

## **The Effects of Market Segmentation and Investor Recognition on Asset Prices: Evidence from Foreign Stocks Listing in the United States**

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### **ABSTRACT**

Non-U.S. firms cross-listing shares on U.S. exchanges as American Depositary Receipts earn cumulative abnormal returns of 19 percent during the year before listing, and an additional 1.20 percent during the listing week, but incur a loss of 14 percent during the year following listing. We show how these unusual share price changes are robust to changing market risk exposures and are related to an expansion of the shareholder base and to the amount of capital raised at the time of listing. Our tests provide support for the market segmentation hypothesis and Merton's (1987) investor recognition hypothesis.

THE GLOBALIZATION OF U.S. CAPITAL MARKETS has accelerated dramatically in the past decade. Increasing numbers of companies from overseas have chosen to either raise capital through global equity issues or prepare for future capital raising by way of cross-listings on U.S. exchanges. As of 1997, about 1,300 non-U.S. companies have listed their shares for trading on the New York Stock Exchange (NYSE), the American Exchange (AMEX), the National Association of Securities Dealers' Automation Quotation (Nasdaq) system, or

\*Foerster is with the Richard Ivey School of Business, University of Western Ontario, and Karolyi is with the Fisher College of Business at Ohio State University. We are grateful for data assistance from John Griffin, Rick Johnston, and Sonali Chalisehar; for background information from Jim Shapiro (NYSE), Mike Shokhouhi (NASD), Vince Fitzpatrick and Joe Velli (Bank of New York), Mark Bach (Citibank), and Rene Vanguetaine (JP Morgan); and for comments from Yakov Amihud, John McConnell, Darius Miller, René Stulz (editor), and an anonymous referee. Comments of conference participants at the 1997 NBER Market Microstructure Conference, the 1997 AFA, 1997 FMA International, 1997 Berkeley Program in Finance, the 1996 Vanderbilt Conference on Investing Internationally, and the 1996 Northern Finance Association meetings, and workshops at HKUST, Laval University, Queen's University, the University of Toronto, and the University of Waterloo greatly improved the paper. Nelson Mark kindly provided access to the Harris Bank interest rate data. We thank the Social Sciences and Humanities Research Council of Canada and the Richard Ivey School of Business Plan for Excellence for financial support, as well as Ohio State University's Dice Center and Summer Fellowship program. All remaining errors are our own.

over-the-counter (OTC), which represents a 75 percent increase since 1991. In 1996 alone, 162 new programs were created, raising \$20 billion in new equity financing and generating exchange trading of over 7 billion shares.<sup>1</sup>

The goal of this paper is to study the stock price performance and changes in risk exposure associated with the cross-listing of non-U.S. stocks in U.S. markets. Our sample comprises first-time U.S. listings by 153 firms from Canada, Europe, and the Asia-Pacific Basin region from 1976 to 1992. We are motivated to study this phenomenon because important inferences pertaining to the issue of capital market integration and segmentation can be drawn from the reaction of stock prices to international listings.<sup>2</sup> Segmentation of markets due to investment barriers (e.g., regulatory barriers, taxes, information constraints) creates an incentive for firms to adopt financial policies to reduce their negative effects. Theory suggests that stock prices for firms that cross-list from segmented markets are expected to rise and their subsequent expected returns should fall as an additional built-in risk premium compensating for these barriers dissipates. Our overall evidence is consistent with this hypothesis. We also explore how these results extend earlier studies of cross-border listing in the United States, such as those by Alexander, Eun, and Janakiraman (1988), Jayaraman, Shastri, and Tandon (1993), and Foerster and Karolyi (1993).<sup>3</sup>

We are also drawn to this question by a second branch of the finance literature that identifies significant changes in share prices for firms that choose to change the location for their traded shares. A number of studies have shown how share prices increase for firms that list on the NYSE from the Nasdaq OTC market and have attributed this outcome to increased investor recognition or superior liquidity.<sup>4</sup> Merton (1987), for example, provides a rationale for the effects of greater investor recognition in an extension to the Sharpe–Lintner Capital Asset Pricing Model (CAPM) which relaxes the assumption of equal information for investors. He shows that expected

<sup>1</sup> See “The Rise of ADRs,” *Fortune* (March 6, 1995); “Four-year Surge in ADR and GDR Issues,” *Financial Times* (November 10, 1994); “The Return of ADRs,” *Euromoney* (December 1995); and Cochrane, Shapiro, and Tobin (1996).

<sup>2</sup> Survey papers by Adler and Dumas (1983) and more recently Stulz (1995) argue that an understanding of the extent of international capital market segmentation is a key challenge for research in international finance. Important studies with evidence of growing integration of financial markets include Jorion and Schwartz (1986), Gultekin, Gultekin, and Penati (1989), Campbell and Hamao (1992), Mittoo (1992), Chan, Karolyi, and Stulz (1992), Bailey and Chung (1995), and Bekaert and Harvey (1995).

<sup>3</sup> Karolyi (1998) surveys the literature on global exchange listings. He cites a number of studies that have examined stock price reactions for U.S. firms listing their shares abroad, including Howe and Kelm (1987), Howe and Madura (1990), Barclay, Litzenberger, and Warner (1990), Varela and Lee (1993), and Lau, Diltz, and Apilado (1994).

<sup>4</sup> Baker and Meeks (1991) and McConnell et al. (1996) survey the literature on domestic exchange listings and delistings. Important contributions include those of Sanger and McConnell (1986) and Dharam and Ikenberry (1995), who focus on the postlisting decline in stock prices following NYSE and AMEX listing, and that of Christie and Huang (1993), who examine the liquidity effects of Nasdaq and AMEX listings to the NYSE using transactions data.

returns decrease with the size of the firm's investor base, which he characterizes as "the degree of investor recognition." Amihud and Mendelson (1986) develop the liquidity hypothesis in the context of an asset pricing model in which gross returns are an increasing and concave function of liquidity measured by the bid-ask spread. Kadlec and McConnell (1994) show that these two hypotheses can in part explain the abnormal returns to NYSE listings from Nasdaq.

We propose that U.S. exchange listing by non-U.S. firms could also be associated with share price changes that are not due to the effects of international investment barriers but rather to investor recognition and liquidity factors, as experienced by purely domestic exchange listings. We test this hypothesis using information available on changes in shareholder base and capitalization changes due to new issues of equity around the listing period for these firms and find that the abnormal returns before, around, and following listing are significantly related to these variables. We interpret this finding as evidence consistent with Merton's investor recognition hypothesis. Finally, we indirectly test Amihud and Mendelson's (1986) liquidity hypothesis and show that the sensitivity of the abnormal returns, as well as changing risk exposures, to changes in shareholder base is different for non-U.S. stocks listing on the NYSE versus those listing on the AMEX and Nasdaq. The finding that stock returns around cross-border listings is related to changes in the investor base and liquidity factors is new.

A primer on the cross-border listing process is presented in Section I. Section II provides a description of our methodology and data. Outlines of the various hypotheses about stock price effects on international listings and the main empirical results are presented in Sections III and IV. Conclusions follow in Section V.

## **I. A Primer on ADRs**

Almost all non-U.S. companies that list their shares on U.S. exchanges do so by creating American Depositary Receipts (ADRs). ADRs were developed by JP Morgan in 1927 as a vehicle for investors to register and earn dividends on non-U.S. stock without direct access to the overseas market itself. U.S. depositary banks hold the overseas securities in custody in the country of origin and convert all dividends and other payments into U.S. dollars to receipt holders in the United States. Investors, therefore, bear all currency risk and indirectly pay fees to the depositary bank. Each depositary receipt denotes shares that represent a specific number of underlying shares in the home market, and new receipts can be created by the bank for investors when the requisite number of shares are deposited in their custodial account in the home market. Cancellations or redemptions of ADRs simply reverse the process.

There are a number of advantages to ADRs for issuers, including an enlarged investor base, enhanced local market for shares, opportunity to raise new capital, and a liquid secondary market in the United States. At the

same time, non-U.S. companies must satisfy two requirements to be listed in the United States. First, they have to arrange with a transfer agent and registrar for an exact replication of settlement facilities as for domestic securities. Second, to register with the U.S. Securities and Exchange Commission (SEC), the non-U.S. company must file a registration statement and furnish an annual report on a Form 20-F with a reconciliation of financial accounts with U.S. Generally Accepted Accounting Principles (GAAP). Several options are available to issuers to balance these advantages with the costs associated with increased scrutiny by the SEC and reconciliation with GAAP reporting requirements. ADRs must now be sponsored by a non-U.S. company seeking access to U.S. markets, but some pre-1983 programs were initially unsponsored, as an initiative by a U.S. securities broker with the depositary bank. The ADR issues can also be associated with new capital raised through the program, though usually this is not the case. Table I outlines the different options with listing, reporting, and GAAP requirements. Level I ADRs trade over-the-counter as Pink Sheet issues with limited liquidity and they require only minimal SEC disclosure and no GAAP compliance. These firms are exempt from SEC filing Form 20-F under Rule 12g3-2(b) allowing home country accounting statements with adequate English translation, if necessary. Level II ADRs are exchange-listed securities, but without a capital-raising element. Level III ADRs, the most prestigious and costly type of listing, require full SEC disclosure with Form 20-F and compliance with the exchange's own listing rules. Finally, Rule 144A, known as RADRs, are capital-raising issues in which the securities are privately placed to qualified institutional buyers (QIBs) and, as a result, do not require compliance with GAAP or SEC disclosure rules. These securities trade over the counter among QIBs with very limited liquidity. As of June 1995, Level I programs comprised 55 percent of new ADRs, 23 percent were private placements (RADRs), and 22 percent were exchange-listed on the NYSE, AMEX, or Nasdaq (Levels II and III).<sup>5</sup>

An alternative option is a direct "ordinary" listing. These ordinary listings must take place on a U.S. exchange. They require an exact replication of settlement facilities as for U.S. securities but have somewhat different GAAP reporting and SEC registration requirements. With rare exceptions, Canadian firms are the only firms that maintain ordinary listings.<sup>6</sup> For example, U.S. and Canadian companies file Form 10-K due within 90 days of their fiscal year-ends and Form 10-Q quarterly, whereas non-Canadian overseas issuers trading as ADRs file an annual Form 20-F within 180 days of fiscal year-end which is less extensive (e.g., fewer footnotes on income taxes, leases,

<sup>5</sup> More details are available from Bank of New York's *Global Offerings of Depositary Receipts; A Transaction Guide* (1996) and Citibank's *An Information Guide to Depositary Receipts* (1995).

