



American Finance Association

What If Trading Location Is Different from Business Location? Evidence from the Jardine Group

Author(s): Kalok Chan, Allaudeen Hameed, Sie Ting Lau

Source: *The Journal of Finance*, Vol. 58, No. 3 (Jun., 2003), pp. 1221-1246

Published by: Blackwell Publishing for the American Finance Association

Stable URL: <http://www.jstor.org/stable/3094578>

Accessed: 24/11/2009 09:11

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=black>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Blackwell Publishing and American Finance Association are collaborating with JSTOR to digitize, preserve and extend access to *The Journal of Finance*.

<http://www.jstor.org>

What if Trading Location Is Different from Business Location? Evidence from the Jardine Group

KALOK CHAN, ALLAUDEEN HAMEED, and SIE TING LAU*

ABSTRACT

We examine the price behavior and market activity of the Jardine Group companies after they were delisted from Hong Kong in 1994. Although the trading activity of the Jardine Group moved to Singapore, the core businesses remained in Hong Kong and Mainland China. Evidence indicates the Jardine stocks are correlated less (more) with the Hong Kong (Singapore) market after the delisting. This result cannot be explained by various hypotheses, such as relocation of core business, time-varying betas, migration of trading activity, and currency and tax distortions. We conclude that price fluctuations are affected by country-specific investor sentiment.

MANY COMPANIES ARE CROSS-LISTED in different countries to broaden their capital and investor base. If international financial markets are perfectly integrated, stock price movements should not be affected by their trading location. However, recent studies show that the share price of a company is excessively influenced by the market in which the stock is traded, indicating that the international markets are partially segmented. For example, Bodurtha, Kim, and Lee (1995) show that in the U.S. market, the prices of closed-end country funds are strongly affected by U.S. market movement, even though their net asset values are not. Froot and Dabora (1999) examine pairs of “Siamese twin” companies whose stocks are traded around the world and find that the difference between the prices of twin stocks appear to be correlated with the markets on which they are traded most. They interpret the results as indicating that country-specific investor sentiment influences the stock prices.

*Chan is with the Department of Finance, Hong Kong University of Science and Technology; Hameed is with the Department of Finance and Accounting, National University of Singapore; and Lau is with the Division of Banking and Finance, Nanyang Technological University. We thank an anonymous referee, Linda Allen, David Ding, Rick Green (the editor), Branson Kwok, Thomas McInish, Ingrid Werner, and seminar participants at Cornell University, Hong Kong Baptist University, Hong Kong Polytechnic University, National University of Singapore, University of Wisconsin at Milwaukee, 2000 APFA Meetings (Shanghai), 2001 FMA Meetings (Toronto), and 2002 AFA Meetings (Atlanta) for helpful comments. Chan acknowledges the financial support from the Fund for Wei Lun Fellowships (HKUST), and Hameed acknowledges the support from NUS Research Grant. Part of the work was completed when Chan was visiting National University of Singapore. All errors are our own.

In this article, we show how trading location affects the Jardine Group companies after they are delisted from the Stock Exchange of Hong Kong at the end of 1994. The Jardine Group refers to Jardine Matheson and its subsidiaries, which historically have had significant operations in Hong Kong, Mainland China, and Far East Asia. In the early 1990s, the Jardine Group accounted for more than 10 percent of the stock market capitalization in Hong Kong. Although the Jardine companies were also listed in London, Singapore, and Sydney before the Hong Kong delisting, more than 95 percent of trading volume took place in Hong Kong.¹ But after the Jardine Group failed to procure exemptions from Hong Kong's takeover regulations, five Jardine Group members—Jardine Matheson, Dairy Farm International Holdings, Hongkong Land Holdings, Mandarin Oriental International, and Jardine Strategic Holdings—canceled their listings in Hong Kong around the end of 1994. After the delisting, more than 90 percent of the trading activity for the Jardine companies flowed to Singapore.

The Jardine delisting offers a natural experiment for examining how trading behavior is affected by trading location because the primary trading location for the Jardine Group is separated from its major business location after the delisting. Many companies are listed in multiple markets worldwide, but they are usually traded on the home market where the core business is located. Furthermore, because the business hours and trading hours overlap in the home market where firm-specific information is released, the home market naturally becomes the most active trading place. It is different, however, for the Jardine Group. Although its shares are traded mostly in Singapore after 1994, the Jardine Group maintains its core business in Hong Kong and Mainland China. If the characteristics of cash flows and risk attributes remain unchanged, we should not expect their stock prices to behave differently after the delisting.

Given that the financial markets in Hong Kong and Singapore are relatively well developed, they should not be completely segmented from each other. However, as long as the international market is not fully integrated, the delisting of the Jardine Group from Hong Kong might cause the "investor clientele" to change. For example, even though Hong Kong and Singapore are in the same time zone, it is still inconvenient for small Hong Kong retail investors to trade Jardine stocks in Singapore. To trade Jardine shares, they need to place orders with Hong Kong brokers that have an office in Singapore, and they may be subject to higher commission costs, especially for small trades.² Furthermore, since the core business of Jardine companies is outside Singapore, the retail investors in Singapore find it difficult and costly to collect information about Jardine companies. Consequently, there are fewer retail investors after the delisting.

¹ Although the primary listing of the Jardine Group is in London and the secondary listing is in Hong Kong, more than 95 percent of the trading takes place in Hong Kong.

² The minimum commission cost in Hong Kong is 0.25 percent, which is typically what Hong Kong retail investors pay. After the delisting, the Jardine Group has negotiated a maximum commission of 0.5 percent with nine brokers in executing trades for Hong Kong retail investors. Although the commission cost varies for the investors, the typical commission cost paid by Hong Kong retail investors is higher after the delisting.

Compared with retail investors, institutional investors are more sophisticated and can easily obtain information about Jardine companies through real-time quotes and other instant sources of information. Furthermore, they should be indifferent to submitting their orders to the market in Hong Kong or Singapore. However, a key issue is whether institutional investors view the Jardine companies as Hong Kong companies or Singapore companies after the delisting. This issue is important because for those fund managers who use a top-down approach in the portfolio-allocation process, they first decide on the stock market before they select individual stocks. Before the delisting, Jardine stocks are included in a typical Hong Kong stock portfolio. Assuming that the demand curve is downward sloping, whenever the institutional investors trade the Hong Kong stock portfolio, there are common price pressures on Jardine shares and the Hong Kong market. After the delisting, institutional investors may trade Jardine stocks as part of a Singapore stock portfolio rather than as part of a Hong Kong stock portfolio.³ Consequently, whenever institutional investors revise their exposures to the Singapore market, there are common price pressures on Jardine shares and the Singapore market. Jardine stocks become more correlated with the Singapore market and less correlated with the Hong Kong market.

The empirical analysis of the paper focuses on the comovement of Jardine stock returns with the Hong Kong and Singapore markets. Because the Jardine Group did not relocate its business operations away from Hong Kong, the comovement with the Hong Kong market will not change. But if there is country-specific investor sentiment, the Jardine stocks will become more (less) related to the Singapore (Hong Kong) market. Our results show that after the delisting, the comovement of Jardine stock returns with the Hong Kong market is lower and the comovement with the Singapore market is higher. We also perform a few additional tests to see whether the change of comovement could be reconciled with various hypotheses, such as relocation of core business, time-varying betas, migration of trading activity, and currency and tax distortions. None of these hypotheses explain our results. In addition, we also find a significant decrease in trading activity and analyst coverage and an increase in average trading size after the delisting, suggesting the location of trade affects the investor clientele and trading interests.

Parallel to our work, a couple of concurrent studies also use the delisting event of the Jardine Group to examine other issues. Lau and McInish (2001) examine abnormal returns around the announcement dates to see whether investors anticipate the decline of trading activity after the delisting, and Carverhill and Chan (2001) build a multivariate GARCH model to investigate the time-varying correlations of Jardine stocks with Hong Kong and Singapore. An important difference between our work and these studies is that we focus on how the departure of trading location from the core business location changes the behavior of price

³ According to market participants, some fund managers who originally held Jardine stocks as part of the Hong Kong equity funds during that time sold the stocks after the delisting announcement (Hong Kong: Poor U.S. Figures Expected to Send Stocks Tumbling, 1994).

fluctuation and market activity of a stock, and we investigate explanations for these changes.

