Foreign ownership in the Taiwan stock market— an empirical analysis

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Abstract

This paper investigates foreign ownership in the Taiwan stock market from 1996 to 2000. From the perspective of informational asymmetry, foreign investors appear to favor large firms and low book-to-market stocks. Analytical results show that foreign investors strongly prefer firms with high export ratios with which they are more familiar on account of their higher foreign sales. Foreign investors hold more shares of high beta stocks than of low beta stocks for small firms. However, this result does not hold for large firms, implying that large firms have lower investment barriers than small firms. Foreign investors, due to their different tax status, may also hold slightly more stocks with low dividend yield. However, evidence for this assertion is inconclusive, with only a weak effect displayed by the sample considered here.
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1. Introduction

The benefits of international diversification are well established. French and Poterba (1991) and Tesar and Werner (1995), for example, argued that international investment dramatically improves the performance of portfolios. However, the strong preference for domestic equities exhibited by international investors, called the 'home bias' phenomenon, is well documented, for instance, by Lewis (1999),

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French and Poterba (1991) and Tesar and Werner (1995) who studied international diversification gains and the home bias phenomenon.

Recently, Kang and Stulz (1997) and Dahlquist and Robertsson (2001) examined foreign ownership in Japanese and Swedish stock markets, respectively. Kang and Stulz (1997) found that foreign investors in Japan prefer large, low leveraged firms, and firms with high export ratios. Dahlquist and Robertsson (2001) found that foreigners prefer large firms, and those with high liquidity. Their results show that foreign investors favor firms with certain characteristics, such as large size and low debt ratio. That is, global investors do not hold a global portfolio, a domestic portfolio and a bond portfolio, as predicted by the International Capital Assets Pricing Model (Solnik, 1974). Global investors actually consider specific advantages when selecting their foreign assets.

The disproportional holding of stocks is not only evident in international investment, but also applied to domestic portfolio selection. Falkenstein (1996) demonstrated that U.S. mutual funds hold more shares in large domestic firms than in small firms. Coval and Moskowitz (1999) examined U.S. investors' holdings in domestic portfolios and found investment managers strongly preferred stocks close to home. Dahlquist and Robertsson (2001) also compared the ownership of Swedish stocks by foreign investors with that by domestic institutional investors, revealing that foreign and institutional investors can be characterized by similar attributes.

The academic literature attributes these findings to investment barriers and asymmetric information among investors. Stulz (1981) focused on barriers to international investment, such as governmental restrictions on foreign and domestic capital flow, foreign tax and higher transaction costs. These barriers caused local investors not to hold foreign assets until the return on foreign assets is sufficiently high to compensate for the barrier cost. Merton (1987) proposed the 'investor base' hypothesis, arguing that investors only receive information from firms familiar to them. Coval and Moskowitz (1999) found evidence of preference among US investment managers for geographically close investments. These studies suggest that asymmetric information and investment barriers, although not fully explaining the phenomenon, are important factors in explaining portfolio selection bias.

Furthermore, tax considerations are also important in allocating assets and selecting portfolios.[1] The difference between the taxation of foreign and domestic investors influences foreign ownership. Liljeblom et al. (2001) showed the positive relation between falls in the ex-dividend day price and the degree of foreign ownership, indicating that foreign investors disfavor stocks with high dividends. These empirical results suggest that foreign investors hold fewer shares with high dividend yields to mitigate the negative impact of disharmonious taxation.

This paper examines foreign ownership in Taiwan's stock market, to more deeply elucidate international portfolio selection. The ratio of merchandise exports to GDP was 34.4% for Taiwan in 1998, higher than 7.9% for the US and 10.1% for Japan.[2]

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[1] Lewellen et al. (1978) provides a detailed discussion.

[2] Please see the Exhibit 1.3 (p.10) in Eun and Resnick (2001).

One reason for the importance of the foreign sector in Taiwan economy is that many Taiwanese firms manufacture brand-name products that were originally designed and owned by US firms. For example, Acer is an important producer of the IBM notebook, and Pou Chen Corporation makes shoes for NIKE. Foreign investors in Taiwan's stock market, most of them are from the US, suffer more severe informational asymmetry than local investors. However, foreign investors have great access to the foreign product markets and the foreign customers of Taiwanese firms, than do local investors. In international trading and outsourcing, the difference between the information of local investors and that of foreigners is smaller for high export firms in Taiwan than for low exports firms. This difference nevertheless powerfully rationalizes foreign investors' holding of more shares in these high export ratio firms, despite that fact these firms' returns may correlate more closely with those of US stocks than do low-export ratio firms and thus represent less diversification.

In Taiwan, domestic and foreign investors are taxed differently. Capital gains are tax-free in Taiwan. Dividends distributed from earnings are taxed as ordinary income for local investors, while foreign investors must pay a 25% withholding tax. We predict that foreign investors should favor equities with lower dividend yields since institutional investors can not enjoy tax refunds or credits in their host country. Taiwan's stock market thus offers a good opportunity to test the dividend clientele hypothesis.

This study proposes several hypotheses concerning factors that affect foreign holdings on the Taiwan market. The sample includes foreign ownership of companies listed on the Taiwan Stock Exchange (TSEC) from 1996 to 2000. Foreign investors are found to favor large firms with high export ratios, and low book-to-market equity. Foreign ownership in small firms is higher for high beta portfolios than for low beta portfolios. These results are consistent with the asymmetric information hypothesis and the investment barrier model. The findings on the tax clientele effect are weak and inconclusive. The rest of this paper is organized as follows. Section 2 proposes some testable hypotheses. Section 3 then introduces the sample market, namely the TSEC. Section 4 describes data and methodology, and Section 5 reports empirical results. Section 6 concludes.

2. Empirical hypotheses

In an environment of informational asymmetry, investment barriers, and disharmonious taxation, foreign investors are expected to hold more stocks with specific characteristics. This section proposes several empirical hypotheses.

As is broadly assumed, more information is available on large firms than on small ones. Foreign investors should favor large firms to minimize the negative impact of informational asymmetry since the degree of informational asymmetry is higher for foreign investors than for local investors. Similarly, foreign investors should favor blue-chip stocks. Fama and French (1995) proposed the book-to-market equity (B/ M) as a proxy for profitability and growth. Low B/M firms have persistently high

earnings while high B/M firms have consistently poor earnings.[3] The future financial performance for low B/M firms are more transparent than for high B/M firms. We hypothesize that, under such circumstances, foreign investors would hold more shares of low B/M firms.

