THE INFLUENCE OF FOREIGN PORTFOLIO INVESTMENT ON DOMESTIC STOCK RETURNS: EVIDENCE FROM TAIWAN

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ABSTRACT

Foreign investors have played an increasingly important role in the stock markets of emerging host countries. Although foreign investors bring large amounts of capital, due to asymmetric information and home bias, they tend to invest only in certain stocks, rather than in the market as a whole. Therefore, the benefits of foreign investment may be limited and stock price dispersion may exist between foreign favored stocks and foreign un-favored stocks. We analyze how foreign investment portfolios affect the domestic stock market of host countries by comparing the performance of favored and un-favored stocks of foreign investors. Specifically, we empirically tested whether investors herded into each group and whether the favored group outperforms the un-favored group during both expansion and recession periods. The findings show that market participants did herd in the foreign investor favored stock group, but herded in the un-favored group only in bear markets. The foreign investor favored group outperformed the other only during economic expansion. During recession, the foreign investor un-favored group performed better.

JEL: G11, G15

KEYWORDS: Financial Liberalization, Foreign Investment, CAPM-GARCH

INTRODUCTION

Since the 1990s, a wave of financial market liberalization in developing countries has brought a tremendous amount of foreign capital to the stock markets of those countries. According to a study by Singh and Weisse (1998), annual average private capital flow to developing countries increased to $107.6 billion during the period of 1989 through 1995, as compared to only $15.1 billion during the period of 1983 to 1988. From the foreign investors' point of view, international investment can broaden portfolio selection, especially through investment in emerging markets, where low correlation with industrial countries helps foreign investors diversify their portfolios. For host countries, cross-border capital can enhance capital structure, improve stock market efficiency and increase corporate governance transparency. Although foreign investment seems to mutually benefit both foreign investors and host countries, several critical issues attached to foreign investment emerge: Does foreign investment improve domestic stock market returns? Would domestic investors do well to follow foreign investors' investment decisions? Do stocks selected by foreign investors perform better than others, even in slumping markets?

Foreign capital is a very important element in the economic growth of developing countries. However, foreign portfolio investment is relatively unstable and easily shifted away. Since stock markets in emerging countries are relatively shallow, when the "hot money" leaves, domestic stock market turmoil can ensue. To protect domestic investors from foreign investment disturbances, most emerging countries, in initiating their stock market openness policies, at first set a strict ceiling on the volume of foreign investor holdings of each stock. Historically speaking, when many emerging countries first open their stock markets, foreign investors are allowed to hold only up to 10% of a domestic company's stock. The countries then gradually release foreign ownership restrictions as their markets mature. In the early 2000s, several emerging countries fully removed their ceilings on foreign ownership

and thus entered the post financial liberalization era. Among such countries, Taiwan is in the ranks of those experiencing the most rapid growth. Taiwan first opened its stock market in 1991 with a 10% ceiling on foreign ownership. That restriction was progressively lifted over the following 10 years, until Taiwan's market became fully open on December 30th, 2000. Since then, the volume of foreign investment has increased sharply in Taiwan. As of the end of 2011, the aggregate market value of foreign investment in the Taiwan Stock Exchange (TWSE) had increased to 700% of its value on December 30th, 2000, while the overall market value of the TWSE had only doubled over the same period.

In this paper, we investigate Taiwan as an example of how foreign investment affects a domestic market in the post financial liberalization era. Unlike most previous studies focusing on the stock market as a whole, we compare the performance of foreign investor favored stocks with that of foreign investor un-favored stocks. Specifically, based on rates of foreign stock ownership between 2001 and 2011, among the 758 stocks listed on the TWSE, we select the 50 most-held stocks as the foreign favored group and the 50 least-held as the foreign un-favored group. Also, to consider the effects of the economic cycle, we classify the data into two sub-periods — expansion (from 2001 to 2007) and recession (from 2008 to 2011) — to test whether the performance of the two groups was affected by the economic cycle. We then examined the impact of foreign investment on the two groups in two respects. First, we adopted a methodology introduced by Chang, Cheng, and Khorana (2000) to investigate whether investors herded in the two groups. Several studies have indicated that if many investors are trading the same stocks over a certain period, this herding behavior will induce market inefficiency, such as unstable price movements and price bubbles. (Scharfstein and Stein, 1990, Gleason, Mathur, and Peterson, 2004). Therefore, if herding behavior occurs in either foreigner favored or un-favored groups, investors will face higher investment risk when investing in that group. The Chang, Cheng, and Khorana model (2000) examined herding behavior based on the relationship between cross-sectional absolute deviation of returns (CSAD) and total market returns. The benefit of using this model is that it can also detect asymmetric herding when the market is up and down. Second, we explore whether the foreign investor favored group showed better performance overall. Given that most foreign investors are institutional investors, it is generally believed that they have access to enormous resources and professional analysis skills (Kim and Singal, 2000). Therefore, foreign investors should be able to make better investment decisions than domestic investors. We presented the average daily returns, standard deviations, and Sharp ratios of the TWSE aggregate index for both the foreign investor favored and un-favored groups and tested the significance of the superior returns of the two groups via a CAPM-GARCH (1,1) model. According to studies by Jagannathan and Wang (1996) and Durack, Durand, and Maller (2004) this CAPM-GARCH (1,1) model has superior explanatory power as compared to the conventional CAPM model.

