48
1984*	516.33	11.67	3	84.21	22.96	24
1985	112.00	17.00	5	92.63	21.87	38
1986	165.73	14.27	11	75.76	22.24	33
1987	188.82	14.53	17	116.00	25.50	10
Whole sample	69.44	16.19	166	67.95	22.64	370

NOTE.—Average gross proceeds are given in million dollars; average maturity time is given in years.

* In 1984, there were two Eurobond convertible issues from Texaco Inc. The first was on March 19 for an amount of \$1 billion, and the second was on April 19 for \$500 million dollars. The third issue in that year was an issue by Viacom International Inc. for \$50 million.

which the issue is discussed either in the *Financial Times* or the *Wall Street Journal*.

Our search of the *Financial Times* and the *Wall Street Journal* provided us with the announcement date for 225 new convertible Eurobond issues. Only 199 issues were by firms listed on either the New York Stock Exchange (NYSE) or the American Stock Exchange (AMEX). Nine issues are excluded from the final sample because they are accompanied by issues of other securities. For 24 issues, the stock of the issuing firm is listed on the NYSE or the AMEX for less than 240 trading days before the announcement date. The final sample consists of 166 issues from 1965 to 1987. Table 1 provides data on the yearly distribution of the sample. It shows that the number of issues varies substantially from year to year.

The first list of convertible debt financings by U.S. firms in the domestic market was obtained from various issues of the *Corporate*

Financing Directory published by the Investment Dealer's Digest. From the list of convertible debt financings, we retained only those firms whose daily stock returns are available from the Center for Research in Security Prices (CRSP) tape and whose announcement or filing date can be obtained from the Wall Street Journal Index. Out of a total of 370 observations for firms with returns data available on the CRSP file, stock returns were not available for 240 days before the bond issue for 90 observations. This sample consists therefore of 280 observations.

After 1984, the Wall Street Journal Index often reports only the offering date for domestic issues. We therefore divide up our sample of domestic issues into a sample for which we have a preoffering announcement date in the *Wall Street Journal* and a sample for which the *Wall Street Journal* reports only the offering date. When no preoffering event date can be obtained from the *Wall Street Journal*, we use the filing data obtained from the Registered Offerings Statistics (ROS) tape as the event date and call the resulting sample the ROS sample. The benefit from using the ROS sample is to increase the sample beyond the 21 domestic issues for which preoffering announcements are published in the *Wall Street Journal* after July 1, 1984. However, the risk that our event date in this sample differs from the actual date that information became available to the market is greater than it is with the sample of *Wall Street Journal* announcements. To address this issue, we report results that use the ROS sample separately. Table 1 provides the yearly distribution of bond issues, including the ROS sample for domestic issues. The sample size for domestic bond issues is slightly more than twice the sample size for Eurobond issues.

C. *Abnormal Returns Associated with Convertible Bond Issues*

Table 2 shows the average stock price reaction, measured as the abnormal return for the announcement day and the preceding day, for Eurobond issues for each year in the sample.⁴ None of the yearly average abnormal returns differs significantly from zero for the period before the removal of the withholding tax, and none is lower than -1% for that period. For 8 years before 1984, the average abnormal return has a positive point estimate. Table 3 shows that the average abnormal return for convertible Eurobonds before July 1984 is -0.23% with a z -statistic of -0.76 . Of the announcement effects, 47.73% are posi-

4. Abnormal returns are computed as market-model residuals. The parameters of the market model for a firm are estimated by regressing the daily rate of return of that firm from the CRSP daily stock-return file on a constant and the daily rate of return of the CRSP equally weighted index over the $(-240, -40)$ period. The test statistics are the same as in Mikkelsen and Partch (1986), who also use days -1 and 0 to compute the stock price reaction.