> H1: Foreign investors hold more shares of large firms than do local investors, with all other factors held constant.
> H2: Foreign investors hold more shares of low B/M firms than do local investors, with all other factors held constant.

Many Taiwanese firms with high export ratios are OEM and ODM manufacturers for foreign corporations. Thus, foreign investors are likely to have more knowledge and information about firms with high foreign sales than about firms with low export ratios. We propose that foreign investors favor firms with high foreign sales to mitigate asymmetric information.

> H3: Foreign investors hold more shares in firms with high export ratios, all other factors being equal.

Factors other than informational asymmetry also affect international investments. Stulz (1981) developed an international investment barrier model, showing that such barriers raise the cost of cross-boarder investments. Accordingly, foreign investors seek assets with higher expected returns to cover these costs. We hypothesize that foreign investors who face such barriers hold more shares of high beta stocks, yielding higher expected returns.

> H4: Foreign investors should hold more shares of high beta firms than low beta firms to cover international investment barrier costs, all other factors remaining constant.

The difference between the status of foreign investors in their parent and host countries, especially investors in pension funds with a tax-exempt status in the United States, reduces after-tax returns on international investment. In Taiwan, although capital gains are tax-free, dividends paid to foreign investors are subject to 25% withholding tax. We propose that a dividend clientele effect exists, that is, foreign investors tend to hold more shares of firms with lower dividend yields, to mitigate the negative impact of disharmonious taxation.

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[3] Fama and French (1995) found that portfolios of high B/M stocks are less profitable than those of low B/M stocks, for four years before and for at least five years following the ranking dates.

Table 1
Statistics for QFIIs in Taiwan from 1991 to 2000

Country	Approved Amount (USD)	Percent	Region	Percent
United States	76 132 609 290	38.59%	North America	42.18%
United Kingdom	38 359 521 633	19.45%	Europe	34.49%
Hong Kong	30 575 008 223	15.50%	Far East	22.30%
Singapore	6 715 000 000	3.40%	Other	1.03%
Japan	6 063 000 000	3.07%		
Luxembourg	5 640 587 000	2.86%	Total	100.00%
France	4 482 783 425	2.27%		
Ireland	4 311 855 181	2.19%		
Canada	4 167 750 000	2.11%		
Netherlands	3 764 000 000	1.91%		
Switzerland	3 344 817 174	1.70%		
Germany	2 111 187 965	1.07%		
Bermuda	1 735 239 738	0.88%		
Italy	1 695 000 000	0.86%		
Australia	1 473 000 000	0.75%		
Other	6 698 673 312	3.40%		
Total	197 270 032 941			

This table reports the investment amount of Qualified Foreign Institutional Investors (QFIIs) from 1991/1 to 2000/6 by country and region. Approved amount is expressed in US dollar.

H5: Foreign investors should hold more shares of firms with lower dividend yield to save taxes, all other factors remaining constant.

3. History and structure of TSEC

The TSEC began operations in 1962. Although only 18 companies were listed in 1962, this figure increased to 462 by the end of 1999. The Taiwan stock market has a market capitalization of NT$ 11.8 trillion (New Taiwan Dollars), equal to approximately US$370 billion, with an annual turnover of 238% in 1999. The TSEC ranks 12th globally, in terms of market value, according to The Salomon Smith Barney Guide to World Equity Markets (1998) and TSEC Monthly Review (2000).

Taiwan opened its stock market in 1983 by allowing its domestic investment trust companies to raise overseas funds for investment in the local market. In 1991, Qualified Foreign Institutional Investors (QFIIs) were allowed to invest directly in the local stock market. QFIIs must obtain permission from both the Securities and Futures Commission (SFC) and the Central Bank.[4] The investment quota for each QFII was originally US$50 million, then it was gradually increased to US$600

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[4] Since October 1997, any foreign investors who invested less than US$50 million must apply directly to the SFC, without the approval of the Central Bank.
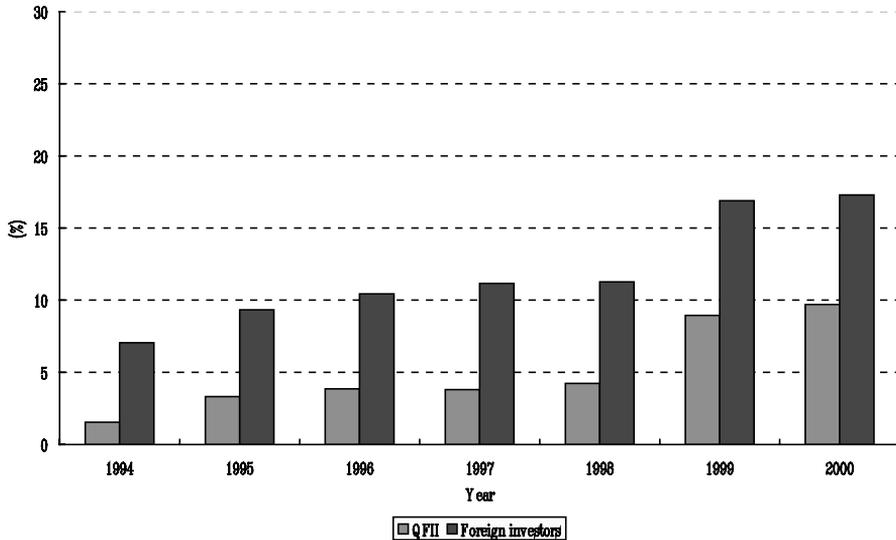
Fig. 1. Market value of Taiwanese listed companies held by foreign investors and Qualified Foreign Institutional Investors (QFII). Ownership is based on data at the end of each year, except for 2000, when it is based on data from the end of March.

million by 1996, (the beginning of our sample period,) and US$2 billion by the end of 2000. Over 500 QFIIs have received permission to invest in the TSEC since 1991. Furthermore, direct investment by individual foreign investors has been allowed since 1996. The original investment quota was US$ 5 million for foreign individual investors; and US$20 million for foreign institutional investors; the latter figure was gradually increased to US$50 million.