This paper contributes to the literature by providing a thorough analysis of performance differences between foreign investor favored stocks and foreign investor un-favored stocks. Although the literature has extensively discussed the impacts of financial liberalization on domestic stock markets, it has examined only the market as a whole. However, the situation in practice, empirically speaking, is that foreign investors tend to channel their investments only into certain stocks. Therefore, the benefits of foreign investment may not spread evenly to all domestic stocks, and research results applicable to the market overall may not be applicable to certain stocks in the market. Our inquiry emphasizes the 50 stocks most favored by foreign investors and the 50 most un-favored and examines their performance over periods of expansion and recession. Our results provide domestic investors and policymakers in host countries a better understanding of how foreign investment affects their domestic stock markets.

The results show that investors did herd in the foreign favored group. The effect was significant in both bull and bear markets and during both expansion and recession periods. In the foreign investor un-favored group, investors herded during the expansion period, while during the recession period, they herded only in bear markets. Regarding the performance of both groups, the empirical results demonstrate that the foreign investor favored group achieved the highest average return over the full data period. In the sub-

period comparisons, the foreign investor favored group showed better performance than the foreign un-favored group during expansion, but worse performance during recession. The robustness of the performance evaluation was also verified by the CAPM-GARCH (1,1) model and similar results emerged. The empirical results indicate that although stocks in the foreign favored group yielded higher returns in the expansion period, when the economy turned bad, the prices plummeted. Therefore, domestic investment in this group may be subject to higher investment risk.

This paper is organized as follows. The section to follow reviews related literature. The third section presents the data used. The fourth section describes the empirical models. The main empirical results are reported in the fifth section, and the sixth section concludes.

LITERATURE REVIEW

Many empirical studies of the TWSE have focused on stock price volatility rather than stock returns. Kassimatis (2002) applied an EGARCH model to daily data from January 1988 to February 1998, and reported that stock price volatility declined after Taiwan opened its stock market. Hsu and Huang (2010) concluded similarly upon employing a GJR-GARCH model to daily data from 1995 to 2007 and finding that the TWSE became more stable after it fully opened. Lin, Lee, and Chiu (2010) utilized an auto regressive jump intensity (ARJI) model to explore stock price volatility for daily data from 1995 to 2005 and also found that the TWSE tended toward greater stability during the post financial liberalization period. As to the relationship between stock returns and financial market openness, Chen, Huang and Chen (2011) applied an EGARCH model to study the effect of removing the foreign institutional quota using daily data from 2003. They found that lifting foreign ownership quotas improved the value of TWSE-listed electronics companies. Several studies focused on investment strategies of foreign investors in emerging markets, such as Karolyi (2004), Swanson and Lin (2005), Richards (2005), and Chen, Lin, Hung, and Wang (2009). In general, such research revealed that foreign investors applied a momentum trading strategy of buying past winners and selling past losers.

Even though a great deal of current literature has addressed the influence of foreign investment on domestic stock markets, such studies have evinced the following shortcomings. First, some earlier studies used data from before 2001, when foreigners were allowed to hold up to 50% of a company's stock. Studies using data from the period prior to full stock market openness cannot reflect the true impact of foreign investment. Second, although other recent studies have utilized data from the post financial liberalization period, they have neglected to take into account the tendency of foreign investors to invest not in the market as a whole, but only in certain stocks. Therefore, such research may underestimate the impact of foreign investment. Third, no recent studies have sought to discern how foreign investment affects the domestic stock market during different states of the economy. This study pioneers such inquiry by investigating the impacts of foreign investment on domestic markets on distinct groups of stocks during different states of the economy. It is well accepted that based on preference, foreign investors limit their investment to certain stocks and seem to shift away from host countries during financial crisis. Therefore, it is beneficial to examine the impacts of foreign investment for different stock group classifications and during different economic states.

