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Living with the "enemy": an analysis of foreign investment in the Japanese equity market

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Abstract

This paper studies the impact of foreign investment on domestic financial markets. In particular, it examines the empirical validity of some protectionist claims used by regulators to restrict foreign investment. These people argue that: (1) trading by foreign investors tends to increase market volatility more than trading by domestic investors; (2) foreign investors have more sophisticated investment technology than do their domestic counterparts, causing domestic investors to "lose out" to foreign ones; and (3) foreign investors tend to make investment decisions on the basis of short-term gains rather than long-term fundamentals, such as corporate dividend growth. We find no evidence supporting these claims from the Japanese experience. To the contrary, we find that foreign investors tend to be long-term contrarian players in the market. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Theoretical and empirical research in finance has demonstrated that international diversification brings enormous benefit to portfolio investors.[1] A recent economic study by Obstfeld (1994) also shows that international diversification can spur economic growth in developing countries by allowing risk-averse investors to take on risky projects. Few studies, however, have systematically examined the impact of foreign equity portfolio investment on domestic financial markets. This is an

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[1] See, for example, Bailey and Stulz (1990), Eun and Resnick (1988), Grauer and Hakansson (1987), Hardy (1990), Harvey (1995) and Stulz (1987). Stulz (1999) gives a comprehensive survey of the topic.

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important issue, particularly given the recent dramatic declines in stock prices of many emerging markets that have resulted from foreign money outflow, and the severe financial disruption that has been created in these economies. Indeed, a serious question is raised about whether international "hot money" really facilitates long-term market development in emerging markets.[2] The presence of foreign investment barriers in many countries suggests that government regulators have serious doubts about the long-term benefits of foreign investment.

Financial authorities in these vulnerable emerging markets often argue that foreign portfolio investment would increase market volatility, hence exposing them to unduly high risk. Another concern is that investors in developed markets have sophisticated investment technology to which domestic investors do not have access, so that domestic investors tend to "lose out" to foreign investors. Open market reform can become quite difficult under the strained political circumstances that result. Emerging market regulators are also concerned that foreign investors tend to be short-term players whose presence in the market today may not be guaranteed tomorrow. In Thailand, for example, investment by foreigners is restricted to a different class of shares that are traded on a separate exchange.[3] Similar regulation exists in China. High withholding taxes on investment gains are another form of restriction against foreign investment (see Harvey (1995) for a description of various capital restrictions in the emerging markets).

In this paper, we study the empirical validity of some of the arguments against foreign investment by examining the behavior of foreign investors in the Japanese stock market. We evaluate and contrast this behavior with that of Japanese domestic investors. The questions we ask are: (1) Do foreign investors demonstrate different investment behavior compared to domestic investors? In particular, are foreign investors contrarians or counter-contrarians, or are they short-term oriented in their investment horizon? (2) How do domestic and foreign investors fare with respect to investment results? and (3) Is there evidence that foreign investors cause higher volatility in the domestic market?

Although there may well be other concerns of financial market regulators, such as protection of domestic financial institutions and investors against foreign competition, here we focus on the above three general questions that are often asked in the context of open-market reforms of emerging markets.

The sample period of this study encompasses the gradual deregulation of the Japanese market, especially with regard to foreign investment over the last 30 years. Our data dates back to the early 1970s when the market was much smaller and more tightly regulated against foreign investment. Then, following the significant amendment to the Foreign Exchange Control Law that took effect at the end of 1980, Japan was, in principle, open to foreign ownership.[4] As a result, our more recent data on trading volume shows a significant increase in trading activities by foreign

[2] "Private-Capital Flows Can Hurt Poor Nations," *Wall Street Journal*, January 30, 1995.

[3] Bailey and Jagtiani (1994) document capital market segmentation in the Thai stock market.

[4] Kang and Stulz (1998) examine foreign ownership in Tokyo Stock Exchange listed firms.

investors. By examining the behavior of overseas investors in the Japanese market, we can study the impact of foreign investment on domestic financial markets.

As a point of clarification, we are analyzing the long-term behavior of foreign investors and the impact of this behavior on the domestic market. To aid this analysis, we examine approximately 18 years of monthly data. We do not, however, examine short-term (day-by-day or minute-by-minute) behavior of foreign investors, such as index futures arbitrage transactions.

In the early 1990s, Japanese regulators introduced several measures to discourage transactions in the stock index futures market on the grounds that such arbitrage transactions cause excessive volatility in the spot market.[5] Because of their high transactions costs and taxes, arbitrage transactions tend to be profitable only for proprietary dealings by securities houses (see Brenner et al., 1989). Since foreign securities houses were active in the futures market, these measures may be partly viewed as regulations against them. We do not address this point. Our definition of foreign investors includes long-term players such as mutual and pension funds. Since proprietary transactions by foreign securities firms are classified as "securities firm proprietary dealing (domestic and foreign)", we are unable to separate these transactions from domestic trades.

Other researchers have used similar datasets from the United States. Tesar and Werner (1994, 1995) and Bohn and Tesar (1995, 1996) analyzed data on net purchases of international equities by US investors. They found no empirical support for the hypothesis that investment activity by foreigners has caused increased host–market volatility. Using data from 17 emerging market countries, Bekaert and Harvey (1997) further discovered that financial market liberalization has generally decreased market volatility in these markets.

Compared to these studies, our dataset has two advantages. First, it covers a longer time period (1975–1992). Second, it includes data on a cross-section of various foreign and other investors in the Japanese market, allowing us to determine which investment behavior is causing greater market volatility. In addition, our study analyzes the extent to which foreign, as compared to domestic, investment is driven by long-term market fundamentals, such as dividend news. We also apply the market timing test of Henriksson and Merton (1981) in evaluating the market timing performance of Japanese and foreign investor groups.

