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World markets for raising new capital ☆

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Abstract

We examine the extent to which firms from different countries rely on alternative sources of capital, the locations in which they raise capital, and the factors that affect these choices. During the 1990–2001 period, firms raised about $25.3 trillion of new capital, including $4.9 trillion from abroad. International debt issuances are substantially more common than equity issuances, with debt (equity) issues accounting for 87% (9%) of all securities issued internationally, and about 20% (12%) of all public debt issuances. Market timing considerations appear to be important in security issuance decisions in most countries.

JEL classification: G15; G32

Keywords: International debt issues; International equity issues; Market timing

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1. Introduction

The financial markets are increasingly integrated globally. Thus, corporations now enjoy not only a tremendous amount of flexibility in deciding which type of security to issue to fund their investments, but also in which location to issue these securities. For instance, firms in Europe can raise capital by issuing bonds, convertible bonds, or stocks in the U.S. or Japan. However, we still know very little about the extent to which firms make use of the wide array of financing choices available to them, or how this practice varies internationally. For example, at present we do not have hard empirical evidence to answer the following questions: How do firms around the world raise capital to fund their investments? To what extent do firms rely on domestic sources of capital, and to what extent do they raise capital internationally? Are some countries more dependent on foreign capital than others? Do firms find it easier to raise some form of capital, such as debt, more easily outside their borders than other forms of capital, such as equity? How do financial market conditions, and factors such as interest rates and equity valuations, affect the decision of what security to issue, and where to issue that security? Answers to these questions would broaden our understanding of corporate finance in a globally integrated environment.

In perfectly frictionless markets, the fundamental Modigliani and Miller (1958) theorem implies that just as the type of securities a firm issues is irrelevant, the location in which these securities are issued is also irrelevant. In reality, however, market frictions, imperfectly integrated capital markets, and taxes render the choice of marketplace an important consideration for practitioners. Important issues such as how firms decide on in which geographic market they should raise various types of capital have received little attention in the corporate finance literature.

This paper addresses a number of questions about when and where firms raise capital and what kinds of securities they issue to raise capital. The first part of the paper documents the extent to which firms go abroad to raise capital, and considers how internationalization varies across security types and across regions. This part of the paper is mostly exploratory and descriptive; it is designed to provide a set of stylized facts about international capital raising that will add to our understanding of international corporate finance.

Firms raised approximately $26 trillion of new capital through public security issues during the 1990 to 2001 period. Cross-border security issues were a large part of this activity, amounting to $4.9 trillion. Over this sample period, international issuances of debt securities were far more common than international equity issuances. For instance, 20.24% (about $4.2 trillion) of the corporate bond offerings were issued outside the home country of issuing firms, whereas 12.2% (about $0.435 trillion) of the public equity offerings were issued outside the home country. During our sample period, the percentage of equity issued abroad increased from 9.0% in 1991 to 12.8% in 2001. The percentage of debt issued abroad, however, decreased from 26.6% in 1991 to 18.5% in 2001.

A number of cross-country patterns are evident from the data on international security issues. First, companies are drawn to liquid markets: the U.S. and the U.K. are by far the most popular sources for new cross-border equity. Firms from countries with illiquid equity markets issue a larger fraction of new equity outside their countries than do firms from countries with relatively well-developed equity markets. Moreover, proximity seems important: firms are more likely to issue securities in countries that are geographically close

to them. European debt markets are more attractive to foreign issuers than are European equity markets. Finally, firms in the U.S. and Canada are by far the largest issuers of nonconvertible preferred stock, while convertible bonds are popular in Europe. Large fractions of both preferred stock and convertibles are issued internationally, although the total value of these securities is relatively small compared to common equity and nonconvertible debt.

The second part of the paper examines whether market timing plays a role in firms' decisions to issue debt or equity, both locally and internationally. In particular, we examine whether aggregate domestic equity issues in various countries predict future market returns in those countries. If firms time the market, then aggregate domestic equity issues should be negatively correlated with future market returns. We also examine whether, at the aggregate level, market timing considerations affect firms' decisions to raise equity abroad. Finally, we examine whether firms time their long-term debt issues, both domestically and internationally, prior to increases in interest rates.

There are a number of reasons why firms could choose to raise capital internationally rather than in their own countries. For example, Stulz (1999) argues that expanding a shareholder base internationally improves risk sharing and thereby lowers the cost of capital.[1] Also, firms may raise capital abroad and trade their stock or bonds in foreign markets if transaction costs are lower there than in domestic markets.[2] Finally, as Coffee (1999) and Reese and Weisbach (2002) point out, when firms issue stock in countries with more stringent capital market regulations and reporting standards than in their home countries, they commit to abide by these higher standards. Such a commitment can facilitate capital-raising throughout the world. While all these factors undoubtedly influence firms' decisions about where to issue securities, a comprehensive evaluation of these motivations is well beyond the scope of this paper. Instead, this paper focuses on understanding whether market timing is one of the factors that play a role in the domestic and foreign capital-raising decisions.

This paper adds to the growing literature on how firms time the market when they issue equity securities. Early papers by Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) document that individual firms are more likely to issue new equity when they are overvalued. At the aggregate level, Loughran et al. (1994) find that the issuance of equity in initial public offerings (IPOs) is negatively related to future returns in 10 out of 14 countries in their sample, although this relation is not statistically significant in any of these countries. Baker and Wurgler (2002) find that aggregate equity issues, which include both seasoned equity offerings and IPOs, predict market returns in the U.S. This paper examines whether aggregate equity issues predict market returns internationally. We also examine whether firms successfully time their cross-border equity issues.

This paper expands upon the older literature on how firms time their debt issues. For instance, Bosworth et al. (1971), White (1974), and Taggart (1977) find that individual firms in the U.S. are more likely to issue debt than equity when interest rates are low.

[1]Of course, shareholders can diversify their portfolios internationally, and hence in perfectly integrated markets it would not be necessary for firms to raise capital from outside their borders to expand their base of shareholders. However, because of investors' home-bias, regulatory frictions, and tax considerations, firms sometimes have to raise capital from abroad directly to take advantage of any lower cost-of-capital opportunities.

[2]For instance, Pagano et al. (2002) report that the number of foreign stocks that are listed on various exchanges is related to the transaction costs in those exchanges.

Unlike these papers, we examine the relation between debt and interest rates at the aggregate level rather than at the firm-specific level. Moreover, we also examine this relation both in the U.S. and internationally. In addition, we examine whether firms choose to issue debt abroad when the interest rates are lower there than in the home market.

This paper also analyzes whether firms' propensity to issue debt in a low interest rate environment allows them to time the market and raise more long-term debt prior to increases in interest rates. Baker et al. (2003) address a similar issue in the U.S.; however, their paper focuses on the timing considerations in the choice of debt maturity, whereas we focus on aggregate levels of long-term debt. Here again, we examine debt market timing both in the U.S. and internationally.

Our main results on timing are as follows: First, firms are more likely to issue equity when the stock market appears to be overvalued. Specifically, we find that stock market returns are abnormally low following periods of high equity issues. Second, international equity issues predict future market returns in the countries in which firms issue equity. Finally, firms time their long-term debt issues prior to future increases in interest rates.

The remainder of the paper proceeds as follows: Section 2 describes the sample and our data sources. Section 3 analyzes the securities that firms in different parts of the world issue to raise new capital, and the locations in which firms issue them. Section 4 examines the extent to which firms time the market when issuing equity, both domestically and internationally. Section 5 investigates the relation between debt issuances and interest rates, both domestically and internationally, and the relation between debt issues and interest rate movements. Section 6 concludes.

2. Data sources

Our source for data on security issuances is Security Data Corporation's (SDC) new issues database. SDC maintains an international transaction-level database on new issues of common equity, preferred equity, and bonds with original maturities greater than one year dating back to 1990. The SDC data are organized as a number of regional databases, which cover the following markets: United States (United States), International (most cross-border issues), Asia Pacific (Hong Kong, Singapore, Malaysia, Indonesia, Taiwan, Thailand, and the Philippines), Australia and New Zealand (Australia, New Zealand, and Papua New Guinea), Canada (Canada), Continental Europe (most major continental European nations including: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, and Switzerland), India and Subcontinent (India, Bangladesh, Pakistan, and Sri Lanka), Japan Domestic (Japan), Korean Domestic (Korea), Latin America (Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Panama, Peru, Uruguay, and Venezuela), and United Kingdom (United Kingdom).

SDC's data collection process is somewhat different for each region. For nations that have disclosure requirements, which facilitate the tracking of new public issues, the SDC's primary data sources are the filings with the respective securities authority. For example, in the United States database, the SDC's primary data come from SEC filings, and in the

Australia and New Zealand database, the primary data come from filings with the Australian Securities Commission. The SDC then supplements the filings data of such countries with data from more informal sources. For example, the SDC's United States database includes investment bank and local underwriter surveys, offering circulars, prospectuses, and stock exchange filings, and the Australia and New Zealand database includes prospectuses, news sources and financial publications, and proprietary surveys of investment banks and other advisors.

For countries that do not have a regulatory body equivalent to the SEC, the primary data sources are more informal. In the Asian Pacific database, for example, the data sources consist of "more than 200 English & foreign language news sources, trade publications, wires, foreign stock exchange filings, and proprietary surveys of investment banks and other advisors," and in the International database, the sources of data are "prospectuses, offering circulars, news sources and wires."

Our sample comprises 195,375 security issues during the 1990 to 2001 period. Since several of the domestic SDC databases, such as the Australia and New Zealand database, do not initiate coverage until 1991, we perform all of our formal statistical tests using data from 1991 to 2001. Moreover, while we present aggregated data for all the geographic regions in the descriptive tables, because SDC does not claim to have comprehensive data for countries in the Eastern Europe, Middle East, and Africa geographic regions, we do not include these three geographic regions in our econometric tests.

We would like to emphasize that SDC coverage is less complete in some countries than in others. For instance, the data for countries for which SDC relies on multiple and diverse sources may be less comprehensive than that for countries for which SDC collects data largely from statutory filings with regulatory bodies. Thus, our descriptive presentations of the data should be interpreted with this caveat in mind. This coverage variation also introduces noise in the data, reducing the power of our timing tests and hence biasing them against finding evidence of market timing.

We obtain aggregate market capitalization and GDP data from the Global Market Information and the World Development Indicators (WDI) databases, both of which are produced by the World Bank. Our inflation data come from the International Financial Statistics database and our interest rate swap data come from Datastream. We use Datastream's "total return" indices to measure stock market returns for the larger countries in our sample. For the smaller countries, we use Datastream's regional value-weighted total return indices to measure market returns. For example, for the "Other Asia" category in our sample, we use the Datastream value-weighted index for "Other Asia excluding Japan" as the market index.

3. Security issuances: Who issues what securities and where?

This section provides an analysis of the locations in which firms from various countries raise capital, and the types of securities they issue to raise this capital, both domestically and internationally. We start by characterizing both the trends in capital-raising activities in different countries and the extent of globalization in the capital markets over our sample period. This analysis will help us understand the factors that affect the demand and supply of capital across countries. We also investigate whether some types of securities are more commonly issued globally than other types of securities.

Table 1
Sample characteristics
This table presents the sample descriptive statistics. Our sample of new capital issues comprises all issues in the SDC database for the years 1990–2001. We report the statistics separately for the G7 countries. We group the non-G7 countries into geographical regions. The market capitalization and GDP data are from the World Bank data and are in U.S. dollars.

Country/region	Number of observations	1997 Market Capitalization	1997 GDP
		(in millions US$)	
Canada	21,556	567,635	627,595
France	6,672	674,368	1,406,120
Germany	12,480	825,233	2,110,965
Italy	3,008	344,665	1,166,795
Japan	16,371	2,216,699	4,313,229
United Kingdom	6,793	1,996,225	1,327,798
United States	38,314	11,308,779	8,256,500
Africa	478	255,959	355,195
Australia & New Zealand	9,431	326,296	482,409
Central America & Caribbean	11,259	161,600	524,058
Eastern Europe	1,123	241,591	1,025,218
Middle East	773	121,123	325,307
Other Asia	31,285	1,077,652	2,678,451
Other Europe	27,736	2,172,168	2,666,545
South America	8,096	441,140	1,479,853

3.1. Global capital markets

Table 1 presents aggregate statistics on international capital markets over the 1990 to 2001 period. Specifically, the table reports market size and GDP. We report the results separately for the Group of Seven (G7) most developed countries,[3] and we aggregate the results for the other countries into "regions". Appendix A identifies the countries making up each region.

We first examine the volume of capital that firms raised during the 1990–2001 sample period. We consider all issues of publicly traded common and preferred equity, and issues of debt with greater than one year to maturity. While firms often rely on bank debt or commercial paper for debt that matures in less than one year, SDC does not collect complete data on these types of short-term debt. Our sample, therefore, excludes such short-term debt.

Table 2 presents changes in the magnitude of security issuance over time. Between 1991 and 2001, the amount of capital raised increases by a factor of about four, from $947.5 billion in 1991 to over $3.62 trillion in 2001. The table shows that both domestic and international issuances increase substantially over the sample period. However, the magnitude of domestic issues increases proportionately faster: the capital raised domestically increases 4.05 times during the sample period, compared with 3.03 times for capital raised internationally. Thus, although the extent to which firms raise capital

[3]The G7 countries are Britain, Canada, France, Germany, Italy, Japan, and the United States.