METHODOLOGY AND DATA

Data

The data examined in this paper consist of the daily closing prices of stocks listed on the TWSE. The sample period runs from January 2nd, 2001 to December 30th, 2011, yielding a total of 2,731 data series. To examine different states of the economy, we split the full sample into two periods: an expansion period (January 2nd, 2001 – November 30th, 2007) and a recession period (December 1st, 2007 – December 30th,

2011). To emphasize the performance differences between foreign investor favored and un-favored stocks among the 758 stocks listed on the TWSE, we selected the 50 stocks with the highest average foreign investment rates over the data period to be the foreign investor favored group, and the 50 stocks with the lowest average foreign investment rates over the same data period to be the foreign investor un-favored group. A summary of the statistics of these 100 stocks is reported in Table 1.

Table 1: Summary Statistics

Foreign Favored Group						Foreign Un-Favored Group					
Stock Code	Mean (%)	STD	SKEW	KURT	J-B test	Stock Code	Mean (%)	STD	SKEW	KURT	J-B test
1440	0.0447	0.0276	0.0478	3.649	49.02***	1213	0.0400	0.0278	0.2389	3.6740	77.60***
1445	0.0161	0.0242	0.0552	4.302	194.1***	1231	0.0453	0.0228	0.0753	4.7040	332.8***
1473	0.0269	0.0163	0.3369	6.564	1,946***	1235	0.0668	0.0217	0.1712	6.1270	1,125***
1513	0.0423	0.0241	0.0831	4.419	232.1***	1307	0.0573	0.0240	0.2307	4.4480	262.6***
1527	0.0056	0.0199	0.1492	5.42	676.6***	1321	0.0313	0.0262	0.2128	4.0350	142.5***
1530	0.0771	0.0220	0.2241	4.825	401.8***	1418	-0.0177	0.0301	0.1026	3.3200	16.40***
1533	-0.0114	0.0259	0.2691	4.298	224.5***	1419	0.0453	0.0282	0.1736	3.5970	54.28***
1608	0.0355	0.0261	0.0194	4.12	142.9***	1423	0.0323	0.0264	0.0226	4.0950	136.7***
1609	0.0272	0.0237	0.0271	4.647	308.9***	1444	0.0550	0.0298	0.1247	3.3560	21.52***
1618	0.0310	0.0284	0.1270	3.736	68.89***	1446	0.0204	0.0282	0.2394	3.7340	87.29***
1713	0.0248	0.0253	0.0571	4.244	177.5***	1452	0.0430	0.0273	0.0677	3.8770	89.59***
1726	0.0470	0.0162	0.2903	7.029	1,884***	1454	0.0151	0.0231	0.0855	4.3330	205.5***
1733	0.0659	0.0245	0.2188	4.354	230.3***	1456	-0.0776	0.0326	0.0735	3.0460	2.697
1909	0.0351	0.0252	0.0975	4.205	169.6***	1457	0.0157	0.0294	0.0924	3.4610	28.02***
2025	0.0131	0.0352	0.0045	2.788	5.146***	1463	0.0096	0.0277	0.1796	3.7340	75.96***
2340	-0.0124	0.0325	0.0547	2.925	2.000	1467	-0.0023	0.0219	0.0661	5.5540	777.3***
2353	0.0343	0.0264	0.0317	3.737	62.28***	1512	0.0162	0.0267	0.1511	3.9750	118.43***
2355	0.0403	0.0227	0.0860	4.72	339.8***	1526	-0.0287	0.0314	0.1900	3.3460	30.08***
2362	0.1062	0.0299	0.0621	3.258	9.312***	1611	0.0537	0.0243	0.1971	4.4210	247.31***
2367	0.0223	0.0304	0.0233	3.134	2.291	1613	-0.0243	0.0336	0.0499	2.9630	1.290
2375	-0.0241	0.0315	0.0297	3.171	3.7423	1616	-0.0101	0.0266	0.0087	4.1860	160.0***