The paper is divided into five sections. Section 2 describes the data and presents some summary statistics on Japanese stock market performance and the trading behavior of Japanese and foreign investor groups. Section 3 examines the impact on market volatility of trading by major investor groups. Section 4 evaluates the market timing ability of Japanese and foreign investor groups in the Japanese market through application of Henriksson and Merton's (1981) market timing test. Section 5 presents an approximate present value model in which excess returns are decomposed into three different components (innovations or news) about dividend growth, interest rates, and future expected returns) and then examines the relationships between trad-

[5] See also Miller (1994) for a criticism of Japanese securities regulation.

ing behavior and various innovations in security returns. Section 6 concludes the paper.

2. The data

We use data on trading by different types of investors on the Tokyo Stock Exchange from July 1974 to June 1992. The yen amount of purchases and sales are recorded each month for proprietary trading of securities firms and trading at their clients' orders. The latter is further classified into insurance companies, banks, other financial institutions, investment trusts (mutual funds), non-financial corporations, other firms, non-Tokyo Stock Exchange member securities firms, individuals, and foreigners. We obtained the original data from the *Tokyo Stock Exchange Monthly Statistics* (1975–1993). It is compiled from reported trading figures of so-called "integrated securities firms." These integrated securities firms are large securities houses capable of lead-underwriting securities and licensed in all lines of business (proprietary dealing, brokerage, sales, and underwriting) in the Tokyo market. Although the data does not include trading by small "non-integrated" firms, the proportion of such transactions is relatively small.[6]

In order to focus on distinctively different types of investors, we limit the number of investor types and use the data for (1) securities firms (proprietary dealing), (2) insurance companies, (3) banks, (4) investment trusts, (5) non-financial corporations, (6) individuals, and (7) foreigners. The bank sector represents investment by the banks themselves (up to 5 percent of any corporation) and the institutional client accounts they manage. While it is not possible to disaggregate the two, it is reasonable to assume that the majority of the trading is for client accounts, given the stationary nature of the banks' own holdings of equities. Investment trusts are essentially the same as mutual funds. The foreigners sector includes both institutions and individuals. Again, although it is not possible to separate the two, it is reasonable to consider most of it to be institutional, in the form of mutual and pension funds.

For monthly aggregate stock returns, we use a value-weighted index (dividend reinvested) of the Tokyo Stock Exchange Section I stocks. For short-term interest rates, we use Gensaki rates. These data are obtained from Hamao and Ibbotson (1989). The S&P 500 total returns are obtained from Ibbotson Associates (1994).

Figs. 1 and 2 present purchases and sales volumes as a percentage of total trading volume by "integrated security companies". We observe several interesting points. First, the relative trading volume of Japanese individuals steadily decreased during the sample period, while the relative trading volume of Japanese institutions and foreigners increased. Second, the trading shares of Japanese banks and non-financial corporations increased during the boom period of 1985 to 1989, but then declined after the crash. Third, the trading share of foreign investors increased after the 1981

[6] The percentage of trading volume by integrated firms of total volume was approximately 83% in the mid-1970s. It has increased over the years to account for more than 90% in 1990s.

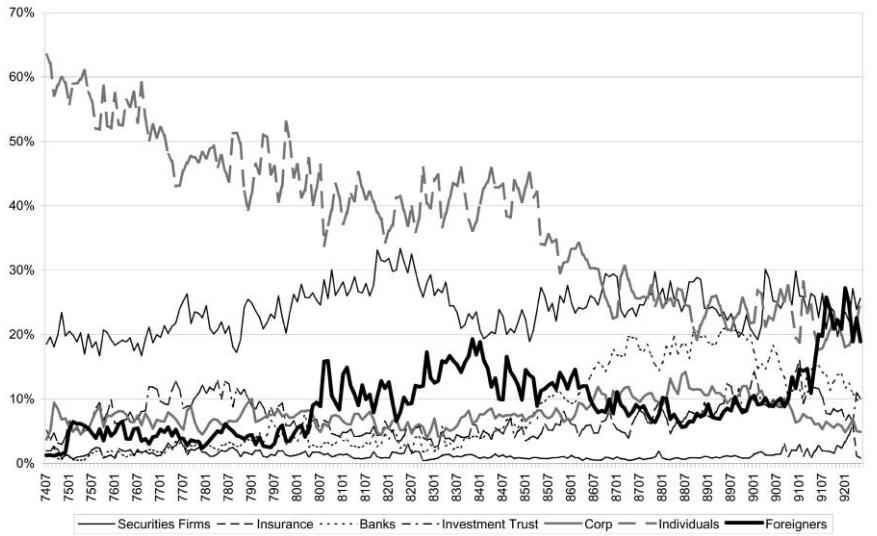

Fig. 1. Purchases by various investor types.

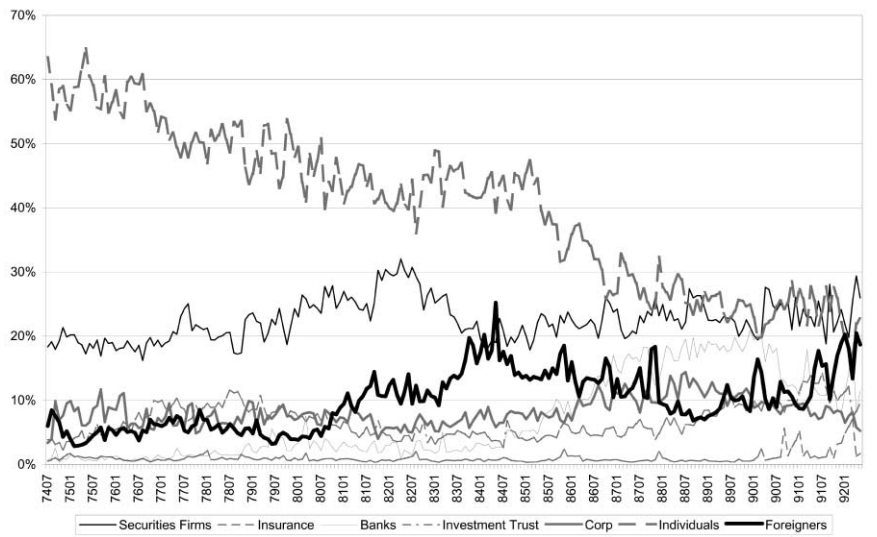

Fig. 2. Sales by various investor types.

deregulation, but then decreased during the boom period. However, foreign investors were the only major investor group that significantly increased its trading share during the post-crash years. Moreover, a comparison of the two figures reveals that foreign investors were the net buyers of Japanese equities during this period.