<sup>6</sup> See Cochrane et al. (1996) for a discussion of registration and trading of foreign securities in the United States including exemptions and key SEC accounting accommodations made. Biddle and Saudagaran (1992) and Frost and Kinney (1996) study disclosure choices among foreign registrants in the United States.

Table I  
Depository Receipt Programs by Type

Four different levels of American Depositary Receipt programs are available with various conditions on trading, registration requirements with the SEC (Securities Act of 1933), and reporting requirements (Securities and Exchange Act of 1934). More details are available from *An Information Guide to Depositary Receipts* by Citibank's Security Services Department (1995).

Item	No Capital Raising		Capital Raising with New Issue		
	Level-I	Level-II	Level-III	Rule 144A (RADR)	Global Offering
Description	Unlisted	Listed on major U.S. exchange	Offered and listed on major U.S. exchange	Private U.S. placement to qualified institutional buyers (QIBs)	Offer of in two or more markets; but not home market of issuer
Trading location	OTC Pink Sheet trading	NYSE, AMEX, or Nasdaq	NYSE, AMEX, or Nasdaq	U.S. private placement market using PORTAL	U.S. and non-U.S. exchanges
SEC registration	Registration Statement Form F-6	Registration Statement Form F-6	Form F-1 and F-6 for initial public offering	None	Private placement, as Rule144A or, new issue, as Level III
U.S. reporting required	Exemption under Rule 12g3-2(b)	Form 20-F filed annually	Form 20-F filed annually; short formsF-2 and F-3 used only for subsequent offerings	Exemption under Rule 12g3-2(b)	Private placement, as Rule144A or, new issue, as Level III
GAAP requirement	No GAAP reconciliation required	Only partial reconciliation for financials	Full GAAP reconciliation for financials	No GAAP reconciliation required	Private placement, as Rule144A or, new issue, as Level III

pensions, industry, and geographic segment information) and can be based on home country accounting practices. Since 1991, Canadian companies have been permitted to meet U.S. annual SEC reporting requirements with Canadian disclosure documents (under the auspices of the Ontario and Quebec Securities Commissions) by way of the Multi-Jurisdictional Disclosure System.<sup>7</sup>

## II. Data

The initial sample of new listings in the United States includes all of the 317 exchange-listing Level II and III ADR applications that were successful for the period from 1976 to 1992. The sample and listing dates were obtained directly from the NYSE, AMEX, and Nasdaq Economic Research departments and were verified in publications such as the *NYSE Fact Book*, the *AMEX Fact Book*, *Moody's International Manuals*, and *Standard and Poor's Stock Reports*. To be included in the sample, the ADR program has to be the first U.S. listing for the firm (i.e., not a transition from RADR private placement to exchange-listed ADR) and has to have weekly (Friday closing) home-market stock price, exchange, and stock index data available.<sup>8</sup> Our primary data source for prices and exchange rates was Reuter's Exshare International Securities Database, accessed using Reuterlink™, its on-line data service. Returns are calculated as price changes without dividends. We cross-checked stock prices using various English-language sources, including *The Japan Times*, *Asian Wall Street Journal*, *Financial Times*, *Wall Street Journal*, and Datastream International. Canadian stock price information was obtained directly from the Toronto Stock Exchange/University of Western Ontario database. Listings before 1976 are excluded because of Reuter's Exshare database limitations.

The final sample consists of 153 listings from 11 countries in four regions of the world, including Europe, Canada, Asia, and Australia. Appendix A lists the firms by country with the associated listing date. The largest contingent is comprised of the 67 Canadian firms, all of which are ordinary listings, followed by the 36 U.K. issues, 26 from Europe (excluding the U.K.), 13 Australian issues, and 11 Asian listings (all but one from Japan). Table II provides summary statistics for the sample organized by home region, listing exchange, industry group, listing year, and type of ADR issue (i.e., Level III capital-raising or Level II non-capital-raising). Several facts are noteworthy. First, the accelerating trend for listings is visible with more than 54 new listings in the four-year period 1989 to 1992 in contrast to 11 new listings in 1976 to 1980 and 26 in 1981 to 1984. Most of the listings (82) occur on Nasdaq and this is dominated by many smaller, resource-based Canadian firms. Overall, all major sectors are represented. Cross-listed firms tend to be very large with an average capitalization of \$2.5 billion, although the dis-

<sup>7</sup> See Multi-Jurisdictional Disclosure and Modifications to the Current Registration and Reporting System for Canadian Issues, Securities Act Release No. 6902 (July 1, 1991).

<sup>8</sup> Exchange rates are based on Friday, 10 a.m. midpoint quotes from Reuter's Exshare.

**Table II**  
**Descriptive Statistics for Global Firms Listing**  
**on U.S. Exchanges, 1976–1992**

Firms listing American Depositary Receipt programs as well as direct listings in the United States with associated listing dates are obtained from the *New York Stock Exchange Fact Book*, *American Stock Exchange Fact Book*, and American Stock Exchange and Nasdaq Economic Research departments directly. New share issues are computed as a fraction of total shares outstanding for 31 capital-raising Level-III ADR issues. Market capitalization values, information about type and sponsor institution of ADR program, and size of new issue for Level-III ADRs are obtained from *Moody's International Manuals* (various issues). Data on shareholder base are obtained from *Moody's Manuals* and supplemented with *Standard and Poor's Stock Reports* (various issues). Sample of 153 firms screened for data on home-market weekly stock price, local stock index values, and New York Friday, 10 a.m. midpoint quotes for home-market exchange rate for 52 weeks before and after the listing date, all obtained from Reuter's Exshare International Securities Database using Reuterlink on-line data service and supplemented with various local periodicals. Data availability for certain variables is indicated in parentheses.

Home Region		Listing Exchange		Industry Group	
Canada	67	New York	60	Industrial	34
Australia	13	American	11	Resource	48
Europe ex U.K.	26	Nasdaq	82	Consumer	37
Asia	11			Financial	14
United Kingdom	36			Technology	12
				Utilities	8
Listing Years		Capital Raising		Capitalization	
1976–1980	11	Level-III ADR	31	Mean (\$mills)	2,515.3
1981–1984	26	Non-capital raising	122	Maximum	53,221.0
1985–1988	62			Median	717.0
1989–1992	54			Minimum	3.5
New Share Issue (% of shares outstanding)		Shareholder Base (000s before listing)		Percent Change in Base (before/after listing)	
Mean	3.0%	Mean	52.9	Mean	28.8%
Maximum	12.6%	Maximum	740.3	Maximum	479.9%
Median	2.1%	Median	10.0	Median	11.1%
Minimum	0.3%	Minimum	0.1	Minimum	–86.7%
Number	31	Number	145	Number	145

tribution is positively skewed with a median of only \$717 million. By studying the descriptions in *Moody's International Manuals* in the year immediately following listing, we also document that 31 of the issues were capital raising.

To proxy for changes in the shareholder base of each firm, data on the number of registered shareholders for each security are collected prior to the listing announcement and subsequent to listing. These data are obtained directly from *Moody's International Manuals* for the year immediately preceding and the year following the recorded listing date, as available. Missing observations are supplemented by *Standard and Poor's Stock Reports*. Table II shows that for 145 of the firms for which data are available, the mean number of registered shareholders is 52,900, although the sample is

strongly positively skewed with a median of only 10,000. The maximum of 740,000 shareholders belongs to Telefonica de Espana. On average, the change in shareholder base is positive at 28.8 percent with a median of 11.1 percent. The extreme outliers at 479 percent (Northern Telecom, Canada) and -86.7 percent (Petromet Resources, Canada) arise for firms with very low initial bases (fewer than 1,500 shareholders).

### **III. Market Segmentation Tests**

#### *A. Global Market Segmentation, Cross-Listings, and Share Value*

Global cross-listings have interested the international finance literature because these securities overcome many of the regulatory restrictions, costs, and information problems that comprise barriers to investing in overseas securities. To the extent that these barriers influence how securities are priced in their respective markets, empirical researchers can evaluate the degree to which international capital markets are segmented or integrated. That is, in the context of an equilibrium model of expected returns, they ask whether market risk is "priced" differently in the two capital markets (see Black (1974), Stapleton and Subrahmanyam (1977), and Stulz (1981)). If markets are segmented, firms have an incentive to adopt policies to mitigate the negative effects of investment barriers and promote the positive effects of international diversification by direct foreign investment, mergers with non-U.S. firms, or dually listing their shares for trading on a non-U.S. capital market. Errunza and Losq (1985) and Alexander, Eun, and Janakiraman (1987) refine the equilibrium models above for pricing shares of firms cross-listing abroad. These models predict that cross-listing shares between two segmented markets leads to a higher equilibrium market price for a given stock and a lower expected return. For example, consider the Errunza and Losq two-country model of "partial" segmentation in which investment barriers are asymmetric: country 1's investors can invest in country 2's securities, but country 2's investors are prohibited from investing in country 1's securities. They show that country 2's (eligible) securities are priced as if markets were completely integrated, but that country 1's (ineligible) securities command a "super" risk premium. If a company from country 1 cross-lists its shares in country 2, comparative statics show that the super risk premium disappears, the share price increases, and the expected return decreases.

Alexander et al. (1988) are the first to have studied price reactions for 34 firms from six different countries that were listed on either the NYSE, AMEX, or Nasdaq between 1962 and 1982. They demonstrate that the cumulative abnormal returns (CARs) for their non-Canadian benchmark sample of firms increase by an annualized 17 percent in the two years before listing and fall by an annualized 33 percent over the three years following listing. The CARs for the Canadian sample are considerably smaller in both periods, which they interpret as evidence consistent with the market integration between Canada and the United States. Foerster and Karolyi (1993) investigate a

larger sample of 52 Canadian firms during the 1980s and find a much more dramatic reaction on the order of an annualized 21 percent run-up in the 100-day prelisting period and a 22 percent postlisting decline. They interpret this finding as evidence of segmentation between Canadian and U.S. markets, consistent with other findings by Booth and Johnston (1984), Jorion and Schwartz (1986), and Mittoo (1992).

In summary, previous research suggests that global cross-listing of shares can lead to a reduction in expected return on a security if the capital markets from which they originate are segmented completely or partially. If the segmentation hypothesis is correct, we should observe several patterns related to non-U.S. firms listing in the United States. First, we predict abnormal returns around interlisting should be positive. Second, abnormal returns around interlisting should vary across stocks by home market in ways related to differences in degrees of market segmentation. That is, firms from emerging markets are likely to experience larger abnormal returns than firms from developed markets.