2412	0.0338	0.0134	0.2360	7.601	2,433***	1734	0.0310	0.0221	0.4437	5.6900	912.8***
2428	0.0499	0.0259	0.1050	4.054	131.4***	2104	0.0450	0.0260	-0.0429	4.1980	164.1***
2430	0.0758	0.0268	0.1512	4.002	124.7***	2107	0.0456	0.0288	0.0168	3.4730	25.59***
2441	0.0702	0.0264	-0.0298	4.01	116.5***	2201	0.0521	0.0250	0.1621	4.2490	189.4***
2442	-0.0512	0.0346	0.0980	2.871	6.2588**	2206	0.0286	0.0277	0.0257	3.6940	55.10***
2474	0.1241	0.0323	-0.0599	2.879	3.310	2313	-0.0894	0.0318	0.0082	3.0560	0.382
2488	-0.0054	0.0212	0.1551	5.08	503.0***	2314	-0.0544	0.0311	0.0145	3.1870	4.076
2514	0.0410	0.0282	0.0307	3.776	68.95***	2345	-0.0003	0.0293	-0.0189	3.4220	20.39***
2545	0.1453	0.0337	0.0222	2.903	1.290	2401	-0.0635	0.0278	-0.0894	3.5510	38.12***
2606	0.1076	0.0253	0.0249	4.21	166.9***	2413	-0.0573	0.0297	0.0828	3.4210	23.28***
2705	0.0153	0.0306	0.0411	3.306	11.43***	2419	-0.0131	0.0300	0.0549	3.3260	13.48***
2836	0.0192	0.0228	0.1329	4.563	285.8***	2421	0.0509	0.0260	0.1525	4.0740	141.7***
2837	-0.0690	0.0277	0.0022	4.203	164.7***	2427	-0.0141	0.0277	0.0720	3.7580	67.67***
2841	0.0618	0.0351	0.0367	2.703	10.67***	2457	0.0376	0.0313	-0.0303	3.0730	1.028
2845	0.0344	0.0257	0.1933	4.067	146.4***	2458	-0.0010	0.0314	-0.0245	3.1520	2.910
2849	0.0117	0.0269	0.0263	4.079	132.8***	2462	0.0669	0.0250	0.2376	4.1190	168.0***
2851	0.0482	0.0170	0.1192	7.189	2,002***	2471	-0.0065	0.0302	0.1124	3.4450	28.24***
2881	0.0151	0.0204	-0.0688	5.363	637.5***	2483	-0.0224	0.0242	0.1623	4.4670	256.7***
3044	0.1096	0.0290	0.0834	3.273	11.63***	2489	0.0401	0.0306	-0.0108	3.2490	7.097**
4104	0.0329	0.0226	0.1612	5.118	522***	2506	-0.0189	0.0367	0.0192	2.6260	16.08***
5203	0.0133	0.0268	0.0928	3.575	41.49***	2509	0.0330	0.0325	0.0645	3.0860	2.740
5388	0.0797	0.0293	0.0567	3.298	11.54***	2537	-0.0927	0.0410	-0.0531	2.3470	49.74***
9905	0.0722	0.0217	0.1857	5.036	487.3***	2901	0.0265	0.0233	0.3260	4.6160	345.6***
9908	0.0475	0.0173	0.0518	6.606	1,480***	3027	-0.0097	0.0264	0.1680	3.8600	97.06***
9914	0.0781	0.0256	0.0529	4.104	140.0***	3035	-0.0049	0.0293	-0.0182	3.4090	19.21***
9924	0.0428	0.0198	0.3022	5.597	808.9***	3036	0.0441	0.0273	0.0557	3.8270	79.13***
9933	0.0715	0.0233	0.0749	4.415	230.2***	9930	0.0808	0.0156	0.1742	7.3370	2,153***
9934	0.0377	0.0235	0.1332	4.351	215.8***	9941	0.0526	0.0163	0.4155	7.2560	2,138***
9937	0.0617	0.0190	0.2709	6.178	1,181***	9943	0.0234	0.0219	0.2146	4.7440	366.9***

Table 1 reports the mean, standard deviation (STD), skewness (SKEW), kurtosis (KURT), and Jarque-Bera (J-B) test results for the daily returns from each stock in both the foreign favored and un-favored group. There were a total of 2730 observations of each stock. The name of each stock is reported via its 4-digit TWSE stock code. The significance of the Jarque-Bera test results are presented with asterisks, where ***,**, and * indicate significance at the 1%, 5% and 10% levels respectively.