The net purchase series may not be stationary due to the dramatic rise in price

and overall shares in the Japanese market. Thus, we perform our analysis using the series that is normalized by dividing by the market capitalization of the corresponding month. Table 1 presents the correlations of normalized net purchases among various types of investors. Japanese institutional investors generally show positive correlations in net purchases among themselves, implying possible "herding" behavior. On the other hand, we observe that the net purchases of foreign investors were negatively related to all of Japanese domestic investor groups. Because foreign investors tend to sell stocks when other Japanese domestic institutional investors are buying, they may have improved liquidity by generally taking the opposite position. In addition, we see that purchases by individual investors in Japan also tend to have negative correlation coefficients with purchases by other investors. The results remain unchanged when we delete the outliers as defined by the net purchase of foreign investors exceeding or falling below the two standard deviation level.

One potential problem in computing correlations in net purchases is the "adding-up constraint". That is, in an extreme situation where foreign investors are taking the residual position in the Japanese market, the correlation between foreigners and other domestic investors would always be negative because the net purchases should sum up to zero. Suppose net purchases by six out of seven investors are drawn from $N(0,1)$ and each investor has a 1/7 probability of becoming the seventh investor who takes the residual position that makes the sum of net purchases equal to zero. In other words, each month, six out of seven investors take an "active" (but random) position, and the last investor takes the residual ("passive") position which clears the market. The probability of becoming this passive investor is 1/7. In this case, it can be algebraically shown that the correlation coefficient is -0.1667.[7] However, we see from Table 1 that several correlation coefficients for foreign investors are lower than -0.1667, indicating that the purchases of foreign investors have lower correlation than just the "adding-up constraints" would suggest.

3. Impact on market volatility by foreign trading

One of the major concerns of governments around the world about foreign investment in domestic equities is that foreign investors tend to be short-term players whose trading activity increases market volatility. In the Japanese market, foreign investors have become more active in recent years. There have been several accounts in the popular press that the behavior of foreign investors is a significant factor determining market movements.[8]

To see whether trading activities by foreign investors cause higher volatility, we perform the following regression analysis:

[7] We thank the referee for pointing this out.

[8] For example, "Foreign Money Inflow Brings Active Investment," April 10, 1993; "Foreign Money Escapes From Tokyo Market, Causing Market Drop," June 22, 1993; "Foreigners Actively Buying Export and Hi-Tech Stock," December 17, 1993 (all in *Nihon Keizai Shimbun* (*Japan Economic Journal*)).

Table 1
Correlation among normalized monthly net purchases of various investor groups (July 1974–June 1992)[a]

	Securities firms	Insurance firms	Banks	Investment trusts	Corporations	Individuals	Foreigners
Securities firms	1.00						
Insurance firms	−0.22 (−6.17)	1.00					
Banks	0.30 (9.49)	0.11 (5.22)	1.00				
Investment trusts	−0.08 (−4.06)	−0.03 (−2.62)	0.05 (3.23)	1.00			
Corporations	−0.05 (−3.08)	0.14 (5.99)	0.14 (5.94)	0.01 (1.41)	1.00		
Individuals	−0.40 (−7.82)	−0.11 (−4.61)	−0.47 (−8.27)	−0.10 (−4.42)	0.12 (5.51)	1.00	
Foreigners	−0.34 (−7.39)	−0.08 (−3.94)	−0.41 (−7.92)	−0.35 (−7.47)	−0.51 (−8.51)	−0.26 (−6.62)	1.00

[a] Note: Net purchases (divided by market capitalization) are computed from monthly trading volume data (in yen) on the Tokyo Stock Exchange by "integrated securities firms." Numbers in parentheses are *t*-statistics. Original data are collected from *Tokyo Stock Exchange Monthly Bulletin*.

$$v_t = b_1 + b_2 v_{t-1} + b_3 w_t + u_t, \quad (1)$$

where v_t is the monthly volatility for month t, w_t is a vector of monthly transactions by various major investment groups (absolute value of net purchases, purchases, or sales, all divided by market capitalization), and u_t is the error term. We include the lagged volatility to take into account the persistence in monthly volatilities. It is worth noting that w_t in the equation could be endogenous. This is because investors' transactions during the month could be affected by the return volatility of the month. This endogeneity could cause the w_t term to be correlated with the error term in the regression. If this is the case, then OLS regressions could be biased and inconsistent.

To solve the endogeneity problem, we use a 3SLS (three-stage-least-squares) instrumental variables regression technique, modified from Holtz-Eakin et al. (1988), to accomplish the estimation task. If the data satisfy the orthogonal condition, meaning regression instruments are not correlated with the error term, and other regularity conditions in Newey and West (1987), the estimates will be consistent despite the presence of heteroskedasticity and serial correlation.

Intuitively, the estimation procedure is a special case of the generalized method of moments (GMM) estimation technique. In the first stage, a simple instrumental-variables regression is used to obtain an estimate of (1), ignoring heteroskedasticity and serial correlations. In the second and third stages, we use moving averages of the residuals from the first-stage regression to calculate a Newey–West adjustment matrix. We then use a generalized least squares (GLS) method to obtain a more efficient estimate of the autoregression for all periods. A detailed description of the estimation procedure is provided in the Appendix A.