The impact of market segmentation on asset pricing has been addressed in several previous papers. For example, Errunza and Losq (1985) develop an international asset pricing model under partially segmented markets where investors in one country can buy stocks in both countries while investors in the other country are restricted to only investing in the home country. They show that the restricted securities command a risk premia that is related to its conditional market risk. A related issue that remains unaddressed is whether location of trade is a priced factor. What impact, if any, does the relocation of the trading venue have on Jardine's risk premia? Nevertheless, it is beyond the scope of the current experiment to address the issue, which we leave as an interesting avenue for future research.

The article is organized as follows. Section I describes the background of the Jardine Group. Section II presents the data and preliminary analysis. Section III discusses results related to testing the comovement of Jardine stock returns with Hong Kong and Singapore. Section IV considers alternative hypotheses and conducts further tests. Section V offers conclusions.

I. Background of the Jardine Group

The Jardine Group was the oldest trading company ("hong") in Hong Kong. It is the name commonly used to refer to Jardine Matheson and its subsidiaries, including Jardine Strategic, Jardine Fleming, Dairy Farm, Hongkong Land, Mandarin Oriental, and Jardine International Motors. The Jardine Group is under the control of the London-based Keswick brothers, who leverage their influence through a web of cross-holdings even though they have a family stake of less than 10 percent in Jardine Matheson. The Jardine Group has significant operations in Hong Kong and Mainland China. It was the largest private employer in Hong Kong and Mainland China in the early 1990s. The Hong Kong/Mainland China operations contributed about 60 percent of the Jardine Group's net profit and housed about two-thirds of its assets. According to the 1994 annual report, the Jardine Group had assets of U.S. \$11.3 billion, net income of U.S. \$453 million, and 220,000 employees. Before the delisting from Hong Kong, the Jardine companies accounted for about 10 percent of Hong Kong's stock market capitalization, and five of its companies (Jardine Matheson, Jardine Strategic, Dairy Farm, Hongkong Land, and Mandarin Oriental) were constituent stocks in the Hang Seng Index of 33 blue chip stocks.

Beginning in the early 1980s, the Jardine Group began to loosen its ties with Hong Kong. Faced with the uncertainty of Hong Kong's future after the handover in 1997, Jardine shifted its legal domicile to Bermuda in 1984.⁴ In 1988, it fended off a takeover attempt on Hongkong Land by a consortium of prominent

⁴ This was common among the Hong Kong companies. For example, during 1994, 215 of the 477 Hong Kong-listed firms were incorporated in Bermuda. (Island Hopping: Jardine Matheson Flees Hong Kong for Bermuda, 1994).

Hong Kong tycoons and the Beijing-based China International Trust & Investment Corporation. In light of the takeover threat and its bitter relationship with China, the Jardine Group decided to move its primary listing to London and keep a secondary listing in Hong Kong. When Hong Kong's Securities and Futures Commission refused to exempt Jardine from the local takeover and mergers code, Jardine Matheson and Jardine Strategic delisted from Hong Kong at the end of 1994, and Hongkong Land, Mandarin Oriental, and Dairy Farm followed by delisting in March 1995.⁵ The only company to remain in Hong Kong was Jardine International Motors. Even before they were delisted from Hong Kong, these five Jardine companies were already listed in other markets, such as Singapore, Australia, London, and the U.S. over-the-counter market. Nevertheless, more than 95 percent of the trading activity of the Jardine Group took place in Hong Kong. Figure 1 shows the timeline for their listings in various markets.

After the delisting, the shares originally traded in Hong Kong were transferred to Singapore, so that most of the trading moved to Singapore. Even though Singapore has longer trading hours than Hong Kong, the trading volume in Singapore never reached the predelisting level in Hong Kong.⁶ One reason is that after the delisting, all five Jardine companies were removed from the (Hong Kong) Hang Seng Index (HSI) and none was added immediately to the (Singapore) Strait Times Industrial Index (STII).⁷ According to Shleifer (1986) and Vijh (1994), institutional investors decrease their demand for the stocks if they are not included in a stock market index.

The regulatory environments in Hong Kong and Singapore are similar. Both the Securities Ordinance in Hong Kong and the Securities Industry Act in Singapore are based on the U.K. model. The Stock Exchange of Singapore requires financial statements to be prepared with one of the following standards: Singapore Statements of Accounting Standard (SAS), International Accounting Standard (IAS), or U.S. Generally Accepted Accounting Principles (GAAP). Before the delisting, the financial statements of the Jardine Group had been prepared based on IAS, so it did not need to change the accounting standard.⁸ In both markets, listed companies must notify the stock exchanges of any events that will affect share price, such as substantial acquisitions, major transactions, and connected transactions. They are also required to make public

⁵ After the delisting, the Jardine Group was governed by Bermuda's takeover code. On paper, Bermuda's takeover code is slightly tougher than Hong Kong's: A 30 percent stake triggers a general offer, as opposed to 35 percent in Hong Kong; and potential raiders must disclose their holdings after buying 1 percent of the shares, versus 5 percent in Hong Kong. These provisions helped the Keswick brothers secure control of the Jardine Group.

⁶ Both Hong Kong and Singapore have morning and afternoon trading sessions. During our sample period, the trading hours in Hong Kong were from 10:00 to 12:30 and from 14:30 to 15:45 (15:55) in 1994 (1996), and the trading hours in Singapore were from 9:00 to 12:30 and 14:00 to 17:00.

⁷ In 1996, none of the Jardine stocks was part of the STII. On August, 28, 1998, the STII was replaced by a 55-stock Straits Times Index. Jardine Matheson and Hongkong Land are now part of the new Straits Times Index.

⁸ We also checked their annual reports from 1993 to 1998 and confirmed that they did not change the reporting requirement as a result of delisting from Hong Kong.

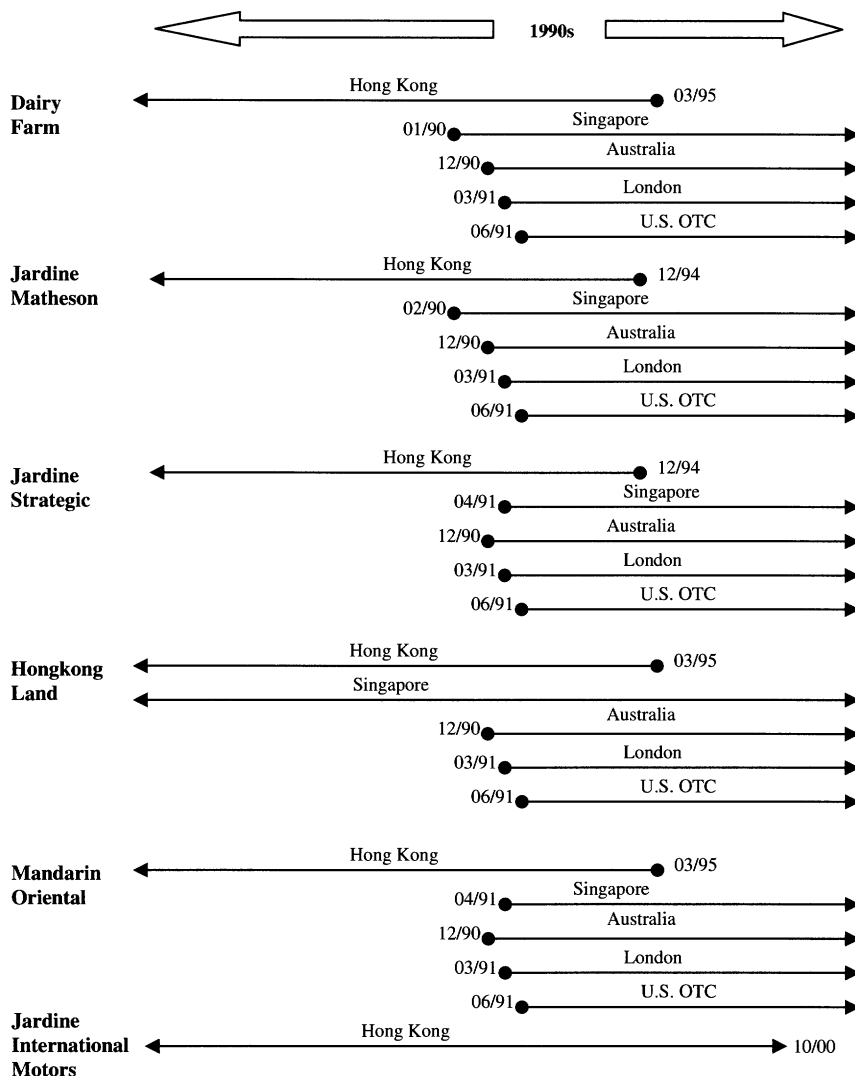


Figure 1. Timeline of the listing periods of five Jardine Group companies in various markets. Note: Jardine International Motors was listed only in Hong Kong, and was delisted after it was acquired in October 2000.