To more conveniently present each stock contained in the table, the name of each stock is reported by its TWSE 4-digit stock code. The average return of the 50 foreign favored stocks is 0.0404%, while the average return of the 50 foreign un-favored stocks is 0.0119%. Among the 50 stocks in the foreign favored group, the highest average return is 0.1453% and the lowest is -0.069%. In the foreign un-favored group, the highest average return is 0.0808% and the lowest is -0.0927%. The results of skewness, kurtosis, and Jarque-Bera tests indicate that most of the stock returns have a non-normal distribution. However, several stocks present normal distributions, including 2340, 2367, 2375, 2474, and 2545 in the foreign favored group and 1456, 1613, 2313, 2314, 2457, 2458, and 2509 in the foreign un-favored group. A possible reason for this situation is that Taiwan imposes a policy of daily price movement limits, under which the daily price of each stock can move only within 7% of its price on the previous business day. Therefore, this restriction may reduce the likelihood of fat-tailed return distributions.

Methodology

This section discusses the application of two analytical models. We first employ the cross-sectional absolute deviation of returns model (CSAD) to investigate herding characteristics in the TWSE for both the foreign investor favored and un-favored groups during the expansion and recession periods respectively. We then applied the CAPM-GARCH (1,1) model to explore whether the foreign investor favored group showed superior returns.

Before we apply the econometrics models, the data are adjusted as follows. First, to compare the selected 100 companies under the same standard, we standardize their daily closing prices as

$$I_{i,t,} = \frac{P_{i,t,}}{P_{i,b,}} \times 100\% \tag{1}$$

where $I_{i,t}$ is the standardized index of stock i on date t, and $P_{j,t}$ and $P_{i, t-1}$ are the closing prices of stock i on date t and t-1 respectively. The base value of each stock is set as its closing price on January 2nd, 2001. The daily group indices for the foreign investor favored and un-favored groups are the daily average of the 50 stocks' indices in each group as follows:

$$V_{j,t} = \frac{1}{n}\sum_{i=1}^{n} I_{i,t} , for \ n=50, j=1,2 \tag{2}$$

where j=1stands for the foreign investor favored group and 2 is the foreign investor un-favored group.

Second, we define the daily return of each group as the continuously compounded change of the group index from date t-1 to date t. This change can be presented mathematically as:

$$R_{j,t} = LN(\frac{V_{j,t}}{V_{j,t-1,}}) \tag{3}$$

Herding

We utilized the cross-sectional absolute deviation of returns model suggested by Chang, Cheng, and Khorana (2000) to probe investors' herding behavior. An earlier model was the cross-sectional standard dispersion (CSSD) model suggested by Christie and Huang (1995). Its authors argued that during stress periods, if investors do not make their investment decisions based on their own information and analysis, an individual asset's returns will deviate substantially from overall market returns. Although that model was rigorous, it was generally able to discover herding only during extraordinary market price movements. Chang, Cheng, and Khorana (2000) extended the Christie and Huang model (1995) to provide for a more

powerful cross-sectional absolute deviation of returns (CSAD) model which can examine asymmetric herding when the market is on the up and downsides (bull and bear markets). The model is described as

$$CSAD_t^{up} = \alpha + \gamma_1^{up}|R_{m,t}^{up}| + \gamma_2^{up}(R_{m,t}^{up})^2 + \varepsilon_t \tag{4}$$

$$CSAD_t^{down} = \alpha + \gamma_1^{down}|R_{m,t}^{down}| + \gamma_2^{down}(R_{m,t}^{down})^2 + \varepsilon_t \tag{5}$$

and CSAD is defined as
$$CSAD_t = \frac{1}{N}\Sigma_{i=1}^n|R_{i,t,} - R_{m,t}| \tag{6}$$

where $R_{i,t}$ and $R_{m,t}$ represent the individual return and the market return on date t respectively, and $CSAD_t^{up}$, $R_{m,t}^{up}$ and $CSAD_t^{down}$, $R_{m,t}^{down}$ represent the value of CSAD and the absolute value of market return on date t when the market is up or down. The coefficient γ_2 is designed to capture investor behavior differences. Based on the rational asset pricing model which asserts increasing equity return dispersions and a linear function of market returns, Chang, Cheng and Khorana (2000) argued that if investors herd during periods of relatively large price movements, average market returns and the CSAD will have inverse and non-linear relationships. Thus, in the above equations, if coefficient γ_2^{up}, γ_2^{down} is significantly negative, market participants herd in bull and bear markets respectively.