Table 2
Aggregated proceeds from new capital issues

This table presents the amount of new capital raised annually. The sample comprises all new issues from the SDC New Issues Databases. We classify security issues as either "Domestic," indicating that the securities are sold in the domestic market of the issuing firm, or as "International," indicating that the proceeds are raised in a marketplace outside the issuer's home country. For offerings that take place in more than one country, we consider issues in each marketplace as separate issues.

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
Equity	Domestic	47,085	136,160	121,536	248,165	248,262	204,393	278,629	325,609	328,505	419,908	481,361	283,452	3,123,064
	International	7,146	13,543	15,342	25,832	39,018	26,854	43,092	46,890	37,462	71,289	67,179	41,442	435,090
	Total	54,231	149,703	136,878	273,997	287,280	231,247	321,721	372,499	365,967	491,197	548,540	324,894	3,558,154
Nonconvertible debt (original maturity< = 5years)	Domestic	84,131	138,088	147,335	240,804	348,696	396,297	502,515	652,607	905,041	1,585,131	1,142,574	1,365,759	7,508,978
	International	47,594	53,858	43,939	61,405	95,049	78,221	117,439	118,365	107,464	262,737	233,378	232,657	1,452,106
	Total	131,725	191,946	191,274	302,209	443,745	474,517	619,954	770,973	1,012,505	1,847,868	1,375,953	1,598,416	8,961,084
Nonconvertible debt (original maturity> 5years)	Domestic	157,652	412,633	499,367	718,106	585,979	692,812	883,424	914,323	1,317,570	792,784	891,263	1,195,219	9,061,132
	International	96,880	145,432	178,191	271,901	191,596	155,154	241,594	262,376	305,064	248,768	314,204	349,987	2,761,147
	Total	254,532	558,065	677,558	990,007	777,575	847,966	1,125,018	1,176,699	1,622,633	1,041,552	1,205,467	1,545,207	11,822,279
All nonconvertible debt[a]	Domestic	241,783	550,520	646,702	958,705	934,581	1,088,878	1,385,740	1,573,126	2,226,337	2,386,040	2,042,190	2,565,424	16,600,025
	International	144,475	199,290	222,130	333,306	286,645	233,375	359,033	380,696	412,520	511,495	547,535	581,788	4,212,288
	Total	386,257	749,810	868,832	1,292,011	1,221,226	1,322,253	1,744,773	1,953,821	2,638,857	2,897,535	2,589,725	3,147,213	20,812,313
Preferred stock	Domestic	7,932	20,467	28,291	26,149	15,650	11,964	23,421	35,982	31,564	27,006	21,486	36,624	286,536
	International	1,868	1,280	1,637	4,710	2,037	2,020	2,523	5,342	8,453	6,415	10,976	6,715	53,976
	Total	9,801	21,747	29,928	30,859	17,687	13,983	25,943	41,324	40,017	33,421	32,462	43,339	340,512
Convertibles	Domestic	30,236	22,365	19,112	43,499	53,030	27,766	67,138	40,163	39,976	51,261	37,878	72,364	504,788
	International	1,576	3,875	2,534	10,532	11,911	10,302	20,823	15,596	13,919	15,488	19,442	31,617	157,612
	Total	31,813	26,239	21,646	54,030	64,941	38,067	87,960	55,758	53,895	66,749	57,320	103,980	662,399
All capital	Domestic	327,037	729,512	815,640	1,276,517	1,251,523	1,333,001	1,754,927	1,974,880	2,626,382	2,884,214	2,582,916	2,957,864	20,514,413
	International	155,065	217,988	241,643	374,380	339,611	272,550	425,470	448,523	472,354	604,687	645,132	661,562	4,858,965
	Total	482,102	947,499	1,057,284	1,650,898	1,591,134	1,605,550	2,180,397	2,423,403	3,098,736	3,488,901	3,228,048	3,619,427	25,373,378

[a]A few debt securities do not have stated maturities in the SDC database. These issues are included in the "all nonconvertible debt" category, but not in the categories that separate debt issues based on original time to maturity.

abroad has increased in absolute magnitude over time, the amount of new foreign capital as a proportion of total new capital has declined over time.

Table 2 also presents security issuances by type of security for our sample period. Nonconvertible bonds are by far the most common type of security that firms issue to raise capital. Specifically, firms issued over $20.81 trillion of debt over the 1990–2001 period, which equals about 82% of total capital raised over the sample period. In comparison, firms raised only $3.6 trillion, or 14% of total capital, by issuing equity. Of course, the magnitude of debt issues is not directly comparable to the magnitude of equity issues because unlike equity, bonds have finite maturities. Firms typically roll over bonds at maturity, in which case part of the debt issue goes toward refinancing old debt and only the remaining portion is new capital. Although we do not observe these components of debt issues separately, we can estimate the division between these two components if we assume a particular growth rate for the capital that firms raise from outside sources. For example, assume a growth rate of 5% to 10%. Then, with the appropriate adjustments (see Appendix B for details), the amount of new debt that firms raised during this period is between $5.6 trillion to $7.4 trillion. Therefore, debt constitutes a significantly larger fraction of the new external capital that firms raise than equity.[4]

In addition to being the more important source of new outside funding, debt is also more commonly issued abroad than equity. In our sample period, about 20% of debt is issued internationally, compared to only about 12.2% of equity. Moreover, among the bond issues, firms raise more international debt for long-maturity bonds than for short-maturity bonds with 23.4% of bonds with maturities longer than five years issued internationally, compared with 16.2% of shorter-term bonds. Quite likely, firms go abroad more frequently for bonds with longer maturities because of the incremental fixed costs associated with issuing securities abroad.

Appendix C breaks down the cross-regional offerings by country/region. Panels A, B, C, and D present these statistics for Equity Offerings, Nonconvertible Debt Offerings, Preferred Stock Offerings, and Convertible Offerings. Each panel indicates that the largest cells are along the 'diagonal' of each table, indicating domestic issues. However, there are notable patterns of cross-regional issues. In particular, it is evident that firms from developing regions of the world such as the Middle East, Africa, and South America, go disproportionately to the developed regions to issue securities, suggesting, not surprisingly, that a consequence of economic development is more liquid financial markets.

The greater internationalization of debt markets than equity markets is especially striking when we consider the fact that cross-border issues of debt do not offer many of the advantages that the literature discusses in relation to equity cross-listings.[5] For example, Karolyi (1998) notes that cross-border equity issues increase issuers' visibility in foreign markets, and Coffee (1999) and Reese and Weisbach (2002) emphasize the corporate governance implications of cross-listing firms' equity in well-regulated markets such as the U.S. In contrast, cross-border debt issues do not increase the issuer's visibility notably, and

[4]Consistent with these findings are the results from Rajan and Zingales (1995), who find that in an earlier sample period (1984–1991), debt provides a majority of new financing for firms in all G7 countries except France.

[5]Since debt instruments have finite maturities, the fixed costs associated with foreign issues would also tend to favor the issuance of equity.

regulations typically do not require that debt issuers abide by the reporting standards in the country of issue.[6]

However, cross-border debt issues do offer several advantages that cross-border equity issues do not provide. First, an important advantage of foreign debt is the potential to hedge exchange rate risk. For example, firms that realize significant revenues in foreign currencies can hedge their exchange rate risk by issuing debt in those currencies. Equity, in contrast, is not a suitable vehicle for hedging cash flow risks because unlike bonds, equity does not promise fixed periodic cash flows. Therefore, firms with significant foreign exchange risk are likely to issue foreign debt in the currencies in which they carry exposure.[7]

Second, important tax considerations influence the decision of where to issue debt. The ability to deduct interest in an international context depends on a number of factors, including the locations of the income and the interest payment. In particular, from a tax perspective, the process for "allocating" the interest deduction depends on where the bond is issued cross-country. Thus, the optimal place to issue a bond depends on a firm's distribution of income; companies that derive significant foreign income are likely to issue debt in the countries that generate the income.[8]

Third, any differences in interest rates across countries are directly observable. Firms may, therefore, attempt to issue debt in the country with the lowest interest rates. The extent to which firms are able to do so is an unexplored empirical issue that we address below in Section 5.

Finally, potential informational asymmetry also favors cross-border debt issues over cross-border equity issues. Bond prices are much less sensitive to information about firm value than are stock prices, and hence informed investors are more likely to trade in stocks than in bonds. Since foreign investors are less likely to have an informational advantage over domestic investors, they are likely to be more receptive to purchasing the less information-sensitive bond issues than the more information-sensitive stock issues across borders.

Among these factors, a survey of chief financial officers by Graham and Harvey (2001) lists the hedging consideration as the most important factor for issuing foreign debt, followed by tax considerations and interest rate timing. Graham and Harvey's survey does not address the importance of potential information asymmetry, perhaps because this factor is not specific to any particular firm. However, information asymmetry is relevant at a general level for investor acceptance of a particular type of security, particularly for foreign investors. Overall, the greater proportion of debt issued overseas is consistent with the advantages of cross-border debt issues being more important to issuers than the advantages of cross-border equity issues.

Notwithstanding the above, it is possible that we observe a larger fraction of cross-border debt issues for a reason that is not particularly interesting from an economic perspective. Specifically, we know that larger firms tend to raise more cross-border capital, and it is plausible that these large firms also issue more debt than equity domestically. Under this scenario, a larger fraction of cross-border debt issues than cross-border equity issues would be a mechanical consequence of firm size.

[6]Rating agencies in the country of issue may require accounting and other disclosures that are more stringent than the regulations in the issuer's home country. However, these are private disclosures, and thus they do not confer credibility upon the firms to the same extent as public disclosures mandated by regulatory bodies.

[7]Of course, firms can issue domestic debt and enter into exchange rate swaps to separately hedge their exchange rate risk exposures. This hedge entails additional transactions in the swap market, however. In addition, the tax implications of issuing domestic debt and swapping currencies are different from issuing debt overseas.

[8]For a detailed discussion of these tax considerations, see Shaviro (2001).

To examine this possibility, we partition the sample of U.S. stocks into ten size deciles based on NYSE size decile cutoffs at the beginning of the calendar year in which the firm issues new debt or equity. We find that the fraction of foreign debt issued by firms in the largest nine size deciles ranges from 1.61% to 4.11%. In comparison, the fraction of cross-border equity issues ranges from 0.10% to 0.33% in these size deciles. In the smallest size decile, the fraction of cross-border debt and cross-border equity issues are both about 0.8%. These results indicate that even after controlling for size differences, firms are more likely to go abroad for new debt than for new equity.

For all countries, other types of securities such as preferred stock and convertible securities are much less frequently issued than either equity or debt. We find that issuers use either debt or equity to raise about 96% of their new capital during our sample period, whereas convertible securities and preferred stocks account for 2.6% and 1.3% of the new capital, respectively. Interestingly, however, a larger fraction of preferred stock and convertibles are issued abroad than equity. Specifically, 15.9% of preferred stock and 23.8% of convertibles are issued overseas. Since the markets for these securities are not particularly well developed in many countries, it is likely that firms go abroad (particularly to the U.S.) to issue these securities to take advantage the greater liquidity in these markets.

Fig. 1 plots the time series of the fraction of various types of securities that firms issue abroad. Although on average we find the smallest fraction of international issues for equity, cross-border equity issues have increased over time. For example, firms issued only 9.0% of equity outside their home countries in 1991, compared with 12.8% in 2001. In contrast, the fraction of debt issued internationally has declined from 26.6% in 1991 to 18.5% in 2001.

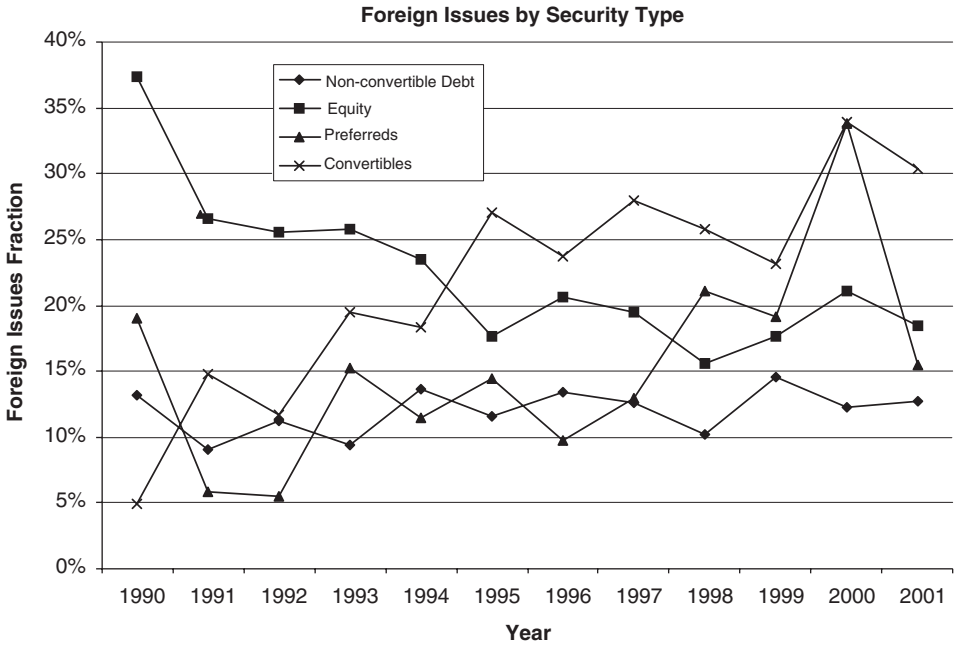

Fig. 1. Foreign issues of each security type. This figure presents the fraction of equity, nonconvertible debt, preferred stock, and convertible securities that are issued in foreign markets during each year in the sample period from 1990 to 2001. The sample comprises all new issues in the SDC new issues database.