Some restrictions apply to foreign investors' holdings. A QFII can normally invest in listed shares, government bonds, corporate bonds, and money market instruments. Investment in convertible bonds was only permitted from March 2000. Ceilings for each foreign investor's holdings in individual listed firms were originally set at 5% in 1991, and were gradually increased to 10% in 1996, and 50% in 2000. The ceiling for total foreign investments was 10% in 1991, gradually increasing to 20% in 1996, and 50% in 2000.[5]

Table 1 presents statistics on QFIIs' approved investment amounts from the beginning of 1991 to June 2000, by nation and region. Only the QFIIs are reported since we do not have detailed data on which countries are home to foreign individual investors. The largest investments of QFIIs in Taiwan are from the US: 38.59% of the approved investment amount of QFIIs in Taiwan are from US institutions. The second to fifth largest amounts are from the United Kingdom, Hong Kong, Japan

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[5] The government has announced plans to cancel existing share holding ceilings for foreign investors in the near future.
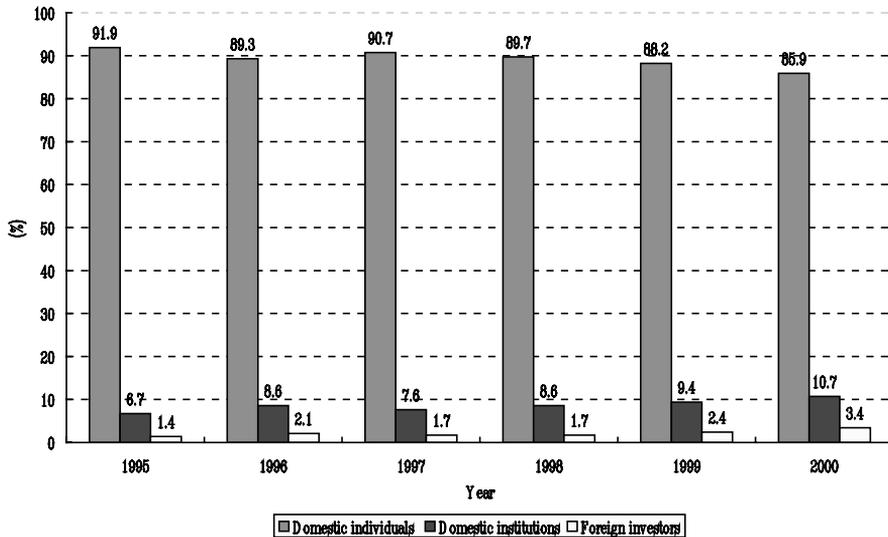
Fig. 2. Trading value by type of investor for the Taiwan Stock Exchange. Trading value is based on data for the whole year, except for in 2000 when the data is from March.

and Singapore, respectively. These countries' QFIIs account for around 80% of the total approved investment in this period.

Fig. 1 shows the fraction of the market value of companies listed on the TSEC that is held by foreign investors and by QFIIs, from 1994 to 2000. Total foreign ownership was 6% in 1994, and has now increased to 16%, and QFII ownership rapidly rose from 2% in 1994 to 10% in 2000. Fig. 2 displays the relative percentage of different investors' holdings in the TSEC. Individual investors, whose trades account for approximately 90% of total trading volume, dominate the Taiwan stock market. Although small, trading by foreign investors is steadily growing. Net buying or selling by QFIIs consistently makes headlines in local newspapers and significantly influences market prices.

4. Data

This study analyzes the foreign ownership of firms listed on the TSEC from 1996 to 2000. In Taiwan, shares are registered. Listed firms report their foreign ownership levels to the SFC and this information is available in the SFC's quarterly reports. Firms' financial data, including financial ratios and stock prices, was obtained from the Taiwan Economic Journal (TEJ), which is a data vendor in Taiwan.

Foreign ownership, both by QFIIs and non-QFIIs, includes all shares held by non-resident investors, irrespective of where they live. Foreign ownership data for the end of March in each year is used herein to avoid the problem of potential 'window dressing' by foreign institutional investors cause by the adjustments by fund

Table 2
The number of the sample during the 1996–2000 period

	1996	1997	1998	1999	2000
No. listed companies	356	389	410	451	470
No. financial firms	23	27	33	47	49
No. financial distress firms	24	24	12	14	35
No. companies listed less than 1 year	48	37	36	50	47
No. samples	261	301	329	340	339
Proportion of sample to total listed companies	0.73	0.77	0.80	0.75	0.72

This table presents the number of listed companies, the number of companies in the sample, and the number of companies excluded. The numbers reported in the table are based on March 31 of each year, and are used to calculate foreign ownership figures.

Table 3
The statistics describing foreign ownership

	1996	1997	1998	1999	2000
No. sample	261	301	329	340	339
Foreign ownership (%)					
Equally weighted mean	9.38	9.88	8.52	7.67	8.02
S.D.	12.33	11.96	11.22	11.32	11.61
Median	4.45	5.40	4.41	2.90	2.89
Value weighted mean	13.19	13.48	13.17	13.86	16.85
No. foreign ownership = 0	5	9	8	19	21
No. ownership not available for foreign investors[a]	1	2	1	0	0
Ownership held by QFIIs (%)					
Equally weighted mean	2.75	3.60	2.84	2.10	2.68
Value weighted mean	4.51	4.72	4.66	5.65	8.89

This table lists the statistics on foreign ownership for the sample. The number of listed companies which are not held by any foreign investors is also provided, as is the number of companies unavailable to foreign investors because of the remaining shares available to foreigners under current regulations limiting foreign investment is less than 1% of the total number of shares. These data are useful in our cross sectional analysis of the relationship between foreign ownership (dependent variable) and specific corporate characteristics. If the number of listed companies which are not held by any foreign investors and/or unavailable to foreign investors is large, the distribution of foreign ownership is truncated at both upper and lower limits. In such cases, it is suggested that 'censored' regression—Tobit model—be applied to the data. However, the dependent variable in our sample is not seriously truncated and we only report the ordinary least square results herein. The Tobit model results, which are not displayed herein, resemble the OLS results.

[a] We define 'Ownership not available for foreign investors' by the condition of the percentage of total shares still available for foreign investors, as compared to the ceiling, being less than 1%.

managers to their portfolios at the end of each year (Lakonishok et al., 1991). Certain firms are also excluded from the analysis, as follows. (1) Financial firms, because they are too different from non-financials. (2) Financially distressed firms, due to illiquidity and incomplete data. (3) Companies which first listed less than 1 year before the beginning of the sample year, because they are relatively unknown to