TABLE 2 Abnormal Returns Associated with Eurobond Issues per Year

Year	Average Abnormal Return in %	<i>t</i> -Statistic
1965	-.70	-.96
1966	.24	.24
1967	-.94	-.76
1968	-.56	-1.40
1969	.97	1.34
1970	-.06	N.A.*
1971	.50	1.66
1972	-.63	-1.34
1973	.41	.49
1974	N.A.	N.A.
1975	N.A.	N.A.
1976	.54	N.A.*
1977	.34	.58
1978	.43	1.48
1979	-.17	-.75
1980	.21	.36
1981	-.85	-1.43
1982	-.90	-.64
1983	-.51	-.40
1984	-.60	-.99
1985	-1.63	-1.63
1986	-1.31	-1.37
1987	-1.35	-1.90

NOTE.—The average of the sum of the market model abnormal returns is given for the day before the announcement and the day of the announcement of Eurobond new issues for each year in the sample with the *t*-statistic for the null hypothesis of no abnormal return; N.A. = not available.

* The sample has only one issue for that year.

tive.⁵ This average announcement effect is considerably smaller in absolute value than the average announcement effect for issues of domestic convertible bonds in our sample, which is -1.67% with a *z*-statistic of -9.17 .⁶ The difference between the average announcement effect for Eurobond convertible issues and domestic convertible issues before July 1984 is 1.43% with a *z*-statistic of 4.71 .⁷

For each year after the removal of the withholding tax, the average announcement effect for Eurobonds is negative and exceeds 1% in absolute value; all *t*-statistics exceed one in absolute value. For 1 year, namely 1987, the announcement effect is significantly different from

5. Deshpande and Philippatos (1988) find a positive announcement effect of 0.67% with a *z*-statistic of 1.47 for a sample of 13 new issues of convertible Eurobonds from July 1974 to June 1984.

6. It is also substantially smaller in absolute value than the average abnormal return of -2.31% reported by Dann and Mikkelsen (1984) for 132 domestic convertible bond announcements from 1969 to 1979.

7. As a further test to insure that this difference is not due to outliers, we used a nonparametric test. We found 55 Eurobond issues for which there is a domestic issue within a week. There are 35 cases where the abnormal return for the domestic issue is smaller and 20 where it is larger. The *p*-value for a two-tailed signs test is 0.06 .

TABLE 3 Comparison of Abnormal Returns Associated with New Convertible Issues

	Eurobond Issues	Domestic Issues	Difference
1. Whole sample:			
Average abnormal return	-.47	-1.66	1.19
z-statistic	-2.37	-9.73	4.06
Number of observations	166	280	...
% positive	43.47	26.43	...
2. Before July 1984:			
Average abnormal return	-.23	-1.66	1.43
z-statistic	-.76	-9.17	4.71
Number of observations	132	259	...
% positive	47.73	27.03	...
3. After June 1984:			
Average abnormal return	-1.40	-1.67	.27
z-statistic	-3.73	-3.32	.31
Number of observations	34	21	...
% positive	26.47	19.05	...
4. Expanded sample after June 1984:			
Average abnormal return	-1.40	-1.07	-.33
z-statistic	-3.73	-2.98	-1.47
Number of observations	34	78	...
% positive	26.47	34.62	...

NOTE.—The average abnormal return is the average sum of the market model residual for the day before the announcement and the day of the announcement. The expanded sample of domestic issues includes new convertible issues for which we have no Wall Street Journal Index preoffering announcement date. We use as the announcement date the day before the filing date obtained from the Registered Offerings Statistics tape.

zero at the 0.10 level. The average announcement effect for new issues after June 1984 is -1.40% , and the z -statistic is -3.73 . Of these announcement effects, only 26.47% are positive. The difference between the average announcement effect for offshore and onshore convertible issues is not significantly different from zero for the period after 1984.

We also studied the average cumulative return from day -20 to day $+20$. At date -2 , this cumulative return is 0.56% with a z -statistic of 1.42 for domestic issues and 0.43% with a z -statistic of 1.08 for Eurobond issues. At date $+20$, this cumulative return is -2.59% with a z -statistic of -2.66 for domestic issues and -0.42% with a z -statistic of -0.15 for Eurobond issues. Consequently, there is no evidence of greater anticipation of Eurobond issues. Since the difference in abnormal returns does not decrease during the first 20 days after the issue, it is unlikely to be caused by a difference in the speed of adjustment of stock prices for offshore issues relative to domestic issues.