#### *B. Cumulative Abnormal Returns around Announcement versus Listing Dates*

International asset pricing models suggest that when investors realize that barriers to investments are to be removed, expected returns should decrease as prices are bid up on the *expectation* of the removal of these barriers. Thus, in order to properly examine market segmentation hypotheses, we should examine price effects around interlisting *announcements*. A small number of studies have examined announcement effects in an international listing context. Lau et al. (1994) examine market reactions around the announcement of U.S. firms listing on overseas markets. Miller (1998) examines market reactions around announcements of international firms (primarily from Europe and emerging market countries) that interlisted on U.S. exchanges between 1985 and 1995, and Switzer (1997) examines announcements of Canadian firms that interlisted over the 1985 to 1996 period.

Although announcement dates are theoretically more appropriate than listing dates in order to test segmentation hypotheses, data collection presents some challenges, particularly for our sample of interlistings dating back to 1976. For example, one challenge relates to data sources. The most common data source for announcements is Lexis/Nexis, which includes hundreds of information sources. However, there are few relevant business data sources that precede 1980. For example, one of the main sources of information, Reuters Financial Service, is only available since January 1987. Another challenge relates to the determination of the announcement date, even if Lexis/Nexis accurately captures what is known in the market. For example, for some firms, markets have expected for years that a firm will eventually list in the United States; in some cases, a company spokesperson indicates that a firm is contemplating interlisting but the firm has not received board approval; and in other cases a firm has received board approval but has not

received approval from the relevant exchange or securities commission. It is possible to have firms announce an intent to interlist without actually interlisting. For example, Grand Metropolitan announced, on November 1, 1989, that it was applying to list on the NYSE; on June 2, 1990, it announced a postponement in the listing; then on February 2, 1991, it announced again that it was seeking a NYSE listing—which finally occurred on March 13, 1991. All of these factors suggest that announcement dates may provide a noisy signal to the market.

Nonetheless, we gather as much data as possible related to announcement effects. We use Lexis/Nexis to obtain announcement dates for the 153 firms in our sample. Generally, the announcement date represents the earliest press release related to the eventual interlisting. We are able to identify 45 announcements,<sup>9</sup> the earliest of which is in 1982. Our sample of firms with announcements includes firms from Australia (6 firms), Canada (7), France (1), Italy (2), Japan (3), Netherlands (3), Norway (1), Spain (1), and the U.K. (21). Of the 45 firms, 32 listed on the NYSE, three on AMEX, and 10 on Nasdaq. For our sample, the mean (median) difference between the announcement date and the listing date is 70 (44) days.<sup>10</sup> The median across exchanges is 40 days for firms listing on the NYSE, 60 days for AMEX, and 65 for Nasdaq. Only nine announcement dates are more than 100 days prior to the listing date.

We compare results for both announcement and listing dates. In order to measure abnormal returns, we first estimate the (local) market model  $\alpha$  and  $\beta$  for each firm (i.e., each firm's return relative to a local stock market index from Datastream International estimated during the 150-day prelisting period from day  $-250$  to day  $-101$ ). Abnormal returns are then calculated from days  $-100$  to  $+250$  as

$$\epsilon_{it} = R_{it} - [\alpha_i + \beta_{iL} R_{mt}^L], \quad (1)$$

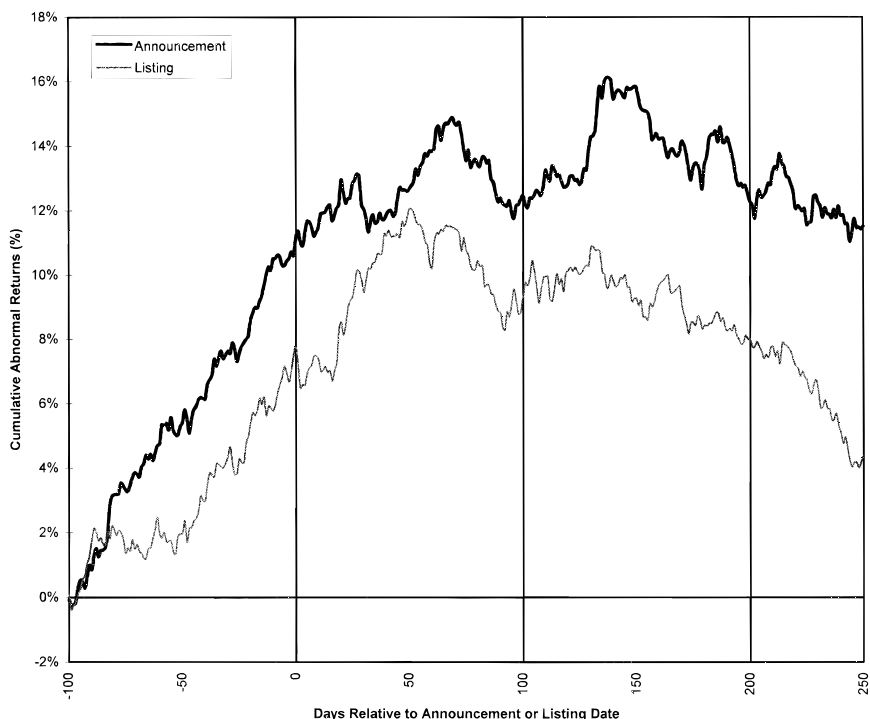
where  $R_{it}$  is firm  $i$ 's local currency return on day  $t$ .<sup>11</sup>

Cumulative abnormal returns from  $-100$  days to  $+250$  around both announcement and listing dates are presented in Figure 1, and statistical results are presented in Table III. Panel A of Table III examines announcement effects. There is strong evidence of a preannouncement run-up in prices. For example, in the preannouncement period between days  $-100$  and  $-2$ , average daily abnormal returns are 0.11 percent and significant ( $t$ -statistic of 4.19). Around the announcement period (days  $-1$  and 0), average daily ab-

<sup>9</sup> Details of dates along with the rationale cited for listing are available in an Appendix from the authors.

<sup>10</sup> Citibank (1995) estimates a 9-week horizon for a Level I ADR between establishing a program launch (U.S. counsel, depositary bank) and the start of Pink Sheet trading, a 14-week period for Level II or III ADRs. The RADR programs require only a 7-week period.

<sup>11</sup> We also examine tests using a two-factor IAPM and the Schipper and Thompson (1983) methodology, which we employ below. Results are quantitatively and qualitatively similar. We present the results above because they are most closely related to the methodology in other "announcement effect" studies.



**Figure 1. Cumulative abnormal returns around announcement/listing in the United States.** Abnormal returns are computed for each firm based on market model risk adjustments using a local market index. Estimates are computed over days  $-250$  to  $-101$  relative to the identified announcement date for the U.S. listing. Daily abnormal returns are averaged across firms and cumulated. The sample includes 45 firms with identifiable announcement dates and stock and index prices are obtained from Datastream International.

normal returns jump to 0.21 percent. Although 53 percent of the firms experience positive abnormal returns around the announcement on day  $-1$  (and 58 percent on day 0), there is a fairly large amount of variability. Consequently, the announcement effect results are not significant in our sample ( $t$ -statistic of 0.85). Subsequent to the announcement, average abnormal returns are not significantly different from zero.

It is possible that, because this analysis is based on event time, we may not capture time variation effects. For example, if markets have become more integrated over time, we might witness a decrease across time in abnormal returns around the announcement date. There is a need to develop new time-varying event methodology, but this is beyond the scope of the current paper.<sup>12</sup>

<sup>12</sup> There are other methodological issues as well. For example, event complexities including firms that signal intent to cross-list but do not actually cross-list could be incorporated in the event methodology (see Prabhala (1997)).

**Table III**  
**Abnormal Returns for 45 Firms around Announcement**  
**and Listing on U.S. Exchanges, 1981–1992**

The market model is estimated for each firm relative to a local market index (Appendix B) during the prelisting period from day –250 to day –101. Abnormal returns are then computed for each firm based on market model risk adjustments. Daily abnormal returns are averaged across firms and cumulated. The sample includes 45 firms with identifiable announcement dates.

Event Period (days)	Average Daily Abnormal Return (%)	<i>t</i> -Statistic
Panel A: Announcements		
(–100, –2)	0.1082	4.19**
(–100, –50)	0.1065	3.07**
(–49, –10)	0.1265	3.02**
(–9, –2)	0.0278	0.28
(–1, 0)	0.2057	0.85
(1, 10)	0.0388	0.55
(11, 50)	0.0291	0.63
(51, 100)	–0.0041	–0.11
(1, 100)	0.0135	0.49
(1, 250)	0.0010	0.06
Panel B: Listings		
(–100, –2)	0.0711	2.74**
(–100, –50)	0.0388	1.09
(–49, –10)	0.0950	2.28**
(–9, –2)	0.1568	1.83*
(–1, 0)	0.3494	1.96*
(1, 10)	–0.0371	–0.41
(11, 50)	0.1169	2.44**
(51, 100)	–0.0546	–1.32
(1, 100)	0.0157	0.53
(1, 250)	–0.0157	–0.87

\*\*, \* indicate significance at the 5 and 10 percent levels, respectively.

Panel B of Table III examines listing effects. As in the preannouncement results, there is strong evidence of a prelisting run-up in prices. For example, in the prelisting period between days –100 and –2, average daily abnormal returns are 0.07 percent and significant (*t*-statistic of 2.74). However, around the listing period (days –1 and 0), average daily abnormal returns jump to 0.35 percent, almost twice as large as the announcement day effects. As well, 69 percent of the firms experience positive abnormal returns around the listing on day –1 (and 58 percent on day 0). Unlike the announcement effect results, these listing effect results are statistically significant (*t*-statistic of 1.96). Subsequent to the listing, average abnormal returns are –0.02 percent between days +1 and +250 but not significantly different from zero (*t*-statistic of –0.87).

Overall, results from Table III suggest there appears to be some information surrounding both the announcement of interlistings and actual listings. However, in addition to the recognition of the data collection challenges described above, these short-term results should be interpreted cautiously for other reasons. There may well be information dissemination (or leakage) prior to the announcement, between the announcement and the listing, at the listing date (with the removal of any remaining uncertainty about the listing), or even in the postlisting period when the information is actually disseminated to market participants. Thus, unlike the existing literature, which examines short-window results around announcement dates, we focus on the overall picture that emerges by examining longer periods around the listing. Consequently, the remainder of this paper focuses on results based on our larger sample of firms with listing dates using weekly returns for one year prior to listing and one year subsequent to listing.