3.2. How firms issue securities internationally

A firm that wishes to issue securities internationally can do so in several different ways. To issue equity, it can issue shares directly on a foreign exchange or it can issue shares through a depositary receipt. Depositary receipts are negotiable certificates that are issued by a local bank and are convertible into the firm's equity. They are therefore linked by arbitrage to the prices of the firm's equity in the home country (see Gagnon and Karolyi (2003) for more discussion and evidence on this relation).

Table 3 reports the incidence of direct sales and depositary receipts by country. The direct sale of equity on foreign exchanges is the most common method that firms use to raise capital from abroad, with firms raising $275 billion through direct sales compared to $129 billion through depositary receipts. The choice of method for raising cross-border equity varies substantially by regions, however. Asian and South American countries raise more capital through the issuance of depositary receipts, while direct listings are more popular in the other regions.

Firms often choose to issue securities internationally through a subsidiary, which is frequently located in the country in which the security is issued. This practice raises the definitional question of which security issues should be labeled international issues. For example, Genentech, a U.S. subsidiary of the Swiss firm, Roche Holdings, issued 18.4 million shares in the U.S. on July 20, 1999. Conceivably, we could view this issuance as a home market issue by Genentech or a foreign issue by Roche Holdings. Since the parent company presumably is the final authority about the issuance decision, we choose to classify such cases by the nationality of the parent and not of the subsidiary.

Table 3 also breaks down international issuances by whether the parent firm issues the security itself (direct sale or depositary receipts), or whether it issues the security through a subsidiary. Issuances by subsidiaries are relatively small, amounting to less than 7% of equity issues and less than 15% of debt issues. All the results we report in the rest of the paper classify these issues as foreign issuances. However, in unreported tests we find similar results even when we categorize subsidiary issues based on the nationality of the subsidiary, rather than that of the parent. Thus, our decision to classify issuances by the nationality of the parent company does not have a major impact on our results.

3.3. Foreign and domestic sources of capital across countries

Next, we examine the extent to which firms in different countries rely on domestic capital and foreign capital. Table 4 presents the quantity raised by each country or region, both inside and outside the region, by security type. Panel A presents the data for equity, Panel B for debt, Panel C for preferred stock, and Panel D for convertibles. The first column of each panel presents the amount of capital raised by firms in each region inside their home country. The second column presents the amount of capital raised by foreign firms in each region, and the third column presents the amount of equity that the firms from each country raise abroad.

3.3.1. Equity markets

Panel A indicates that over the entire sample period, firms raise $3,123 billion through domestic equity issues, and $435 billion through cross-border equity issues. The U.S. is by far the most common location for cross-border equity issues. Non-U.S. firms raise $287

Table 3
Methods of cross-border equity and nonconvertible debt issues across all marketplaces by foreign firms

This table presents aggregate cross-border equity and debt issues. We define a cross-border security issue as an issue that takes place in a marketplace outside the country of an issuer, or if the issuer is subsidiary, then the home country of the issuer's ultimate parent. Depository issues are either American Depository or Global Depository issues. Direct sales comprise issues that are directly listed in the foreign country. Our sample consists of all equity and nonconvertible debt issues available from 1990 through 2001 in the Securities and Data Corporation's New Issues Databases. All proceeds are reported in millions of U.S. dollars.

Method of issuance	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Australia and New Zealand	Africa	Central America and Caribbean	Eastern Europe	Middle East	Other Asia	Other Europe	South America	Total
Panel A: Aggregate cross-border equity issues 1990–2001, in millions of U.S.$																
Depositary Receipts	157.00	5,495.90	6,516.50	4,549.90	5,300.80	10,955.70	508.20	4,654.40	769.30	14,103.70	3,632.50	1,664.10	39,531.40	18,268.40	13,317.60	129,425.40
Direct sale	25,976.90	16,025.80	15,819.20	10,045.00	11,485.40	30,509.40	16,028.20	8,561.30	3,969.10	30,330.00	2,641.10	9,322.10	21,702.40	70,618.50	2,535.80	275,570.20
through a subsidiary	309.50	2,780.30	537.80	1,279.20	154.20	665.10	13,790.90	1,388.40	322.80	122.20	0.00	638.90	1,285.90	6,818.70	0.00	30,093.90
Total	26,443.40	24,302.00	22,873.50	15,874.10	16,940.40	42,130.20	30,327.30	14,604.10	5,061.20	44,555.90	6,273.60	11,625.10	62,519.70	95,705.60	15,853.40	435,089.50
Panel B: Aggregate cross-border nonconvertible debt issues 1990–2001, in millions of U.S.$																
Direct sale	266,453.60	295,719.90	349,785.80	215,424.80	190,824.20	241,378.20	646,578.70	150,938.20	17,718.30	320,210.40	81,659.80	29,741.90	136,920.00	464,894.40	190,131.30	3,598,379.50
through a subsidiary	45,910.70	47,496.30	48,712.90	27,241.80	62,022.80	21,234.40	76,328.70	8,104.70	2,100.40	15,935.10	6,665.10	1,262.70	15,020.70	206,588.90	29,283.20	613,908.40
Total	312,364.30	343,216.20	398,498.70	242,666.60	252,847.00	262,612.60	722,907.40	159,042.90	19,818.70	336,145.50	88,324.90	31,004.60	151,940.70	671,483.30	219,414.50	4,212,287.90

billion in the U.S., which is about 66% of the total amount of global cross-border equity issues. Of course, it is possible that the U.S. ranks first in the volume of foreign equity issues simply because it is the largest equity market. However, the U.S. share of cross-border issues is almost twice the size of the U.S. market relative to the world market. It is also twice the fraction of new equity issues by domestic firms in the U.S. relative to domestic new equity issues in all countries.

The U.K. is the second-largest country for cross-border equity issues, accounting for about 10% of the cross-border equity capital raised by foreign firms. In addition, the U.K. share of cross-border equity issues has decreased somewhat from 10.1% in 1991 to 8.9% in

Table 4
Domestic and cross-border security issues

This table presents the aggregate amounts of new issues. Column [a] reports the gross proceeds raised through new issues in home countries. Column [b] reports the gross proceeds raised through cross-border issues by firms in each country/region. Column [c] reports the gross proceeds from new issues by firms in each country/region through issues outside their home markets. Panel A reports equity issues, Panel B reports nonconvertible debt issues, Panel C reports nonconvertible preferred stock issues, and Panel D reports convertible bond and convertible preferred stock issues. The sample period is from 1990 through 2001.

	Total issues in own market [a]	Foreign issues in this market [b]	Home firms' foreign issues [c]	Size of foreign issues relative to home issues [c]/[a]	Measure of net import of equity capital [c]/[b]	Foreign issues in home market relative to home market issues [b]/[a]
Panel A. Equity issues, publicly sold and privately placed equity 1990–2001 (Converted to millions of U.S.$)[a]						
Canada	129,681.8	5,328.3	26,443.4	20.39%	496.28%	4.11%
France	129,859.8	13,569.5	24,302.0	18.71%	179.09%	10.45%
Germany	160,952.4	9,508.9	22,873.5	14.21%	240.55%	5.91%
Italy	122,272.4	2,338.5	15,874.1	12.89%	678.82%	1.91%
Japan	280,315.6	10,121.8	16,940.4	6.04%	167.37%	3.61%
United Kingdom	285,515.5	45,068.8	42,130.2	14.76%	93.48%	15.79%
United States	1,159,067.4	287,402.7	30,327.3	2.62%	10.55%	24.80%
Africa	5,292.6	610.6	5,061.2	95.63%	828.89%	11.54%
Australia and New Zealand	68,284.4	11,574.7	14,604.1	21.39%	126.17%	16.95%
Central Am and Caribbean	21,615.4	1,086.5	44,555.9	206.13%	4100.87%	5.03%
Eastern Europe	14,042.2	2,129.9	6,273.6	44.68%	294.55%	15.17%
Middle East	32,176.6	7.0	11,625.1	36.19%	166072.86%	0.02
Other Asia	340,056.1	5,794.7	62,519.7	18.39%	1078.91%	1.70%
Other Europe	316,759.0	29,477.0	95,705.6	30.21%	324.68%	9.31%
South America	57,173.2	11,070.6	15,853.4	27.73%	143.20%	19.36%
Total	3,123,064.4	435,089.5	435,089.5			
% of Equity sold in foreign markets	12.23%					

See Panel D for footnote.

Table 4 (*continued*)

	Total issues in own market [a]	Foreign issues in this market [b]	Home firms' foreign issues [c]	Size of foreign issues relative to home issues [c]/[a]	Measure of net import of debt capital [c]/[b]	Foreign issues in home market relative to home market issues [b]/[a]
Panel B. Nonconvertible debt issues[b]						
Canada	506,264.4	3,591.8	312,364.3	61.70%	8696.60%	0.71%
France	450,945.1	77,281.2	343,216.2	76.11%	444.11%	17.14%
Germany	2,101,925.8	420,709.5	398,498.7	18.96%	94.72%	20.02%
Italy	721,465.1	4,999.0	242,666.6	33.64%	4854.30%	0.69%
Japan	1,426,906.7	60,544.5	252,847.0	17.72%	417.62%	4.24%
United Kingdom	667,952.4	766,104.5	262,612.6	39.32%	34.28%	114.69%
United States	7,719,959.0	836,577.3	722,907.4	9.36%	86.41%	10.84%
Africa	119.1	0.0	19,818.7	16640.39%	N/A	0.00%
Australia and New Zealand	60,365.8	3,179.8	159,042.9	263.47%	5001.66%	5.27%
Central Am and Caribbean	39,919.4	357.8	336,145.5	842.06%	93947.88%	0.90%
Eastern Europe	12,912.3	36.3	88,324.9	684.04%	243319.28%	0.28%
Middle East	0.0	0.0	31,004.6	N/A	N/A	N/A
Other Asia	287,975.0	40,694.3	151,940.7	52.76%	373.37%	14.13%
Other Europe	2,503,627.4	1,998,148.2	671,483.3	26.82%	33.61%	79.81%
South America	99,687.9	63.7	219,414.5	220.10%	344449.76%	0.06%
Total	16,600,025.4	4,212,287.9	4,212,287.9			
% of Debt sold in foreign markets	20.24%					

See Panel D for footnote.

2001. The dominance of U.S. and U.K. here indicates that the size of the market is clearly an important factor in determining the country in which firms raise cross-border equity.

Among the G7 countries, Japan and Italy attract the least amount of foreign equity issues relative to the size of their domestic issues (3.6% in Japan and 1.9% in Italy). This evidence is consistent with Pagano et al. (1998), who also note that Italy's equity market is associated with low volume of new issues. Italy's relatively illiquid equity market has likely resulted in its low volume of foreign equity issues. Japan, however, has a large and open market, yet does not attract many foreign issuers. It may be the case that geographic distance from the countries that need new capital and language barriers are partly responsible for Japan's marginal role. Future research that compares institutional and regulatory differences between Japan and other countries could potentially shed light on the factors other than market size that are important for attracting issuers from abroad.

The fourth column in the table presents the ratio of the amount of new equity capital that firms raise in their home countries to the amounts that they raise abroad. This ratio provides a measure of the extent to which firms in each country rely on foreign capital to fund their investment demands. The U.S. has the lowest ratio (2.62%), while the Central American and

Table 4 (*continued*)

	Total issues in own market [a]	Foreign issues in this market [b]	Home firms' foreign issues [c]	Size of foreign issues relative to home issues [c]/[a]	Measure of net import of preferred equity capital [c]/[b]	Foreign issues in home market relative to home market issues [b]/[a]
Panel C. Nonconvertible preferred equity[c]						
Canada	16,652.2	226.6	3,035.8	18.00%	1340.00%	1.00%
France	89.6	0.0	619.2	691.00%		0.00%
Germany	4,186.2	627.6	1,533.8	37.00%	244.00%	15.00%
Italy	207.4	0.0	925.7	446.00%		0.00%
Japan	0.0	0.0	0.0			
United Kingdom	5,079.9	2,433.0	15,079.2	297.00%	620.00%	48.00%
United States	234,252.3	38,020.1	1,390.5	1.00%	4.00%	16.00%
Africa	0.0	0.0	0.0			
Australia and New Zealand	138.4	17.4	1,361.9	984.00%	7827.00%	13.00%
Central Am and Caribbean	445.5	0.0	15,653.4	3514.00%		0.00%
Eastern Europe	5.5	0.0	0.0	0.00%		0.00%
Middle East	0.0	0.0	53.3			
Other Asia	3,659.3	0.0	4,556.1	125.00%		0.00%
Other Europe	7,880.3	12,651.3	7,781.4	99.00%	62.00%	161.00%
South America	13,939.2	0.0	1,985.7	14.00%		0.00%
Total	286,535.8	53,976.0	53,976.0			
% of preferreds sold in foreign markets	15.85%					

See Panel D for footnote.

Caribbean countries have the highest ratio (206%).[9] A striking pattern that we observe here is that this ratio is significantly smaller for the developed countries than for other countries. This evidence indicates that capital markets develop relatively slowly in the developing countries, which typically close their markets to foreign investors, and thus the firms in these countries are forced to incur the additional costs of going abroad to raise funds.