disclosure of any other events that may affect their share prices. In addition, listed companies must announce semi-annual results. Hong Kong companies must submit the report within four months of the period end, and Singapore companies must do it within three months. Another notable difference in the regulations governing the two markets is in the takeover rules. In Hong Kong, the trigger point for control is a holding of 35 percent of the voting rights. When a shareholder crosses this point, he/she must make a general offer for the rest of the shares. In Singapore, the trigger point is 25 percent of the voting rights. By

moving their secondary listings from Hong Kong to Singapore, the Keswick brothers found it easier to retain control of the Jardine Group.⁹

II. Data and Preliminary Analysis

A. Data

The analysis is based on daily data as well as intraday data. We retrieve the daily stock returns and daily trading volume data for the entire year of 1994 and 1996 from the Pacific-Basin Capital Market (PACAP) database. These two years represent the predelisting and postdelisting periods. We also obtain some intraday data to supplement the analysis. The intraday data set for the Singapore market, which is obtained from a brokerage firm, comprises two types of data. The first type includes the STII prices for every 15-minute interval from July 18, 1994, to December 30, 1994, and from March 11, 1996, to June 26, 1996. These data therefore cover both the predelisting and postdelisting periods. The second type of data includes the time, transaction price, and volume of every trade. However, the data are only from March 11, 1996, to June 26, 1996, which is during the postdelisting period. There are no transactions data available for individual Singapore stocks in the predelisting period. As for the Hong Kong market, we obtain transactions data for individual Hong Kong stocks from the Stock Exchange of Hong Kong. The data set includes transaction prices and volume of every trade with a time-stamp record. We also obtain minute-to-minute Hang Seng Index (HSI) prices from the Hang Seng Index Service Ltd.

B. Preliminary Analysis

We first compare daily trading activity before and after the delisting of the Jardine stocks. We construct two daily trading activity measures: (1) daily dollar trading volume and (2) daily number of trades. Daily dollar trading volume is calculated by multiplying the trading price with the number of shares for each trade, and aggregating across all trades over a day. Because the Jardine shares are denominated in Hong Kong dollars when they are traded in Hong Kong and in U.S. dollars when they are traded in Singapore, we standardize dollar volume by calculating the dollar trading volume in terms of U.S. dollars. Results are reported in Table I. For all five Jardine companies that moved to Singapore, both daily dollar trading volume and daily number of trades are lower in the postdelisting period. However, the decline in the number of trades is much bigger than the decline in the dollar volume. For example, for Hongkong Land, which is the most actively traded Jardine stock, daily dollar trading volume declines by less than 50 percent (from U.S. \$13.16 million to U.S. \$7.32 million), whereas daily number of trades declines by about 85 percent (from 547 to 82). This indicates an

⁹ It is very common for the majority shareholders to control the companies through pyramiding in East Asian markets. See Claessens et al. (2000) for details.

Table I
Statistics on Daily Trading Activity of Jardine Group Before and After Delisting

This table reports the trading activity of five Jardine Group companies (Dairy Farm, Jardine Matheson, Jardine Strategic, Hongkong Land, and Mandarin Oriental) that were delisted from Hong Kong, and Jardine International Motors, which was not delisted. Trading activity in the Hong Kong market and the Singapore market are based on all the stocks listed in each market. Statistics in the pre-delisting period for the delisted companies are based on data from the Hong Kong stock market from July 18, 1994 to December 30, 1994, and statistics in the post-delisting period are based on data from the Singapore stock market from March 11, 1996 to June 28, 1996. Statistics in both the pre-delisting and post-delisting periods for Jardine International Motors are based on data from the Hong Kong market. The symbols * and ** denote significance at the five and one percent levels, respectively.

		Daily-Trading Volume (U.S. Dollars)	Daily Number of Trades ^a	Average Trade Size (U.S. Dollars)
Dairy Farm	Pre-delisting	2,849,672	136.12	20,935
	Post-delisting	743,986	35.17	21,154
	<i>t</i> -statistic	9.35**	12.50**	- 0.85
Jardine Matheson	Pre-delisting	8,509,260	185.00	45,996
	Post-delisting	6,077,599	54.43	111,659
	<i>t</i> -statistic	3.43**	12.81**	- 8.72**
Jardine Strategic	Pre-delisting	3,768,930	117.50	32,076
	Post-delisting	2,243,372	32.61	68,794
	<i>t</i> -statistic	2.91**	10.20**	- 6.19**
Hongkong Land	Pre-delisting	13,162,830	547.22	24,054
	Post-delisting	7,320,474	81.73	89,569
	<i>t</i> -statistic	6.30**	14.24**	- 10.78**
Mandarin Oriental	Pre-delisting	634,583	46.85	13,545
	Post-delisting	336,730	14.55	23,143
	<i>t</i> -statistic	2.18*	8.64**	- 2.79**
Jardine International Motors	Pre-delisting	223,600	10.02	20,305
	Post-delisting	176,881	7.43	21,913
	<i>t</i> -statistic	1.27	2.08*	- 0.60
Hong Kong Market	Pre-delisting	420.3m	566.7m ^a	NA
	Post-delisting	494.3m	857.5m	
	<i>t</i> -statistics	- 3.51**	- 9.44**	
Singapore Market	Pre-delisting	146.7m	52.5m ^a	NA
	Post-delisting	187.0m	59.8m	
	<i>t</i> -statistic	- 4.33**	- 1.96*	

^aDue to data unavailability, figures for the Hong Kong market and the Singapore market are *daily number of shares traded*, not daily number of trades.

increase in average trade size in the postdelisting period. Except for Dairy Farm, the other four Jardine companies experience a significant increase in average trade size.¹⁰

¹⁰The stock prices of Jardine companies are generally lower after the delisting. Therefore, if the average trade size is calculated based on the number of shares (instead of dollar trading volume) per trade, it will be even higher after the delisting.

Two explanations are possible for these findings. The first is that there are fewer retail investors trading Jardine stocks after they are delisted. Because retail investors trade less volume on a per-trade basis than institutional investors, a drop in their trading activity leads to a decline in the daily number of trades but an increase in average trade size. The second possible explanation is that even if retail investors participate, notwithstanding the higher transaction cost in placing orders overseas, it is more economical for them to trade less frequently and batch their trades together. In any case, both explanations suggest fewer small, retail investors are participating in the market.

Table I also reports the results for Jardine International Motors, the only Jardine company still traded in Hong Kong. Relative to the other five Jardine companies, the decline in dollar trading volume and number of shares is much smaller for Jardine International Motors. Furthermore, average trade size increases only slightly, and the increase is not statistically significant. These results are consistent with the hypothesis that the decline in small, retail investors is more pronounced for the Jardine companies delisted from Hong Kong. To see whether there is any structural break around the delisting, we also examine the aggregate trading volume for both the Hong Kong and Singapore markets. Because the intraday data is not available for the Singapore market in the predelisting period, we could only retrieve the daily trading volume figures from the PACAP Database. Results indicate that regardless of whether we use the dollar trading volume or number of shares traded, both the Hong Kong and Singapore markets experience increases in trading activity in 1996 relative to 1994. Therefore, the decline in trading activity of Jardine shares after delisting is not due to a slowdown in general market activity, but could be a Jardine-specific result. However, this paper will try to convince readers that the decline and other results are not Jardine-specific.