The first row of Table 2 reports the regression of monthly volatility on lagged volatility and contemporaneous net purchases by various groups. Since we are interested in whether increased transactions (either net selling or net purchasing) can increase volatility, we use the absolute value of the net purchase series. Monthly volatility is measured by a rolling 25-day variance of daily returns of the Nikkei 225 index.[9] We find no evidence that volatility is affected by the purchases of any of the investor groups. The second row of Table 2 reports the regression of monthly volatility on lagged volatility and contemporaneous purchases by various groups. We find no evidence that foreign purchases affect volatility while individuals have a negative effect on volatility. The third row of Table 2 reports the same regression using sales. Here we do find some evidence that foreign sales tend to increase market volatility more than domestic sales. However, Japanese Insurance Firms also have a positive impact on volatility. In sum, we find little empirical evidence from the Japanese experience to suggest that trading by foreign investors tends to increase

[9] Due to data availability, we use daily Nikkei 225 index (instead of the value-weighted index) returns to compute this volatility. Nikkei 225 index is a price-weighted average of large and representative 225 stocks on the Tokyo Stock Exchange Section I. As a check, we ran the same regression with the TOPIX (Tokyo Stock Exchange Index), which is a value-weighted index of Tokyo Stock Exchange Section I for the period we were able to obtain the data (January 1977–June 1992). The results show no significant influence on volatility by foreign investor.

Table 2
Regression of volatility on lagged volatility and contemporaneous purchases and sales[a]

	b_1	b_2	Securities firms	Insurance firms	Banks	Invest. trusts	Corporations	Individuals	Foreigners	$\bar{R}^2$
Absolute value of net purchases	0.42 (1.69)	0.36 (7.75)	−0.17 (−0.09)	0.80 (0.10)	3.88 (1.51)	−1.74 (−0.62)	4.29 (0.92)	−2.58 (−1.24)	0.56 (0.39)	0.23
Purchases	0.00 (2.68)	0.32 (6.72)	−0.53 (−0.79)	3.03 (0.42)	−1.23 (−1.14)	0.65 (0.52)	3.44 (1.50)	−0.99 (−2.57)	0.88 (1.14)	0.26
Sales	0.53 (1.76)	0.26 (5.60)	0.01 (0.01)	14.39 (2.67)	−0.27 (−0.25)	2.15 (1.66)	−1.01 (−0.50)	−0.81 (−2.08)	1.66 (2.37)	0.32

[a] Note: The table reports regression coefficients from the regression

$$v_t = b_1 + b_2 v_{t-1} + b_3 w_t + u_t,$$

where v_t is the monthly volatility of daily index returns for month t, w_t is the vector of monthly transactions (divided by market capitalization), and u_t is the error term. The index used is Nikkei 225 Index, which is a price-weighted index of large, representative stocks on the Tokyo Stock Exchange Section I. The t-statistics (in parentheses) are computed by the three-stage-least-square approach to adjust for possible endogeneity. Sample period: July 1974–June 1992.

market volatility more than trading by domestic groups. While there may have been a few instances in which foreign trading affected market volatility, there is no systematic evidence that foreign trading tends to increase market volatility more than trading by domestic groups.[10]

4. Evaluating market timing performance of various investment groups

Henriksson and Merton (1981) developed a non-parametric test to evaluate investors' market timing performance that only requires the observation of market excess returns and the prediction of forecasters. It does not depend on knowledge of the distribution of excess returns on the market or any particular model of security valuation. Given that the predictions of forecasters are generally unobservable, later studies have tried to use ex post portfolio excess return to proxy for the unobservable ex ante predictions.[11] In this paper, we use an alternative proxy, the net purchase of stocks, in order to evaluate the market timing performance of Japanese institutional and individual investors.

The intuition behind this proxy is as follows. In a simple mean-variance world with time-varying expected returns and constant covariance, stock trading tends to be driven by investors' forecasts of future market excess returns. Investors are more likely to increase their positions in stocks if they forecast next period stock excess return to rise and to reduce their positions in stocks if they forecast next period stock excess return to fall. Thus, investors are more likely to increase their net purchases if next period market excess returns are positive.[12]

Following Henriksson (1984), we first define $Z_M(t)$ to be the one-period return on the market portfolio and $R(t)$ to be the one-period return on riskless securities. We also define $\gamma(t)$ to be the investors' investment decision (forecast) variable where $\gamma(t)=1$ if investors decide to increase their position during time $t-1$, and $\gamma(t)=0$ if investors decide to reduce their position during time $t-1$. The two probabilities of interest for $\gamma(t)$ conditional on the realized return on the market are

$$p_1(t)=prob[\gamma(t)=0|Z_M(t)\leq R(t)] \text{ and } p_2(t)=prob[\gamma(t)=1|Z_M(t)>R(t)].$$

[10] These results are consistent with other studies that use a large number of countries and different methodologies, such as Bekaert and Harvey (1997), DeSantis and Imrohoroglu (1997), Tesar and Werner (1995) and Kim and Singal (2000). Those studies report no empirical support for the hypothesis of increased host-country volatility because of foreign investor activities. Using data similar to ours, Karolyi (1999) also finds no evidence that trading activity by foreigners destabilized the markets around the time of the Asian financial crisis. Bekaert and Harvey (1998, 2000) also document that the capital integration process reduces the cost of capital.

[11] See, for example, Henriksson (1984).

[12] Since the Henriksson and Merton model is for the asset allocation decision, the test, if applied accurately, requires information on changes in portfolio compositions. In the absence of such detailed data, we use net purchase as a proxy. This is due to the fact that, under constant variance of expected excess returns, the correlation between net purchase and expected excess return is positive if the correlation between net purchase and *changes* in expected excess return is also positive.

Thus, $p_1(t)$ is the conditional probability of a correct forecast, given that $Z_M(t) \leq R(t)$, and $p_2(t)$ is the conditional probability of a correct forecast, given that $Z_M(t) > R(t)$. Merton (1981) showed that a necessary and sufficient condition for a forecaster's predictions to have no value is that $p_1(t) + p_2(t) = 1$. The existence of forecasting ability will result in $p_1(t) + p_2(t) > 1$.[13]

Based on the above theoretical results, Henriksson and Merton (1981) proposed the following test statistic to test the null hypothesis of $p_1(t) + p_2(t) = 1$:

$$S = \frac{n_1}{N_1} + \frac{n_2}{N_2} - 1,$$

where n_1 is the number of correct forecasts, given $Z_M \leq R$; N_1 is the number of observations where $Z_M \leq R$; n_2 is the number of times forecast that $Z_M > R$; and N_2 is the number of observations where $Z_M > R$. They provide asymptotic standard errors for the statistic, thus a simple *t*-test of the null hypothesis can be formed.