The fifth column in this panel presents the ratio of equity capital that firms in each country raise abroad to the amount of equity capital that foreign firms raise in that country. A ratio greater than one for a country indicates that more new foreign equity flows into that country than domestic investors invest in new equity abroad. In other words, a ratio greater than one indicates that the country is a net importer of new equity capital, and a ratio less than one indicates that the country is a net exporter of new equity capital.[10]

[9]This ratio is particularly high for Caribbean countries in large part because a number of companies are incorporated in this region even though their primary operations are in the U.S.

[10]We emphasize that these terms refer to whether particular *markets* are net importers or exporters; we do not have access to data on the identity or country of the actual purchasers of the new issues.

Table 4 (*continued*)

	Total issues in own market [a]	Foreign issues in this market [b]	Home firms' foreign issues [c]	Size of foreign issues relative to home issues [c]/[a]	Measure of net import of convertible capital [c]/[b]	Foreign issues in home market relative to home market issues [b]/[a]
Panel D. Convertible preferred equity and convertible debt[d]						
Canada	10,171.0	72.4	5,878.9	57.80%	8120.00%	0.70%
France	26,967.1	1,287.1	13,876.8	51.50%	1078.10%	4.80%
Germany	6,669.5	9,588.4	4,858.0	72.80%	50.70%	143.80%
Italy	3,254.2	60.3	6,789.5	208.60%	11259.50%	1.90%
Japan	130,786.1	1,104.9	12,305.8	9.40%	1113.70%	0.80%
United Kingdom	25,058.4	15,218.9	8,392.3	33.50%	55.10%	60.70%
United States	215,668.1	29,889.4	15,753.2	7.30%	52.70%	13.90%
Africa	18.9	0.0	1,082.8	5729.10%		0.00%
Australia and New Zealand	14,153.4	0.0	1,320.8	9.30%		0.00%
Central Am and Caribbean	424.8	114.1	27,914.5	6571.20%	24464.90%	26.90%
Eastern Europe	1,876.6	0.0	610.7	32.50%		0.00%
Middle East	183.4	0.0	727.0	396.40%		0
Other Asia	17,955.2	1,158.6	38,965.4	217.00%	3363.10%	6.50%
Other Europe	44,990.6	99,117.6	16,472.0	36.60%	16.60%	220.30%
South America	6,610.3	0.0	2,664.0	40.30%		0.00%
Total	504,787.6	157,611.7	157,611.7			
% of convertibles sold in foreign markets	23.79%					

[a]Equity data for Italy, Australia, and New Zealand are not available until 1991; the numbers reported above are for 1991–2001 for these countries.

[b]Debt data for Italy's domestic debt market are not available until 1991; the numbers reported above for Italy in Column [a] are for the years 1991–2001. Additionally, domestic debt market issuance data for Australia and New Zealand in column [a] are for the period 1997–2001.

[c]Data on Italy's domestic preferred stock issuances are not available until 1991; the numbers reported above for Italy in Column [a] are for the years 1991–2001. Additionally, domestic preferred issuance data for Australia and New Zealand are available starting in 1991; the numbers reported for Australia and New Zealand in column [a] are for the period 1997–2001. SDC does not report preferred stock issuances for Japanese companies.

[d]Convertible data for Italy, Australia, and New Zealand's domestic market are not available until 1993. Thus, the numbers reported above for Italy, Australia, and New Zealand in Column [a] are for the years 1993–2001.

The U.S and the U.K. are the only countries that are net exporters of new equity capital. For all the other countries, the ratio is greater than one. The emerging market countries are the greatest net importers of new equity, largely because their capital markets are poorly developed.

3.3.2. Debt issues

Panel B presents the amount of new debt issued by firms in various countries. In our sample, firms raise \$16.6 trillion of debt domestically and \$4.2 trillion of debt from abroad. The debt

markets are much more international than equity markets, with about 20.2% of debt being issued overseas compared with only about 12.2% of equity. In addition, the pattern of foreign issues of debt across countries is substantially more dispersed than that of equity.[11]

The Eurobond market is far more popular than the U.S. for foreign debt, although the U.S. has the largest domestic market. The popularity of the European markets for foreign debt issues is also evident when we consider the amount of foreign debt raised in the U.K. and Germany. For example, domestic debt issues in the U.S. are almost six times those in the U.K., but foreign debt issues in the U.S. are only about 10% more than those in the U.K. However, the U.S. is still a net exporter of debt, with an import-to-export ratio for new debt of 86.4%. The difference between equity and debt in the U.S. is striking; the U.S. exports 15.7% more debt capital than it imports but exports about ten times more equity capital than it imports. The U.K. is also a large exporter of debt capital, exporting about three times as much debt capital as it imports. Germany is the only other net exporter of debt capital (excluding the "other Europe" category, which includes many Eurobond issues), with an import-to-export ratio of 94.7%.

The results in Panel B indicate that the markets for publicly traded corporate debt are not well developed in many of the developing countries. Firms in Africa, Eastern Europe, the Middle East, and South America issue virtually no publicly traded corporate debt in their home countries. They do, however, have demand for public debt; they rely mostly on foreign issues to meet this demand.

3.3.3. Preferred and convertible issues

Panels C and D present comparable statistics on preferred equity and convertible debt. The markets for these securities are much smaller than the market for common equity and nonconvertible debt. These panels indicate that 15.8% of preferred equity is sold internationally and 23.8% of convertible securities are sold overseas. The United States is the largest destination for international issues of preferred stock, while the Other Europe region is the largest destination for issues of convertibles.

4. Equity market timing

Loughran and Ritter (1995) and Baker and Wurgler (2000) present evidence that firms in the U.S. tend to issue equity prior to low returns at both the individual firm level and the aggregate market level. Baker and Wurgler (2002) present further evidence that leads them to conclude that market timing plays an important role in determining the capital structure of firms. Kim and Weisbach (2005) find that, consistent with the market-timing hypothesis, when stock prices are high, firms are more likely to issue secondary shares owned by insiders than new primary shares, whose proceeds are retained by the firm. Kim and Weisbach also find, as does Greenwood (2005), that the proceeds of equity issues executed when stock prices are high, are much more likely to be kept as cash than the proceeds of equity issues done when prices are low. This result suggests that a motivation for issuing

[11]An important issue in studying international debt issues is how one classifies Eurobonds and Foreign Bonds. SDC classifies most Eurobonds as being listed on the Luxembourg exchange. However, these bonds are issued all over the continent and, as in the U.S., most of the secondary market trades take place over the counter. We use the SDC data field "primary exchange where the issue is listed" as a proxy for the marketplace of sale, and many are assigned to the "Other Europe" category since they are primarily listed in Luxembourg.

equity is to take advantage of high stock price levels. This section builds on the above literature and examines whether aggregate issues of equity are related to these factors internationally. It also examines whether firms issue equity in foreign markets when they expect lower costs of capital abroad.

4.1. Domestic equity issues

4.1.1. Equity issues and past returns

We begin by examining whether firms' decisions to issue new equity are related to past market returns. To do so, we estimate two regression specifications, the first of which is

$$\frac{E_{i,t}}{GDP_{i,t}} = a + b\, R12_{i,t-1} + \varepsilon_{i,t}, \tag{1}$$

where $E_{i,t}$ is the amount of new equity issued in region i in month t, $GDP_{i,t}$ is one-twelfth of the region's GDP in the four fiscal quarters prior to month t, and $R12_{i,t-1}$ is the stock market return for region i over the 12-month period from $t-12$ to $t-1$. For regions that consist of more than one country, the market returns are the market capitalization-weighted averages of the domestic stock market returns in the constituent countries. We estimate this regression individually for each country or region, and we also estimate it globally, allowing for region-specific fixed effects.

We also examine whether the share of equity in total new capital is related to past returns, using the regression specification

$$\frac{E_{i,t}}{E_{i,t} + D_{i,t}} = a + b\, R12_{i,t-1} + \varepsilon_{i,t}, \tag{2}$$

where $D_{i,t}$ is the total new debt in region i in month t. We fit these regressions with monthly observations.

Since we have a relatively short time series, estimates of regressions (3) and (4) could be biased downwards because of the small-sample bias discussed in Stambaugh (1999). For this reason, we estimate the equations using the procedure described in Amihud and Hurvich (2004).[12] In addition, since the amount of new debt and equity that firms raise tends to be serially correlated, we use Hansen and Hodrick (1980) standard errors to compute serial correlation-consistent t-statistics for the regression coefficients. We present the details for both of these procedures in Appendix D.

Table 5 presents the regression estimates. While the estimates vary somewhat across regions, the coefficients on past domestic returns are all positive in regression (1), and only one (Germany) is negative in regression (2). The slope coefficients are also generally statistically significantly different from zero, indicating that generally, large equity issues are preceded by relatively large stock market returns. On average, large market returns indicate that economy-wide investment opportunities have improved. Firms would likely issue equity to take advantage of these investment opportunities, leading to the positive coefficients we observe in regressions (1) and (2). Also, it is possible that the rise in stock prices results in market overvaluation. Consequently, firms may issue new equity to time

[12]None of the coefficients reported here or elsewhere in the paper are materially different if we estimate the regressions using ordinary least squares.

Table 5
Past market returns and domestic equity issues

We estimate the following regressions for each of the G7 countries and geographic regions in our sample:

$$\frac{E_{i,t}}{GDP_{i,t}} = a + b\ R12_{i,t-1} + \varepsilon_{i,t}, \tag{1}$$

$$\frac{E_{i,t}}{E_{i,t} + D_{i,t}} = a + b\ R12_{i,t-1} + \varepsilon_{i,t}, \tag{2}$$

where $E_{i,t}$ and $D_{i,t}$ are the total new domestic equity and debt issued in region i in month t, respectively, $GDP_{i,t}$ is the region's GDP over the previous four quarters, and $R12_{i,t-1}$ is the stock market return for region i over the 12-month period from $t-12$ to $t-1$. The market returns are the returns on the Datastream value-weighted indices. The independent variables are standardized to have zero mean and unit standard deviation. The regression estimates are corrected for small sample bias using the Amihud and Hurvich (2004) procedure. The table reports serial correlation-consistent t-statistics within parentheses. The sample period is 1991–2001.

	Regression (1)		Regression (2)	
	Intercept	Slope	Intercept	Slope
Canada	0.019	0.013	0.235	0.025
	(5.79)	(1.63)	(7.06)	(1.28)
France	0.009	0.018	0.206	0.032
	(6.65)	(3.04)	(7.58)	(1.85)
Germany	0.007	0.012	0.146	−0.022
	(5.09)	(1.93)	(3.59)	(−1.04)
Italy	0.01	0.019	0.267	0.06
	(6.98)	(3.93)	(9.38)	(2.39)
Japan	0.006	0.008	0.194	0.05
	(6.02)	(2.36)	(7.46)	(1.75)
United Kingdom	0.02	0.01	0.255	0.008
	(6.13)	(1.41)	(8.58)	(0.49)
United States	0.013	0.016	0.152	0.022
	(16.69)	(2.71)	(11.34)	(2.21)
Australia and New Zealand	0.016	0.02	0.42	0.038
	(4.99)	(1.63)	(9.85)	(1.70)
Central America and Caribbean	0.004	0.004	0.244	0.036
	(2.58)	(1.70)	(7.18)	(1.12)
Other Asia	0.013	0.012	0.574	0.06
	(9.99)	(3.71)	(6.55)	(1.83)
Other Europe	0.011	0.012	0.12	0.03
	(5.15)	(1.76)	(7.30)	(2.36)
South America	0.005	0.01	0.326	0.036
	(5.94)	(1.06)	(11.02)	(1.68)
Fama-Macbeth regressions	0.011	0.013	0.285	0.026
	(12.35)	(2.58)	(6.77)	(1.70)
Pooled country fixed effects	0.008	0.015	0.253	0.024
	(23.02)	(3.04)	(5.26)	(2.14)
Global regression	0.01	0.018	0.268	0.029
	(26.96)	(3.86)	(7.03)	(2.37)

the market and exploit any overvaluation. The next subsection examines whether such market timing plays a role in new equity issues.

4.1.2. Equity issues and future returns

This subsection examines whether the amount of new equity issues that firms issue is related to future stock market returns. If firms are able to time the market then equity issues should be negatively related to future market returns.

During our sample period, in most countries stock prices increased from 1991 to 1999, and then they declined in 2000 and 2001. Since we are interested in examining whether equity issues predict future returns after accounting for the pattern of changes in global stock prices, we use the stock market return in excess of the world market return as our dependent variable.[13] Specifically, we estimate the following regression for each country or region individually, and also for all regions in a pooled regression:

$$(FR_{i,t} - FR_{\text{World},t}) = a + b\frac{E_{i,t-1}}{GDP_{i,t-1}} + \varepsilon_{i,t}, \tag{3}$$

where $FR_{i,t}$ is the future 12-month market return in region i from month t to $t+12$ and $FR_{\text{World},t}$ is the future 12-month return on the world market index from month t to $t+12$. To facilitate interpretation of the regression coefficients, we standardize the independent variables in this regression and in all subsequent regressions to have zero mean and unit standard deviation. With this standardization, the slope coefficients can be interpreted as the amount by which the dependent variable would change for a one-standard deviation change in the independent variable.