III. Test and Results Relating to Comovement

In this section, we examine whether the comovement of Jardine stock returns with the Hong Kong and Singapore markets changes after the change of trading location. The null hypothesis is that the international financial markets are integrated so that the Jardine share prices depend on the stream of future cash flows and the discount rate, and not on the trading location. This means the comovement of Jardine stocks with any market should not change if the characteristics of cash flows remain the same. The alternative hypothesis is that the markets are segmented and Jardine shares are subject to the investor sentiment so that the comovement with the market depends on where the shares are traded. This hypothesis is supported by the findings in several studies. Bodurtha et al. (1995) find that after controlling for foreign market fundamentals, the stock prices of foreign country funds traded in the United States are heavily influenced by market movement in the United States although their net asset values are not. Hardouvelis, La Porta, and Wizman (1995) show that discounts of country funds are too sensitive to movements in the United States and in the global market. Froot and Dabora (1999) find that the difference between the prices of "Siamese

twin" companies is correlated with the market on which they are traded most, suggesting the twin stocks have different investor clienteles.

To measure the comovement of Jardine stocks with the two markets, we regress Jardine stock returns on Hong Kong and Singapore market returns, with dummy slope coefficients for the postdelisting period. The empirical specification is as follows:

$$RET_{i,t} = \beta_{i0} + \beta_{i1}MRET_{SING,t} + \beta_{i2}MRET_{HK,t} + \beta_{i0}^*D_t + \beta_{i1}^*D_tMRET_{SING,t} + \beta_{i2}^*D_tMRET_{HK,t} + \varepsilon_{i,t} \quad (1)$$

where $RET_{i,t}$ is the return of Jardine stock i on day t , $MRET_{SING,t}$ is the Singapore market return on day t , $MRET_{HK,t}$ is the Hong Kong market return on day t , and D_t is a dummy variable that is equal to one if day t is in the postdelisting period and zero otherwise. The coefficients β_{i1}^* and β_{i2}^* measure the change of comovement after the delisting. Under the null hypothesis of market integration, the comovement does not depend on the trading location, and both coefficients β_{i1}^* and β_{i2}^* are equal to zero. Under the alternative hypothesis of market segmentation, the comovement with the market depends on where the shares are traded. When the trading location is moved from Hong Kong to Singapore, Jardine shares are subject to more (less) investor sentiment from Singapore (Hong Kong), so that the comovement with Singapore (Hong Kong) is higher (lower) after the delisting. Therefore, the alternative hypothesis predicts that the coefficient β_{i1}^* will be positive and the coefficient β_{i2}^* will be negative.¹¹

Before estimating specification (1), we need to decide which market returns should be used. When the Jardine companies were traded in Hong Kong, all five were component stocks within the HSI, which consists of only 33 stocks. Therefore, the movements of the Jardine stocks and the HSI are bound to be highly correlated in the predelisting period. To avoid such a spurious relation, we construct ex-Jardine market returns using the other 28 component stocks within the HSI. We retrieve daily stock prices and the number of shares outstanding from the PACAP database for these component stocks. We then calculate the market weight of each stock by dividing its own market capitalization by the total market capitalization of the 28 stocks. The market weight on day $t - 1$ is used to compute the market return on day t . We therefore construct a time series of daily ex-Jardine HSI returns for both the predelisting and postdelisting periods.¹² As for Singapore market returns, we use the STII for both the predelisting and postdelisting periods, because none of the Jardine companies is included in the STII during the period.

¹¹ If the comovement with Hong Kong (Singapore) is smaller (larger) after delisting, this will also suggest that there is more diversification gain by adding Jardine stocks to Hong Kong market portfolio. See Errunza, Hogan, and Hung (1999) for their investigation of how the market segmentation will impact the "diversification portfolio."

¹² Of the 28 component stocks, 2 were not in the HSI in the postdelisting period. However, to maintain consistency for comparison, we use the same set of 28 stocks in computing the market returns for the predelisting and postdelisting periods.

We first estimate the specification based on daily returns in the entire year of 1994 and 1996. Coefficients for individual companies are estimated on a group basis using a GLS procedure that allows contemporaneous correlations across equations. We also estimate the coefficients for the portfolio of five Jardine stocks (excluding Jardine International Motors). The Jardine portfolio is formed on a market-capitalization-weighted basis, where the market capitalization weights at the beginning of 1994 for the five Jardine stocks are: 13 percent for Dairy Farm, 29 percent for Jardine Matheson, 14 percent for Jardine Strategic, 37 percent for Hongkong Land, and 4 percent for Mandarin Oriental. Results are reported in Table II. Panel A contains the results based on daily returns. During the pre-delisting period, daily returns for the Jardine stocks are positively and significantly related to movement in the Hong Kong market, but are not related to movement in the Singapore market. The beta sensitivity of daily returns of the Jardine portfolio (market-capitalization-weighted returns of five Jardine stocks) to the Singapore market is -0.1016 and the beta sensitivity to the Hong Kong market is 0.8820 . During the postdelisting period, Jardine stocks become more correlated with the Singapore market and less correlated with the Hong Kong market. For example, for the Jardine portfolio, the coefficient β_{i1}^* is 0.4662 and the coefficient β_{i2}^* is -0.3858 , and both are significantly different from zero. Out of the five Jardine companies, two show significantly positive β_{i1}^* coefficients and four show significantly negative β_{i2}^* coefficients. The Wald tests reject the hypothesis that both sets of coefficients are jointly equal to zero across the five companies. In contrast, we do not find any significant change in comovement of Jardine International Motors with either the Singapore or the Hong Kong market. This suggests the change in the comovement is only for the Jardine companies that moved their trading location from Hong Kong to Singapore.

Panels B and C contain results for overnight returns and daytime returns. The motivation for the analysis is to examine whether the beta change is confined to the daytime period when there is more information being released. Because of the data unavailability, the analysis is carried out based on a shorter sample period from July 18, 1994, to December 30, 1994, and from March 11, 1996, to June 26, 1996. We use two methods to construct the overnight returns and daytime returns. The first method is based on the trading hours in the Hong Kong market, whereby we measure daytime returns from 10:15 to 15:45 and overnight returns from 15:45 to 10:15 (the next day). We use the prices at 10:15 instead of at 10:00 (the opening prices) because it may take some time for the market to incorporate all the information accumulated overnight. The second method is based on the trading hours in Singapore, whereby we measure overnight returns from 17:00 to 9:15 (the next day) and daytime returns from 9:15 to 17:00. Because the results for the two methods are qualitatively similar, we report only those based on the first method.¹³

Overall, results based on overnight returns and daytime returns are similar to those based on daily returns. We again focus on the results for the Jardine

¹³ We also examine the comovement using intraday returns. Results are qualitatively similar.

Table II
Regression of Stock Returns of Jardine Companies on Market Returns of Singapore and Hong Kong before and after Delisting from Hong Kong

This table presents estimates of the regression model:

$$RET_{i,t} = \beta_{i0} + \beta_{i1}MRET_{SING,t} + \beta_{i2}MRET_{HK,t} + \beta_{i0}^*D_t + \beta_{i1}^*D_tMRET_{SING,t} + \beta_{i2}^*D_tMRET_{HK,t} + \varepsilon_{i,t}$$

where $RET_{i,t}$ is the return of Jardine stock i on day t , $MRET_{SING,t}$ is the Singapore market return on day t , $MRET_{HK,t}$ is the Hong Kong market return (Jardine-free) on day t , and D_t is a dummy variable that is equal to one if day t is in the postdelisting period and zero otherwise. Returns of Jardine portfolio are the market-capitalization-weighted returns of the first five Jardine stocks. The regression model is fitted using daily returns, overnight returns, and daytime returns. The t -statistics are reported in parentheses and based on GLS estimation. The symbols * and ** denote significance at the five and one percent levels, respectively.