Applying the Merton and Henriksson test, we evaluate the market timing performance of various investment groups in the Japanese market, using net stock purchases as a proxy for the ex ante prediction of forecasters.[14] The results are presented in Table 3. In addition to evaluating the ability to forecast Japanese stock market returns

Table 3
Market timing tests[a]

	$p_1 + p_2$	std.	*t*-test
Forecast over short rate			
Securities firms	1.003	0.026	0.123
Insurance firms	0.991	0.041	−0.219
Banks	1.074	0.037	2.020
Investment trusts	1.005	0.047	0.096
Corporations	0.882	0.046	−2.581
Individuals	0.910	0.035	−2.565
Foreigners	1.049	0.048	1.021
Forecast over S&P 500 in dollar			
Foreigners	1.015	0.047	0.314

[a] Note: $p_1(t)$ is the conditional probability of a correct forecast, given that $Z_M(t) \leq R(t)$, and $p_2(t)$ is the conditional probability of a correct forecast, given that $Z_M(t) > R(t)$, where $Z_M(t)$ is the return on value-weighted index of Tokyo Stock Exchange Section I stocks and $R(t)$ is the short interest rate. For "Forecast over S&P 500 in dollar," $Z_M(t)$ is the return on value-weighted index of Tokyo Stock Exchange Section I stocks in U.S. dollar terms and $R(t)$ is the return on S&P 500 index (in dollar). Sample period July 1974–June 1992.

[13] For a more thorough presentation of this framework, see Merton (1981) and Henriksson and Merton (1981).

[14] Since the Heriksson and Merton test implicitly assumes the return is independent of the position taken, an alternative test would be the Cumby and Modest (1987) regression test, which does not make this assumption. Using net purchase data, our regression results indicate that there is little evidence of superior market timing ability of foreign investors.

in excess of the short-term rate ("Forecast over short rate"), we also evaluate the ability to forecast Japanese stock market returns (in US dollar terms) in excess of the S&P 500 returns. Since the timing ability over S&P 500 is relevant only to foreign (or dollar-based) investors, it is reported only for that investor group.[15]

Table 3 shows that Japanese banks have the best market timing performance while corporations and Japanese individual investors have the worst market timing performance during the sample period of August 1974–June 1992. Foreign investors also demonstrate some degree of market timing ability but the performance is not statistically significant. Interestingly, when we split the sample into two subperiods, we find that foreign investors do relatively well in yen returns during the first sample period when there were restrictions on foreign investment, and less well in the second time period when there was considerable relaxation of foreign investments. Our subperiod study also finds that performances are not consistent over time.[16] In summary, we find little evidence of superior foreign investor market timing abilities.

5. What determines investors' security trading?

Some market regulators claim that foreign investors tend to be short-term investors whose investments are mostly driven by expectation of short-term gains rather than long-term fundamentals such as corporate dividend growth. In this section, we further examine the trading activities of foreign investors with respect to various return components. The frequency of our data forces us to define a "short-term trading strategy" as one that can be captured by monthly aggregate transactions.[17]

We begin by examining the relationship between net purchases and market past excess returns. We regress net purchases by various groups on their lagged net purchases and past returns from month $t-1$, $t-2$, and $t-3$. The results are presented in Table 4. We find that, unlike some domestic investments, foreign investments are negatively related to past excess returns. Thus, foreign investors are generally contrarian investors who tend to sell after a market rally and buy after a market downturn. One interpretation of this result is that foreign investors may be trying to keep a constant fraction of their portfolio in Japanese equity. In line with this strategy, a relative appreciation (depreciation) of Japanese stocks will cause foreign investors to sell (buy).[18]

[15] We also evaluated the ability to forecast Japanese stock market returns in excess of the long-term bond returns, and in excess of S&P 500 returns in yen. The results are qualitatively similar to the ones presented here.

[16] These subperiod results are available upon request. The inconsistency of performance is found by a simple calculation of correlations of performances over the two subperiods. The correlations are negative or close to zero for all measures.

[17] As noted earlier, index arbitrage which is one of the most prominent short-term trading strategies, is not captured by either the monthly data or "foreign investor" category. See footnotes 5 and 7.

[18] In order to examine the impact of exchange rate movements on net purchases, we have also added lagged change in Yen/dollar exchange rates to the regression. The impact was not significant for all seven groups. The result is available upon request.

Table 4
Regression of net purchases on lagged net purchases and past excess returns[a]

	g_1 (t-stat)	g_2 (t-stat)	g_3 (t-stat)	g_4 (t-stat)	g_5 (t-stat)	$\bar{R}^2$
Securities firms	0.41 (3.19)	0.69 (12.98)	−0.76 (−0.33)	1.56 (0.69)	0.03 (0.02)	0.47
Insurance firms	0.06 (2.34)	0.55 (9.55)	1.03 (2.21)	0.45 (0.94)	0.65 (1.38)	0.34
Banks	0.22 (1.92)	0.51 (8.88)	4.51 (2.04)	4.54 (2.03)	5.66 (2.51)	0.34
Investment trusts	0.13 (1.35)	0.47 (7.55)	−0.49 (−0.25)	0.91 (0.48)	1.86 (0.98)	0.21
Corporations	−0.14 (−2.70)	0.39 (5.63)	0.37 (0.34)	−0.15 (−0.15)	3.06 (3.04)	0.16
Individuals	−0.47 (−3.51)	0.50 (8.02)	−4.96 (−1.95)	2.33 (0.91)	−3.40 (−1.36)	0.28
Foreigners	−0.12 (−0.77)	0.68 (13.70)	−6.47 (−2.05)	−13.05 (−4.21)	−7.92 (−2.49)	0.52

[a] The table reports regression coefficients from

$$NPUR_t = g_1 + g_2 NPUR_{t-1} + g_3 e_{t-1} + g_4 e_{t-2} + g_5 e_{t-3} + \varepsilon_t,$$

where $NPUR_t$ is net purchases for month t and e_{t-1}, e_{t-2} and e_{t-3} are past excess returns (in excess of short rate) for months $t-1$, $t-2$, and $t-3$, respectively. Sample period July 1974–June 1992.