We also examine whether the share of equity issues in total new capital is related to future returns using the following regression

$$(FR_{i,t} - FR_{\text{World},t}) = a + b\frac{E_{i,t-1}}{E_{i,t-1} + D_{i,t-1}} + \varepsilon_{i,t}, \tag{4}$$

We estimate both regressions (3) and (4) with monthly observations. We correct for small-sample biases using the the Amihud and Hurvich (2004) procedure. Also, since we use overlapping observations on the left-hand side, we use Hansen and Hodrick standard errors to compute the t-statistics.

Table 6 presents the estimates of regressions (3) and (4) for each region, and for the pooled regression with country fixed effects. In addition, the table presents the estimates of a ''global'' regression. In the global regression, we aggregate all issues across the world to compute the independent variables, and we use the value-weighted world market return as the dependent variable.

The coefficients on total equity issues in regression (3) are negative in ten out of 12 regions. Additionally, the slope coefficient is significantly less than zero in all the pooled regressions. These results indicate that, across the world, firms tend to issue more equity when they expect future returns to be lower. We find that the slope coefficient is significantly negative in the global regression as well. As with domestic market returns, the world market return also tends to be low following periods of high new equity issues globally. The slope coefficient in the global regression is -0.02, which indicates

[13]In unreported tests, we also find qualitatively similar results when we use raw country returns as the dependent variable.

Table 6
Equity issues and market timing

This table reports the estimates of the following regressions:

$$(FR_{i,t} - FR_{\text{World},t}) = a + b\left(\frac{E_{i,t}}{GDP_{i,t}}\right) + e_{i,t}, \tag{3}$$

$$(FR_{i,t} - FR_{\text{World},t}) = a + b\left(\frac{E_{i,t}}{E_{i,t} + D_{i,t}}\right) + e_{i,t}, \tag{4}$$

where $E_{i,t}$ and $D_{i,t}$ are the total new domestic equity and debt issued in region i in month t, respectively, $GDP_{i,t}$ is one twelfth the region's GDP over the previous four quarters, $FR_{i,t}$ is the future 12-month market return in region i from month $t+1$ to $t+12$, and $FR_{\text{world},t}$ is the future 12-month market return on the world index. The market returns are the returns on the Datastream value-weighted indices. The independent variables are standardized to have zero mean and unit standard deviation. The regression estimates are corrected for small sample bias using the Amihud and Hurvich (2004) procedure. The table reports serial correlation-consistent t-statistics within parentheses. The sample period is 1991–2001.

	Regression (3)		Regression (4)	
	Intercept	Slope	Intercept	Slope
Canada	0.026	−0.035	0.026	−0.021
	(0.88)	(−4.08)	(0.85)	(−1.65)
France	−0.03	−0.012	0.031	−0.019
	(−1.29)	(−1.63)	(1.24)	(−0.74)
Germany	−0.007	−0.015	−0.004	0.002
	(−0.28)	(−1.47)	(−0.15)	(0.16)
Italy	−0.007	−0.024	−0.024	−0.033
	(−0.14)	(−1.79)	(−0.53)	(−1.12)
Japan	−0.071	0.01	−0.071	−0.026
	(−1.25)	(0.41)	(−1.26)	(−1.29)
United Kingdom	0.017	−0.024	0.017	−0.009
	(0.70)	(−1.22)	(0.76)	(−2.38)
United States	0.052	−0.029	−0.052	−0.024
	(1.94)	(−2.47)	(1.92)	(−1.66)
Australia and New Zealand	0.013	−0.015	0.045	−0.039
	(0.37)	(−1.21)	(1.73)	(−2.82)
Central America and Caribbean	0.05	0.046	0.052	0.06
	(0.55)	(3.25)	(0.58)	(1.31)
Other Asia	0.003	−0.059	−0.005	−0.12
	(0.06)	(−1.67)	(−0.046)	(−1.97)
Other Europe	0.039	−0.029	0.039	−0.024
	(1.47)	(−1.70)	(1.59)	(−2.19)
South America	0.026	−0.004	0.026	0.066
	(0.33)	(−0.18)	(0.35)	(1.59)
Fama–Macbeth regressions	0.029	−0.028	0.018	−0.022
	(2.44)	(−2.03)	(2.29)	(−1.73)
Pooled, country fixed effects	0.026	−0.03	0.014	−0.018
	(2.99)	(−2.30)	(2.35)	(−1.90)
Global regression	0.03	−0.02	0.016	−0.022
	(4.72)	(−2.09)	(2.69)	(−1.92)

that a two-standard deviation increase in equity issues (normalized by GDP) would lead to a 4% decrease in future returns.

The slope coefficients in regression (4) are also generally negative and the slope coefficient in the global pooled regression is marginally significant. Therefore, the share of equity in new outside capital that firms raise also increases when firms expect market returns to be lower. However, the relation between share of equity in new issues and future returns is weaker than that between aggregate new equity issues and future returns.

To assess the economic significance of market timing, we compare the market performance following periods of high equity returns with that following low equity issues. Fig. 2 plots the average returns in the 12-month period after below-median and above-median equity issues. In every region except "Central America and Caribbean," stock market returns are higher after below-median equity issue periods than after above-median equity issue periods. In most cases, the differences in returns following high and low issue periods are fairly large, indicating that market timing is economically important.

As we discussed earlier, equity issues could predict future market returns either because firms tend to issue more equity when the market is overvalued, or because firms issue more equity when the market rationally demands lower return on equity.[14] Baker and Wurgler (2000) investigate the relative merits of these explanations for the U.S., and they conclude that their results support the market overvaluation explanation. The difference between market returns following high and low issues in the U.S. during our sample period is similar in magnitude to that in Baker and Wurgler. The average return differences for the other countries are also of a similar magnitude. Our findings are therefore likely to provide support for the overvaluation hypothesis internationally; but we leave direct tests to differentiate between these hypotheses for future research.

Overall, our results indicate that the relation between equity issues and future returns is a global phenomenon. Since equity issues predict returns in most regions, it is not surprising that world equity issues predict world market returns. For example, the annual world market returns following high and low issue periods are 3.8% and 12.1%, respectively. It is unlikely that the managers of the issuing firms individually have special skills to predict world market returns. Most likely, managers only consider the extent to which their particular firms are overvalued when deciding whether to issue equity. However, when a large number of firms decide to issue equity at any point in time, their collective decision indicates that the overvaluations have a market-wide component. Therefore, large equity issues signal aggregate market overvaluation and predict low future returns, even though each individual manager focuses only on his or her specific firm.

4.2. *Cross-border equity offerings*

So far, our results indicate that firms time their domestic markets when they issue equity. With increased globalization, firms also have the choice of timing the markets globally in

[14]It is also possible that managers issue new equity during periods of overvaluation simply because they share investors' overly optimistic outlook about the future, and not because they deliberately decide to exploit the market.

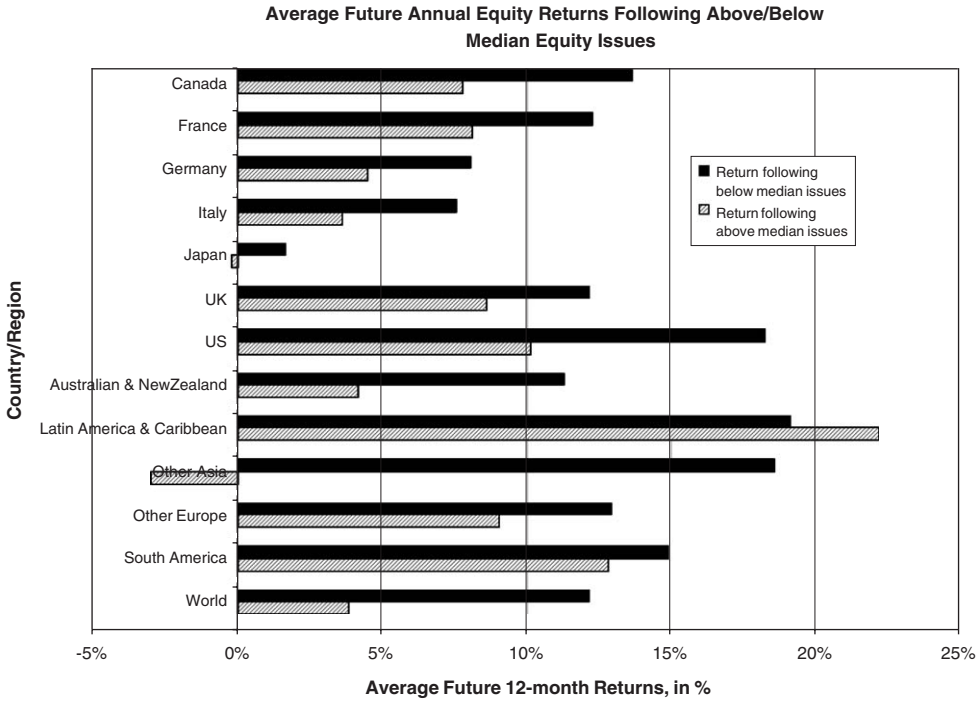

Fig. 2. Average annual equity returns following above/below median equity issues. This figure presents the average value-weighted annual returns for each of the G7 countries and the geographic regions following months of above- and below-median domestic equity issues for the sample period of 1991–2001. We categorize months with above- and below-median equity issues as high and low equity issue periods, respectively. We define the level of new equity issues in each domestic country/region as the level of equity issued normalized by that country's nominal GDP.

the sense that they can choose both the location and time of issues based on market conditions. For example, firms that issue equity in initial public offerings (IPOs) are likely to realize higher prices in a foreign market if the market abroad is overvalued relative to their domestic markets. It is less clear, however, if firms would be able to time overvaluation in the foreign markets through seasoned equity offerings using depositary receipts; the prices of depository receipts and domestic stock prices are tightly linked since any deviation in their prices would give rise to arbitrage opportunities. However, firms would still be attracted to markets that as a whole are seen as relatively overvalued or "hot" because of increased activity in the new issue markets in these countries. Thus, with an active new issue market, firms are likely be able to issue seasoned equity without suffering a significant price decline.[15]

Our next set of tests examines whether firms issue more equity abroad when their managers perceive a foreign market as being overvalued. Since we find that most of the

[15]Of course, there is no reason why investors from hot markets cannot directly invest abroad in seasoned offerings. In practice, however, investors exhibit a home bias that limits their direct investments abroad. Edison and Warnock (2004) find evidence suggesting that firms are able to overcome foreign investors' home bias when they list in the investors' home market.

cross-border equity issues occur in the U.S. and the U.K., we restrict our tests to only these two countries. We estimate the following three regression specifications

$$FR12_{i,t} = a + b\frac{FE^{i}_{t-1}}{HE_{t-1}} + e_{i,t}, \tag{5}$$

$$(FR12_{i,t} - FR12_{w,t}) = a + b\frac{FE^{i}_{t-1}}{HE_{t-1}} + e_{i,t}, \tag{6}$$

$$(FR12_{i,t} - FR12_{\text{home},t}) = a + b\frac{FE^{i}_{t-1}}{HE_{t-1}} + e_{i,t}, \tag{7}$$

where $FR12_{i,t}$ is 12-month return from month t through $t+11$ in country of issue i. The ratio

$$\frac{FE^{i}_{t-1}}{HE_{t-1}} = \frac{\sum_{j=1}^{N} FE^{i}_{j,t-1}}{\sum_{j=1}^{N} HE_{j,t-1}}, \tag{8}$$

where $FE^{i}_{j,t-1}$ is the amount of equity that firms from countries j issue in country i (either the U.S. or the U.K.), $HE_{j,t-1}$ is the amount of equity that firms in country j issue in their home country, and N is the number of countries. We define a home country return index in regression (7) as

$$FR12_{\text{home},t} = \frac{\sum_{j=1}^{N}(FR12_{j,t} \times HE_{j,t-1})}{\sum_{j=1}^{N} HE_{j,t-1}}. \tag{9}$$

Regression (5) examines whether future market returns are related to the volume of foreign issues. Since capital-raising activities tend to be correlated across markets, we would expect foreign issues to be correlated with domestic issues in the U.S. and the U.K. Therefore, rather than using the absolute level of foreign issues, we use the ratio of foreign issues to domestic issue in these countries as the independent variable. Regression (6) is the same as regression (5) except that it measures the returns in the country of issue in excess of the world market returns. Similarly, regression (7) adjusts market returns by an index of market returns in the issuing countries.

We fit these regressions separately for the U.S. and the U.K. Within each of these two markets, we fit two versions of each regression, one with *FE* and *HE* equal to all new foreign equity and all new equity issued in country *i*'s domestic markets, and the other with *FE* and *HE* equal to aggregate IPOs from abroad and all aggregate IPOs in country *i*'s domestic marketplaces. As before, we estimate these equations with monthly data on issues from 1991 to 2001 using the Amihud and Hurvich approach, and we use Hansen and Hodrick standard errors to compute the *t*-statistics.

Table 7 presents estimates of these regressions. The slope coefficients are negative in all regressions, both in the U.S. and the U.K. They are also negative regardless of whether all equity issues or only IPOs are used as the independent variable. In five out of 12 regressions, the slope coefficients are significant at the 5% level; they are significant at the 10% level in four other regressions.