<u>Superior Return</u>

The CAPM-GARCH model is employed to analyze whether the foreign investor favored group yielded superior returns. Conventionally, the Capital Asset Pricing Model (CAPM) is defined as

$$E(R_{i,t}) = R_{f,t} + \beta_i(R_{m,t} - R_{f,t}) + \varepsilon_{i,t} \tag{7}$$

where $\varepsilon i,t$ is independent and identically distributed random variables (iid), β is the risk factor of stock i, and $R_{i,t}$ and $R_{m,t}$, are the returns of stock i and the risk free rate on date t respectively. By arranging $R_{f,t}$ to the left side, the equation can be re-written as

$$E(R_{i,t}) - R_{f,t} = \beta_i(R_{m,t} - R_{f,t}) + \varepsilon_{i,t} \tag{8}$$

Extended from the conventional CAPM model, the CAPM-GARCH(1,1) model is described as:

$$RP_{j,t} = \varphi 0 + \varphi_1 RP_{m,t} + \varepsilon_{i,t} \tag{9}$$

$$\varepsilon_{i,t} = Z_{i,t}\sqrt{h_{i,t}} \tag{10}$$

$$h_{i,t} = \alpha_0 + \alpha_1\varepsilon_{i,t-1}^2 + \gamma\varepsilon_{i,t-1}^2 D_{t-1} + \beta_1 h_{i,t-1} + \eta_1 CSAD_{i,t} \tag{11}$$

where $RP_{j,t}$ represents the daily risk premium for the foreign investor favored group (j=1) and the foreign investor un-favored group (j=2) on date t. We use the prime rate of 90-day commercial paper as a proxy for the risk-free rate. The market return is the return of the TWSE aggregate index. The superior (inferior) return is probed when φ_0 is a significantly positive (negative) coefficient.

EMPIRICAL RESULTS

The trends of the two groups and of the standardized TWSE index are presented in Figure 1. These trends reveal a dispersion between the foreign investor favored and un-favored groups. While this dispersion

was not significant in the first year of full stock market openness, the gap expanded over time. At the beginning of the recession period, the prices of the foreign investor favored group decreased to a larger extent than those of the foreign investor un-favored group, and the gap narrowed. Between 2009 and 2011 stock prices of the foreign investor favored group increased, again enlarging the dispersion. The TWSE aggregate index seemed to follow a similar path as the foreign investor un-favored group. We ran a Mann–Whitney U Test to examine whether the three pairs — the foreign investor favored group versus the foreign investor un-favored group, the foreign investor favored group versus the TWSE aggregate index, and the foreign investor un-favored group versus the TWSE aggregate index — were statistically different. The results, as reported in Table 2, show that at a 5% significance level, the three data series were statistically different.
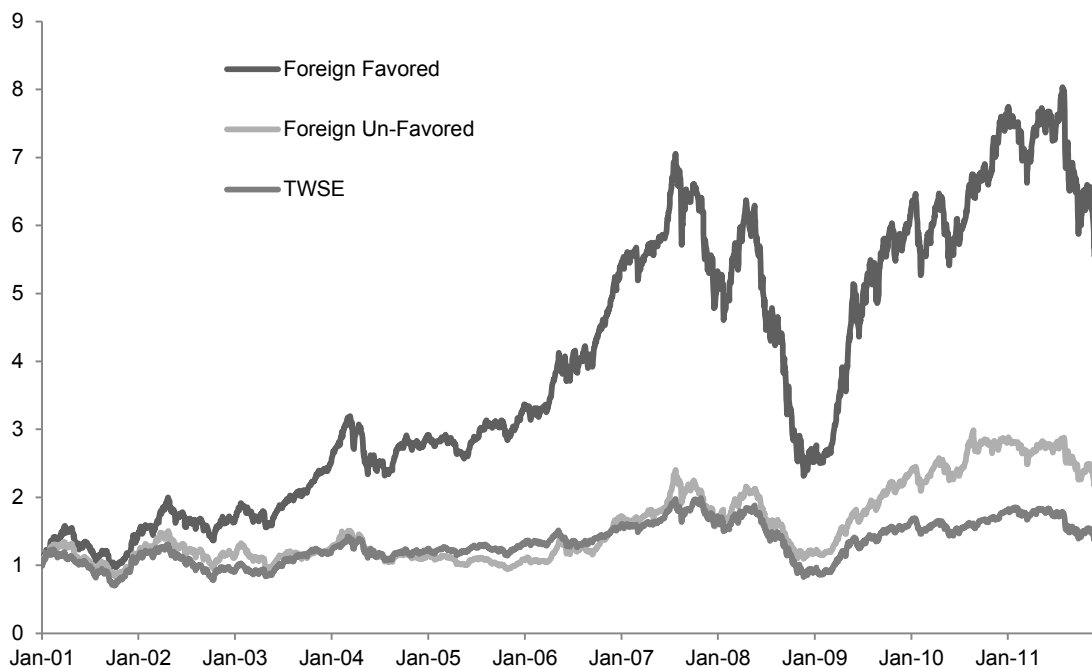
Figure 1: Trends of the Three Indices