Table 4
Descriptive statistics of variables

Variables	Mean	S.D.	Correlation matrix						
			1	2	3	4	5	6	7
Panel A: 1996									
1. Foreign ownership	9.38	12.33	1.0000						
2. Debt ratio	39.02	14.29	−0.1234	1.0000					
3. Current ratio	196.50	157.04	0.0863	−0.6112	1.0000				
4. Beta	1.01	0.25	0.0729	−0.0142	0.0250	1.0000			
5. Lg(MV)	8.84	0.93	0.2841	0.0389	0.0007	0.0213	1.0000		
6. Exports ratio (%)	26.83	30.84	0.1332	−0.0056	−0.0439	0.0636	−0.0311	1.0000	
7. Dividend yield (%)	2.41	2.18	0.2643	−0.3134	0.2097	−0.1249	0.4997	0.0676	1.0000
8. Book-to-market	0.55	0.17	−0.2381	0.1934	−0.0846	0.3902	−0.1152	−0.1223	−0.2734
Panel B: 1997									
1. Foreign ownership	9.88	11.96	1.0000						
2. Debt ratio	40.18	15.14	−0.0298	1.0000					
3. Current ratio	202.01	144.83	0.0094	−0.5968	1.0000				
4. Beta	0.70	0.22	0.0624	−0.0009	0.0347	1.0000			
5. Lg(MV)	9.02	0.98	0.2758	−0.0362	0.0335	0.5865	1.0000		
6. Exports ratio (%)	26.90	31.89	0.1233	−0.1114	0.0158	−0.1988	0.0016	1.0000	
7. Dividend yield (%)	2.12	1.85	0.1895	−0.2449	0.2223	0.0347	0.3948	0.1500	1.0000
8. Book-to-market	0.49	0.17	−0.2469	0.0755	−0.0898	0.1209	−0.2050	−0.1057	−0.1988
Panel C: 1998									
1. Foreign ownership	8.52	11.22	1.0000						
2. Debt ratio	39.71	14.69	−0.0668	1.0000					
3. Current ratio	206.67	133.08	0.0589	−0.5309	1.0000				
4. Beta	0.86	0.32	0.1936	−0.0072	0.0352	1.0000			
5. Lg(MV)	9.26	1.01	0.2480	−0.0204	−0.0257	0.4283	1.0000		
6. Exports ratio (%)	26.98	32.91	0.1813	−0.0747	0.0633	0.4623	0.0797	1.0000	
7. Dividend yield (%)	2.36	1.89	0.0875	−0.2810	0.1920	0.1956	0.2966	0.1183	1.0000
8. Book-to-market	0.49	0.21	−0.2010	0.0817	−0.0628	−0.2893	−0.3085	−0.1880	−0.0669

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Table 4 (*Continued*)

Variables	Mean	S.D.	Correlation matrix						
			1	2	3	4	5	6	7
Panel D: 1999									
1. Foreign ownership	7.64	11.31							
2 .Debt ratio	41.24	16.30		−0.1573	1.0000				
3. Current ratio	190.10	164.89	0.1593	−0.4774	1.0000				
4. Beta	0.90	0.32	0.2049	−0.0997	0.1050	1.0000			
5. Lg(MV)	8.99	1.09	0.2676	−0.0957	0.0204	0.3521	1.0000		
6. Exports ratio (%)	27.39	33.78	0.1423	−0.1518	0.0545	0.4243	0.2061	1.0000	
7. Dividend yield (%)	2.11	2.50	0.0658	−0.2752	0.1690	0.0536	0.1906	0.1294	1.0000
8. Book-to-market	0.70	0.35	−0.1990	0.1682	−0.0855	−0.2195	−0.4032	−0.2969	−0.1496
Panel E: 2000									
1. Foreign ownership	8.02	11.61	1.0000						
2. Debt ratio	42.34	16.48	−0.1948	1.0000					
3. Current ratio	171.77	116.67	0.1557	−0.5347	1.0000				
4. Beta	0.78	0.25	0.2252	−0.1709	0.0248	1.0000			
5. Lg(MV)	8.73	1.40	0.3580	−0.2443	0.1083	0.4564	1.0000		
6. Exports ratio (%)	27.98	33.76	0.1974	−0.1360	0.0348	0.3288	0.3323	1.0000	
7. Dividend yield (%)	2.27	2.70	0.0978	−0.3491	0.2892	0.0327	0.1956	−0.0195	1.0000
8. Book-to-market	1.01	0.73	−0.2831	0.2477	−0.1592	−0.1876	−0.5817	−0.3552	−0.1824

investors, and especially foreign investors. Additionally, characteristics such as beta can not be adequately calculated for these newly listed firms, since one complete year of daily data preceding the beginning of the sample year is required.

Table 2 presents the number of listed companies, number of companies excluded, and number companies sampled during the sample period. The sample includes between 72 and 80% of all listed companies.

Table 3 lists the statistics on foreign ownership in our sample. The equally weighted means of foreign ownership range from 7.7 to 9.9%. Meanwhile, the median is smaller than the mean every year, indicating that the distribution of foreign ownership is skewed to the right. The value-weighted mean based on the market value of the outstanding shares for each firm is larger than the equally weighted mean, showing that foreign ownership of large firms tends to be higher than that of small firms.

Table 3 also presents the number of companies in which no foreign investors have holdings, and the number of firms unavailable for further foreign investment because that investment has already reached the permitted ceiling. Total foreign holdings in individual listed firms were restricted to 20% in 1996, 25% in 1997 (adjusted on November 22, 1996), 30% in both 1998 and 1999 (adjusted on January 7, 1998), and 50% in 2000 (adjusted on March 30,1999), respectively. 'Further ownership unavailable to foreign investors' was defined herein as applying when the remaining percentage share holding available for foreign investors was under 1%. Relatively few stocks were found to either have no foreign ownership or be unavailable to foreign investors. Thus, neither foreign ownership ceilings nor cases of no foreign ownership seriously truncate the distribution of foreign ownership.

The following characteristics of firms were used herein as independent variables to analyze foreign ownership

a) Market value: defined as the market value of a firm's outstanding common stocks at the end of December, preceding foreign ownership measurement. This variable measures firm size.
b) Export ratio: defined as the export-to-sales ratio for the year preceding foreign ownership measurement.
c) Book-to-market equity: measured as the book value of equity divided by its market value at the end of the previous year.
d) Dividend yield: calculated as the dividend per share for the previous year divided by the market price per share at the end of the previous year.
e) Beta: estimated by the market model with the daily returns of the previous year.
f) Debt ratio: measured as the ratio of total liabilities to total assets at the end of the previous year.
g) Current ratio: defined as the ratio of current assets to current liabilities at the end of the previous year.

Table 4 lists descriptive statistics for all variables in our sample, and the corresponding correlation matrix. Understanding the correlation between variables is essential. Foreign ownership is strongly correlated with firm size (the natural

logarithm of market value of equity, Lg(MV)), beta, and book-to-market ratio in most sample years, and correlates most closely with firm size. The correlations between firm size and beta, book-to-market ratio, and the export ratio are also found to be high.