### C. Pre- and Postlisting Returns Performance

Summary statistics for weekly returns of the 153 firms around the listing dates are presented in Table IV. We report both mean excess returns—that is, in excess of risk-free rates and the associated Newey and West (1987) *t*-statistics in local currency and U.S. dollar-denominated terms for all firms and separately by region. The returns are computed in excess of weekly one-month Eurodollar quotes, which are obtained directly from Harris Bank's *Foreign Exchange Weekly*.<sup>13</sup> We compute average weekly returns before listing (weeks  $-52$  to  $-1$ ), around listing (week 0), and after listing (weeks  $+1$  to  $+52$ ).

The general pattern of excess returns is similar to that in other studies of interlistings, such as Alexander et al. (1988) and Foerster and Karolyi (1993). The returns increase by 0.38 percent per week in local currency (0.44 percent per week in dollars) during the period before listing, which is statistically significant. The cumulative return over the 12-month period corresponds to about 22 percent (26 percent). The excess returns are significantly positive during the listing week period, with an average return of 1.20 percent (1.24 percent) per week. After listing, the cumulative returns dissipate to a significant extent with an average weekly postlisting decline of  $-0.27$  percent ( $-0.30$  percent). This corresponds to an annualized cumulative return of  $-13$  percent ( $-15$  percent), which yields a net cumulative excess return of 7.5 percent (8.7 percent) over the entire two-year period. Given the similarity of our results using local currency and dollar returns, we only report local currency returns in subsequent analyses.<sup>14</sup>

To explain this returns pattern around the listing decision, Alexander et al. (1988), Foerster and Karolyi (1993), and many others propose the market segmentation hypothesis. These studies posit that the listing week

<sup>13</sup> We are grateful to Nelson Mark for providing us with these data.

<sup>14</sup> In an earlier version, we report all results using both local currency and U.S. dollar-denominated returns and find that the inferences from the two sets of results are qualitatively similar.

**Table IV**  
**Summary Statistics for Weekly Excess Returns**  
**of Global Listings around Listing Dates**

Weekly (Friday close) returns for 153 listings are denominated in U.S. dollars and local currency terms using foreign exchange rates based on 10 a.m. (New York) midpoint quotes, all obtained from Reuter's Exshare International Securities Database using Reuterlink on-line data service and supplemented with various local periodicals. The returns are computed in excess of weekly one-month Treasury bill yields obtained from Harris Bank quotes. Means and standard deviations are computed separately across weeks (−52, −1) before listing, (0) during listing, and (+1, +52) after listing.

Stocks	No. of Observations	Local Currency		U.S. Dollar	
		Mean (%)	<i>t</i> -Statistic	Mean (%)	<i>t</i> -Statistic
Panel A: Before U.S. Listing (weeks −52 to −1)					
All	7062	0.3815	4.65**	0.4409	4.96**
Australia	659	0.8746	3.26**	0.8118	3.03**
Canada	3033	0.4152	2.60**	0.5359	3.00**
Europe ex. U.K.	1103	0.3966	3.04**	0.3649	2.82**
Asia	525	0.1524	0.81	0.0917	0.49
United Kingdom	1742	0.1956	1.75*	0.2883	2.58**
Panel B: During U.S. Listing Week (week 0)					
All	153	1.2026	1.65*	1.2404	1.71*
Australia	13	−0.1275	−0.08	−0.2071	−0.14
Canada	67	1.1463	0.75	1.2207	0.80
Europe ex. U.K.	26	2.5481	2.49**	2.4757	2.45**
Asia	11	0.7904	0.95	0.7325	0.89
United Kingdom	36	0.9419	1.18	1.0629	1.34
Panel C: After U.S. Listing (weeks +1 to +52)					
All	7681	−0.2651	−2.92**	−0.3035	−3.31**
Australia	674	−0.8594	−2.46**	−0.9500	−2.72**
Canada	3368	−0.4764	−2.76**	−0.5173	−2.99**
Europe ex. U.K.	1274	0.2051	1.63	0.1637	1.29
Asia	571	0.0026	0.01	−0.0649	−0.35
United Kingdom	1794	−0.0642	−0.48	−0.0670	−0.48

\*\* , \* indicate significance at the 5 and 10 percent levels, respectively.

returns should be positive overall and greater for firms for which the domicile market is more likely to be segmented from the U.S. market (e.g., emerging markets) and smaller for firms for which the domicile market is more integrated with that of the United States (e.g., Canada). Unlike the early Alexander et al. (1988) findings, we show in comparisons across different regions that the stock price reactions for the Canadian firms are at least as dramatic as most of the others. For example, the Canadian firms on average achieve an average prelisting stock price rise of 0.42 percent per week, equal to that of the entire sample. This contrasts with the largest average weekly rise for the Australian firms of 0.87 percent and with the insignificant run-

ups for Asian firms. The large positive excess returns during the listing week for the Canadian firms is similar to that experienced by the U.K. firms but lower than that for the European (excluding U.K.) firms. Finally, the postlisting declines also exhibit considerable variation by region. The largest declines are for the Australian firms (−0.86 percent per week) and Canadian firms (−0.48 percent per week), yet for the Asian and European firms, the postlisting returns are positive.

#### *D. Risk Adjusted Returns*

In order to isolate patterns in expected returns around interlistings, existing studies, such as those by Alexander et al. (1988), Howe and Kelm (1987), Foerster and Karolyi (1993), and Lau et al. (1994), employ standard event study methodology in which expected returns are derived from the Sharpe–Lintner CAPM. This is a limiting approach for several reasons. First, the expected returns are proportional to a market covariance risk (beta) and the excess return on a benchmark portfolio, both defined relative to a domestic stock market index. In an international context, it seems appropriate for a firm listing in an overseas market to calibrate its exposure to overseas market risks in addition to domestic risks.<sup>15</sup> Second, these local and overseas market risks could be changing over time due to the interlisting itself or due to other firm-specific factors (e.g., changes in capitalization, new equity issues for Level III ADRs) that occur around interlistings. Third, using an International Asset Pricing Model (IAPM), such as that of Solnik (1974), where covariance risks are defined relative only to the world market portfolio, ignores local market risks that may impact prices of interlisting stocks from markets that are not integrated. Our objective is then to specify a returns generating model for these interlisting firms that captures both domestic and global risks and their changes over time.

To generate abnormal excess returns around the interlisting, we estimate a modified IAPM that captures both domestic and global market risk, where the former is computed relative to a local market index (Appendix B lists different indexes by local market) and the latter is computed relative to the weekly excess return on the Datastream International World Index.<sup>16</sup> We draw on the methodology of Schipper and Thompson (1983) in which we pool the cross-section and time series of returns to estimate our two-factor IAPM:

$$R_{it} = \alpha_i^{PRE} + \beta_{iL}^{PRE} R_{mt}^L + \beta_{iW}^{PRE} R_{mt}^W + \alpha_i^{LIST} D_t^{LIST} + \alpha_i^{POST} D_{it}^{POST} + \beta_{iL}^{POST} R_{mt}^L D_{it}^{POST} + \beta_{iW}^{POST} R_{mt}^W D_{it}^{POST} + \epsilon_{it}, \quad (2)$$

<sup>15</sup> Empirical studies by Jorion and Schwartz (1986), Chan et al. (1992), and Dumas and Solnik (1995) focus on the pricing of domestic and foreign market risks as well as currency risks for stocks. See the survey by Stulz (1995).

<sup>16</sup> We chose the Datastream International World Index, denominated in U.S. dollars, because other well-known global indices, such as Morgan Stanley's Capital International and Financial Times Actuaries/Goldman Sachs indices do not extend back to 1976 when our sample begins.

where  $\alpha_i$ 's are constants (which we interpret as abnormal excess returns);  $\beta_{iL}$ 's are the coefficients on the local market excess return,  $R_{mt}^L$ ;  $\beta_{iW}$ 's are the coefficients on the global market index excess return,  $R_{mt}^W$ ;  $D_{it}^{LIST}$  is a dummy variable that equals one if observations are from the listing week (week 0) and zero otherwise; and  $D_{it}^{POST}$  is a dummy variable that equals one if observations are from the postlisting period (weeks +1 to +52) and zero otherwise. The returns are denominated in local currency and are defined in excess of the weekly yield of the one-month Eurodollar rate for U.S. dollar returns and in excess of weekly yields of one-month Euromarket rates for the Canadian dollar, U.K. sterling, German mark, Japanese yen, and French franc, where appropriate.<sup>17</sup> The advantage of this methodology is that we can measure the pre- and postlisting returns after adjusting for market covariance risks in addition to just the event-period abnormal returns using conventional event study methods. A distinct disadvantage is that by pooling cross-sectionally across the firms, we average the beta risk measures. Furthermore, the estimation and test periods are identical, which may not capture changing betas around the event period. However, in the next section, we compute these results separately by firm for the univariate and cross-sectional regressions and identify no major distortions or outliers that should generate concern about the pooled estimation.<sup>18</sup>

Table V presents results for the IAPM model regressions. We report the adjusted  $R^2$  and robust  $t$ -statistics that are computed using Newey and West (1987) standard errors correcting for heteroskedasticity and serial correlation (up to six weekly lags). The final column reports a robust Wald test  $\chi^2$ -statistic for the Chow test of structural break for the pre- and postlisting coefficients on the local and global returns.

Overall, we find in the prelisting period that the average beta on the local market excess return is close to one (1.03) and that of the global market beta is much smaller (0.22) but still significantly different from zero. By contrast, the postlisting local market beta drops considerably and significantly to 0.74 (a decrease of approximately 0.28) and the global market beta decreases from 0.22 to 0.12, but this change is not significant. The  $p$ -value for the Chow test for structural break indicates that the overall change is statistically significant. Our key finding here is that important changes in risk exposure result for firms interlisting their shares in the U.S. market: Exposure to the local market risk is diminished and exposure to global market risk has not significantly changed.

<sup>17</sup> Data were not available on Euromarket rates for each country from which sample firms originate. For local currency excess returns, we make arbitrary assignments, such as Euromark rates for Europe, except U.K. and French firms, Euroyen rates for all Asian and Australian firms, and Euro-Canadian dollar rates for Canadian firms.

<sup>18</sup> In an earlier version of the paper, we extend the model in two other ways: (a) to allow for currency risk with a separate factor related to foreign exchange returns and (b) to allow market risk factors (betas) to change with information variables related to macroeconomic conditions. See Shanken (1990) and Ferson and Schadt (1996). The results do not change qualitatively.