To get a closer look at the impact of different excess return components on stock holdings, we use the approximate present value relation of Campbell and Ammer (1993) to decompose unexpected excess stock returns into news about future dividends, interest rates, and future excess returns:[19]

$$\tilde{e}_{t+1} = (E_{t+1} - E_t)\left\{\sum_{j=0}^{\infty} \rho^j \Delta d_{t+1+j} - \sum_{j=0}^{\infty} \rho^j r_{t+1+j} - \sum_{j=1}^{\infty} \rho^j e_{t+1+j}\right\}, \quad (2)$$

where r is the one-period treasury bill return, e is the excess return on equity (over short rate), and d is the log dividend paid. All variables are measured in real terms and in logs, a tilde (~) superscript represents an innovation in a variable, and a delta (Δ) designates a first difference. Thus Δd is the log change in real dividends. We use E_t to denote expectations formed at the end of period t, while $(E_{t+1} - E_t)$ is the revision in expectations given new information arrived during period $t+1$. The parameter ρ is a constant of linearization that is slightly less than one.[20]

For convenience, we define a simpler notation to refer to the three news components above:

[19] An approximate intertemporal identity is derived by taking a first-order Taylor expansion of an accounting identity for the log one-period return, computing the forward solution of the resulting difference equation in the log of the dividend-price ratio, and applying expectations operators. The only assumption we make here is to impose a consistency condition on expectations that is somewhat weaker than rational expectations. For details, see Campbell and Ammer (1993) or Campbell and Mei (1993).

[20] It is approximately equal to the inverse of 1 plus the mean of the dividend yield on stocks, or about 0.99 for the Tokyo Stock Exchange Section I index.

$$\tilde{e}=\tilde{e}_{\mathrm{d}}-\tilde{e}_{\mathrm{r}}-\tilde{e}_{\mathrm{e}}. \tag{3}$$

Each term in Eq. (3) corresponds to one of the summations in Eq. (2). Eq. (3) says that, ceteris paribus, news that dividends will grow more rapidly in the future would have a positive impact on today's stock return. On the other hand, an unexpected increase in future expected excess returns (risk premiums) generates an immediate capital loss. Similarly, positive revisions to future interest rate expectations reduce the current return on equity.

In order to determine the relative importance of dividends, real interest rates and future expected excess return innovations on asset returns, Panel A of Table 5 decomposes the variance of unexpected asset returns into six components. The six components are the variance associated with news about future cash flows ($Var(e_{\mathrm{d}})$), the variance due to news about future real interest rates ($Var(e_{\mathrm{r}})$), and news about future expected returns ($Var(e_{\mathrm{e}})$), and the covariances among these three news components. For easier interpretation, the six terms are given as ratios to the variance of the unexpected excess asset returns so that they sum to one. From Panel A, one can observe that a large portion of the variance in unexpected returns is explained by news (or changing expectations) about future dividends for the Tokyo Stock Exchange Section I stocks. More specifically, news about future dividends accounts for 88.6% of the total variance of unexpected returns in a VAR(2) model and 86% of the total variance in a VAR(3) model for Tokyo Stock Exchange Section I stocks.[21] The variation of real interest rates has a small impact on the variation of unexpected excess stock returns (accounting for 10.4% of the $Var(e)$ under VAR(2)). The variance of news about future expected returns impacts on the variance of stock returns to a greater extent (24.1%).

Given the dynamics of asset returns, our next step is to study the trading (net purchase) behavior of Japanese market investors in relation to the dynamics of stock market returns. More specifically, given that the return generating process is exogenous, we run a regression of security trading on innovations about stocks' future dividends and expected future returns.

Panel B of Table 5 reveals the relationship between net stock purchases and various components of excess stock returns. We can see from panel B-1 that the net purchases of insurance firms, investment trusts, corporations, and individuals are negatively related with future dividend growth, while the net purchases of securities firms' proprietary trading, banks, and foreign investors are positively correlated with future dividend growths. These results suggest that relative to some Japanese market participants, foreign investors are more likely to take into account future dividend growth when they make their purchase decisions.

[21] See Appendix A for the VAR specification and the computation of the return components. Here, we first perform a test of lag length of the VAR process. A simple Wald-test of the hypothesis that the coefficients on the last lagged variables are jointly zero is rejected for VAR(2) but not for VAR(3). Thus, the last lag is significant for VAR(2) but not significant for VAR(3). Therefore either a VAR(2) or VAR(3) process should be utilized in decomposing the variance of asset returns.