5. Methodology and empirical results

This section begins by presenting the results of the cross-sectional analysis of foreign ownership. The cross-sectional data for each year are then stacked to panel data. The random effect model is adopted to analyze the relationships among foreign ownership and other factors. Finally, the effect of firm size is separated from the effect of other correlated variables since firm size may be a proxy for several variables that might affect foreign ownership.

5.1. Cross-sectional analysis

Linear regression analysis is employed to examine the relationship between foreign ownership and firm characteristics. As Table 3 shows, very few listed companies are both not held by foreign investors and unavailable to such investors. The distribution of foreign ownership is thus a little truncated at the upper and lower limits. Consequently, the linear regression model is used rather than the 'censored' regression model (that is, Tobit model) to fit the data.[6] The estimated equation is a standard linear regression model as follows.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_n x_n + \varepsilon \tag{1}$$

where y denotes the foreign ownership of firm i; x_j represents the firm characteristic variable j, and ε is the error term.

Least squares estimation is inefficient if heteroskedasticity exists in the regression analysis. White's (1980) procedure is used herein to correct the standard error of the estimated coefficients. The White estimator, which can serve as an estimate of the true variance of the least squares estimator, is,

$$\mathrm{Var}(\hat{\beta}) = n(\mathbf{X'X})^{-1} S_0 (\mathbf{X'X})^{-1} \tag{2}$$

$$\mathbf{S}_0 = \frac{1}{n} \sum_{i=1}^{n} e_i^2 \mathbf{x}_i \mathbf{x'}_i \tag{3}$$

where e_i is the ith least squares residual.

Table 5 presents the cross sectional results. The dependent variable in all models in Table 5 is foreign ownership. The independent variable in each of Panels A–E is one of the firm's characteristics, including firm size, export ratio, beta, dividend yield, and book-to-market ratio. As anticipated, the coefficients of both firm size and

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[6] We also employ the Tobit model in our cross sectional analysis, the results do not change greatly.

Table 5
Results of cross-sectional analysis

Variables	1996	1997	1998	1999	2000
Panel A					
Intercept	−23.76	−20.59	−17.00	−17.31	−17.98
	(−4.10)**	(−3.61)**	(−2.83)**	(−3.18)**	(−4.48)**
Firm size	3.75	3.38	2.76	2.77	2.98
	(5.61)**	(5.26)**	(4.23)**	(4.59)**	(6.42)**
Adjusted R^2	0.0772	0.0730	0.0586	0.0689	0.1255
Panel B					
Intercept	7.95	8.64	6.85	6.34	6.12
	(9.26)**	(10.98)**	(9.94)**	(9.42)**	(8.80)**
Exports ratio	0.05	0.05	0.06	0.05	0.07
	(2.01)**	(2.07)**	(3.06)**	(2.75)**	(3.58)**
Adjusted R^2	0.0140	0.0119	0.0299	0.0173	0.0361
Panel C					
Intercept	5.75	7.52	2.70	1.04	−0.25
	(1.94)*	(3.96)**	(1.67)*	(0.66)	(−0.16)
Beta	3.61	3.36	6.75	7.35	10.66
	(1.20)	(1.34)	(3.52)**	(3.97)**	(4.94)**
Adjusted R^2	0.0015	0.0006	0.0345	0.0391	0.0479
Panel D					
Intercept	5.78	7.29	7.29	7.04	7.06
	(5.59)**	(7.25)**	(7.59)**	(10.13)**	(9.76)**
Dividend yield	1.49	1.23	0.52	0.30	0.42
	(3.72)**	(3.09)**	(1.54)	(1.27)	(1.93)*
Adjusted R^2	0.0663	0.0327	0.0046	0.0014	0.0066
Panel E					
Intercept	19.14	18.21	13.88	12.15	12.55
	(6.92)**	(8.14)**	(7.60)**	(8.53)**	(11.10)**
book-to-market	−17.71	−17.16	−10.92	−6.39	−4.50
	(−4.18)**	(−4.35)**	(−3.56)**	(−3.94)**	(−6.03)**
Adjusted R^2	0.0530	0.0578	0.0375	0.0368	0.0774
Panel F					
Intercept	−25.81	−21.80	−17.17	−16.40	−16.70
	(−4.39)**	(−3.80)**	(−2.91)**	(−2.93)**	(−3.92)**
Firm size	3.81	3.38	2.61	2.58	2.73
	(5.74)**	(5.32)**	(4.10)**	(4.03)**	(5.29)**
Exports ratio	0.06	0.05	0.06	0.03	0.03
	(2.28)**	(2.20)**	(2.85)**	(1.70)*	(1.50)
Adjusted R^2	0.0940	0.0851	0.0822	0.0741	0.1299
Panel G					
Intercept	−18.98	−19.42	−17.19	−16.24	−16.53
	(−3.02)**	(−3.37)**	(−2.93)**	(−2.90)**	(−3.92)**
Firm size	2.82	3.01	2.62	2.56	2.67
	(3.74)**	(4.61)**	(4.12)**	(4.02)**	(5.20)**
Exports ratio	0.052	4.181	5.547	3.009	3.054
	(2.12)**	(1.91)*	(2.78)**	(1.65)*	(1.52)
Dividend yield	84.03	49.10	−0.951	3.278	15.065

Table 5 (*Continued*)

Variables	1996	1997	1998	1999	2000
	(1.92)	(1.17)	(−0.03)	(0.15)	(0.69)
Adjusted R^2	0.1071[**]	0.0867	0.0793	0.0703	0.1342
Panel H					
Intercept	−15.36	−11.10	−10.80	−11.34	−11.28
	(−2.07)[**]	(−1.38)	(−1.56)	(−1.81)*	(−1.98)*
Debt ratio	−0.04	−0.01	−0.02	−0.05	−0.03
	(−0.68)	(−0.01)	(−0.46)	(−1.35)	(−0.92)
Current ratio	0.002	−0.002	0.003	0.008	0.009
	(0.32)	(−0.43)	(0.71)	(1.45)	(1.37)
Beta	7.95	−2.45	0.52	3.23	3.15
	(2.32)[**]	(−0.63)	(0.28)	(1.65)*	(1.36)
Firm size	2.84	3.03	2.25	2.03	2.03
	(3.89)[**]	(3.20)[**]	(3.32)[**]	(3.00)[**]	(3.16)[**]
Exports ratio	0.039	3.320	4.628	0.953	1.832
	(1.66)*	(1.47)	(2.27)[**]	(0.51)	(0.93)
Dividend yield	50.28	33.37	−8.037	−12.89	−4.245
	(1.16)	(0.82)	(−0.26)	(−0.70)	(−0.19)
Book-to-market	−17.08	−11.91	−5.71	−2.42	−1.32
	(−3.26)[**]	(−2.78)[**]	(−1.94)[**]	(−1.51)	(−2.03)[**]
Adjusted R^2	0.1479	0.1071	0.0821	0.0966	0.1454

This table presents the coefficients of cross-section analysis. The dependent variable is foreign ownership of corporations listed on the Taiwan Stock Exchange, while the independent variables include debt ratio, current ratio, beta, firm size (the natural logarithm of total equity market value), export ratio (the exports-to-sales ratio), dividend yield, and book-to-market ratio, depending on different models. The t-statistics are reported in parentheses. All t-statistics have been adjusted for heteroskedasticity using White's (1980) procedure.