**Table V**  
**Market Model Regressions for Global Listings around Listing Date**  
**using Weekly Local Currency Excess Returns**

We estimate IAPM market model regressions of firm excess returns on a constant, a local market index (Appendix B) excess return (in excess of a local/regional one-month Euromarket yield),  $R_{Mt}^L$ , and a global index (Datastream International World Index) excess return (in excess of the one-month U.S. Eurodollar yield),  $R_{Mt}^W$ :

$$R_{it} = \alpha_i^{PRE} + \beta_{iL}^{PRE} R_{mt}^L + \beta_{iW}^{PRE} R_{mt}^W + \alpha_i^{LIST} D_t^{LIST} + \alpha_i^{POST} D_t^{POST} + \beta_{iL}^{POST} R_{mt}^L D_t^{POST} + \beta_{iW}^{POST} R_{mt}^W D_t^{POST} + \epsilon_{i,t}.$$

The model is estimated with dummy variables to index the listing ( $D_t^{LIST}$  for week 0) and postlisting periods ( $D_t^{POST}$  for weeks +1 to +52) and associated coefficients are denoted with superscript *PRE* for prelisting, *LIST* for listing, and *POST* for postlisting periods. For excess returns, we employ Euroyen rates for Asian firms, Euromark rates for European (ex U.K.) firms, pound sterling rates for U.K. firms, Euro-Canadian dollar rates for Canadian firms, and Euromark rates for all others. Robust *t*-statistics are computed using heteroskedasticity-consistent and serially uncorrelated (lags = 6) standard errors using Newey and West (1987) procedures and reported below the coefficient estimates. A Chow test of the structural break in the coefficients before listing (weeks -52 to -1) and after (weeks 0 to +52), is reported as a  $\chi^2$  with associated *p*-value below the estimate.

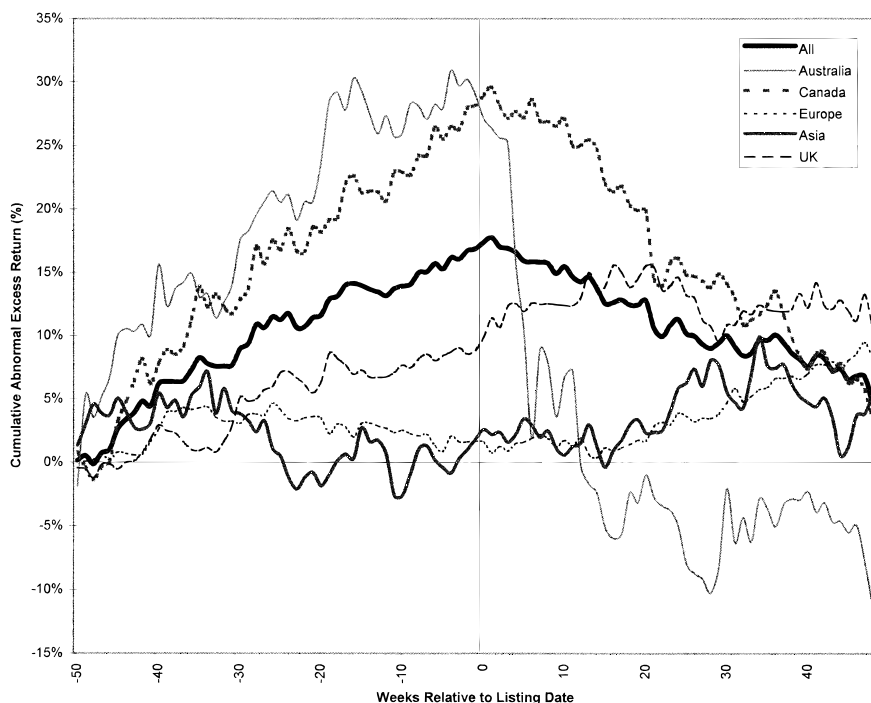
	Before U.S. Listing (weeks -52, -1)			Listing Week	After U.S. Listing (weeks +1, +52)			Adj. $R^2$	$\chi^2$ ( <i>p</i> -value)
	$\alpha_i^{PRE}$	$\beta_i^{PRE}$	$\beta_{iW}^{PRE}$		$\alpha_i^{POST}$	$\beta_{iL}^{POST}$	$\beta_{iW}^{POST}$		
All firms	0.0031 4.14**	1.0259 29.98**	0.2162 5.03**	0.0029 0.44	-0.0053 -4.64**	-0.2835 -5.53**	-0.1023 -1.44	11.24%	57.28 0.00
Australia	0.0056 2.59**	1.3602 7.39**	0.0786 0.60	-0.0218 -1.86*	-0.0116 -2.87**	-0.5157 -2.12**	0.2211 0.85	18.88%	14.39 0.01
Canada	0.0049 3.17**	1.1664 10.59**	0.2337 2.57**	0.0023 0.17	-0.0092 -4.06**	-0.2019 -1.31	-0.0317 -0.23	6.36%	18.39 0.00
Europe (ex. U.K.)	0.0010 1.67*	0.8719 41.99**	0.0811 1.96*	0.0064 1.21	-0.0001 -0.06	-0.0848 -2.28**	0.0401 0.69	6.19%	7.315 0.12
Asia	0.0003 0.17	1.2294 9.81**	0.2153 1.77*	0.0059 0.66	-0.0001 -0.02	-0.8987 -5.19**	-0.2309 -1.21	10.01%	35.53 0.00
United Kingdom	0.0016 1.64*	0.9998 18.81**	0.1678 2.93**	0.0081 1.23	-0.0017 -1.06	-0.5245 -4.77**	-0.2496 -2.07**	14.04%	36.57 0.00

\*\*, \* indicate significance at the 5 and 10 percent levels, respectively.

Even after we adjust for these changes in risk, however, interlisting firms still generate statistically significant abnormal returns, as measured by the  $\alpha_i$  coefficients. In the prelisting period, firms earn 0.31 percent per week; in the postlisting period, firms lose 0.22 percent per week (calculated as the sum of  $\alpha_i^{PRE}$ , 0.31 percent per week, and the  $\alpha_i^{POST}$ ,  $-0.53$  percent per week). This suggests that the abnormal returns performance around interlistings is robust to changes in expected returns that are captured by shifts in risk exposure.

Table V also reports similar results by groups of firms according to home region. We find some important differences. First, the dramatic shift in local market betas is evident for the Australian stocks.  $\beta_L$  falls by 0.52 from 1.36 during the prelisting period to 0.84 during the post-listing period;  $\beta_W$  increases by 0.22 from 0.08 to 0.30, although the prelisting global beta is not significantly different from zero, nor is the change in the global beta. For the Canadian firms, the significant positive abnormal prelisting returns (0.49 percent per week) and negative abnormal postlisting returns (0.92 percent lower or  $-0.43$  percent per week) obtain, as in Foerster and Karolyi (1993). Unlike other markets, however, neither the local market beta nor the global market beta change is significant during the postlisting period. Firms from the European and Asian subsample of ADRs retain the familiar increase in prelisting abnormal returns, but do not yield a significant decline in postlisting abnormal returns. The local market betas do drop significantly, by 0.08 from 0.87 to 0.79 for Europe and by 0.90 from 1.23 to 0.33 for Asia, and the global beta increases slightly for Europe but decreases for Asia, although neither change is significant. Finally, the U.K. ADRs generate negative postlisting abnormal returns, and significant declines in both local betas (by 0.52 from 1.00 to 0.48) and global betas (by 0.25 from 0.17 to  $-0.08$ ). One possible implication of the significant decrease in local betas combined with the lack of significant increase in global betas suggests these firms appear to be successful in lowering their cost of equity, and hence cost of capital, by interlisting their stock on U.S. exchanges.

In order to observe the time series patterns in abnormal returns in event time, we compute estimates of the two-factor IAPM model using Ibbotson's (1975) Regression across Time and Securities (RATS) model. That is, we reestimate equation (2) pooled across all securities (and by regional groups), but in event-time on a week-by-week basis. We obtain estimates of the coefficients for each week  $\tau$ , where  $\tau$  runs from  $-52$  to  $+52$ , and where the listing week corresponds to  $\tau$  equal to zero. The cumulative values for the  $\alpha_i$ 's are computed. Figure 2 exhibits the results overall and by region. The cumulative abnormal returns pattern for the Australian and Canadian firms follow most clearly the prelisting run-up and postlisting decline. The drop for the Australian stocks occurs during week 5, whereas that for the Canadian stocks is more gradual. The cumulative abnormal returns for the European and U.K. firms follow a general increase for the entire pre- and postlisting period. The Asian ADRs demonstrate no discernible pattern at all.



**Figure 2. Cumulative abnormal excess returns for global listings in the United States by region.** Cumulative abnormal excess returns are computed weekly using Ibbotson (1975) RATS (Regression Across Time and Securities) in event time using a two-index IAPM model for local currency excess returns with a local market index (Appendix B) and Datastream International's World Index. The intercept coefficients from each weekly regression are cumulated over the 52 weeks before and after listing. Data are obtained from Reuter's Exshare International Securities Database using Reuterlink on-line data service and supplemented with various local periodicals. The returns are computed in excess of weekly one-month Euromarket yields obtained from Harris bank quote sheets.

In summary, we compute measures of abnormal returns for a cross-section of global listings before, around, and following their U.S. listing. The pattern of a prelisting price run-up, listing week increase, and postlisting decline is robust even after accounting for statistically important risk changes around the listing. These abnormal return patterns also differ by region, though caution should be exercised as these regional subsamples are smaller. In the next section, we attempt to shed further light on these results by examining whether there are important differences in these abnormal returns that are related to firm-specific variables, such as the listing location, the industry group to which the firm belongs, or the type of listing.

*E. Univariate Cross-Sectional Tests*

In this section, we recompute weekly abnormal excess returns and betas for each firm based on 153 univariate time-series regressions as in equation (2). We cumulate across event time  $\alpha$ 's, as appropriate, to compute listing and postlisting abnormal returns and perform a series of cross-sectional tests based on the univariate abnormal returns and changing betas. Table VI reports dummy variable regression results of the abnormal returns and changing betas as the dependent variables with dummy variables as the independent variables based on different regions, exchanges, industries, and listing type. Average weekly abnormal excess returns are 0.15 percent in the prelisting period, 0.12 percent in the listing week, and  $-0.14$  percent in the postlisting period. The fraction of firms with positive abnormal returns in the prelisting period is 61 percent versus 52 percent around listing and 50 percent in the postlisting period. The differences across regions indicate similar patterns to those uncovered above. When we test whether the regional differences are significant, we do not reject the null in the prelisting and postlisting period but reject the null in the listing period itself. When comparing the abnormal returns for global listings by exchange location, we find no significant differences on average. The NYSE listings seem to generate higher positive abnormal returns, not only in the prelisting period but also in the listing period as well as smaller declines than AMEX and Nasdaq firms following listing. However, the  $\chi^2$ -statistics suggest the differences are not significant.