Stock	β_{i0}	β_{i1}	β_{i2}	β_{i0}^*	β_{i1}^*	β_{i2}^*
Panel A: Daily Returns (Entire Year of 1994 and 1996)						
Dairy Farm	-0.0014 (-1.04)	0.1830 (1.14)	0.6199** (6.64)	0.0006 (0.28)	0.1636 (0.67)	-0.4153* (-2.41)
Jardine Matheson	-0.0003 (-0.21)	-0.3137* (-1.98)	0.9693** (10.47)	0.0000 (-0.02)	0.6474** (2.68)	-0.4354* (-2.54)
Jardine Strategic	-0.0004 (-0.37)	0.2224 (1.61)	0.6093** (7.53)	0.0009 (0.54)	0.0906 (0.43)	-0.2468 (-1.65)
Hongkong Land	-0.0011 (-1.00)	-0.1795 (-1.42)	1.0468** (14.17)	0.0020 (1.29)	0.6245** (3.24)	-0.3848** (-2.82)
Mandarin Oriental	0.0007 (0.44)	-0.1708 (-0.97)	0.7489** (7.28)	-0.0005 (-0.22)	0.4781 (1.78)	-0.3901* (-2.05)
Wald test: Coefficients are jointly equal to zero						
Jardine portfolio	-0.0007 (-0.88)	-0.1016 (-1.06)	0.8820** (15.83)	0.0009 (0.79)	0.4662** (3.20)	-0.3858** (-3.74)
Jardine International Motors	-0.0007 (-0.51)	0.1750 (1.13)	0.3135** (3.51)	0.0010 (0.50)	0.1101 (0.43)	0.1131 (0.66)

Table II—continued

Panel B: Overnight Returns (July to December 1994 and March to June 1996)						
Dairy Farm	-0.0003 (-0.25)	0.0262 (0.15)	1.1609** (8.58)	0.0013 (0.82)	0.1979 (0.65)	-0.7841** (-3.38)
Jardine Matheson	-0.0004 (-0.32)	0.1172 (0.54)	0.9212** (5.33)	0.0014 (0.69)	-0.3687 (-0.95)	-0.7909** (-2.67)
Jardine Strategic	0.0017 (1.84)	0.3893** (2.66)	0.6655** (5.74)	-0.0016 (-1.17)	0.2485 (0.95)	-0.6128** (-3.08)
Hongkong Land	0.0001 (0.05)	0.5258** (2.55)	0.8115** (4.96)	0.0026 (1.33)	0.1798 (0.49)	-0.4994 (-1.78)
Mandarin Oriental	0.0014 (1.09)	0.0929 (0.43)	0.4359* (2.57)	0.0037 (1.81)	0.1766 (0.46)	-0.2977 (-1.02)
Wald test: Coefficients are jointly equal to zero					2.67	32.23**
Jardine portfolio	0.0001 (0.17)	0.1828 (1.63)	0.9204** (10.33)	0.0016 (1.52)	0.1514 (0.75)	-0.6639** (-4.34)
Jardine International Motors	-0.0004 (-0.71)	0.0851 (0.84)	-0.0435 (-0.54)	0.0000 (-0.02)	-0.1479 (-0.79)	0.1150 (0.82)
Panel C: Daytime Returns (July to December 1994 and March to June 1996)						
Dairy Farm	-0.0013 (-1.08)	-0.4904 (-1.89)	1.1121** (6.89)	-0.0006 (-0.32)	0.9564* (2.23)	-0.4428 (-1.49)
Jardine Matheson	0.0009 (0.76)	-0.1778 (-0.67)	0.9122** (5.56)	-0.0024 (-1.30)	0.5713 (1.31)	-0.8823** (-2.92)
Jardine Strategic	-0.0014 (-1.02)	0.0239 (0.08)	0.7914** (4.23)	-0.0006 (-0.27)	-0.1243 (-0.25)	-0.8680* (-2.52)
Hongkong Land	-0.0009 (-0.66)	0.0160 (0.05)	0.4898* (2.58)	-0.0005 (-0.22)	0.2496 (0.50)	-0.1212 (-0.35)
Mandarin Oriental	-0.0039 (-1.75)	-1.0903* (-2.24)	1.0555** (3.49)	0.0011 (0.34)	1.3099 (1.63)	-1.1857* (-2.13)
Wald test: Coefficients are jointly equal to zero					9.67	21.68**
Jardine portfolio	-0.0008 (-0.99)	-0.2776 (-1.67)	0.9130** (8.84)	-0.0010 (-0.85)	0.6198* (2.26)	-0.5887** (-3.09)
Jardine International Motors	-0.0002 (-0.12)	0.3973 (1.08)	0.0439 (0.19)	-0.0014 (-0.52)	0.0710 (0.12)	0.7290 (1.80)

portfolio. The coefficient β_{i2}^* is significant and negative in both specifications, indicating a smaller comovement of Jardine share prices with the Hong Kong market in both the overnight and daytime periods after the delisting. The coefficient β_{i1}^* is positive in both specifications, but is only significant in the specification based on daytime returns.

Given that there is measurement error for daily beta estimates due to a thin trading problem, especially since Jardine stocks are less actively traded in Singapore, we also reestimate the regression based on weekly return data. We find that the coefficient estimates of β_{i1}^* and β_{i2}^* remain consistently positive and negative, respectively. This confirms that the results on beta changes of Jardine stocks are not driven by market microstructure phenomenon.

Overall, our results are generally consistent with the hypothesis that the share prices are driven by investor sentiment. When the Jardine companies changed their trading location from Hong Kong to Singapore, their investor clientele changed as well, so that the Jardine share prices are driven more by sentiment in the Singapore market and less by sentiment in the Hong Kong market. Furthermore, the investor sentiment effect is stronger during the daytime and weaker overnight.

Looking at other possible explanations for our results, we consider the alternative hypothesis that the results are due to an index effect. According to Vijh (1994), many index funds buy and sell index component stocks together in the same direction to track the stock index. With a downward sloping demand curve, their trading activities frequently exert common price pressure on the component stocks so that the component stocks exhibit a higher degree of comovement with the market. Vijh also finds that after a stock is added to the S&P 500 index, the beta increases, which he attributes to the common price pressure effect caused by index trading strategies. This hypothesis may explain our results. Once the Jardine companies are no longer included in the HSI (Hong Kong) after the delisting, they are not subject to the same common pressure caused by index trading strategies, so that their comovement with the market will become smaller. Although we cannot rule out this possibility, we do not think it explains all of our results. First, the decline in the beta sensitivity of Jardine shares to the Hong Kong market is quite big. The results in Panel A of Table II show that the daily return beta for the Jardine portfolio in the Hong Kong market is 0.8820 before delisting and decline by 0.3858 after delisting. This means the index effect has to account for half of the comovement of the Jardine portfolio with the Hong Kong market. Second, because the Jardine stocks are not added to the STII (Singapore) in our postdelisting period, they should not be subject to the common price pressure that affects the component stocks in Singapore. However, their comovement with the Singapore market increases in the postdelisting period. Therefore, it is not consistent with the index effect hypothesis.

IV. Alternative Hypotheses and Further Tests

Results in the previous section show that the location of trades affects the comovement of Jardine shares with the market. Two important issues arise.

First, other than the investor sentiment hypothesis being proposed earlier, are there any other alternative hypotheses to explain the anomaly? Second, if the location of trade affects the comovement of stock returns, does it affect the pricing of stocks? While both issues are equally interesting, we feel that it is difficult to implement an asset pricing test due to data limitations. For example, in the five years subsequent to the delisting, the stock prices of all five Jardine stocks have fallen by more than 50 percent. It is difficult to attribute the decline of stock prices solely to the change of trading location. The stock prices will fall either because of an increase in risk premium or a decrease in projected cash flows. Furthermore, the change in risk premium could be due to changes in either the trading location or systematic risk. Given the limitation of the sample—five stocks and about seven years of data—it is beyond the scope of the paper to investigate whether the location of trade is a priced factor. We therefore confine our subsequent analysis to the first issue. In the following, we will propose several reasonable explanations and examine additional evidence to see whether they could explain the anomaly.

A. Business Relocation

One explanation for the change of comovement of Jardine shares with the Hong Kong and Singapore markets is that the Jardine Group also relocated its business following the delisting. The business relocation was deemed necessary because of the bitter relationship between the Jardine Group and China and because of the Jardine Group's desire to reduce its dependence on Hong Kong and Mainland China before the 1997 takeover. Such a business relocation would mean less of the Jardine Group's cash flow would be derived from operations in Hong Kong and Mainland China, so that the correlation of Jardine share prices with the Hong Kong market would become smaller.