* Significant at the 10% level.
** Significant at the 5% level.

export ratio are all significantly positive at the 5% level for simple regression models, in each of the 5 years. The coefficients of the book-to-market ratio are all significantly negative in each of the 5 years. While the coefficients of beta are all positive, only three are significant. Finally, the dividend yields are all positive, being significant in 1996 and 1997, and marginally significant in 2000.

Panels F, G and H in Table 5 display the results of multiple regression. The findings are as follows. The coefficients of firm size are all positive and significant in each year in Panels F, G, and H. Firm size has the largest influence on foreign ownership, with foreign investors' favoring shares in large firms. This finding is consistent with that of Kang and Stulz (1997) and Dahlquist and Robertsson (2001). After additional independent variables are included in Panels F, G and H, the coefficients of export ratio all remain positive, although the statistical significance slowly decreases in each of the 5 years. In Panel H, which includes all independent variables, the coefficients of export ratio are only significant in 1996 and 1998, although the signs are positive for every year. This result is interpreted as indicating that foreign investors tend to hold more shares in firms with higher export-to-sales

Table 6
Results of random effects model

Intercept	Debt ratio	Current Ratio	Beta	Firm size	Exports ratio	Dividend yield	Book-to-market	Adj-R^2
0.0354	−0.0086	−0.0007	0.2247	0.8986	0.0061	−0.0340	−1.2526	0.0598
(0.36)	(−0.62)	(−0.73)	(0.54)	(3.37)[**]	(0.65)	(−0.60)	(−3.78)[**]	

The table reports the results of random effect model. The random effect model is as follows: $y_{i,t} = \beta_0 + \beta_1 x_{1,i,t} + \beta_2 x_{2,i,t} + \cdots + \beta_n x_{n,i,t} + \varepsilon_{i,t} + \mu_i$, $y_{i,t}$ is the foreign ownership of firm i in the year t (t = 1996, 1997,..., 2000), $x_{n,i,t}$ represents the specific corporate characteristics in the year t, and β_n is the parameter being estimated. The estimation procedure follows Greene (1997).

[**] Significant at the 5% level.

ratios. Once again, this finding is consistent with Kang and Stulz (1997), who argued that firms with high export-to-sales ratios are well known internationally, and that foreign investors hold more shares in firms with which they are familiar.

Results for the dividend yield in multiple regression models are mixed. In Panels G and H, the coefficients of dividend yield are positive in 1996 and 1997, while in 1998, 1999 and 2000 they were negative. Consequently, evidence of the negative relationship between foreign ownership and dividend yield is weak. The results for beta are also mixed. Although four of the five coefficients in Panel H are positive, only one is significant at the 5% level. Therefore the evidence for the positive relationship between foreign ownership and beta is also weak. These findings imply that since foreign investors face investment barriers and inharmonious taxes, they tend to hold a slightly more shares in high beta firms to increase expected returns, and slightly fewer shares in high dividend yield ratio firms, to minimize taxes.

The results for book-to-market equity are similar to those for firm size, except that the signs are negative. In Panel H, the coefficients of B/M are all negative, and four of them are significant. This finding suggests that foreign investors tend to hold more shares of firms with low B/M ratios, which firms may be proxies for profitable and high growth firms.

5.2. Panel data analysis

The preceding subsection discusses cross sectional analysis for each year in the sample period, from 1996 to 2000. The cross sectional data is stacked to form the panel data, and the random effect model is used to test the relationship between foreign ownership and other variables and thereby determine whether the relationship between foreign ownership and the explanatory variables changes over the study period.

$$y_{i,t} = \beta_0 + \beta_1 x_{1,i,t} + \beta_2 x_{2,i,t} + \cdots + \beta_n x_{n,i,t} + \varepsilon_{i,t} + \mu_i \tag{4}$$

where $y_{i,t}$ denotes the foreign ownership of firm i in the year t ($t =$ 1996, 1997, ..., 2000); $x_{n,i,t}$ represents the specific corporate characteristics in the year t, and β_n is the parameter to be estimated.

The estimation method used here is that suggested by Greene (1997). Complete data for the duration of the study period is available for 245 firms, and Table 6 lists the estimation results.

Table 6 shows that only firm size and B/M significantly affect foreign ownership: firm size displays a positive relationship and B/M a negative one. This finding is consistent with the cross sectional analysis and with our research hypothesis. However, beta and export ratios are also found to have positive coefficients, while dividend yield has a negative coefficient. Although the signs are as expected, the values are statistically insignificant. According to the empirical results of the random effect model, foreign investors clearly favor large stocks with low B/M ratios. Furthermore, foreign investors also appear to hold stocks with high betas, high export ratios and low dividend yields.

Table 7
Mean and median of foreign ownership (%) of portfolios formed by firm size and export ratio

Exports/sales ratio	Size quintiles					All	$(4+5)-(1+2)$ (t-statistic)
	Smallest (1)	2	3	4	Largest (5)		
Smallest(1)	4.13	3.86	4.96	7.15	11.23	6.26	**5.20**
	[0.08]	[1.01]	[3.11]	[2.81]	[6.29]	[2.16]	**(4.25)**[**]
2	5.38	3.59	4.63	5.32	14.28	6.64	**5.31**
	[1.62]	[0.89]	[1.20]	[2.56]	[11.90]	[2.40]	**(4.35)**[**]
3	5.30	8.10	6.12	7.83	15.34	8.54	**4.88**
	[1.75]	[2.70]	[1.51]	[3.90]	[13.92]	[4.41]	**(3.76)**[**]
4	7.04	6.63	11.20	14.27	15.56	10.94	**8.08**
	[1.22]	[1.65]	[3.98]	[9.06]	[13.07]	[5.83]	**(5.10)**[**]
Largest(5)	5.94	8.87	10.45	11.09	17.04	10.69	**6.65**
	[1.33]	[3.79]	[4.38]	[8.34]	[13.34]	[4.75]	**(3.98)**[**]
All	5.56	6.23	7.50	9.15	14.71	8.63	**6.04**
	[1.01]	[1.88]	[2.88]	[4.64]	[11.84]	[3.91]	**(5.16)**[**]
(4+5)−(1+2)	**1.74**	**4.03**	**6.02**	**6.43**	**3.55**	**4.37**	
(t-statistic)	**(1.30)**	**(3.20)**[**]	**(4.25)**[**]	**(4.43)**[**]	**(2.20)**[**]	**(3.43)**[**]	