Fig. 3 evaluates the economic significance of the relation between aggregate foreign equity issues in the U.S. and U.K. and future returns. As before, we classify months with below- and above-median equity issues in each country as low and high issue

Table 7
International equity market timing

We estimate the following two regression specifications for foreign equity issues in the U.S. Equity markets:

$$FR12_{i,t} = a + b\frac{FE^{i}_{j,t-1}}{HE_{j,t-1}} + e_{i,t}, \tag{5}$$

$$(FR12_{i,t} - FR12_{w,t}) = a + b\frac{FE^{i}_{j,t-1}}{HE_{j,t-1}} + e_{i,t}, \tag{6}$$

$$(FR12_{i,t} - FR12_{j,t}) = a + b\frac{FE^{i}_{j,t-1}}{HE_{j,t-1}} + e_{i,t}, \tag{7}$$

where $FE^{i}_{j,t-1}$ is the total foreign equity issued in country i (the U.S. in Panel A and the U.K. in Panel B) in month t by firms from country j, $HE_{j,t-1}$ is the total domestic equity issued in country j's domestic markets in month t, and $FR12_{i,t}$, $FR12_{w,t}$, and $FR12_{j,t}$are the value-weighted stock market index return in country i, the world market return over the 12-month period from month t through $t+11$, and the market index 12-month return from t through $t+11$ for the home market of the issuers of equity in the US or UK, respectively. We fit these regressions separately for the U.S. (Panel A) and the U.K. (Panel B). Within each market, we fit the regressions with *FE* and *HE* equal to all new foreign equity and all new equity issued in country *i*'s domestic markets, and also with *FE* and *HE* equal to aggregate IPOs from abroad and all aggregate IPOs in country *i*'s domestic markets. We weight each observation by the size of the home market issues. The independent variables are standardized to have zero mean and unit standard deviation. The regression estimates are corrected for small sample bias using the Amihud and Hurvich (2004) procedure. The table reports serial correlation-consistent *t*-statistics within parentheses. The sample period is 1991–2001.

Dependent Variable:	All equity issues Intercept	Slope	IPO equity only Intercept	Slope
Panel A: Foreign equity issues in U.S. equity markets				
$FR12_{US,t}$	0.137	−0.02	0.14	−0.02
	(2.81)	(−4.22)	(2.84)	(−1.12)
$FR12_{US,t} - FR12_{world,t}$	0.053	−0.011	0.056	−0.019
	(2.08)	(−1.93)	(2.06)	(−3.12)
$FR12_{US,t} - FR12_{home,t}$	0.072	−0.012	0.07	−0.019
	(1.86)	(−1.64)	(1.58)	(−1.87)
Panel B: Foreign equity issues in U.K. equity markets				
$FR12_{US,t}$	0.101	−0.016	0.102	−0.017
	(2.21)	(−1.18)	(1.88)	(−1.30)
$FR12_{US,t} - FR12_{world,t}$	0.018	−0.019	0.019	−0.021
	(0.77)	(−1.98)	(0.71)	(−2.11)
$FR12_{US,t} - FR12_{home,t}$	0.028	−0.023	0.027	−0.024
	(0.71)	(−1.93)	(0.74)	(−1.97)

months. Fig. 3 plots the average 12-month market returns, and market returns in excess of the world market returns, after the low and high issue periods. In all cases, the returns are higher following low issue periods than high issue periods. For example, U.S. return minus world returns following high issue periods is 9%, compared with about 3% following low issue periods. Overall, these results indicate that foreign companies issue equities in the U.S. or the U.K. when these markets are relatively hot.

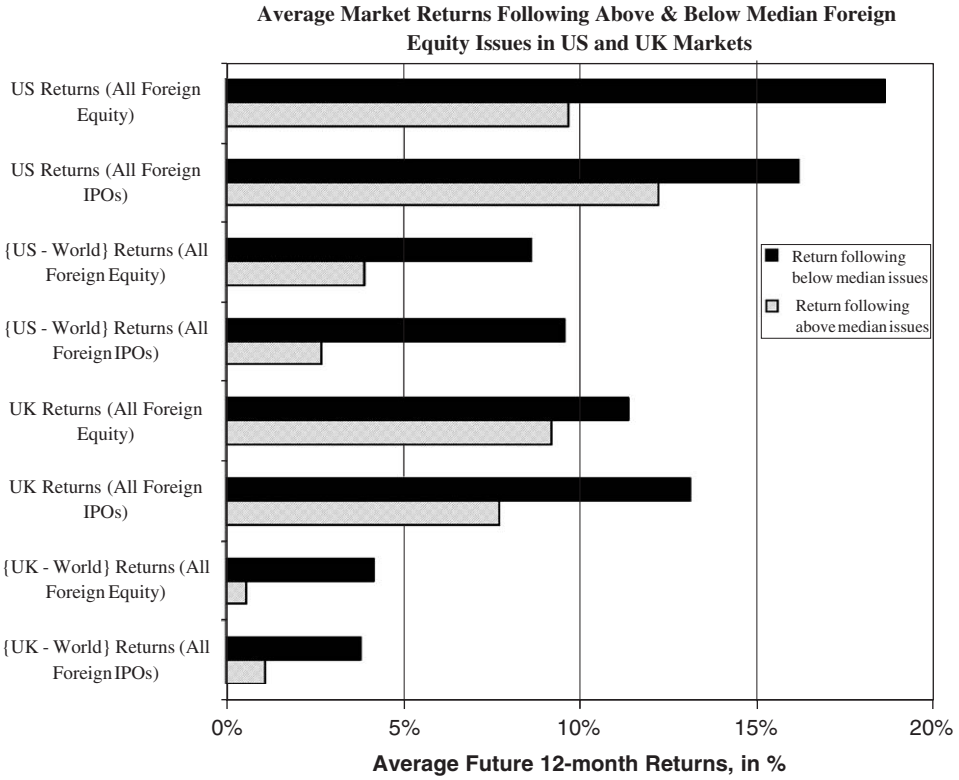

Fig. 3. Foreign timing of U.S. and U.K. equity markets. This figure presents the one-year equity market returns following months in which foreign equity issues in the U.S. and U.K. markets are above and below their median level for the sample period from 1991 to 2001. We define the level of foreign equity issues in the US market as the dollar value of equity proceeds raised in the U.S. by foreign firms divided by the U.S. GDP. We compute this ratio for all foreign equity offerings and for all foreign IPO offerings. Months in which issues are above our sample median are high issue periods. For the months in which foreign equity issues are above median, we calculate the average value-weighted annual return for the following 12 months. We do the same for below-median equity issue periods. We also present the average difference between U.S. and U.K. excess returns over world market returns following high and low issue periods.

5. Debt market timing

5.1. Domestic debt issuance

This subsection examines whether aggregate domestic debt issues within each country are related to the levels of domestic interest rates. We use the fixed rate paid in an interest rate swap contract as our measure of corporate interest rates.[16] Since we are able to obtain

[16]The swap rate equals the yield on a par bond issued by firms with the highest credit rating. Firms with lower credit ratings, therefore, will not be able to borrow at the swap rate. For our purposes, however, the swap rate is more appropriate than the rates paid by individual firms, since it is largely unaffected by default risk considerations.

complete swap rate data only for the largest and most developed countries, we restrict our analysis of the effect of interest rates on debt issues to the G7 countries.

We fit the following regression to examine the relation between debt issues and interest rates:

$$\frac{D_{i,t}}{GDP_{i,t}} = a + b\, SR_{i,t}^{\text{nominal}} + e_{i,t}, \tag{10}$$

where $SR_{i,t}^{\text{nominal}}$ is the nominal domestic swap rate in country i at the end of month t.

We fit this regression within each G7 country individually, and we also estimate a pooled regression across all countries. Table 8 presents the regression estimates, with the ten-year swap rate as the independent variable. We find a negative relation between the level of interest rates and the quantity of debt issued in all countries, and in most cases this relation is statistically significant. The slope coefficients are negative in each specification, and are generally significant.

To verify the robustness of our results, we also estimate regression (10) separately for short-term fixed rate debt (original maturity of one to five years) and long-term fixed rate debt (original maturity greater than five years). We use the two-year swap rate in the short-term debt regressions and the ten-year swap rate in the long-term debt regressions. In unreported results, we find that in all these regressions the coefficients on interest rates are negative and generally significantly different from zero. Both long-term and short-term debt issues are negatively related to their respective interest rates. Therefore, firms appear to time their issues of both long-term and short-term bonds to coincide with low contemporaneous rates. These results are consistent with the survey evidence in Graham and Harvey (2001), in which CFOs claim that they actively attempt to issue debt at times of low interest rates.

Firms could conceivably issue more debt when interest rates are low for two reasons, which are not mutually exclusive. First, firms are likely to have more positive net present value projects when interest rates are lower, leading to an increased demand for new capital to finance these projects. Second, firms potentially substitute debt for equity when rates are low.[17] To examine whether firms indeed substitute debt for equity, we consider the following specification, in which the volume of debt issues is normalized by total issues:

$$\frac{D_{i,t}}{D_{i,t} + E_{i,t}} = a + b\, SR_{i,t}^{\text{nominal}} + e_{i,t}. \tag{11}$$

Table 8 presents estimates of this equation. The coefficients on interest rates are generally negative, and they are significant for some countries. However, in the pooled specification, the coefficient is only marginally significant using the nominal interest rate as the explanatory variable. These results suggest that debt issues increase when interest rates are low mainly because firms have larger aggregate demand for capital. Substitution of debt for equity as reflected in the share of debt in new capital seems to be of secondary importance.

5.2. Future interest rates and debt issues

Why do firms issue more debt when interest rates are low? Perhaps managers perceive the cost of debt capital to be low when they observe low interest rates, and hence they take

[17]A third possible explanation for this finding, which was suggested to us by Jay Ritter, is that bonds tend to be called and then reissued following declines in interest rates.

Table 8
Domestic debt market timing
This table reports the estimates of the following regressions:

$$\frac{D_{i,t}}{GDP_{i,t}} = a + b\ SR_{i,t} + e_{i,t} \tag{10}$$

$$\frac{D_{i,t}}{D_{i,t} + E_{i,t}} = a + b\ SR_{i,t} + e_{i,t}, \tag{11}$$

where $SR_{i,t}$ is the domestic swap rate in country i at the end of month t, $D_{i,t}$ is the total new domestic debt issued in country i in month t, $E_{i,t}$ is the total new domestic equity issued in region i in month t, and $GDP_{i,t}$ is one-twelfth of the country's GDP over the previous four quarters. The swap rates for each G7 country come from Datastream and are end of month observations of the ten-year swap rate. The independent variables are standardized to have zero mean and unit standard deviation. The regression estimates are corrected for small sample bias using the Amihud and Hurvich (2004) procedure. The table reports serial correlation-consistent t-statistics within parentheses. The sample period is 1991–2001.

	Regression (10)		Regression (11)	
	Intercept	Slope	Intercept	Slope
Canada	0.05	−0.005	0.523	−0.018
	(12.10)	(−1.37)	(10.40)	(−1.76)
France	0.024	−0.003	0.655	0.003
	(10.52)	(−2.14)	(6.85)	(0.34)
Germany	0.054	−0.03	0.508	−0.052
	(9.34)	(−5.15)	(5.05)	(−2.36)
Italy	0.044	−0.013	0.572	−0.017
	(4.79)	(−1.57)	(5.36)	(−1.14)
Japan	0.014	−0.004	0.609	−0.004
	(23.98)	(−7.31)	(7.44)	(−0.23)
United Kingdom	0.033	−0.006	0.549	−0.008
	(16.03)	(−3.01)	(6.81)	(−0.80)
United States	0.035	−0.01	0.365	−0.025
	(10.37)	(−3.57)	(8.51)	(−2.56)
Pooled fixed effects	0.037	−0.01	0.513	−0.015
	(8.10)	(−2.57)	(5.29)	(−1.58)

on new debt-financed projects that would not have been undertaken in a high interest rate environment. Alternatively, managers may view periods of low interest rates as opportune times to issue new debt, in which case they issue debt to acquire capital prior to increases in interest rates. If managers are able to time debt issuances successfully, then at the aggregate level the quantity of new debt issued should predict future changes in interest rates.

To examine whether firms are indeed able to time their debt issues successfully prior to interest rate increases, we estimate the following equations:

$$\Delta SR_{i,t} = a + b\frac{D^{lt}_{i,t}}{D_{i,t} + E_{i,t}} + e_{i,t}, \tag{12}$$

$$\Delta SR_{i,t} = a + b\frac{D^{lt}_{i,t}}{GDP_{i,t}} + e_{i,t}, \tag{13}$$

Table 9
Debt issues and future interest rate changes
We estimate the following regression specifications using monthly observations:

$$\Delta SR_{i,t} = a + b\frac{D_{i,t}}{D_{i,t} + E_{i,t}} + e_{i,t}, \tag{12}$$

$$\Delta SR_{i,t} = a + b\frac{D_{i,t}}{GDP_{i,t}} + e_{i,t}, \tag{13}$$

where $\Delta SR_{i,t}$is the change in the ten-year swap rate over the 12-month period from month t to $t+11$, $E_{i,t}$ and $D_{i,t}$ are the total new domestic equity and long-term debt issued in country i in month t, respectively, and $GDP_{i,t}$ is one-twelfth of the country's GDP over the previous four quarters. The independent variables are standardized to have zero mean and unit standard deviation. The regression estimates are corrected for small sample bias using the Amihud and Hurvich (2004) procedure. The table reports serial correlation-consistent t-statistics within parentheses. The sample period is 1991–2001.