To explore this possibility, we look for a significant change in the source of revenues after the delisting. Table III presents a breakdown of the Jardine Group's Net profits (after-tax; in Panel A) and sales (in Panel B) from 1994 to 1998. The information is obtained from the companies' annual reports from various years. From Panel A, we find there is a decline in profits after 1994, dropping from U.S. \$775.4 million in 1994 to U.S. \$369.5 million in 1998. Except for North America, all other regions experienced similar profit declines. Profits in North America increased by almost 100 percent during the five-year period. However, profits in Hong Kong and Mainland China declined from U.S. \$449.4 million in 1994 to U.S. \$246.6 million in 1998. Despite the decline in profits, Hong Kong and Mainland China still accounted for the largest share of profits throughout the period. The region contributed almost 60 percent of profits in 1994, 58 percent in 1995, 64 percent in 1996, 60 percent in 1997, and 65 percent in 1998. Although the Jardine Group was no longer traded in Hong Kong after 1994, it still derived most of its profits from Hong Kong and Mainland China. We find no evidence that the Group relocated its business to Southeast Asia so that the business depends more on the economic climate of Singapore. Even before the financial crisis hit Asia in 1997, profits in Southeast Asia were declining, dropping from U.S. \$98.3 million in 1994

Table III
A Geographical Breakdown of Net Profits (After Tax) and Sales of the Jardine Group from 1994 to 1998

Country	1994		1995		1996		1997		1998	
	US\$m	Percent	US\$m	Percent	US\$m	Percent	US\$m	Percent	US\$m	Percent
Panel A: Net Profits (After Tax)										
Australia	57.7	7.44	50.1	7.13	1.2	0.19	24.0	4.09	31.4	8.26
Europe and Middle East	60.7	7.83	42.6	6.06	51.4	8.30	5.6	0.96	2.8	0.74
Hong Kong and China	449.4	59.96	407.2	57.97	397.6	64.18	355.0	60.57	246.6	64.84
North America	57.2	7.38	103.5	14.73	109.0	17.59	90.6	15.46	99.5	26.16
Northeast Asia	52.1	6.72	33.3	4.74	-1.9	—	110.9	18.92	-5.4	—
Southeast Asia	98.3	12.68	65.7	9.35	60.3	9.73	-5.2	—	-5.4	—
Total	775.4		702.4		617.6		580.9		369.5	
Panel B: Sales										
Australia	3,454.0	36.14	3,814.4	35.86	4,221.2	36.37	4,019.3	34.88	3,421.6	30.43
Europe and Middle East	1,562.8	16.35	1,994.1	18.75	2,263.6	19.51	2,398.9	20.82	3,179.2	28.27
Hong Kong and China	3,095.5	32.39	3,218.7	30.26	3,417.6	29.45	3,539.0	30.72	3,304.2	29.39
North America	413.6	4.33	401.7	3.78	400.0	3.45	376.3	3.27	404.7	3.60
Northeast Asia	550.5	5.76	604.0	5.68	651.1	5.61	596.1	5.17	464.5	4.13
Southeast Asia	482.4	5.05	603.1	5.67	651.5	5.61	592.0	5.14	469.7	4.18
Total	9,558.8		10,636.0		11,605.0		11,521.6		11,243.9	

to U.S. \$60.3 million in 1996. Therefore, changes in the source of profits cannot explain why the comovement of Jardine shares with the Singapore market becomes higher in the postdelisting period.

The sales figures in Panel B also cannot explain the increase in comovement of Jardine shares with the Singapore market. The sales contribution provides no indication of any trend for Jardine companies to move their operations to Australia or Southeast Asia. The sales figures for both regions were declining in either the dollar amount or the percentage contribution to the Group. Furthermore, the sales generated from Hong Kong and Mainland China were quite stable after the delisting despite the Asian financial crisis. Therefore, it does not seem that Jardine Group moved its business from Hong Kong/Mainland China to Southeast Asia.

Certainly, one could still argue that despite the intention of the Jardine Group not to relocate, their delisting could signal to the market that their prospects in China are fading and they will become less integrated with Mainland China in the future. At the same time, with the handover of Hong Kong to China in 1997, many market participants believed that Hong Kong companies would become more integrated with Mainland China. Therefore, we would expect (i) the price of Jardine stocks to fall due to the inability of the company's owners to negotiate with the future government in Hong Kong, and (ii) the beta of Jardine stocks with the HSI to fall as other Hong Kong companies becomes more integrated with China.¹⁴ Nevertheless, this argument fails to explain why the betas with the Singapore market increase after delisting. As an additional test, we collect daily returns data on the Shanghai A-share and B-share market indices and include them as the independent variables for explaining Jardine stock returns in the regression analysis in Table II. We do not find that the inclusion of these China stock market indices cause any material change to the betas relative to the Hong Kong market. Therefore, the results are qualitatively similar even after we control for the Mainland China factor.

B. Time-varying Betas

Another explanation for the change in comovement of Jardine shares with the Hong Kong and Singapore markets is the time-varying beta hypothesis. Several studies provide evidence of this hypothesis. Bekaert and Harvey (1995) document that the covariance of a single market with the world market portfolio is changing over time as a function of market integration. Chari and Henry (2001) show that the betas of an emerging market stock relative to the local market and the world market exhibit substantial variation after stock market liberalization. De Jong and De Roon (2001) find significant time variation in the betas relative to the world portfolio because of the level of segmentation. For the composite index of the emerging markets, beta increases 0.09 annually because of decreased segmentation of the emerging markets.

¹⁴ We thank the referee for suggesting this possibility.

Therefore, one might argue our results are driven by the changing level of market integration for Jardine stocks. If Jardine stocks become less segmented from the world market over time, the betas relative to the Hong Kong market will be lower and the betas relative to the world market will be higher. Our evidence that the betas of Jardine stocks relative to the Singapore market increase in the postdelisting period may be because the Singapore market captures part of the variation of the world market, so that it becomes more correlated with Jardine stocks.

To test this hypothesis, we extend equation (1) by including world market returns:

$$RET_{i,t} = \beta_{i0} + \beta_{i1}MRET_{SING,t} + \beta_{i2}MRET_{HK,t} + \beta_{i3}MRET_{world,t} + \beta_{i0}^*D_t + \beta_{i1}^*D_tMRET_{SING,t} + \beta_{i2}^*D_tMRET_{HK,t} + \beta_{i3}^*D_tMRET_{world,t} + \varepsilon_{i,t} \quad (2)$$

where $MRET_{world,t}$ is the world market return on day t , and other variables are as defined in equation (1). Equation (2) is simply an extension of the international pricing model where we assume Jardine returns are driven by the Hong Kong, Singapore, and world market factors, allowing for the possibility that the betas relative to the three factors might change from 1994 to 1996.

The Morgan Stanley Capital International (MSCI) global index is chosen as a proxy for the world market in the estimation. Results are presented in Table IV. The results show a significant decline in the betas of Jardine returns relative to the Hong Kong market after controlling for the world market factor. However, we find no evidence that the world market betas increase in 1996. In fact, for all five delisted Jardine stocks, world market betas decline from 1994 to 1996. The world market beta for Jardine International Motors also declines. Therefore, it does not seem the declines in the world market betas for the five Jardine companies are related to the delisting. This evidence is not consistent with the hypothesis that the Jardine Group is more integrated with the world market over time.

Another explanation for the time-varying betas is that the industry exposures of the Jardine companies may vary over time. To control for industry effects, we create Hong Kong industry portfolios (excluding Jardine stocks) that match each Jardine stocks.¹⁵ We then estimate a three-factor model just like equation (2), except that we replace the world market returns with the returns of the matching industry portfolio. Results, which are not reported, continue to show that the betas of Jardine stocks increase (decrease) with the Singapore (Hong Kong) market.

We also explore the possibility that our results are driven by the size effect. Since the Jardine companies are smaller after the delisting and if the betas of smaller firms are smaller than the betas of large firms, this could explain why the betas of Jardine companies decline. To shed light on this issue, we sort the stocks in both Hong Kong and Singapore into four size groups, and for each size group we estimate the betas relative to Hong Kong and Singapore. We confirm

¹⁵ Based on the Hong Kong industrial classification, the five delisted Jardine companies are from consolidated enterprises industry (Dairy Farm, Jardine Matheson, and Jardine Strategic), hotel industry (Mandarin Oriental), and property industry (Hongkong Land). Jardine International Motors is an automotive distributor.