Table 5
Excess return decomposition and trading activities

Panel A Decomposition of excess stock returns[a]

	VAR with 2 lags		VAR with 3 lags	
	Point estimate	Asymptotic standard error	Point estimate	Asymptotic standard error
$var(\tilde{e}_d)$	0.886	0.581	0.860	0.642
$var(\tilde{e}_r)$	0.104	0.103	0.133	0.164
$var(\tilde{e}_e)$	0.241	0.360	0.304	0.401
$-2cov(\tilde{e}_d,\tilde{e}_r)$	−0.402	0.462	−0.445	0.618
$-2cov(\tilde{e}_d,\tilde{e}_e)$	0.410	0.223	0.378	0.266
$2cov(\tilde{e}_r,\tilde{e}_e)$	−0.239	0.225	−0.230	0.314
$corr(\tilde{e}_d,\tilde{e}_r)$	0.662	0.292	0.658	0.364
$corr(\tilde{e}_d,\tilde{e}_e)$	−0.443	0.326	−0.370	0.309
$corr(\tilde{e}_r,\tilde{e}_e)$	−0.753	0.179	−0.571	0.417

Panel B Regression of net purchases on components of excess returns. B-1: Regression of net purchases on components of contemporaneous excess returns

B-1-1: Dividend component[b]

	h_1 (t-stat)	h_2 (t-stat)	h_3 (t-stat)	R^2
Securities firms	0.40 (3.26)	0.70 (14.08)	0.03 (1.48)	0.48
Insurance firms	0.07 (2.70)	0.56 (9.97)	−0.01 (−2.58)	0.34
Banks	0.23 (2.03)	0.57 (9.94)	0.05 (2.22)	0.33
Investment trusts	0.13 (1.41)	0.48 (7.75)	−0.01 (−0.40)	0.22
Corporations	−0.12 (−2.44)	0.37 (5.70)	−0.00 (−0.36)	0.13
Individuals	−0.48 (−3.63)	0.51 (8.76)	−0.09 (−3.44)	0.30
Foreigners	−0.23 (−1.39)	0.69 (13.59)	0.06 (1.75)	0.47

B-1-2: Future expected return component[c]

	h_1 (t-stat)	h_2 (t-stat)	h_3 (t-stat)	R^2
Securities firms	0.41 (3.29)	0.69 (13.97)	−0.04 (−0.83)	0.48
Insurance firms	0.06 (2.54)	0.58 (10.05)	0.01 (0.51)	0.32
Banks	0.23 (2.00)	0.58 (9.97)	−0.01 (−0.24)	0.32
Investment trusts	0.13 (1.43)	0.47 (7.68)	−0.04 (−0.81)	0.22
Corporations	−0.12 (−2.45)	0.37 (5.72)	0.00 (0.13)	0.13
Individuals	−0.48 (−3.57)	0.51 (8.64)	0.07 (1.26)	0.26
Foreigners	−0.22 (−1.35)	0.69 (13.42)	−0.04 (−0.49)	0.46

(continued on next page)

Table 5 (*continued*)

B-2: Regression with lagged future dividend component

B-2-1: Dividend component[d]

	h_1 (*t*-stat)	h_2 (*t*-stat)	h_3 (*t*-stat)	R^2
Securities firms	0.42 (3.46)	0.68 (14.20)	0.09 (3.95)	0.52
Insurance firms	0.06 (2.31)	0.68 (10.64)	0.01 (2.98)	0.35
Banks	0.23 (1.97)	0.59 (10.07)	−0.02 (−0.90)	0.32
Investment trusts	0.14 (1.50)	0.48 (8.01)	−0.06 (−3.20)	0.25
Corporations	−0.12 (−2.61)	0.35 (5.99)	−0.06 (−6.50)	0.27
Individuals	−0.50 (−3.70)	0.49 (8.12)	−0.05 (−2.02)	0.27
Foreigners	−0.25 (−1.54)	0.67 (13.52)	0.12 (3.47)	0.49

B-2-2: Future expected return component[e]

	h_1 (*t*-stat)	h_2 (*t*-stat)	h_3 (*t*-stat)	R^2
Securities firms	0.42 (3.35)	0.69 (13.91)	−0.07 (−1.33)	0.48
Insurance firms	0.06 (2.57)	0.57 (10.04)	−0.01 (−0.48)	0.32
Banks	0.23 (1.99)	0.58 (10.01)	0.00 (0.02)	0.32
Investment trusts	0.13 (1.41)	0.47 (7.72)	−0.00 (−0.07)	0.22
Corporations	−0.13 (−2.49)	0.37 (5.75)	0.04 (1.57)	0.14
Individuals	−0.49 (−3.59)	0.51 (8.55)	0.06 (1.13)	0.26
Foreigners	−0.22 (−1.34)	0.69 (13.49)	−0.06 (−0.81)	0.46

[a] Note: Unexpected excess stock returns are decomposed into $\tilde{e}_d$, $\tilde{e}_r$ and $\tilde{e}_e$ representing components due to innovation in future dividends, interest rates, and future excess returns. Sample period is July 1974–June 1992. The state variables in the VAR process are excess stock returns, the real interest rate, the relative bill rate (the current short term rate subtracted by its twelve months moving average), the term spread (the difference in the long-term government bond yield and the Gensaki rate), the dividend yield, and the industrial production growth rate. The R^2 for the VAR(2) regressions are 0.053, 0.177, 0.897, 0.983, 0.989, and 0.235 respectively for these six variables, and 0.063, 0.220, 0.900, 0.984, 0.989, and 0.345 for VAR(3).

[b] The table reports regression coefficients from

$$NPUR_t = h_1 + h_2 NPUR_{t-1} + h_3 \tilde{e}_d + \varepsilon_t,$$

where $NPUR_t$ is net purchases for month t and $\tilde{e}_d$ is the dividend component of the unexpected excess returns, respectively. A VAR with lag 2 is used to obtain $\tilde{e}_d$. Sample period July 1974–June 1992.

[c] The table reports regression coefficients from

$$NPUR_t = h_1 + h_2 NPUR_{t-1} + h_3 \tilde{e}_e + \varepsilon_t,$$

where $NPUR_t$ is net purchases for month t and $\tilde{e}_e$ is the future expected return component of the unexpected excess returns, respectively. A VAR with lag 2 is used to obtain $\tilde{e}_e$. Sample period July 1974–June 1992.

[d] The table reports regression coefficients from

$$NPUR_t = h_1 + h_2 NPUR_{t-1} + h_3 \tilde{e}_{d,t-1} + \varepsilon_t,$$

where $NPUR_t$ is net purchases for month t and $\tilde{e}_d$ is the dividend component of the unexpected excess returns, respectively. A VAR with lag 2 is used to obtain $\tilde{e}_d$. Sample period July 1974–June 1992.