This table reports the mean and median of foreign ownership (%) of portfolios formed by firm size (market value of equity) and exports-to-sales ratio in the sample period (1996–2000). The mean of foreign ownership of portfolios is equally weighted. The median is shown in brackets. For each year, the firms are divided into size quintiles, and each quintile is then divided into five quintiles based on the exports-to-sales ratio. The bold values in the last row represent the mean difference between the large (the largest and the second largest) and the small (the smallest and second smallest) export ratio samples in each size quintile with the t-statistic.

** Significant at the 5% level.

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Reexamining the correlation matrix in Table 4 reveals that the beta, book-to-market, and export ratios all correlate strongly with firm size. Meanwhile, the results in Table 5 also indicate that firm size might be a proxy for several variables that may influence foreign ownership. The following subsections clarify the effect of firm size.

5.3. Firm size, export ratio, and foreign ownership

Portfolios are formed based on firm size and then export ratio over the 1996–2000 period, to separate the effects of these two factors. For each year, firms are divided into size quintiles, each of which is then divided into five quintiles based on exports-to-sales ratios. Table 7 lists the results. Ignoring export ratio, foreign ownership increases monotonically from 5.56% for the smallest size quintile to 14.71% for the largest size quintile. Ignoring firm size, foreign ownership increases from 6.26% for the smallest export ratio quintile to 10.94% for the second largest export ratio quintile, then decreases slightly to 10.69% for the largest export ratio quintile. In each export ratio quintile, foreign ownership gradually increases from the smallest to the largest size quintile, although the change is not monotonic. In each size quintile, foreign ownership also gradually increases from the smallest to the largest export ratio quintile, and once again the change is not monotonic.

The shaded cells of the last column represent the mean difference between the large (largest and second largest) and the small (smallest and second smallest) firm sizes in each export ratio quintile. Foreign ownership in large firms is significantly higher than that in small firms in all export ratio quintiles. For comparison, the mean difference between the high (the highest and the second highest) and low (the lowest and the second lowest) export ratios in each size quintile is reported in the shaded cells of the last row. The foreign ownership in the high export ratio firms is significantly higher than in low export ratio firms in four of the five size quintiles, and the difference is insignificant only for the smallest size quintile. The mean difference between the large and small sizes is then tested, ignoring export ratio, and the mean difference between the high and low export ratios is tested, ignoring firm size. The mean differences are 6.04 and 4.37%, respectively. The above figures all differ significantly from zero at the 5% level. Therefore, both firm size and export ratio influence foreign ownership, but firm size seems to have a stronger effect than export ratio.

Why do foreign investors prefer firms with high export-to-sales ratios? Kang and Stulz (1997) propose that high export-to-sales firms are internationally well known. Foreign investors have information concerning the customers of high export firms, with which they are familiar, just because of geographic proximity. Foreign investors prefer to invest in high export ratio firms to mitigate the informational asymmetry. Our result is consistent with that of Kang and Stulz (1997), and supports the arguments of Merton (1987) and Coval and Moskowitz (1999).

5.4. Firm size, beta, and foreign ownership

Facing international investment barriers, foreign investors should favor high beta stocks because of their higher expected returns. The correlation matrix shows that

Table 8
Mean and median of foreign ownership (%) of portfolios formed by firm size and Beta

Beta	Size quintiles					All	(4+5)−(1+2) (*t*-statistic)
	Smallest (1)	2	3	4	Largest (5)		
Smallest(1)	3.58	4.20	5.87	8.36	15.57	7.52	**8.08**
	[0.08]	[0.98]	[1.46]	[4.22]	[13.92]	[2.51]	**(6.62)**[**]
2	3.48	5.28	5.88	8.45	15.07	7.63	**7.38**
	[0.72]	[1.76]	[2.21]	[3.90]	[11.70]	[3.20]	**(5.37)**[**]
3	5.51	5.32	9.80	10.30	14.00	8.99	**6.74**
	[1.20]	[1.03]	[4.52]	[4.83]	[12.10]	[4.45]	**(5.11)**[**]
4	7.94	8.79	6.36	9.11	14.22	9.28	**3.40**
	[2.34]	[2.95]	[1.90]	[3.56]	[8.72]	[3.69]	**(2.02)**[**]
Largest(5)	7.29	7.62	9.74	9.85	14.04	9.72	**4.50**
	[1.58]	[2.67]	[4.76]	[6.01]	[11.35]	[5.45]	**(3.07)**[**]
All	5.56	6.23	7.50	9.15	14.71	8.63	**6.04**
	[1.01]	[1.88]	[2.88]	[4.64]	[11.84]	[3.91]	**(5.16)**[**]
(4+5)−(1+2)	**4.09**	**3.47**	**2.17**	**1.06**	**−1.19**	**1.93**	
(*t*-statistic)	**(3.21)**[**]	**(2.62)**[**]	**(1.65)***	**(0.73)**	**(−0.74)**	**(2.94)**[**]	

This table reports the mean and median of foreign ownership (%) of portfolios formed by firm size and stock beta in the sample period (1996–2000). The mean of foreign ownership of portfolios is equally weighted. The median is shown in brackets. For each year, the firms are divided into size quintiles, and each quintile is then divided into five quintiles based on the stock beta. The bold values in the last row represent the mean difference between the large (the largest and the second largest) and the small (the smallest and second smallest) beta samples in each size quintile with the *t*-statistic.