Table IV
Regression of Stock Returns of Jardine Companies on Returns of Hong Kong Market, Singapore Market, and Morgan Stanley Capital International (MSCI) World Market before and after Delisting from Hong Kong

This table presents the estimates of the regression model

$$RET_{i,t} = \beta_{10} + \beta_{11}MRET_{SING,t} + \beta_{12}MRET_{HK,t} + \beta_{13}MRET_{world,t} + \beta_{10}^*D_t + \beta_{11}^*D_tMRET_{SING,t} + \beta_{12}^*D_tMRET_{HK,t} + \beta_{13}^*D_tMRET_{world,t} + \varepsilon_{i,t}$$

where $RET_{i,t}$ is the return of Jardine stock i on day t , $MRET_{SING,t}$ is the Singapore market return on day t , $MRET_{HK,t}$ is the Hong Kong market return (Jardine-free) on day t , $MRET_{world,t}$ is the MSCI global market return on day t , and D_t is a dummy variable that is equal to one if day t is in the postdelisting period and zero otherwise. The regression model is fitted using daily returns in the entire year of 1994 and 1996. Intercepts and dummy intercepts are not reported. The t -statistics are reported in parentheses. The symbols * and ** denote significance at the five and one percent levels, respectively.

Stock	β_{11}	β_{12}	β_{13}	β_{11}^*	β_{12}^*	β_{13}^*
Dairy Farm	0.1773 (1.11)	0.6240** (6.67)	-0.2026 (-0.73)	0.1940 (0.79)	-0.4351* (-2.51)	0.6102 (1.45)
Jardine Matheson	-0.3094 (-1.95)	0.9662** (10.42)	0.1521 (0.55)	0.6651** (2.74)	-0.4462** (-2.60)	0.2105 (0.50)
Jardine Strategic	0.2399 (1.74)	0.5968** (7.40)	0.6156* (2.57)	0.0714 (0.34)	-0.2332 (-1.56)	-0.6452 (-1.78)
Hongkong Land	-0.1780 (-1.40)	1.0457** (14.11)	0.0519 (0.24)	0.6124** (3.16)	-0.3770** (-2.75)	-0.2276 (-0.68)
Mandarin Oriental	-0.1600 (-0.91)	0.7412** (7.19)	0.3845 (1.26)	0.4847 (1.80)	-0.3933* (-2.06)	-0.0969 (-0.21)
Wald test: Coefficients are jointly equal to zero						
Jardine portfolio	-0.0971 (-1.02)	0.8789** (15.73)	0.1570 (0.95)	21.44**	27.29**	6.02
Jardine International Motors	0.2005 (1.30)	0.2990** (3.37)	0.7757** (2.91)	0.4686** (3.20)	-0.3869** (-3.74)	-0.0454 (-0.18)
				0.0938 (0.37)	0.1233 (0.72)	-0.6845 (-1.65)

that small stocks have smaller betas. Nevertheless, for Jardine stocks, even though they are smaller after the delisting, all of them are still in the fourth size quartile (largest) within both the Hong Kong market and the Singapore market. The difference between the betas in the fourth quartile and the third quartile is much smaller than the changes in betas of Jardine stocks. Therefore, it does not seem that the size effect could explain the results.

C. Migration of Trading Activity to Other Markets

So far, our analysis of Jardine stocks is based on the market activity in Hong Kong and Singapore. Because Jardine shares are also traded in other markets, such as the United States (OTC), London, and Sydney, one might argue we are examining only a portion of the Jardine Group's trading activity, especially after it was delisted from Hong Kong. If some of the trading activity migrates to markets other than Singapore, it is misleading to interpret the results based only on the Singapore market.

To examine this issue, we collect information from the Bloomberg Database on the Jardine Group's trading activity in different markets from 1994 to 1998. Table V reports a breakdown of the number of shares traded for the five Jardine companies in Hong Kong, Singapore, Australia, London, and the United States. Before the delisting in 1994, the trading predominately took place in Hong Kong. After the delisting, most of the trading moved to Singapore. All five Jardine companies had no less than 90 percent of their trading volume transacted in the Singapore market from 1995 to 1998. Therefore, we feel confident our analysis captures most of the trading activity before and after the delisting, and that our comovement results cannot be explained by the migration of trading activity from Hong Kong to markets other than Singapore.

D. Extent of Analyst Coverage

Our previous results show a decline in trading volume after the Jardine Group moved its trading location away from Hong Kong. Two explanations are possible. The first is that fewer investors are interested in trading Jardine stocks after the delisting. The second explanation is that the fund managers are rebalancing their positions in Jardine shares before they move out of Hong Kong, causing an increase in trading volume before the delisting. In other words, the delisting does not cause a decline in trading volume, but rather the delisting announcement prompts a subsequent increase in portfolio rebalancing.

To examine whether investor interest declines, we collect information on the extent of analyst coverage of Jardine companies after the delisting. Security analysts provide information to investors. When more investors, especially institutional investors, are interested in a company, the demand for information is greater and the number of analysts following the company is higher (Bhushan (1989)). Consequently, if fewer investors are interested in Jardine companies after the delisting, the number of security analysts should decline.

Based on I/B/E/S International, we tabulate the number of security analysts following the Jardine companies and the number of earnings forecasts issued

Table V
A Geographical Breakdown of Trading Volume of Jardine Group Stocks before and after Their Delisting from Hong Kong

The trading volume figures are obtained from Bloomberg. Jardine Matheson and Jardine Strategic were delisted from Hong Kong at the end of 1994. Dairy Farm, Hongkong Land, and Mandarin Oriental were delisted after March 1995, and their trading volumes in Hong Kong in the first quarter of 1995 are not considered. All shares traded figures are in million of shares.

	Country	1994		1995		1996		1997		1998	
		Shares Traded	Percent	Shares Traded	Percent	Shares Traded	Percent	Shares Traded	Percent	Shares Traded	Percent
Dairy Farm	Hong Kong	560	99.61	—	—	—	—	—	—	—	—
	Singapore	0	0.00	457	99.49	289	97.90	237	98.05	318	98.27
	United States	0.2	0.04	1.4	0.30	5.4	1.83	0.8	0.33	1.3	0.40
	Europe	0.1	0.02	0.3	0.06	0.6	0.20	2.7	1.11	2.1	0.65
	Australia	1.9	0.34	0.6	0.13	0.2	0.07	1.2	0.49	2.2	0.68
Jardine Matheson	Hong Kong	369	100.00	—	—	—	—	—	—	—	—
	Singapore	0	0.00	229	99.09	248	92.39	255	89.78	157	88.85
	United States	0	0.00	2.1	0.90	20.2	7.52	27.5	9.68	18.5	10.47
	Europe	0	0.00	0	0.00	0.2	0.07	1.5	0.52	1.2	0.67
	Australia	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Jardine Strategic	Hong Kong	330	100.00	—	—	—	—	—	—	—	—
	Singapore	0	0.00	233	98.68	190	97.98	189	99.16	196	98.64
	United States	0	0.00	3.1	1.31	3.9	2.01	1.6	0.84	2.7	1.35
	Europe	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Australia	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Hongkong Land	Hong Kong	1,330	99.97	—	—	—	—	—	—	—	—
	Singapore	0	0.00	1,010	99.94	774	99.80	1,170	99.68	757	99.50
	United States	0	0.00	0.2	0.02	0.9	0.11	2.8	0.23	2.8	0.36
	Europe	0.4	0.03	0.4	0.04	0.6	0.07	0.9	0.07	1.0	0.13
	Australia	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Table V—continued

Mandarin Oriental	Hong Kong	189	100.00	—	—	—	—	—	—	—	—	—	—
	Singapore	0	0.00	178	99.66	89.9	98.79	190	97.63	157	93.17	—	—
	United States	0	0.00	0.6	0.33	1.1	1.20	4.6	2.36	11.5	6.82	—	—
	Europe	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	—	—
	Australia	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	—	—
Jardine Int'l Motors*	Hong Kong	81.9	100.00	53.6	100.00	53.4	100.00	36.6	100.00	62.6	100.00	—	—

*Jardine Int'l Motors was listed only in Hong Kong throughout the period.