D. Does the Withholding Tax Explain the Differential Abnormal Returns?

Our empirical evidence shows that, before the removal of the withholding tax, the average abnormal return difference between the announce-

ment of domestic issues and the announcement of Eurobond issues is 1.43%. Can this difference be explained by the withholding tax? To investigate this, we compute an estimate of the upper bound for the tax gain for each firm assuming that all the tax gain accrues to the issuer and that the tax gain is equivalent to the withholding tax.⁸ This implies that, for otherwise equivalent issues, the Eurobond coupon is 70% of the coupon that would have been paid had the bond been issued on the domestic market.⁹ We also assume that the debt is neither called nor converted before maturity, so that the lower coupon is paid for the whole life of the debt. We capitalize the coupon advantage over the life of the debt using the domestic yield on Moody's AAA index for long-term industrial bonds. Finally, we divide the coupon advantage for the issue by the value of the firm's equity at the time of issue.

Our estimate of the tax advantage corresponds to an average of 1.38% of the value of the equity of the issuing firm. Consequently, it is not implausible that the difference in abnormal returns results from the tax advantage. However, for the tax advantage to explain all the stock price reaction differential, firms would have had to capture all of the tax advantage of Eurobonds, and the tax advantage would have to have been equivalent to the withholding tax. It seems unlikely that the tax advantage could have been that large because tax credits for withholding taxes paid are available for some investors in some countries. Consequently, differences in firm and issue characteristics may explain part of the differential stock price reaction. We explore that possibility in the next section.

III. Characteristics of Issuing Firms and Abnormal Returns

The most widely accepted explanation for the stock price reaction to the issue of risky securities is based on the existence of informational asymmetries between management and investors.¹⁰ In the presence of such informational asymmetries, uninformed investors can infer some of the management's private information by observing its actions. Therefore, it is possible that the differential stock price reaction between domestic and Eurobond issues could simply result from the information contained in the firm's choice of the market on which to issue debt if, for instance, the ability to issue on the Eurobond market

8. The tax gain is equivalent to the withholding tax if foreign holders of Eurobonds pay no taxes on their interest income from these bonds and lose all the tax withheld on income from bonds issued in the United States. Foreign investors may lose part or all of the tax withheld because of the tax code of their home country or because they choose not to declare income on bonds subject to withholding taxes.

9. If r_e is the coupon yield of Eurobond convertible debt, then the tax advantage per year is assumed to be $[(1 - 0.7)/0.7]r_e$ times the par value of the debt.

10. See Harris and Raviv (1991) for a review of the literature.

provides information to investors that the issuing firm is a low-risk firm. Alternatively, it could be that the information revealed by a convertible debt issue differs across firms with different characteristics and that firms with similar characteristics just happen to issue on the same market. In this case, the choice of a market on which to issue debt has no implications for the abnormal return. We call the first hypothesis the "certification hypothesis" and the second hypothesis the "neutral mutation hypothesis." In this section, we first present some univariate tests of these hypotheses and then focus on regression tests. Each set of tests has some limitations. The univariate tests use relatively small samples. The regression tests suffer from the lack of theoretical models offering explicit functional forms for the relation between abnormal returns and firm and issue characteristics.

A. *Univariate Tests*

If a firm's ability to issue on the Eurobond market conveys positive information, one would expect firms to benefit most from their first Eurobond issue. Hence, a test of the certification hypothesis is to compare abnormal returns for the first Eurobond issue relative to subsequent Eurobond issues. In our sample, 16 firms issued Eurobond convertible debt more than once. The average return for the first issue from these firms is 0.12%, and the average return for their subsequent issues (23 in total) that took place before July 1, 1984, is -0.63%. The difference between the two issues has a p -value of 0.22. We conducted the same test in Kim and Stulz (1988) for fixed-rate issues and obtained the same result. After having issued convertible debt on that market, 16 firms issued fixed-rate debt on the Eurobond market. These 16 firms had 22 fixed-rate Eurobond issues; the average abnormal return for these issues is 0.88% with a t -statistic of 1.67. Consequently, the evidence presented here is not supportive of the certification hypothesis.