* Significant at the 10% level.
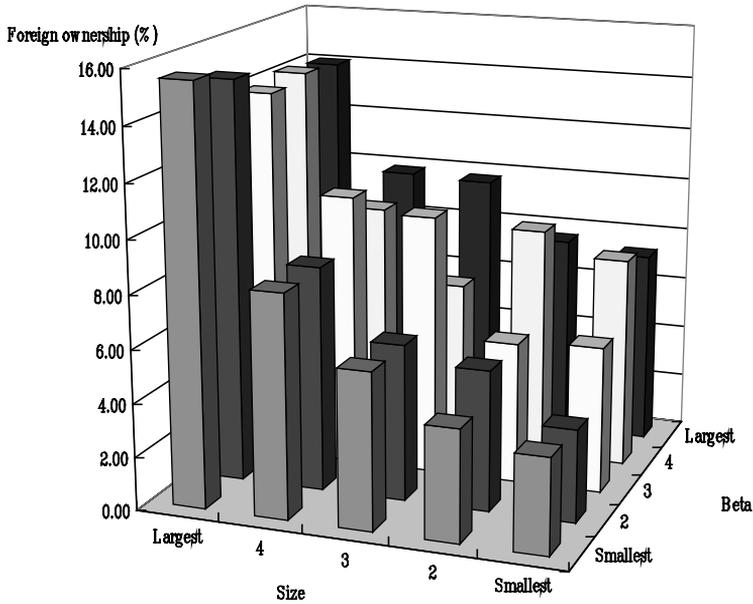** Significant at the 5% level.

Fig. 3. Mean of foreign ownership (%) of portfolios formed by firm size and Beta. The mean of foreign ownership of portfolios is equally weighted. The portfolios are formed on firm size and then stock beta over the sample period (1996–2000). For each year, the firms are divided into size quintiles, and each quintile is then divided into five quintiles based on the stock beta.

large firms tend to have high betas. Table 8 specifies the portfolios selected by firm size and beta. Samples are ranked by size and then each size quintile is divided into five beta quintiles. For the size quintiles of small firms, beta appears correlated with foreign ownership, and the mean differences between high and low beta are 4.09 and 3.47% for the smallest and the second smallest size quintiles, respectively. Both differences are statistically significant at the 5% level. However, beta does not appear to be correlated with foreign ownership for large firms, and the mean differences are insignificant. Fig. 3 depicts the mean foreign ownership for portfolios selected by firm size and beta.

The result is interesting. Beta is important only to foreign ownership of small firms, but not to that of large firms. We postulate that this result follows from the fact that large firms have lower investment barriers than small firms. Foreign investors who demand high expected returns associated with high beta stocks to compensate for the costs associated with the high barriers to investment in small firms, may cause this phenomenon. The result supports the investment barrier model proposed by Stulz (1981).

5.5. Firm size, book-to-market, and foreign ownership

Book-to-market equity (B/M) is a proxy variable for profitability and growth. Low B/M firms have persistently high earnings, while high B/M firms have poor

Table 9

Mean and median of foreign ownership (%) of portfolios formed by firm size and book-to-market ratio

B/M ratio	Size quintiles					All	$(4+5)-(1+2)$ (t-statistic)
	Smallest (1)	2	3	4	Largest (5)		
Smallest(1)	5.65	8.59	9.88	10.38	22.19	11.34	**9.17**
	[0.20]	[3.41]	[6.23]	[6.91]	[17.21]	[6.07]	**(5.17)**[**]
2	7.45	8.97	10.65	9.42	15.27	10.35	**4.14**
	[1.27]	[4.51]	[4.32]	[3.76]	[11.39]	[4.66]	**(2.51)**[**]
3	6.78	5.17	8.49	9.19	13.46	8.62	**5.35**
	[1.61]	[1.94]	[3.19]	[4.60]	[11.79]	[4.00]	**(4.16)**[**]
4	5.15	4.45	5.32	9.70	12.15	7.35	**6.12**
	[1.62]	[1.06]	[1.90]	[5.53]	[8.12]	[3.27]	**(4.96)**[**]
Largest(5)	2.88	4.18	3.39	7.14	10.72	5.66	**5.40**
	[0.34]	[0.99]	[1.31]	[3.63]	[9.20]	[1.81]	**(5.45)**[**]
All	5.56	6.23	7.50	9.15	14.71	8.63	**6.04**
	[1.01]	[1.88]	[2.88]	[4.64]	[11.84]	[3.91]	**(5.16)**[**]
(4+5)−(1+2)	**−2.53**	**−4.47**	**−5.91**	**−1.49**	**−7.33**	**−4.34**	
(**t-statistic**)	**(−2.04)**[**]	**(−3.39)**[**]	**(−4.28)**[**]	**(−1.00)**	**(−4.66)**[**]	**(−6.60)**[**]	

This table reports the mean and median of foreign ownership (%) of portfolios formed by firm size and book-to-market equity (B/M) in the sample period (1996–2000). The mean of foreign ownership of portfolios is equally weighted. The median is shown in brackets. For each year, the firms are divided into size quintiles, and each quintile is then divided into five quintiles based on the B/M ratio. The bold values in the last row represent the mean difference between the large (the largest and the second largest) and the small (the smallest and second smallest) B/M ratio samples in each size quintile with the t-statistic.

** Significant at the 5% level.

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earnings (Fama and French, 1995). Besides, low B/M firms typically have high growth rates, and thus investors are willing to pay higher prices for each unit of book value. Given informational asymmetry, foreign investors might well prefer to hold low B/M stocks because of their good earnings or high growth. Samples are ranked by size and then each size quintile is divided into B/M quintiles to filter out the size effect, as large firms tend to have low B/M ratios. Table 9 lists the results. The B/M ratio appears to be negatively correlated with foreign ownership, while the mean differences between high B/M and low B/M firms range from -1.49 to -7.33%. The mean differences are all significant except for those of the second largest size quintile, implying that foreign investors strongly prefer investments in low B/M firms.

6. Conclusion

Foreign investors are essential in emerging markets, and their levels of ownership, although not high, are increasing. This study investigates foreign ownership in Taiwan, from 1996 to 2000 and identifies the factors that affect foreign ownership in emerging markets. Foreign investors strongly prefer shares of large firms, and low book-to-market stocks, due to the effects of informational asymmetry. Furthermore, foreign investors are shown to favor to investment in firms with high export ratios, a finding that is consistent with that of Kang and Stulz (1997). We assert that foreign investors know about firms with high export ratios, and thus hold more shares in these firms. Our evidence supports the informational asymmetry hypothesis.

Furthermore, this investigation finds that, in their holdings of small firms, foreign investors hold more shares of high beta stocks, but no similar evidence exists for their holdings of large firms. Foreign investors have higher investment barriers to investment in small firms than in large firms. The results support the Stulz (1981) investment barrier model. Finally, foreign investors, because of their tax status, tend to hold shares of stocks with low dividend yields. However, the evidence for this claim is mixed and weak.

Acknowledgements

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