	Regression (12)		Regression (13)	
	Constant	Slope	Constant	Slope
Canada	−0.407	0.028	−0.411	0.255
	(−1.70)	(0.70)	(−1.86)	(2.36)
France	−0.394	0.166	−0.39	0.189
	(−1.58)	(1.78)	(−1.72)	(1.88)
Germany	−0.321	0.213	−0.325	0.209
	(−1.70)	(1.89)	(−1.79)	(1.93)
Italy	−0.595	−0.173	−0.683	−0.158
	(−1.51)	(−1.07)	(−1.67)	(−0.84)
Japan	−0.489	0.188	−0.418	0.188
	(−3.99)	(2.23)	(−4.68)	(2.23)
United Kingdom	−0.491	0.176	−0.491	0.178
	(−2.09)	(1.62)	(−2.19)	(1.69)
United States	−0.288	0.133	−0.294	0.181
	(−1.20)	(0.81)	(−1.18)	(1.35)
Fixed effects	−0.363	0.111	−0.386	0.144
	(−1.80)	(1.44)	(−1.88)	(2.07)

where $\Delta SR_{i,t}$ is the change in the ten-year swap rate over the 12-month period from month t to $t+11$ and $D_{i,t}^{lt}$ is the amount of debt with maturities of five years or longer. We use only long-term debt in the predictive regression because if firms expect interest rates to increase then they have an incentive only to issue long-term debt, since short-term debt would have to be rolled over at higher rates. We fit these regressions separately for each of the G7 countries and we also estimate a pooled regression allowing for country fixed effects.

We present estimates of this equation in Table 9. Using both specifications (12) and (13), the estimated coefficients on b are positive and generally significantly different from zero. This finding is consistent with the view that on average managers are able to issue long-term fixed rate debt prior to increases in interest rates.

5.3. International debt issues

Firms raise large amounts of debt from outside their own country. One of the main reasons why firms may issue debt abroad is that they may seek to take advantage of lower

Table 10
International debt issues
This table reports estimates of the following regression:

$$\frac{FD^{j}_{i,t}}{FD^{j}_{i,t} + HD_{i,t}} = a + b \cdot \left[SR^{j}_{t} - SR_{i,t}\right] + e_{i,t}, \tag{14}$$

where $FD^{j}_{i,t}$ is the debt issued in country j (the U.S. or the U.K.) by firms in country i in month t, $HD_{i,t}$ is the debt issued in the home marketplaces of country i, $GDP^{j}_{i,t}$ is one-twelfth of the contemporaneous annual GDP in country i, and $SR_{i,t}$ and SR^{j}_{t} are the swap rates in countries i and j, respectively. We estimate each specification for short-term debt (original maturity of one through five years), long-term debt (greater than five-year original maturity), and all floating coupon rate debt regardless of its original issue term to maturity. In the short-term debt regressions, $FD^{j}_{i,t}$ represents the debt issued in country j by firms in country i in month t with an original maturity from one to five years and fixed coupon rates, $HD_{i,t}$ represents the debt issued in the domestic marketplaces of country i in month t with an original maturity between one and five years and fixed coupon rates, and $SR_{i,t}$ and SR^{j}_{t} are the two-year swap rates in countries i and j, respectively. In the long-term debt regressions, $FD^{j}_{i,t}$ is the debt issued in country j by firms in country i in month t with both an original maturity greater than five years and fixed coupon rates, $HD_{i,t}$ represents the debt issued in the domestic marketplaces of country i with both an original maturity greater than five years and a fixed coupon rate, and $SR_{i,t}$ and SR^{j}_{t} are the ten-year swap rates in countries i and j, respectively. In the floating rate coupon regressions, $FD^{j}_{i,t}$ represents the debt issued in country j by firms in country i in month t with floating rate coupons and regardless of original term to maturity, $HD_{i,t}$ represents the debt issued in the domestic marketplaces of country i in month t with floating rate coupons regardless of the debt's original term to maturity, and $SR_{i,t}$ and SR^{j}_{t} are the two-year swap rates in countries i and j respectively. The independent variables are standardized to have zero mean and unit standard deviation. The regression estimates are corrected for small sample bias using the Amihud and Hurvich (2004) procedure. The table reports serial correlation-consistent t-statistics within parentheses. The sample period is 1991–2001.

	United States			United Kingdom	
	Intercept	Slope		Intercept	Slope
Canada	0.252	−0.038	Canada	0.001	0.002
	(7.40)	(−1.24)		(1.10)	(0.91)
France	0.024	−0.005	France	0.016	0.014
	(2.44)	(−0.63)		(4.21)	(2.61)
Germany	0.008	−0.006	Germany	0.011	−0.004
	(2.03)	(−1.52)		(4.04)	(−1.35)
Italy	0.059	−0.042	Italy	0.001	−0.002
	(2.45)	(−1.41)		(0.91)	(−1.28)
Japan	0.024	−0.011	Japan	0.001	−0.003
	(2.60)	(−1.07)		(1.27)	(−1.38)
United Kingdom	0.098	−0.01	United Kingdom	0.018	−0.005
	(9.07)	(−1.33)		(1.75)	(−1.63)
Pooled country dummies	0.078	−0.015	Pooled country dummies	0.007	−0.002
	(4.88)	(−1.74)		(1.72)	(−1.30)

interest rates abroad than in the home country (see the Graham and Harvey survey of CFOs). However, if the goal is simply to take advantage of lower interest rates abroad, firms can also lock in the foreign rate by issuing domestic debt and then entering into a corresponding currency swap. Because of covered interest parity, both issuing debt abroad and combining domestic debt with a currency swap would entail the same interest cost. Thus, it is unclear whether lower interest rates in a particular country would in fact attract

foreign debt issues. This subsection empirically examines the extent to which foreign debt issues are related to the difference between domestic and foreign interest rates.

As we report earlier, aside from the Eurobond market, firms typically issue foreign debt either in the U.S. or in the U.K. We therefore examine the relation between cross-border bond issues in the U.S. and the U.K. by firms in the G7 countries and the domestic interest rates in these countries. In particular, we estimate the equation

$$\frac{FD_{i,t}^{j}}{FD_{i,t}^{j} + HD_{i,t}} = a + b[SR_{t}^{j} - SR_{i,t}] + e_{i,t}, \tag{14}$$

where $FD_{i,t}^{j}$ is the debt issued in country j (the U.S. or the U.K.) by firms in country i in month t, $HD_{i,t}$ is the debt issued in the domestic market of country i, and $SR_{i,t}$ and SR_{t}^{j} are the swap rates in countries i and j, respectively. We estimate Eq. (14) using international long-term (maturity greater than five years) fixed rate debt issues.

Table 10 presents the regression estimates. For issues in the U.S., the slope coefficient for each country is negative, although none of them is statistically significant. The slope coefficient in the pooled specification is negative and marginally significant. In the U.K., only four out of the six coefficients for individual countries are negative but they are not statistically significant. Therefore, the empirical support for the hypothesis that firms issue debt abroad to take advantage of lower foreign interest rates is weak at best. It is possible that our tests lack power because our sample period is short. Alternatively, it is possible that firms issue debt abroad largely due to one of the other reasons that we discuss in Section 3, that is to hedge exchange rate risk or to achieve favorable tax treatment.

6. Conclusions

When a firm raises external capital, its managers have discretion over the type of securities they issue, as well as the location of the source of capital and the timing of the capital-raising activity. We examine the extent to which firms from countries around the world rely on different sources of capital, and the locations in which they raise various sources of capital. We also examine how market timing affects these choices.

Globally, firms raised about $25.3 trillion of new capital during the 1990–2001 period. International security issuances accounted for about $4.9 trillion of this new capital. International debt issues are much more common than international equity issues, with debt issues accounting for 87% of all cross-border security issues and 20% of all public debt issues, whereas international equity issues account for only 9% of all cross-border security issues and about 12% of all equity issues during our sample period.

Firms are drawn to liquid and well-regulated markets when they issue new securities. The U.S. and the U.K. are by far the most preferred locations for cross-border equity issues, and are the only net exporters of new equity capital. While these two countries also attract significant cross-border debt issues, they are not as dominant for cross-border debt as they are for cross-border equity.

Timing considerations appear to be particularly important in security issuance decisions. Firms all around the world are more likely to issue equity preceding low equity market returns and are more likely to issue debt preceding high equity market returns. Foreign equity issues tend to occur in "hot" markets, and market returns are generally low following periods of high equity issuance from abroad. Finally, firms issue more long-term debt when interest rates are lower, and prior to increases in interest rates.

An important caveat in interpreting these results is that they are based on a fairly short sample period. However, the period we study in this paper is the only period over which security issuance data are available for most of the countries outside the U.S. Thus, the extent to which these findings hold over other time periods is an open question.

In conclusion, firms have a much wider set of choices available to them when they issue securities than typically is emphasized in corporate finance textbooks. Specifically, in addition to the choice over the *type* of securities they issue, firms can decide *where* and *when* they should issue the securities. As markets continue to become more globally integrated, these additional choice variables will become increasingly important for firms. Thus, the importance of studying these issues is likely to grow. This paper provides a first look at the way in which firms across the world raise new capital and whether market timing considerations play a role in the choice of when and where to issue securities. We expect that future research will build on this work, and provide additional insights into how firms raise capital in a globally integrated environment.

Appendix A

Countries included in geographical regions Table A.1.

Table A.1
This appendix presents the countries that constitute various regions.

Africa	Central America and Caribbean	Eastern Europe	Middle East	Other Asia	Other Europe	South America
Algeria	Aruba	Bulgaria	Afghanistan	Bangladesh	Austria	Argentina
C. African Rep	Bahamas	Croatia	Bahrain	China	Belgium	Bolivia
Gabon	Barbados	Czech Republic	Cyprus	Hong Kong	Denmark	Brazil
Ghana	Belize	Estonia	Egypt	India	Finland	Chile
Ivory Coast	Bermuda	Georgia	Israel	Indonesia	Gibraltar	Colombia
Kenya	British Virgin Islands	Hungary	Jordan	Macau	Greece	Ecuador
Liberia	Cayman Islands	Kazakhstan	Kuwait	Malaysia	Guernsey	Neth. Antilles
Malawi	Costa Rica	Latvia	Lebanon	Micronesia	Iceland	Peru
Mauritius	Cuba	Lithuania	Oman	Mongolia	Ireland	Uruguay
Morocco	Dominican Rep	Moldova	Pakistan	Myanmar(Burma)	Isle of Man	Venezuela
Nigeria	El Salvador	Poland	Qatar	Papua New Guinea	Jersey	
Senegal	Guatemala	Romania	UAE	Philippines	Luxembourg	
South Africa	Honduras	Russian Fed		Singapore	Malta	
Tanzania	Jamaica	Slovak Rep		South Korea	Monaco	
Trinidad & Tobago	Mexico	Slovenia		Sri Lanka		
Tunisia	Panama	Turkey		Taiwan	Netherlands	
Zambia	Puerto Rico	Ukraine		Thailand	Norway	
Zimbabwe	St Lucia			Vietnam	Portugal	
					Spain	
					Sweden	
					Switzerland	

Appendix B. Debt adjustment factors

This appendix explains the method we use to infer the approximate portion of total debt issues that is accounted for by new issues. Let K be the total amount of currently outstanding debt that had t years to maturity at the time of issue. Let X be the rate of growth of debt that is due to new issues. We assume that when a debt issue matures, a new debt issue that rolls over the old debt also has t years to maturity. Therefore, K/t of the new t-year debt is used to roll over maturing debt. We do not have data on the amount of outstanding debt K. However, under our assumptions, we can back out the amount of new debt issues from the amount of total debt issues. Specifically,

$$\text{Total } t \text{ year maturity debt issue} = XK + \frac{K}{t}.$$

$$\Rightarrow XK = \frac{\text{Total } t \text{ year maturity debt issue}}{1 + 1/Xt}.$$

We can use this expression to compute the amount of new debt issues as a function of our assumptions about the growth rate X.

Appendix C

See Table C.1.