If firms for which a convertible issue conveys less unfavorable information just happen to issue on the Eurobond market, one would expect firms issuing on both markets during our sample period to have similar stock price reactions on both markets. We found 46 Eurobond issues for which there were matching domestic issues, and the difference in abnormal returns for these issues is 1.04% with a t -statistic of 1.54. For firms that issued either on the domestic market or on the Eurobond market only, the difference in abnormal returns is 1.08% with a t -statistic of 3.43. The point estimate of the difference in abnormal returns is almost the same for both groups of firms. Of course, it is possible that the characteristics of firms that issued on both markets changed between the Eurobond issue and the domestic bond issue. Nevertheless, it is difficult to interpret this evidence as supportive of the neutral mutation hypothesis.

B. Regression Tests

Table 4 provides evidence on how firm and issue characteristics differ across markets both before and after July 1, 1984. Before July 1, 1984, firms issuing offshore and Eurobond issues differed substantially from firms issuing domestically and from domestic issues, respectively. Some of these differences are less pronounced after July 1, 1984.

Table 4 shows that Eurobond issues are smaller and mature more quickly than domestic bond issues. Firms issuing on the Eurobond market are larger than firms issuing on the domestic market. For firms issuing on the domestic market, the convertible issue amounts to a larger fraction of equity, long-term debt, and total liabilities than it is for firms issuing on the Eurobond market. Consequently, a Eurobond convertible issue is a smaller event in the life of the issuing firm than is a domestic convertible issue.

The coupon yield of Eurobonds is lower, but this is not evidence of market segmentation since the nature of the issuing firms and the characteristics of the debt typically differ. In particular, before July 1, 1984, but not after, the average and median ratio of the conversion premium, defined as the conversion price minus the stock price (measured on the day of the issue) expressed as a fraction of the stock price, is lower for Eurobonds than for domestic bonds. This difference in the conversion premium could explain a lower coupon yield on Eurobonds since it implies that the call option on the issuing firm's stock attached to the debt is more valuable for Eurobonds than for domestic bonds, *ceteris paribus*.

Firms issuing convertible debt on the domestic market are riskier than firms issuing on the Eurobond market, but substantially more so before July 1, 1984. In particular, firms issuing on the domestic market are more highly levered than firms issuing on the Eurobond market. Further, firms issuing on the Eurobond market have a significantly lower beta (at the 0.01 level using a *t*-test) than firms issuing on the domestic market before July 1, 1984, but not after. The volatility of stock returns for firms issuing abroad is smaller than the volatility of stock returns for firms issuing domestically both before and after July 1, 1984, but less so after July 1, 1984.¹¹

The regression estimates in table 5 show that similar firm and issue characteristics have opposite effects on abnormal returns for the two markets. In particular, the stock price reaction of Eurobond issues is negatively related to maturity, volatility, and the conversion premium

11. If we use the extended sample of domestic bonds, the volatility difference after 1984 is significant at the 0.05 level, assuming that the sample comes from populations with different variances, and is significant at the 0.11 level assuming identical variances. The hypothesis of equal variances can be rejected at almost any level of significance.