Table VI
Number of Brokers and Earning Forecasts (Reported in I/B/E/S International) for the Jardine Group during the Period from 1994 to 1998

	1994	1995	1996	1997	1998
Panel A: Number of Earnings Forecasts Made During the Year					
Dairy Farm	214	89	18	6	28
Jardine Matheson	237	74	18	19	20
Jardine Strategic	172	58	20	14	13
Hongkong Land	249	107	23	6	33
Mandarin Oriental	169	85	8	22	15
Total	1,041	413	87	67	109
Jardine International Motors	144	59	9	8	5
Panel B: Number of Unique Brokers Who Issued Forecasts during the Year					
Dairy Farm	32	17	5	2	8
Jardine Matheson	32	17	4	5	7
Jardine Strategic	28	17	5	3	4
Hongkong Land	34	21	8	2	7
Mandarin Oriental	31	20	2	5	5
Total	157	92	24	17	31
Jardine International Motors	27	19	3	4	2

per year from 1994 to 1998. Results are reported in Table VI. Overall, analyst coverage declined dramatically after the delisting. For example, 157 brokers issued 1,041 earnings forecasts for the five Jardine companies in 1994; however, only 92 brokers issued 413 earnings forecasts in 1995. These figures continue to decline, and in 1997 only 17 brokers issued 67 earnings forecasts. Analyst coverage rebounded in 1998, probably because of market speculation that the Jardine stocks would move back to Hong Kong. We also report the number of security analysts for Jardine International Motors. Similar to the other five Jardine companies, analyst coverage declined. The number of earnings forecasts declined significantly from 144 in 1994 to 5 in 1998, and the number of brokers who issued forecasts declined from 27 in 1994 to 2 in 1998. This result is not surprising. There are economies of scale for an analyst to collect information for companies of the same group. When fewer analysts followed the delisted Jardine companies, this affected the coverage for the company that remained in Hong Kong.

An alternative explanation for the decline in the number of analysts is the drop in profits and market capitalization for the Jardine companies during the period.¹⁶ To control for the effects of profit and size, we use the panel data

¹⁶ The drop in profits is shown in Table III. The drop in market capitalization, which is not reported, is due to a general decline in the stock prices of Jardine companies after the delisting.

analysis by regressing the number of analysts of the five Jardine companies in different years on profits and market capitalization. To conserve space, results are not reported here. We find that after controlling for profits and size, there is still a decline in the number of analysts. Therefore, the evidence of a decline in analyst coverage is robust. Coupled with earlier evidence that there is a decline in trading activity after the delisting, our results are consistent with the hypothesis that there is less interest among investors trading Jardine shares.

E. Currency and Tax Issues

Froot and Dabora (1999) suggest that currency and tax considerations could potentially explain some of the comovement of share prices with the market on which they are traded most. In the case of the Jardine Group, the exchange rate movements are not important since Jardine shares are denominated in Hong Kong dollars when traded in Hong Kong and in U.S. dollars when traded in Singapore. Since the Hong Kong dollar has been pegged to the U.S. dollar (at the rate of U.S. \$1 = H.K. \$7.8), there is little exchange rate risk for Hong Kong investors even after the delisting.¹⁷ As for Singapore investors who need to convert Jardine shares into Singapore dollars, they will be subject to exchange rate risk regardless of whether the shares are denominated in the Hong Kong dollar or the U.S. dollar. However, since the Hong Kong dollar remains pegged to the U.S. dollar after the delisting, there is no increase in exchange rate risk for Singapore investors. It should be noted that when foreigners purchase shares in Hong Kong or Singapore, there is no restriction on the foreign investments as well as transfer of funds in and out of both countries. Foreigners should be able to convert their currencies into the currency of denomination in either Hong Kong or Singapore to buy Jardine shares and later convert them back to the initial currency for onward remittance. Therefore, the currency fluctuations cannot explain the change in behavior of Jardine share prices after the delisting.

Tax distortions also cannot explain the results in the paper. In Hong Kong, neither dividend income nor capital gains are subject to tax. In Singapore, there is also no tax on capital gains. While dividends paid by a resident company are subject to a withholding tax, this does not apply to nonresident companies such as Jardine Group companies. Therefore, there is no additional tax effect on the cash flows to any investor groups in either Hong Kong or Singapore after the delisting.

V. Conclusion

The delisting of Jardine Group companies from Hong Kong offers a natural experiment for examining whether the location of trade affects the stock trading behavior. The delisting event is unique because the core business remains in

¹⁷ Despite the peg, there is slight exchange rate risk for Hong Kong investors because the actual exchange rate can deviate slightly from the pegged rate, where the deviation is bounded by transaction cost in the arbitrage.

Hong Kong and Mainland China while the stock trading activity takes place in Singapore. If the two markets are integrated, the location of trade should not influence stock trading behavior.

Contrary to this prediction, evidence indicates significant changes in the behavior of Jardine stocks after the delisting. We find a significant decrease in trading activity and analyst coverage but an increase in average trade size after the delisting, suggesting there are fewer small, retail investors than before. The fall in retail interest in these stocks can be attributed to the higher costs and inconvenience of originating small trades from Hong Kong and the higher information gathering costs for retail investors in Singapore. We also find an increase (decrease) in stock price comovement with the Singapore (Hong Kong) stock market after Jardine moved its trading location to Singapore. These findings suggest that the geographical proximity of trading and core business locations affects investor interests and trading behavior.

Overall, our results are consistent with Froot and Dabora (1999), who find that the prices of twin stocks are dependent on the location of trades. We consider and reject other obvious explanations such as the relocation of core business, time-varying betas, migration of trading activity, and currency and tax considerations. Our evidence supports the conjecture that stock price fluctuations are affected by country-specific investor sentiment. An interesting question that arises is whether the exposure to country-specific sentiment affects the stock's risk premium. Future research should address the remaining pricing issues.

REFERENCES

- Bekaert, Geert, and Campbell Harvey, 1995, Time-varying world market integration, *Journal of Finance* 50, 403–444.
- Bhushan, Ravi, 1989, Firm characteristics and analyst following, *Journal of Accounting and Economics* 11, 255–274.
- Bodurtha, James, Dong-Soon Kim, and Charles Lee, 1995, Closed-end country funds and U.S. market sentiment, *Review of Financial Studies* 8, 879–918.
- Carverhill, Andrew, and Alex Chan, 2001, Jardine Matheson Groups migration from Hong Kong to Singapore: Evidence on international market integration/segmentation, Working paper, Hong Kong University of Science and Technology.
- Chari, Anusha, and Peter Blair Henry, 2001, Stock market liberalizations and the repricing of systematic risk, Working paper, Stanford University.
- Claessens, Stijn, Simeon Djankov, Joseph Fan, and Larry Lang, 2000, Expropriation of minority shareholders in East Asia, Working paper, Hong Kong University of Science and Technology.
- De Jong, Frank, and Frans De Roon, 2001, Time-varying market integration and expected returns in emerging markets, Working paper, University of Amsterdam.
- Errunza, Vihang, and Etienne Losq, 1985, International asset pricing under mild segmentation: Theory and test, *Journal of Finance* 40, 105–124.
- Errunza, Vihang, Kedreth Hogan, and Mao-Wei Hung, 1999, Can the gains from international diversification be achieved without trading abroad? *Journal of Finance* 54, 2075–2107.
- Froot, Kenneth, and Emil Dabora, 1999, How are stock prices affected by the location of trade? *Journal of Financial Economics* 53, 189–216.
- Hardouvelis, Gikas, Rafael La Porta, and Thierry Wizman, 1995, What moves the discount on country equity funds, Working paper no. 4571, National Bureau of Economic Research, Cambridge, MA.
- Hong Kong: Poor U.S. figures expected to send stocks tumbling, 1994, *South China Morning Post*, September 19.

- Island Hopping: Jardine Matheson flees Hong Kong for Bermuda, 1994, *Far Eastern Economic Review*, April 7, 73–74.
- Lau, Sie Ting, and Thomas McInish, 2001, Equity market integration: Evidence from Jardine Group listings in Hong Kong and Singapore, Working paper, University of Memphis.
- Shleifer, Andrei, 1986, Do demand curves for stocks slope down? *Journal of Finance* 41, 579–590.
- Vijh, Anand, 1994, S&P 500 trading strategies and stock betas, *Review of Financial Studies* 7, 215–251.