Industry differences are not an important factor in general. For the prelisting period, the abnormal returns increase consistently but differences range from as low as  $-0.27$  percent per week for the technology stocks to  $0.42$  percent per week for industrial stocks. Similarly, the postlisting decline for the technology stocks is the highest, and contrasts with the postlisting increase observed for the utilities. The  $\chi^2$  test suggests the postlisting results are measurably different by industry at the 10 percent significance level. These postlisting returns results are consistent with earlier findings of differences across industry sectors in Foerster and Karolyi (1993) and complement those studies examining the important role of industrial structure in international diversification strategies.<sup>19</sup>

We also investigate whether there are possible confounding effects between industries and exchanges. For example, if technology stocks tend to list on Nasdaq, then any apparent differences across exchanges may actually be the result of differences across industries. To examine this, we rerun cross-sectional regressions including both industry and exchange dummies (to preserve space, results are not presented). We then test for differences across industries (after controlling for exchanges) and for differences across exchanges (after controlling for industries). In the prelisting period, abnor-

<sup>19</sup> Roll (1992), Heston and Rouwenhorst (1994), and Griffin and Karolyi (1998) debate the importance of industry and country factors in international stock returns. Recent evidence is also found in Karolyi and Stulz (1996).

**Table VI**  
**Mean Abnormal Returns and Changing Local and Global Beta by**  
**Variables Related to Home Region, Choice of U.S. Exchange,**  
**Industry Group, and Capital Raising**

Abnormal returns are computed using regression model estimates of excess returns from before listing (weeks  $-52$  to  $-1$ ), listing week (week  $0$ ), and postlisting periods (weeks  $+1$  to  $+52$ ) for an IAPM model using excess returns of local market index and global index. Distributions of firms by region, U.S. exchange location industry group, and capital raising are provided in Table II.  $\Delta\beta^{LO}$  and  $\Delta\beta^{WO}$  are the differences between the prelisting and postlisting betas relative to the local market and global market, respectively. Abnormal returns are computed separately for each firm using local currency excess returns.  $\chi^2$  denotes a robust Wald test of the difference between the mean abnormal returns across different groupings. Tests for significance use Newey and West (1987) robust  $t$ -statistics. Wald tests and binomial Z-tests for percentage of positive/negative abnormal returns are indicated for significance at the 10 percent \* and 5 percent \*\* levels, respectively.

Category	Abnormal Returns			Beta Changes	
	Prelisting $\alpha_i^{PRE}$ ( $-52, -1$ )	Listing $\alpha_i^{LIST}$ (week 0)	Postlisting $\alpha_i^{POST}$ ( $+1, +52$ )	Change in Local Beta $\Delta\beta_{iL}$	Change in Global Beta $\Delta\beta_{iW}$
Overall					
Mean	0.0015*	0.0012	-0.0014	-0.3209**	0.1349
Percentage Positive	60.78%**	51.63%	50.32%	39.86%**	53.59%
By region					
Australia	0.0052	-0.0276	-0.0016	-0.4904	0.1388
Canada	0.0034	0.0060	-0.0038	-0.1388	0.1910
Europe	-0.0055	-0.0179	0.0007	-0.3674	0.4536
Asia	0.0016	0.0099	0.0011	-1.0679	-0.0739
United Kingdom	0.0019	0.0135	0.0007	-0.3367	-0.1372
Adjusted $R^2$	3.25%	2.61%	2.98%	3.66%	2.21%
$\chi^2$	5.52	12.29**	6.83	7.94*	5.886
By exchange					
NYSE	0.0027	0.0100	-0.0011	-0.4075	-0.0790
AMEX	0.0071	-0.0047	-0.0037	0.0268	0.0563
NASD	-0.0002	-0.0045	-0.0014	-0.3042	0.3021
Adjusted $R^2$	1.30%	0.71%	0.27%	0.75%	1.88%
$\chi^2$	3.58	1.62	0.35	1.64	3.75
By industry					
Industrial	0.0042	-0.0029	-0.0001	-0.2508	-0.0990
Resource	0.0001	0.0026	-0.0034	-0.2974	0.2369
Consumer	0.0021	0.0079	-0.0007	-0.3407	-0.0037
Financial	0.0015	-0.0004	-0.0002	-0.4739	0.1097
Technology	-0.0027	-0.0145	-0.0042	-0.2866	0.8240
Utility	0.0011	0.0055	0.0031	-0.4510	0.1695
Adjusted $R^2$	1.08%	0.51%	2.22%	0.29%	3.23%
$\chi^2$	5.85	1.21	10.47*	1.35	4.64
By level					
Capital Level (III)	0.0013	0.0025	0.0017	-0.3922	-0.0765
No capital Level (II)	0.0016	0.0009	-0.0023	-0.3028	0.1886
Adjusted $R^2$	0.04%	0.01%	1.62%	0.01%	0.63%
$\chi^2$	0.02	0.02	7.22**	0.20	3.05*

\*\*, \* indicate significance at the 5 and 10 percent levels, respectively.

mal returns are not significant across industries, but are marginally significant across exchanges (with a  $\chi^2$   $p$ -value of 0.103). During the listing week, abnormal return differences are not significant across either group. In the postlisting period, abnormal returns are significantly different across industries (with a  $\chi^2$   $p$ -value of 0.004), but are not across exchanges.

Capital raising differences provide surprising results. One hypothesis suggested by Dharan and Ikenberry (1995) is that postlisting negative stock returns following Nasdaq and AMEX listings on the NYSE can be explained by managers of firms acting opportunistically in timing their listing. These managers, typically of smaller firms, strategically apply for listing just before a decline in performance. Dharan and Ikenberry refer to this as the opportunism hypothesis. They also offer this explanation for the equity issuance postlisting decline for U.S. initial public offerings (IPOs) and seasoned equity offerings (SEOs) uncovered by other studies, such as that by Loughran and Ritter (1995). One possible explanation for the postlisting negative abnormal returns for the ADRs around their listing in the United States is that the managers of these firms are timing their listing and equity issuance precisely when poor fundamental performance will follow. Our results in Table VI show that in the prelisting and listing periods both firms that raised capital through ADRs and those that did not experience positive abnormal excess returns and these returns are not significantly different across the two groups. However, in the postlisting period, capital-raising firms experience positive abnormal returns (weekly 0.17 percent, or annualized 8.84 percent) but non-capital-raising firms experience negative abnormal returns (weekly, -0.23 percent, or annualized -11.96 percent). The differences across the two groups are statistically significant. These results are contrary to findings in the IPO/SEO literature which show that firms that raise capital tend to experience subsequent negative abnormal returns. For example, Loughran and Ritter find a post-issue abnormal decline of 4.5 percent for IPOs in the first year and a decline of 6.3 percent for SEOs. Our results suggest global equity secondary offerings may differ from domestic equity offerings. A more extensive investigation of this issue is warranted, but is beyond the scope of this paper.

Table VI also presents results related to cross-sectional differences of changing local betas and global betas. Overall, firms experience a significant decline in local betas. On average, postlisting local betas are 0.32 below the level of prelisting betas. Furthermore, more than 60 percent of the firms experienced a decline. In contrast, world betas tend to increase by 0.13, on average, but only 54 percent of the firms experience an increase, and the postlisting beta is not significantly different from the prelisting beta. Changes in local betas are significantly different across regions. Canadian firms experience the smallest decrease in local betas, followed by U.K. firms; Asian firms experience the largest declines. Firms from Australia, Canada, and Europe experience increases in global betas; firms from Asia and the U.K. experience declines, although differences in global beta changes are not significant ( $\chi^2$   $p$ -value of 0.210). There are no significant differences in either

local or global beta changes across exchanges or industries. In fact, local beta changes are consistently negative across all industries and two of three exchanges. Both capital-raising firms and non-capital-raising firms experience local beta declines of similar magnitudes, but significant differences appear for the changing global betas. Capital-raising firms experience a decline in global betas, non-capital-raising firms experience an increase.

#### IV. Abnormal Returns, Betas, Liquidity, and Changes in the Shareholder Base

Although our findings on share price patterns around global cross-listings are generally consistent with the market segmentation hypothesis, we propose in this section two alternative hypotheses that associate the share price effects to changes in the underlying liquidity in the market for the shares and to changes in the shareholder base. Foreign firms seeking access to U.S. markets often cite these as two key factors in their decision to list abroad (see Karolyi (1998)) but they are just as likely to influence U.S. firms that may simply seek to change trading location (i.e., from Nasdaq to the NYSE). In fact, existing research on domestic listings, such as Christie and Huang (1993) and Kadlec and McConnell (1994), links the effects of listing choices on share prices, liquidity, and changes in the shareholder base to theoretical models developed by Amihud and Mendelson (1986) and Merton (1987). In this section, we follow these studies on domestic listings and describe the Amihud–Mendelson and Merton models, outline the new tests for global cross-listings, and present key findings.