Figure 1 presents the trends of the indices of the foreign favored group, the foreign un-favored group, and the standardized TWSE. Among the three curves, the foreign un-favored group and the TWSE show similar patterns, but a dispersion exists between the foreign favored group and the other two. The gap expanded from 2003 to 2008. The gap narrowed during the financial crisis of 2008, but enlarged again from 2009 to 2011.

Table 2: Results of the Mann-Whitney U test

	Test result	Statistics (Z-valus)	P-value
Foreign favored Versus Foreign un-favored	1	48.252	0.0000***
Foreign favored Versus TWSE	1	54.640	0.0000***
Foreign un-favored Versus TWSE	1	10.516	0.0001***

Table 2 reports the results of the Mann-Whitney U Test for the three pairs — Foreign Favored versus Foreign Un-Favored, Foreign Favored versus TWSE, and Foreign Un-Favored versus TWSE. A test result of 1 indicates that under a significance level of 5%t we can reject the null hypothesis, that data in each pair are from identical continuous distributions with equal medians. The significance of the test results are presented with asterisks, where ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively

The results of the cross-sectional absolute deviation of returns model are reported in Table 3. The asymmetric herding behaviors during the bull and bear markets are investigated via the γ_2 coefficient. The results show that during the expansion period, market participants herded in both foreign favored and un-favored groups regardless of whether the market was up or down. During the recession period, investors continued to herd in the foreign favored group. However, in the un-favored group, investors herded only in bear markets, while in bull markets, the regression results failed to reach a sufficiently significant level to support investor herding. These results imply that during the recession period, domestic investors tended to be more conservative with regard to the un-favored group, and thus seemed to mimic one another's trading behavior when the market was on the downside. However, when the market was on the upside, domestic investors seemed to prefer to make their investment decisions based on their own analysis.

Table 3 Results of Herding Examination

Panel A: Foreign Favored Group			
Expansion Period	α	γ_1	γ_2
Up	0.0041	0.2143	-3.565
	(0.0000)***	(0.0000)***	(0.0006)***
Down	0.0041	0.2813	-3.7999
	(0.0000)***	(0.0000)***	(0.0001)***
Recession Period	α	γ_1	γ_2
Up	0.0029	0.4178	-6.919
	(0.0000)***	(0.0000)***	(0.0000)***
Down	0.0041	0.2807	-2.8863
	(0.0000)***	(0.0000)***	(0.0038)***
Panel B: Foreign Un-Favored Group			
Expansion Period	α	γ_1	γ_2
Up	0.0042	0.3117	-5.655
	(0.0000)***	(0.0000)***	(0.0000)***
Down	0.0046	0.2907	-4.0456
	(0.0000)***	(0.0000)***	(0.0004)***
Recession Period	α	γ_1	γ_2
Up	0.0044	0.1921	-0.9343
	(0.0000)***	(0.0017)***	(0.5819)
Down	0.0048	0.2997	-4.213
	(0.0000)***	(0.0000)***	(0.0061)***

Table 3 reports the results of the examination of the cross-sectional absolute deviation of returns model for asymmetric herding, where a significant negative γ2 indicates herding in the market. Panel A reports the test results of the foreign favored group when the market is up and down, in both expansion and recession periods respectively. The corresponding results for the foreign un-favored group are reported in Panel B. The P-values for the tests are reported in parentheses. The significance of the results are presented with asterisks, where ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

Table 4 presents the average returns, the standard deviations and the Sharpe ratios for the full sample period, the expansion period, and the recession period. For the full sample data period, the foreign investor favored group had the highest average daily return of 0.0637%. Although the foreign investor un-favored group reached only 0.0292%, it nonetheless outperformed the TWSE aggregate index return, which yielded only 0.0132%. We also presented the corresponding Sharpe ratios to demonstrate reward to risk relationships. The Sharpe ratio results showed that the foreign investor favored group showed the best performance, thus supporting the myth that foreign investors make better investment decisions. When we go deeper to compare the relative performance of the two groups and that of the TWSE aggregate index during different economic states, we find the performance levels to be quite different. During the expansion period, the foreign favored group outperformed the foreign un-favored group and the market as a whole, with an average return of 0.09847%. However, during the recession period, the foreign un-favored group showed the best performance.