TABLE 4 Characteristics of Eurobond and Domestic Convertible Bond Issues

	Before July 1, 1984				After July 1, 1984			
	Domestic		Eurobond		Domestic		Eurobond	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Gross proceeds (in million \$)	60.1	50.0	44.5	30.0	89.4	60.0	166.0	100.0
Common stock (in billion \$)	.57	.22	1.49	.71	.69	.30	2.27	1.31
Gross proceeds/common stock	.24	.18	.08	.05	.28	.19	.13	.08
Gross proceeds/liabilities	.35	.20	.15	.09	.43	.28	.31	.10
Convertible debt/proceeds	.42	.0	.47	.0	.39	.0	.56	.0
Number of shares issued upon conversion/number of shares	.17	.14	.06	.04	.21	.15	.11	.08
Conversion premium	.22	.19	.14	.13	.23	.22	.22	.23
Coupon yield (%)	8.52	8.75	6.44	5.88	7.81	8.00	6.53	6.52
Dividend yield (%)	2.18	1.54	2.48	2.12	1.84	1.44	2.75	2.77
Time to maturity	22.7	25.0	16.5	15.0	22.5	25.0	14.8	15.0
Long-term debt/common stock	.63	.33	.29	.18	.46	.33	.48	.18
Short-term debt/common stock	.34	.06	.09	.04	.67	.04	.33	.05
Liabilities/common stock	2.20	.84	1.10	.55	2.34	.74	2.67	.67
Stock return beta*	1.33	1.25	1.12	1.04	1.30	1.29	1.24	1.18
Variance of residual risk*	.07	.05	.04	.03	.05	.04	.03	.03
Stock return volatility*	.08	.06	.05	.03	.05	.04	.04	.03

NOTE.—All firm characteristics are measured before the offering. If accounting data is used, it is obtained from the Compustat file for the year before the offering. (Information about the conversion premium is not available for some of the issues.)

* Estimated from 240 to 40 days before the issue.

TABLE 5 Cross-sectional Regressions with the Stock Price Reaction of Eurobond Issues and of Domestic Issues as the Dependent Variable

	Before July 1, 1984		After July 1, 1984	
	Eurobond (1)	Domestic (2)	Eurobond (3)	Domestic (4)
<i>N</i>	96	191	25	76
Constant	4.68 (2.34)	-5.05 (-2.08)	7.23 (1.53)	-2.38 (-.86)
Gross proceeds	-3.28 (-1.18)	.47 (.10)	2.05 (.37)	-1.72 (-.30)
Years to maturity	-.23 (-2.03)	.06 (.65)	-.51 (-1.86)	-.05 (-.43)
Volatility	-9.71 (-1.66)	2.48 (.56)	44.10 (1.47)	-9.07 (-.66)
Conversion premium	-4.92 (-1.67)	7.92 (3.34)	-12.22 (-1.40)	12.61 (2.88)
Adjusted <i>R</i> ²	.06	.05	.09	.06
<i>p</i> -value for <i>F</i> -test	.05	.01	.22	.09

NOTE.—*t*-statistics are in parentheses. Gross proceeds are in billion dollars. Volatility is the volatility of the stock return estimated from 240 to 40 days before the issue. The conversion premium is the conversion price minus the stock price on the issue day divided by the stock price.

before July 1984.¹² This contrasts with the stock price reaction of domestic issues, which is unrelated to maturity and positively related to volatility and the conversion premium.

The signaling model of Brennan and Kraus (1987) predicts that the conversion premium is positively related to the risk of the issuing firm and that the abnormal return is positively related to the conversion premium. This is because, in their fully revealing equilibrium in which the firm issuing convertible debt has debt outstanding, outsiders price the convertible debt assuming that the issuing firm sets its terms to maximize the value of the issue. If a low conversion premium issue is priced based on the expectation that the issuing firm has high risk, low-risk firms would gain from making such issues and high-risk firms would not lose. Hence, for a separating equilibrium to exist, low conversion premium issues must be priced by investors based on the expectation that the issuing firm has low risk. When a firm issues debt with a high conversion premium, the existing bondholders lose and the

12. If we use regression (1) to forecast stock price reactions to Eurobond issues after July 1, 1984, the predicted average abnormal return for the period after 1984 would be -0.74%, which is greater in absolute value than the average abnormal return before 1984. This indicates that changes in firm characteristics explain partly why the average stock price reactions became more similar across markets after 1984. However, regression (1) can be used to forecast at most an increase of 0.25% in the absolute value of the stock price reaction for Eurobond issues. This suggests that changes in firm characteristics are not sufficient to explain why the stock price reactions become more similar across markets after 1984.

equity holders gain because outsiders learn that the firm is a high-risk firm, so that the stock price reaction is increasing in the conversion premium.¹³ The regression estimates of table 5 show that this prediction of the model holds for domestic issues, but not for Eurobond issues. The opposite effect of the conversion premium on stock price reactions for Eurobond and domestic issues suggests that existing signaling models cannot be used to interpret the stock price reaction to Eurobond convertible issues.