##### A. Merton's (1987) Investor Recognition Hypothesis

Merton's (1987) capital market equilibrium is different from that of the Sharpe–Lintner CAPM in that investors consider only securities of which they are aware, an assumption about incomplete information. With this assumption, Merton shows that expected returns depend on factors other than just market risk. Specifically, the shadow cost of incomplete information for stock  $i$  is given as

$$\lambda_i = \delta \sigma_i^2 x_i (1 - q_i) / q_i, \quad (3)$$

where  $\delta$  is the coefficient of aggregate risk aversion,  $\sigma_i^2$  is the firm-specific component of the stock's return variance,  $x_i$  is the relative market value of the firm, and  $q_i$  is the size of the firm's investor base relative to the total number of investors. The relationship between the actual expected excess return of the stock,  $E(R_i)$ , and the expected excess return for the complete information case (where  $q_i$  equals 1),  $E(R_i^*)$ , is

$$E(R_i) - E(R_i^*) = \lambda_i E(R_i^*) / R_0, \quad (4)$$

where  $R_0$  is the return on the zero-beta asset. The intuition behind the result is that since investors consider only a part of the opportunity set, full diversification is not possible and firm-specific risk is priced in equilibrium. Moreover, this firm-specific risk is weighted by the relative market value of the firm and its shareholder base. For firms with a relatively small shareholder base, these factors are likely to be very significant on average. Indeed, firms would have incentives to incorporate policies that actively expand the investor base of the firm's shares. For non-U.S. firms cross-listing their shares in the United States, we know that this is one of the primary motivations.<sup>20</sup>

We construct an empirical proxy for the shadow cost of incomplete information,  $\lambda_i$ , for each firm, following Kadlec and McConnell (1994). Specifically, we measure the change in  $\lambda$  around the interlisting by

$$\Delta\lambda_i = \sigma_{ei}^2 SIZE_i (1/SHR_{t+1} - 1/SHR_t), \quad (5)$$

where  $\sigma_{ei}^2$  is the residual variance from our two-factor IAPM benchmark model regressions, as in equation (2);  $SIZE_i$  is the U.S.-dollar market capitalization of the firm as measured by the price of the stock in week 0 and the number of shares outstanding, and is normalized by the level of the Datastream International World Stock index value in the listing week;<sup>21</sup> and  $SHR_t$  is the number of shareholders of record in the year before ( $t$ ) and after ( $t + 1$ ) listing. The data on the number of shares outstanding and the shareholders of record are obtained from various publications of *Moody's International Manuals* in the year before and after listing. Due to data availability, our sample is pared down slightly to 145 firms.

In Section II and Table II, we demonstrate that firms experience an increase in their shareholder base by about 28.8 percent. The investor recognition hypothesis of Merton (1987) suggests that the abnormal returns experienced by firms during the pre- and postlisting period may be due to changes in the shareholder base, adjusted by the stock's residual variance and relative size. We follow Kadlec and McConnell (1994) and use cross-sectional regressions, such as

$$\alpha_i = \gamma_0 + \gamma_1 \Delta\lambda_i + e_{it}, \quad (6)$$

where  $\alpha_i$  is the pre- or postlisting or listing week abnormal returns.<sup>22</sup> Given that  $\Delta\lambda_i$  is negative for most firms with an increase in shareholder base, we expect that  $\gamma_1$  will be significant and negative in the cross-sectional regressions.

<sup>20</sup> See Fanto and Karmal (1997) for a recent survey of corporate financial officers from overseas companies that listed their shares in the U.S. for the first time.

<sup>21</sup> We regress the capitalization value of each firm cross-sectionally on a constant and the value of the Datastream International World Index (where January 1, 1975, equals 100). The relative market value is computed as the residuals from this regression.

<sup>22</sup> Note that this estimation suffers from an error-in-variables problem. Due to the estimation error in  $\Delta\lambda_i$ , this would imply that the coefficient  $\gamma_1$  is likely biased to zero.

We also investigate a cross-sectional relationship between changing betas (both local and global) and changing shareholder base; that is, in separate regressions, we replace the dependent variable,  $\alpha_i$ , of equation (6) with  $\Delta\beta_L$  and  $\Delta\beta_W$ , respectively. Changing betas reflect changes in the assessments by the marginal investor of the domestic and global risk exposures of the firm and, as a result, changes in the market's expectation of its future returns. The Merton hypothesis would then predict a positive coefficient on  $\Delta\lambda_i$  for these beta changes because an increase in  $\Delta\lambda_i$  due to a larger investor base should be associated with a decrease in covariance risk and thus the cost of capital.

### *B. Amihud and Mendelson's (1986) Liquidity Hypothesis*

Amihud and Mendelson (1986) develop an equilibrium asset pricing model in which gross returns are shown to be an increasing and concave function of liquidity. They proxy for liquidity using the bid-ask spread. In notational form, the gross return required by investor  $i$  on asset  $j$  is

$$E(R_j^i) = R_i^* + \mu_i S_j, \quad (7)$$

where  $R_i^*$  is the required spread-adjusted return and  $\mu_i S_j$  is the expected liquidation cost (i.e., the investor's liquidation probability,  $\mu_i$ , times the asset's relative spread,  $S_j$ ). If spreads drop following listing, the lower expected returns required by investors should give rise to an increase in share value.

Unlike studies of the share price and liquidity impact of Nasdaq firms listing on the AMEX or the NYSE, no data on bid-ask spreads in home markets are systematically available for the cross-section of non-U.S. firms. In a domestic setting, Christie and Huang (1993) and Kadlec and McConnell (1994) show that Nasdaq listings on the NYSE enjoy uniformly lower spreads and that these changes are associated with abnormal returns for these firms around listing. We propose to test this liquidity hypothesis of Amihud and Mendelson (1986) indirectly by allowing the dependence of the abnormal returns in the prelisting, postlisting, or listing weeks themselves in the regression model of equation (6) to be differentially sensitive for NYSE, AMEX, and Nasdaq listings. We employ a series of controls associated with the size of the firm, whether it is a Level III capital-raising ADR or not, and, if so, the size of the new issue. We also investigate changing betas in a similar manner.

### *C. Multivariate Cross-Sectional Tests*

Table VII presents the cross-sectional regressions of the abnormal returns. Four different models are examined using the abnormal returns as measured by the two-factor IAPM. We present regressions for the abnormal returns from the pre- and postlisting periods and for the listing weeks in

**Table VII**  
**Regressions of Abnormal Returns for Global Listings on Variables Related to Size, Shareholder Base, and Size of New Issue**

Abnormal excess returns are computed for listing week (0) using an IAPM regression model and mean abnormal returns from the intercept of the same model for before listing period (weeks  $-52$  to  $-1$ ) and after listing period (weeks  $+1$  to  $+52$ ). Variables related to relative market capitalization (*SIZE*), change in shareholder base (*SHR<sub>t</sub>* for before and after listing), capital raising dummy (*ICAP*) and issue size (*ISSUE*) are as in Table II. Market incompleteness factor ( $\Delta\lambda$ ) is from Merton (1987) based on Kadlec and McConnell (1994):

$$\Delta\lambda = (\sigma_{\epsilon}^2 \text{SIZE}) \cdot (1/\text{SHR}_{t+1} - 1/\text{SHR}_t),$$

where  $\sigma_{\epsilon}^2$  is the residual variance from IAPM model regression before listing period. Abnormal returns are computed separately using local currency and U.S. dollar denominated returns.  $R^2$  is the adjusted coefficient of determination.  $t$ -statistics use Newey and West (1987) standard errors corrected for heteroskedasticity and serial correlation.

Variable	Prelisting Abnormal Returns				Listing Period Abnormal Returns				Postlisting Abnormal Returns			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Constant	0.0015*	0.0020*	0.0021*	0.0014*	0.0013	-0.0022	-0.0019	0.0007	-0.0014	-0.0016	-0.0015	-0.0015
SIZE ( $10^{-9}$ )	-0.0822		-0.0868		0.0538		0.0656		0.0315		-0.0423	
$\Delta\lambda$	-0.2401**		-0.2404**	2.2006	-1.2738		-1.2710	0.4640**	-0.4514**		-0.4450**	0.0283
ICAP		-0.0011	-0.0010*			0.0071	0.0069			0.0028*	0.0028*	
ISSUE ( $10^{-6}$ )		0.0433	0.0516			-0.3023	-0.3088			0.0649**	0.0689**	
$\Delta\lambda$ (AMEX)				-3.7026				-0.5525**				-0.0449
$\Delta\lambda$ (NASD)				-2.3490				-0.4716**				-0.0319
$R^2$	0.24%	0.02%	0.27%	0.52%	0.24%	0.05%	0.29%	0.98%	1.36%	1.72%	3.03%	2.04%

\*\*, \* indicate significance at the 5 and 10 percent levels, respectively.

three panels. In each regression, we report the coefficient estimates, denoted as statistically significant based on robust  $t$ -statistics from Newey and West (1987) standard errors, and adjusted  $R^2$ .

The first regression shows that the abnormal returns around the listings are not significantly related to the market value of the firm, but are negatively related to Merton's market incompleteness factor. The coefficient on  $\Delta\lambda$  is  $-0.24$  for the prelisting period. During the listing weeks, we find that the relationship is still negative on  $\Delta\lambda$  at  $-1.27$ , but the relationship is not significant. Finally, in the postlisting period, the coefficient on  $\Delta\lambda$  is of the expected sign,  $-0.45$ , and statistically significant at the 5 percent level. These results are supportive of the Merton hypothesis and consistent with Kadlec and McConnell (1994).

When the size and Merton incompleteness factors are introduced into the regressions of abnormal returns, the intercept term is statistically indistinguishable from zero in the listing and postlisting periods. However, with  $R^2$  measures at approximately one percent, it appears that these two variables cannot explain much of the cross-sectional variation in abnormal returns across the 145 firms. The explanatory power is likely low due to measurement errors in the incompleteness factor. Nevertheless, we interpret these multivariate cross-sectional regression results as consistent with the investor recognition hypothesis because  $\Delta\lambda$  is generally significant and is consistently of the expected negative sign.

To gauge the robustness of these tests, we consider confounding influences of other firm-specific variables, such as the type of ADR issue. For example, we control for whether the ADR listing is Level III (capital-raising) and measure the size of the new issue. Regression (2) in Table VII demonstrates that the dummy variable for a capital-raising ADR (*ICAP*) is statistically significant and positive in the post-listing period. The positive *ICAP* coefficient in the postlisting period confirms our previous analysis presented in Table VI and suggests that the general postlisting negative abnormal return pattern is mitigated for firms that raise capital. Furthermore, the positive and significant *ISSUE* coefficient in the postlisting period suggests the postlisting decline is even more offset for larger issues. We combine the *SIZE*,  $\Delta\lambda$ , *ICAP*, and new issue variables in regression (3) and find that the statistical significance of the negative  $\Delta\lambda$  and positive *ICAP* coefficient in the postlisting period is similar in the joint regression. As discussed earlier, this finding that capital-raising ADR issues yield positive abnormal postlisting returns is surprising given the U.S. IPO/SEO findings of Loughran and Ritter (1995).

To test the Amihud and Mendelson (1986) liquidity hypothesis, we allow the coefficient on the Merton incompleteness factor to interact with a dummy variable for the NYSE, AMEX, and Nasdaq. We know from Table VI that the average abnormal returns in any of the subperiods around interlisting are not different by exchange listing location. However, studies by Christie and Huang (1993) and Kadlec and McConnell (1994) show important liquidity effects for Nasdaq stocks listing on the NYSE. Regression model (4) indicates that the impact of changes in the shareholder base around listings for

these firms does matter. In both the prelisting and postlisting periods, none of the coefficients are significant. However, in the listing period, the AMEX and Nasdaq  $\Delta\lambda$  coefficients are significantly negative and the NYSE coefficient is significantly positive. If the NYSE is viewed as a more liquid market than the AMEX or Nasdaq, then these results are inconsistent with the liquidity hypothesis of Amihud and Mendelson (1986). More likely, these results represent only an indirect test of the liquidity hypothesis at best and should be interpreted with caution.