To provide a statistically rigorous evaluation of performance robustness, we applied the CAPM-GARCH (1,1) model to examine whether the foreign investor favored group yielded a superior return. The results, reported in Table 5, indicate that for the full sample period, the foreign investor favored group offered a

superior return at a 99% significance level. When we examined its performance in different states of economy, the foreign investor favored group showed superior returns during the expansion period at a 99% significance level, but during the recession period, only the foreign un-favored group showed a superior return at a 90% significance level. One possible reason for this situation is that since the stocks in the foreign investor favored group were largely held by foreign investors, when recessions occurred, foreign investors tended to withdraw their investments from the host country, causing stock market turmoil in that country.

Table 4: Results of the Average Return, Standard Deviation and Sharpe Ratio

	Foreign Favored Group	Foreign Un-Favored Group	TWSE
Full sample Period	0.064	0.029	0.013
	(1.162)	(1.409)	(1.490)
	3.934	2.076	0.885
Expansion Period	0.098	0.034	0.031
	(1.472)	(1.384)	(1.432)
	6.685	2.423	2.193
Recession Period	0.006	0.022	-0.017
	(1.839)	(1.449)	(1.581)
	0.301	1.520	-1.102

Table 4 reports the results of the average return, standard deviation, and Sharpe ratio for the foreign favored and un-favored groups in the full sample, expansion period and recession period respectively. The number in the first row of each cell is the daily average return. The standard deviation is reported in the parentheses, and the number on the third row of each cell is the corresponding Sharpe ratio.

Table 5 Results of the CAPM-GARCH (1,1) Test

Panel A: Whole Sample Period	φ_0	φ_1
Foreign favored group	0.0004	0.9247
	(0.0021)***	(0.0000)***
Foreign un-favored group	0.0001	0.7543
	(0.3261)	(0.0000)***

Panel B: Expansion Period	φ_0	φ_1
Foreign favored group	0.0006	0.8651
	(0.0006)***	(0.0000)***
Foreign un-favored group	-0.0001	0.7703
	(0.5704)	(0.0000)***

Panel C:Recession Period	φ_0	φ_1
Foreign favored group	0.0002	1.0243
	(0.4925)	(0.0000)***
Foreign un-favored group	0.0004*	0.7374
	(0.0620)	(0.0000)***

*Table 5 reports the results of the CAPM-GARCH (1,1) test, with the corresponding p-value of each coefficient reported in parentheses. The test results for both the foreign favored and un-favored groups during the full sample period are reported in Panel A. The test results of the expansion and recession periods are reported in Panels B and C respectively. The significance of the test results are presented with asterisks, where ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively..*

CONCLUSION

In this paper, we have assessed whether stocks favored by foreign investors have outperformed other stocks in Taiwan. This study was motivated by the dispersion precipitated by foreign investors' investment preferences. Based on the holding percentage of foreign ownership, from among the 758 companies listed on the Taiwan Stock Exchange we selected the 50 most-held stocks as the foreign investor favored group and the 50 least-held stocks as the foreign investor un-favored group. We first examined investors' asymmetric herding in both groups during expansion and recession periods. We then tested whether the foreign investor favored group performed better than the foreign investor un-favored group. Moreover, we went further to test the robustness of the return performance of the foreign investor favored group, the foreign investor un-favored group, and the TWSE aggregate index.

The main findings are as follows. First, in the foreign investor favored group, investors herded regardless of whether the market was up or down and regardless of whether the economy was in expansion or recession. However, in the foreign investor un-favored group, investors herded during the expansion period on both bull and bear market days, while during the recession period, investors herded only when the markets were up. Second, in general, the foreign investor favored group outperformed the foreign investor un-favored group and the TWSE aggregate index, especially during the expansion period. However, during the recession period, the foreign investor un-favored group performed better than the foreign investor favored group. These findings suggest that during a recession period, foreign investors may withdraw their investment from the host country, causing stock prices to plummet. Since foreign un-favored stocks were less subject to such disturbance, it was possible for domestic investors to obtain better rewards by investing in this group during the recession period.

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