The negative relation between the stock price reaction to Eurobond convertible issues and the risk of the issuing firm is consistent with the hypothesis that markets are partially segmented and that Eurobond issues are less advantageous for riskier firms. After the removal of the withholding tax, if the conversion premium is omitted as an explanatory variable, the coefficients on years to maturity, gross proceeds, and volatility are similar for the onshore and offshore regressions. However, as evidenced from regressions (3) and (4), the conversion premium still affects abnormal returns differently across markets after July 1, 1984.

If the issue and issuing firm characteristics explain the difference in abnormal returns, the market in which an issue is floated and the time period during which it is floated should convey no information once we control for issue- and/or firm-specific characteristics. Table 6 provides estimates of regressions of the abnormal returns for all issues in our sample on firm and issue characteristics and on our estimate of the upper bound of the tax gain. First, we estimate a regression of abnormal returns on a constant, the gross proceeds of the issue, its time to maturity, the stock return volatility, a dummy variable that takes value one for a Eurobond issue before July 1, 1984, and a dummy variable that takes value one for a Eurobond issue after July 1, 1984. Since the period from 1979 to 1984 is generally perceived to be the one with greater demand for dollar securities, we also estimate the regression using a dummy variable that takes value one for Eurobond issues floated before 1979 and a dummy variable that takes value one for issues floated from 1979 to July 1984.

The first four regressions of table 6 use the largest sample available and hence do not include the conversion premium because it could not be determined exactly for some issues. Regressions (1) and (2) show that, even after controlling for differences in gross proceeds, time to maturity, and stock return volatility, the average abnormal return asso-

13. The Kim (1990) model also yields the results that absolute value of the stock price reaction is negatively related to the conversion premium. In that model, the argument is that, as the conversion premium increases, insiders bear more risk from their fixed stake in the firm's equity, and they would not do so without favorable information about the firm.

TABLE 6 Cross-sectional Regressions with the Announcement Effect as the Dependent Variable

	(1)	(2)	(3)	(4)	(5)	(6)
<i>N</i>	536	536	533	533	388	386
Constant	-2.94 (-2.45)	-2.73 (-2.31)	-.89 (-1.03)	-2.72 (-2.29)	-1.77 (-1.22)	-1.86 (-1.28)
Gross proceeds	-1.11 (-.53)	-.24 (-.12)	-1.75 (-.88)	-.39 (-.18)	1.20 (.54)	.66 (.30)
Years to maturity	.05 (1.06)	.04 (.81)	-.02 (-.57)	.04 (.82)	-.07 (-1.25)	-.06 (-1.13)
Volatility	3.95 (1.48)	4.38 (1.63)	1.34 (.53)	4.11 (1.52)	-1.75 (-.54)	-2.62 (-.79)
Tax advantage	...	...	.29 (2.32)	.14 (.93)	...	.37 (1.97)
Conversion premium (Eurobond issues)	...	...	...	...	-4.92 (-1.56)	-5.02 (-1.59)
Conversion premium (domestic issues)	...	...	...	...	8.69 (4.61)	8.88 (4.71)
EURO	1.72 (3.47)	...	...	...	...	...
EURO1	...	1.96 (3.62)	...	1.76 (2.90)	3.65 (4.53)	3.19 (3.77)
EURO2	...	1.11	...	.77 (.98)	2.67 (2.80)	1.90 (1.85)
EUROAFTER	.80 (1.01)	.63 (.80)	...	.64 (.82)	2.74 (2.52)	2.89 (2.65)
Adjusted R^2	.03	.03	.02	.03	.07	.08
<i>p</i> -value for <i>F</i> -test	.01	.01	.06	.01	.01	.01

NOTE.—*t*-statistics are in parentheses. Volatility is the volatility of the stock return estimated from 240 to 40 days before the issue. EURO, EURO1, EURO2, and EUROAFTER are dummy variables that take value one for a Eurobond issue before July 1, 1984; before January 1, 1979; from January 1, 1979, to July 1, 1984; and after July 1, 1984, respectively. Gross proceeds are in billion dollars. Tax advantage is the estimate of the tax advantage resulting from the absence of a withholding tax on Eurobonds. The conversion premium is the conversion price minus the stock price on the day of the issue expressed as a fraction of the stock price.