Finally, we examine the relationship between changing betas and shareholder base, as captured by  $\Delta\lambda$ . We repeat the four regressions described above using either the change in local betas or the change in global betas as the dependent variable. Results are presented in Table VIII. Coefficients are generally not significant, but the signs on  $\Delta\lambda$  are positive, which implies that the decline in local and global betas is positively associated with an increase in shareholder base. To the extent that the decline in betas can be interpreted as a lowering of the firm's cost of equity, we find evidence once again consistent with Merton's investor recognition hypothesis. The only statistically significant results obtain for regression (4), which allows  $\Delta\lambda$  to vary by exchange. In the case of both local betas and global betas, the NYSE coefficient is positive and the AMEX and Nasdaq coefficients are negative. This finding suggests that the overall statistical insignificance may stem from an averaging of the effect across exchanges: the lower betas, and potentially lower cost of equity, derive primarily from the NYSE cross-border listings. Again, the explanatory power of these cross-sectional tests is limited and results should be interpreted with caution.

## V. Conclusions

We document the effect on share value and global risk exposures of a non-U.S. firm listing on U.S. exchanges. Our sample consists of 153 firms from 11 countries that listed their shares for the first time in the United States directly or as ADRs during the period from 1976 to 1992. We find that these stocks earned a significant average excess return of 19 percent during the year before listing, an additional 1.20 percent during the listing week, but incurred a significant average decline of 14 percent during the year following listing. We also find that a stock's market beta relative to its home market index declines dramatically from 1.03 to 0.74 on average, but its global beta relative to the world market index does not change significantly.

Existing studies have interpreted the dramatic patterns in share values around cross-border listings as evidence of market segmentation due to direct or indirect investment barriers. To the extent that a higher risk premium is built into the expected returns of such stocks as compensation for these investment restrictions, the cross-border listings in the United States overcome these barriers and their stock prices adjust accordingly. We find the evidence generally consistent with the market segmentation hypothesis. However, we uncover two other possible explanations for the abnormal return patterns for cross-border

**Table VIII**  
**Regressions of Changing Local and Global Betas for Global Listings on Variables Related to Size, Shareholder Base, and Size of New Issue**

We estimate an IAPM market model regressions of firm excess returns on a constant, a local market index (Appendix B) excess return (in excess of a local/regional one-month Euromarket yield), and a global index (Datastream International World Index) excess return (in excess of the one-month U.S. yield). Changes in local and global betas are based on estimates from the prelisting period (weeks  $-52$  to  $-1$ ) and postlisting period (weeks  $+1$  to  $+52$ ). Variables related to relative market capitalization (*SIZE*), change in shareholder base (*SHR*<sub>*t*</sub> for before and after listing), capital raising dummy (*ICAP*), and issue size (*ISSUE*) are as in Table II. Market incompleteness factor ( $\Delta\lambda$ ) is from Merton (1987) based on Kadlec and McConnell (1994):

$$\Delta\lambda = (\sigma_e^2 \text{SIZE}) \cdot (1/\text{SHR}_{t+1} - 1/\text{SHR}_t),$$

where  $\sigma_e^2$  is the residual variance from IAPM model regression before listing period. Abnormal returns are computed separately using local currency and U.S. dollar denominated returns.  $R^2$  is the adjusted coefficient of determination. *t*-statistics use Newey and West (1987) standard errors corrected for heteroskedasticity and serial correlation.

Variable	Changes in Local Betas				Changes in Global Betas			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Constant	-0.3237**	-0.2963**	-0.2988**	-0.3401**	0.1330	0.1699	0.1695	0.1402
SIZE ( $10^{-8}$ )	-0.4293		-0.3160		-1.0932*		-0.6912	
$\Delta\lambda$	0.2241		0.2229	14.236**	0.1564		0.1525	9.3731**
ICAP		-0.1014	-0.0930			-0.2307	-0.2170	
ISSUE ( $10^{-5}$ )		0.6510	0..9599			-1.8735	-1.2029	
$\Delta\lambda$ (AMEX)				-15.934**				-7.2099*
$\Delta\lambda$ (NASD)				-13.879**				-9.3592**
$R^2$	0.38%	0.08%	0.44%	2.63%	0.39%	0.64%	0.87%	2.04%

\*\*,\* indicate significance at the 5 and 10 percent levels, respectively.

listings which stem from the larger shareholder base and the greater liquidity that these firms achieve upon listing in the United States. We show that a proxy for a market incompleteness factor, which captures the impact of a heightened level of investor recognition, is significantly related to the abnormal patterns in the pre- and postlisting periods. This market incompleteness factor derives from the incomplete information asset pricing model of Merton (1987). We also offer evidence that the statistical importance of this increased investor recognition is sensitive to the listing location of the non-U.S. firm. Finally, a surprising finding is that the postlisting decline of abnormal returns for these cross-border listings is mitigated for those firms that raise capital at the same time. This contrasts with the existing evidence on the long-run underperformance of equity issuances via IPOs and SEOs in the United States, and poses an interesting challenge for future research.

### Appendix A. Sample Firms and Listing Dates

	Date (yr/mo/day)		Date (yr/mo/day)		Date (yr/mo/day)
<b>Australia:</b>		<b>Canada (continued):</b>		<b>Canada (continued):</b>	
Boral	920319	Giant Bay Res	870121	Scintilore Res	831007
Broken Hill Prop	870528	Gold Knight Res	841024	Sonora	860731
Central Pacific	810312	Goldex	890112	Sceptre Res	820402
Coles Myer	881031	Greenstone Res	890112	Softkey Softward	901001
FAI Insurance	880928	Granges	860618	Tudor	880304
Natl Australia Bank	880624	Healthcare	881110	Tee Comm	920828
News Corp	860520	Hemlo Gold	920115	Total Energold	880923
Orbital Engine	911204	Horsham	900115	Transcda Pipelines	850530
Pacific Dunlop	870702	Highwood Res	820226	Westburne Intl.	780510
Santos	810321	Corona	880729	Wharfe Res	830201
Southern Pacific	810312	Intl Platinum	890526		
Western Mining	900102	Intercity Products	780901	<b>France:</b>	
Western Pacific	890317	IPSCO	911217	Alcatel Alsthom	920520
		Intl Colin Energy	910515	LVMH Motet	871023
<b>Canada:</b>		Lac Minerals	850731	Societe Elf Aquitaine	910614
American Barrick	850125	Laidlaw	831021	Thomson	860723
Aber Res	890320	Loewen	900515	Total	911025
BCE Inc	760818	Magna Intl	840823		
BII Enterprises	920804	Mitel	810518	<b>Hong Kong:</b>	
Belmoral Res	880104	Mirtronics	861202	Hong Kong Teleph	881223
Bunker Hill	900530	MSR Explorations	830913		
Central Fund Cda	860610	Minven Gold	891207	<b>Italy:</b>	
Centurian Gold	881003	Norcen Energy	890328	Benetton	890609
Consolidated Merc	860822	NHI Nelson	870626	Fiat	890214
Cornucopia Res	881003	Northern Telecom	751110	Montedison	870716
Consolidated Prof	820127	Nova Corp	880613		
Cineplex Odeon	870514	Newfield Mines	880314	<b>Japan:</b>	
Cognos	870701	Noweco Wells	770314	CSK	830830
Davidson Tisdale	850225	Petromet	880616	Hitachi	820414
Deprenyl	890808	Pegasus	820823	Honda	860523
Dickenson Mines	810114	Pop Shoppes	770603	Kubota	761109
Dreco Energy	900618	Quadra Logic	881025	Makita	770125
ECO Corp	900126	Quebec Sturgeon	830125	Mitsubishi	890919
Energex	870803	Rea Gold	850328	Pioneer	761213
Eastmaque Gold	870904	Repap Res	880202	Sanyo	770401
Fahnestock Vine	860828	SHL Systemhouse	850614	TDK	820515
				Wacoal	890428

## Appendix A—Continued

	Date (yr/mo/day)		Date (yr/mo/day)		Date (yr/mo/day)
<b>Netherlands</b>		<b>Sweden:</b>		<b>United Kingdom (continued):</b>	
Aegon	911105	AB Electrolux	870701	Grand Metropolitan	910313
Ahold	910408	AB SKF	851025	Hanson	861103
Akzo	890508	ASEA AB	830815	Huntingdon Intl	890216
Oce Van Grinten	841101	AB Volvo	841203	Imperial Chemical	831101
Philips	870414			LEP Group	880930
		<b>United Kingdom:</b>		London Intl Group	901002
<b>Norway:</b>		Allied Irish Banks	890912	Medeva	910930
Hafslund Nycomed	920624	Attwoods	910412	Micro Focus Group	920526
Norsk Data	830210	Auto Security	920714	Natl Westminster	861022
Norsk Hydro	860625	Barclays	860909	Ratners Group	880713
		Bass	900216	Royal Bank of Scot	891016
		Beazer	870605	RTZ Corp	900628
<b>Portugal:</b>		BET	870806	Saatchi & Saatchi	871208
Banco Comercial	920612	Cable & Wireless	890927	Smithkline Beecham	890727
		Cadbury Schwepp	840911	Tiphook	911001
<b>Spain:</b>		Carlton Commun.	870130	Tomkins	881107
Banco Bilbao Vizca	881214	CRH	890710	United Newspapers	870828
Banco Central	830720	Danka Business	921217	Waterford Wedgwood	870128
Banco De Santander	870730	ECC Group	920430	Wellcome	920727
Empresa Electricidad	880601	ELAN Corp	910103	Willis Corroon	901009
Telefonica Espana	870612	Glaxo Holdings	870610	WPP Group	871229

## Appendix B. Local Market Indexes

Australia	All-Ordinaries (275)	Norway	FT-Actuaries-Norway
Canada	TSE-Western Index	Portugal	Lisbon BPA
France	CAC Broad Index	Spain	Madrid Gesant Index
Hong Kong	Hang Seng Index	Sweden	J-P Index (40)
Italy	BCI-Milan 260 Index	United Kingdom	FT-Actuaries UK
Japan	Topix Index	United States	Standard & Poor 500
Netherlands	Morgan Stanley Capital International		

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