Table C.1
Dollar volume (in millionsUS$) of new issues

Location of Issuing Firm	Marketplace of equity issue															
	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Africa	Australia & New Zealand	Central Am & Caribbean	Eastern Europe	Middle East	Other Asia	Other Europe	South America	Total
Canada	129,681.8	374.8	54.5	44.0	—	2,541.5	22,903.0	—	123.3	—	—	—	342.4	59.9	—	156,125.2
France	34.5	129,859.8	890.6	11.6	—	4,492.4	14,049.9	—	519.9	—	101.2	—	136.5	2,531.1	1,534.3	154,161.8
Germany	66.0	3,385.3	160,952.4	1,668.7	—	1,312.9	13,934.2	—	97.6	—	42.6	—	1.7	2,364.5	—	183,825.9
Italy	5.4	356.6	360.5	122,272.4	—	28.6	12,818.6	—	92.0	—	182.0	—	0.2	956.4	1,073.8	138,146.5
Japan	16.2	—	392.6	21.3	280,315.6	18.7	15,747.8	—	89.9	—	—	—	413.6	238.2	2.1	297,256.0
United Kingdom	171.8	237.0	1,819.1	229.1	131.1	285,515.5	27,606.6	577.5	4,086.4	—	2.0	—	1,785.7	5,483.8	0.1	327,645.7
United States	4,413.9	2,349.3	1,169.8	198.9	8,803.9	4,980.0	1,159,067.4	5.8	3,007.6	456.6	1,404.5	3.6	683.2	1,841.6	1,008.6	1,189,394.7
Africa	17.0	—	263.6	—	—	1,973.5	1,733.9	5,292.6	388.5	—	—	—	227.8	456.9	—	10,353.8
Australia & New Zealand	31.4	—	—	—	—	965.8	12,279.6	—	68,284.4	—	—	—	311.1	1,016.2	—	82,888.5
Central Am & Caribbean	39.7	—	—	—	—	2,298.0	41,023.3	—	117.6	21,615.4	—	—	185.1	655.6	236.6	66,171.3
Eastern Europe	38.6	—	120.4	—	—	2,147.9	2,931.9	—	—	—	14,042.2	—	745.2	289.6	—	20,315.8
Middle East	6.6	16.2	221.4	—	—	1,041.7	8,898.9	—	—	—	—	32,176.6	204.5	1,235.8	—	43,801.7
Other Asia	170.9	96.6	75.6	—	1,171.0	10,523.8	35,835.3	1.1	2,445.0	60.4	—	3.4	340,056.1	12,136.6	—	402,575.8
Other Europe	247.6	6,753.7	4,140.8	164.9	15.8	12,744.0	62,956.6	18.0	606.9	177.7	397.6	—	266.9	316,759.0	7,215.1	412,464.6
South America	68.7	—	—	—	—	—	14,683.1	8.2	—	391.8	—	—	490.8	210.8	57,173.2	73,026.6
Total	135,010.1	143,429.3	170,461.3	124,610.9	290,437.4	330,584.3	1,446,470.1	5,903.2	79,859.1	22,701.9	16,172.1	32,183.6	345,850.8	346,236.0	68,243.8	3,558,153.9

Panel A. Equity issues: This table presents the amount of new capital (in millions US$) raised through equity issues. Our sample comprises all new issues in the Security Data Corporation's (SDC) New Issues Databases. We consider each of the G7 countries individually, and we aggregate the other countries into geographic regions. See Table A.1 for a complete list of individual countries comprising each geographical region. The sample period is from 1990 through 2001.

Location of Issuing Firm	Marketplace of debt issue															
	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Africa	Australia & New Zealand	Central Am & Caribbean	Eastern Europe	Middle East	Other Asia	Other Europe	South America	Total
Canada	506,264.4	4,171.2	7,904.5	—	1,051.1	42,527.0	185,263.8	—	339.7	—	—	—	3,153.9	67,953.1	—	818,628.7
France	—	450,945.1	24,077.9	229.3	201.3	12,754.2	14,871.8	—	—	—	—	—	876.6	290,205.1	—	794,161.3
Germany	12.2	8,769.6	2,101,925.8	—	1,118.9	70,091.1	71,733.4	—	1,354.4	—	—	—	1,921.0	243,498.1	—	2,500,424.5
Italy	—	588.7	5,632.3	721,465.1	507.6	14,796.5	34,519.4	—	—	—	—	—	1,597.0	185,025.1	—	964,131.7
Japan	—	1,625.2	20,185.0	—	1,426,906.7	112,234.2	15,258.9	—	—	—	—	—	1,937.1	101,606.6	—	1,679,753.7
United Kingdom	499.0	12,312.5	20,596.9	346.1	2,491.8	667,952.4	111,946.5	—	330.9	—	—	—	6,042.6	108,046.3	—	930,565.0
United States	2,295.6	14,936.9	42,739.7	2,323.7	6,207.2	99,270.1	7,719,959.0	—	754.7	—	—	—	14,367.9	540,011.6	—	8,442,866.4
Africa	—	88.1	2,211.6	—	2,241.6	1,314.4	5,442.4	119.1	—	—	—	—	—	8,520.6	—	19,937.8
Australia and New Zealand	—	—	2,854.5	—	2,904.9	61,547.8	27,667.6	—	60,365.8	—	—	—	1,658.7	62,409.4	—	219,408.7
Central Am and Caribbean	—	4,497.8	13,530.9	—	1,541.8	69,229.7	82,436.6	—	—	39,919.4	—	—	1,481.3	163,363.7	63.7	376,064.9
Eastern Europe	—	—	26,211.3	—	9,001.0	898.3	9,626.0	—	—	—	12,912.3	—	—	42,588.3	—	101,237.2
Middle East	—	41.1	150.6	—	—	2,150.1	13,812.8	—	—	—	—	—	—	14,850.0	—	31,004.6
Other Asia	147.8	308.1	5,263.0	—	11,218.7	12,883.2	67,669.5	—	69.7	—	—	—	287,975.0	54,380.7	—	439,915.7
Other Europe	637.2	29,212.0	221,729.0	1,266.1	20,745.8	260,529.0	129,688.4	—	330.4	—	36.3	—	7,309.1	2,503,627.4	—	3,175,110.7
South America	—	730.0	7,622.3	833.8	1,312.8	5,878.9	66,640.2	—	—	357.8	—	—	349.1	115,689.6	99,687.9	319,102.4
Total	509,856.2	528,226.3	2,522,635.3	726,464.1	1,487,451.2	1,434,056.9	8,556,536.3	119.1	63,545.6	40,277.2	12,948.6	—	328,669.3	4,501,775.6	99,751.6	20,812,313.3

Panel B: Debt issues: This table presents the amount of new capital (in millions US$) raised through non-convertible debt issues. Our sample comprises all new issues in the Security Data Corporation's (SDC) New Issues Databases. We consider each of the G7 countries individually, and we aggregate the other countries into geographic regions. See Table A.1 for a complete list of individual countries comprising each geographical region. The sample period is from 1990 through 2001.

Table C.1 (*continued*)

Location of Issuing Firm	Marketplace of preferred stock issue															
	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Africa	Australia & New Zealand	Central Am & Caribbean	Eastern Europe	Middle East	Other Asia	Other Europe	South America	Total
Canada	16,652.2	—	—	—	—	—	3,035.8	—	—	—	—	—	—	—	—	19,688.0
France	—	89.6	—	—	—	—	300.8	—	—	—	—	—	—	318.4	—	708.8
Germany	85.1	—	4,186.2	—	—	—	1,243.8	—	—	—	—	—	—	204.9	—	5,720.0
Italy	—	—	—	207.4	—	—	542.0	—	—	—	—	—	—	383.7	—	1,133.1
Japan	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
United Kingdom	—	—	—	—	—	5,079.9	10,075.0	—	—	—	—	—	—	5,004.2	—	20,159.1
United States	103.9	—	—	—	—	—	234,252.3	—	—	—	—	—	—	1,286.6	—	235,642.8
Africa	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Australia & New Zealand	—	—	—	—	—	—	1,361.9	—	138.4	—	—	—	—	—	—	1,500.3
Central Am & Caribbean	10.0	—	290.2	—	—	1,665.9	9,389.9	—	—	445.5	—	—	—	4,297.4	—	16,098.9
Eastern Europe	—	—	—	—	—	—	—	—	—	—	5.5	—	—	—	—	5.5
Middle East	—	—	—	—	—	—	53.3	—	—	—	—	—	—	—	—	53.3
Other Asia	—	—	—	—	—	266.5	3,116.1	—	17.4	—	—	—	3,659.3	1,156.1	—	8,215.4
Other Europe	—	—	162.4	—	—	500.6	7,118.4	—	—	—	—	—	—	7,880.3	—	15,661.7
South America	27.6	—	175.0	—	—	—	1,783.1	—	—	—	—	—	—	—	13,939.2	15,924.9
Total	16,878.8	89.6	4,813.8	207.4	—	7,512.9	272,272.4	—	155.8	445.5	5.5	—	3,659.3	20,531.6	13,939.2	340,511.8

Panel C: Preferred stock: This table presents the amount of new capital (in millions US$) raised through preferred stock issues. Our sample comprises all new issues in the Security Data Corporation's (SDC) New Issues Databases. We consider each of the G7 countries individually, and we aggregate the other countries into geographic regions. See Table A.1 for a complete list of individual countries comprising each geographical region. The sample period is from 1990 through 2001.

Location of Issuing Firm	Marketplace of Convertible Bond and Convertible Preferred Stock Issue															
	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Africa	Australia & New Zealand	Central Am & Caribbean	Eastern Europe	Middle East	Other Asia	Other Europe	South America	Total
Canada	10,171.0	—	—	—	—	—	5,860.6	—	—	—	—	—	—	18.3	—	16,049.9
France	—	26,967.1	73.4	60.3	—	280.2	504.9	—	—	—	—	—	—	12,958.0	—	40,843.9
Germany	—	—	6,669.5	—	—	40.0	161.9	—	—	—	—	—	—	4,656.1	—	11,527.5
Italy	—	—	—	3,254.2	—	519.9	1,070.0	—	—	—	—	—	—	5,199.6	—	10,043.7
Japan	—	—	240.1	—	130,786.1	—	413.7	—	—	—	—	—	547.5	11,104.5	—	143,091.9
United Kingdom	5.2	—	890.3	—	141.6	25,058.4	1,461.1	—	—	—	—	—	40.0	5,854.1	—	33,450.7
United States	67.2	0.1	1,455.5	—	—	90.7	215,668.1	—	—	—	—	—	—	14,139.7	—	231,421.3
Africa	—	—	—	—	—	564.5	20.3	18.9	—	—	—	—	—	498.0	—	1,101.7
Australia & New Zealand	—	—	—	—	—	—	943.0	—	14,153.4	—	—	—	37.8	340.0	—	15,474.2
Central Am & Caribbean	—	—	—	—	—	4,056.3	10,088.5	—	—	424.8	—	—	492.6	13,277.1	—	28,339.3
Eastern Europe	—	—	—	—	—	280.0	156.5	—	—	—	1,876.6	—	—	174.2	—	2,487.3
Middle East	—	—	—	—	—	—	522.0	—	—	—	—	183.4	—	205.0	—	910.4
Other Asia	—	—	12.3	—	—	5,363.6	3,252.4	—	—	—	—	—	17,955.2	30,337.1	—	56,920.6
Other Europe	—	1,287.0	6,916.8	—	963.3	4,023.7	3,240.5	—	—	—	—	—	40.7	44,990.6	—	61,462.6
South America	—	—	—	—	—	—	2,194.0	—	—	114.1	—	—	—	355.9	6,610.3	9,274.3
Total	10,243.4	28,254.2	16,257.9	3,314.5	131,891.0	40,277.3	245,557.5	18.9	14,153.4	538.9	1,876.6	183.4	19,113.8	144,108.2	6,610.3	662,399.3

Panel D: Convertible bonds and convertible preferred stock: This table presents the amount of new capital (in millions US$) raised through convertible bond and convertible preferred stock issues. Our sample comprises all new issues in the Security Data Corporation's (SDC) New Issues Databases. We consider each of the G7 countries individually, and we aggregate the other countries into geographic regions. See Table A.1 for a complete list of individual countries comprising each geographical region. The sample period is from 1990 through 2001.

Appendix D. Correction for small sample bias

To correct for the small sample bias in our regression estimates, we follow the procedure recommended by Amihud and Hurvich (2004). This appendix briefly describes the correction procedure.

Suppose the regression is of the form

$$y_t = \alpha + \beta \cdot x_{t-1} + \varepsilon_t. \tag{D.1}$$

Also, suppose the independent variable follows an AR (1) process. Let

$$x_t = \theta + \rho \cdot x_{t-1} + \upsilon_t. \tag{D.2}$$

Stambaugh (1999) shows that if $\mathrm{cov}(\varepsilon_t, \upsilon_t) > 0$, then the OLS estimate of β would be biased downwards. To correct for this bias, we follow the Amihud and Hurvich (2004) procedure. We first estimate regression (D.2). We then construct the corrected estimator for the autocorrelation coefficient in this regression as follows:

$$\hat{\rho}_{\mathrm{C}} = \hat{\rho} + \left(\frac{1 + 3\hat{\rho}}{n}\right) + \left(\frac{3 + 9\hat{\rho}}{n^2}\right) \tag{D.3}$$

where n is the sample size. We then use the corrected autocorrelation coefficient to construct a time series of residuals, that is,

$$\upsilon_t^{\mathrm{c}} = x_t - \hat{\vartheta} - \hat{\rho}^{\mathrm{c}} \cdot x_{t-1}. \tag{D.4}$$

Next, we augment regression (D.1) with the residual from (D.4), and fit the following augmented regression:

$$y_t = \alpha + \hat{\beta}^{\mathrm{c}} \cdot x_{t-1} + \phi \cdot \hat{\upsilon}_t^{\mathrm{c}} + \varepsilon_t. \tag{D.5}$$

Amihud and Hurvich (2004) show that this augmented regression yields an unbiased estimate of β. The regression estimates we report are from the augmented regression. Since our dependent variables are measured using over overlapping intervals, we use the Hansen and Hodrick (1980) standard errors to compute the t-statistics. We allow for serial correlation in the error term up to 12 lags. Specifically, we compute the Hansen and Hodrick covariance matrix Ω as

$$\begin{aligned} \omega_{i,j} &= \tfrac{1}{n} \sum_{t=|i-j|+1}^{n} \hat{e}_t \hat{e}_{t-|i-j|} \quad \forall\, |i-j| \leqslant 12, \\ &= 0 \qquad\qquad\qquad\qquad \text{otherwise}, \end{aligned} \tag{D.6}$$

where $\omega_{i,j}$ is the ijth element of Ω. We compute the standard errors using the following formula:

$$T(X_T' X_T)^{-1} X_T' \Omega_T X_T (X_T' X_T)^{-1}, \tag{D.7}$$

where T is the number of time-series observations.

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