ciated with Eurobond issues is significantly higher than the average abnormal return associated with domestic issues before July 1, 1984, but not after. The coefficient on the dummy variable for Eurobond issues before July 1, 1984, has a point estimate that is similar to the difference for the univariate comparison in table 3, and it does not seem to be sensitive to the variables we control for. In regression (2), the coefficient on the dummy variable for Eurobond issues between January 1, 1979, and July 1, 1984, is only marginally significant at the 0.10 level, suggesting that the difference in abnormal returns between Eurobond convertible issues and domestic convertible issues is weaker during the period of high demand for dollar securities. This result contrasts with the results of Kim and Stulz (1988), where the period of high demand for dollar securities corresponds to significant positive

abnormal returns for fixed-rate Eurobond issues, suggesting that Eurobond convertible and fixed-rate debt are poor substitutes for foreign investors.

In an attempt to find variables that explain the difference in the announcement effects, we also controlled for gross proceeds divided by the value of equity, beta, the variance of residual risk, leverage, the coupon payment, and the dividend yield. In all cases, the dummy variable for Eurobond issues is significant and has about the same value. Leverage, coupon, and dividend measures are never significant. Beta and the variance of residual risk are significant in some regressions, which is not surprising since they are closely related to the volatility that is marginally significant in some of the regressions in table 6.

Whereas firm characteristics and issue differences seem to be unable to explain the difference in abnormal returns, regressions (3) and (4) of table 6 suggest that our estimate of the upper bound of the tax advantage explains part of the differential stock price reaction. In regression (3), the coefficient on the estimate of the tax advantage is significantly different from zero and is positive. It is, however, much smaller than one, suggesting that firms capture only a fraction of the upper bound of the tax advantage. If we estimate regression (1) with the tax estimate as an additional explanatory variable, neither the tax estimate nor the dummy variable for Eurobond issues before 1984 are significant. Regression (4) includes as explanatory variables the tax gain variable and dummy variables for Eurobond issues before 1979, between 1979 and July 1, 1984, and after July 1, 1984. Only the dummy variable for Eurobond issues before 1979 is significant with a *t*-statistic of 2.90. These estimates suggest that, before 1979, the tax gain variable alone is not sufficient to explain the difference in abnormal returns, but that it is sufficient for the period from 1979 to 1984.

Regressions (5) and (6) of table 6 include the conversion premium as an explanatory variable. Since the regressions of table 5 show that the conversion premium has opposite effects on the stock price reaction depending on where an issue is sold, we allow for this differential effect in our regressions. Using the conversion premium as a dependent variable substantially increases the explanatory power of our regressions. However, there is no evidence that the difference in abnormal returns between domestic and Eurobond issues can be attributed to a differential effect of the conversion premium. Allowing for this differential effect leads to greater estimates of the coefficients on the dummy variables and suggests that there still exists a differential stock price reaction after July 1, 1984. These results should be interpreted with caution since we are not estimating a formal model of the relation between the conversion premium and the stock price reaction.

IV. Conclusion

This article shows that, although there were two markets for convertible bonds before the removal of the U.S. withholding tax on bonds held by foreign investors in 1984, in many ways there has been only one market for convertible bonds since 1984. American firms that issue convertible bonds still self-select into either the domestic or the offshore market; large and low-risk firms are more likely to issue offshore. However, there seems to be no difference between the announcement effect of Eurobond and domestic convertible bond issues since 1984, whether one controls for differences in issuing firm characteristics or not. The evidence of the sample period before 1984 is consistent with the hypothesis that American firms that issued convertible debt on the Eurobond market benefited from the partial segmentation of that market and were able to capture some of the tax advantage resulting from the absence of a withholding tax on offshore bonds. In contrast to the results for domestic issues, the stock price reaction to Eurobond issues is not consistent with existing signaling models of convertible issues.

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