[e] The table reports regression coefficients from

$$NPUR_t = h_1 + h_2 NPUR_{t-1} + h_3 \tilde{e}_{e,t-1} + \varepsilon_t,$$

where $NPUR_t$ is net purchases for month t and $\tilde{e}_e$ is the future expected return component of the unexpected excess returns, respectively. A VAR with lag 2 is used to obtain $\tilde{e}_e$. Sample period July 1974–June 1992.

Panel B-1 also presents evidence on the relation between net stock purchases and news about future excess returns. Again, we see no evidence that foreign investors behave differently from domestic groups.

Panel B-2 presents the relationship between net stock purchases and lagged components of excess stock returns. We can see that the net purchases of banks, investment trusts, corporations, and individuals are negatively related with lagged future dividend growths, while the net purchases of security firms, insurance companies, and foreign investors have a positive relation.[22,23] This result suggests that foreign investment, in particular, is positively related to long-term fundamentals such as corporate dividend growth.

6. Conclusions

This paper develops a comprehensive framework for analyzing the impact of foreign investment on domestic financial markets. First, we develop a three-stage-least-squares estimation approach to examine the impact of foreign and domestic trading on market volatility. Second, we use net purchases of securities as a proxy for investors' forecasts of future excess returns, and apply the market timing test of Henriksson and Merton (1981) to evaluate the market timing performance of various investment groups in the Japanese market. Third, using the Campbell and Shiller (1988) approximate present value model, we decompose excess stock return innovations into news about future excess returns, dividend growths, and interest rates. We then study the relationship between different news components and foreign and domestic trading behavior.

Our study confirms the results of Tesar and Werner (1994, 1995) and Bohn and Tesar (1995, 1996): there is little evidence that trading by foreign investors tends to increase market volatility any more than trading of domestic groups. We find that foreign investment improves liquidity in the Japanese market. We also find no evidence of superior foreign investor market timing abilities. There is even some weak evidence that foreign investment is sensitive to long-term dividend news.

We view this study as a further step towards understanding the impact of foreign investment on domestic financial markets. Our work provides future researchers with useful information about data collection, econometric modeling and estimation procedures. It also provides some direction for future research, such as the need to

[22] We have also studied the relations among stock buying and selling activities with current and lagged components of stock excess returns. The results are similar to what we find for net purchase. These results are available upon request.

[23] Noting that in almost all of the regressions the h_2 coefficient (on lagged purchases) is much larger and more important than h_3 (on return components), we ran ARMA (1) for net purchases. The R^2 are 0.47 (securities firms), 0.32 (insurance firms), 0.31 (banks), 0.22 (investment trusts), 0.13 (corporations), 0.26 (individuals), and 0.46 (foreigners). Comparing these R^2s with R^2s in Table 5, we note that e_d is marginally important for individuals, and the lagged e_d is marginally important for securities firms, corporations, and foreign investors.

develop a more comprehensive framework to evaluate the costs and benefits of foreign investment and the regulatory policy issue of how to balance the need for attracting foreign capital and maintaining domestic market stability. We hope our work will stimulate even further theoretical and empirical analysis in this area.

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Appendix A

A.1. The three-stage-least-square instrumental variables estimation procedure

The three-stage-least-square instrumental variables estimation is given in the following framework. We denote:

$$Y=(v_2,v_3,\ldots,v_T)'$$

as $N\times1$ vectors of observations for the monthly volatility.

Denote the variables on the right side of Eq. (1) as $X = (i, Y_{-1}, W)$, where i is an $N\times1$ vector of ones, Y_{-1} is the lagged monthly volatility, and W is the vector of monthly transactions. $U=(u_2, u_3,\ldots u_T)'$ is the transformed error terms, and $B = (b_1, b_2, b_3)'$. Then Eq. (1) can be written as

$$Y=XB+U. \tag{A1}$$

Since W_{-1} are orthogonal to the error terms in Eq. (A1), the following qualify as instrumental variables $Z = (i, Y_{-1}, W_{-1})$.

To estimate Eq. (A1), we use a linear 3SLS procedure which is quite similar to the conventional 3SLS procedure for estimating simultaneous equations. In the first stage, a generalized instrumental variable estimation procedure is used to obtain a consistent estimate of B of Eq. (A1):

$$B=[W'Z(Z'Z)^{-1}Z'W]^{-1}W'Z(Z'Z)^{-1}Z'Y. \tag{A2}$$

Using the above results, we then construct a more efficient estimate of B in the second and third stage:

$$B=[W'Z(G)^{-1}Z'W]^{-1}W'Z(G)^{-1}Z'Y, \tag{A3}$$

in which G is the covariance matrix of $Z'U$. See Newey and West (1987) for the calculation of G. The variance-covariance matrix of B is given by $P = Var(B) = [W'Z(G)^{-1}Z'W]^{-1}$. The estimate of B given by Eq. (A3) is consistent despite the correlation between the autoregressors and the error terms, and the presence of heteroskedasticity and serial correlation. As pointed out by Holtz-Eakin et al. (1988), the consistency is based mainly on the orthogonal condition that the error terms are uncorrelated with the instrumental variables used in estimating Eq. (A1). It is a special case of Hansen's (1982) GMM consistent estimator.

A.2. The excess return decomposition based on Campbell and Ammer (1993)

In order to implement our decomposition in Section 5, we need to construct empirical proxies for the various excess return components in Eq. (3). To do this, we assume that z_t is a vector of state variables which includes (e_t, r_t) as its first two elements. z_t also includes the relative bill rate (the current short term rate subtracted by its twelve months moving average), the term spread (the difference in the long-term government bond yield and the Gensaki rate), the dividend yield, and the industrial production growth rate. Next we assume that: $z_{t+1} = Az_t + w_{t+1}$, where w_{t+1} is innovation in z_{t+1}. Under the above assumptions, it is easy to compute the following:

$$\tilde{e}_e=e_1\rho A(1-\rho A)^{-1}w_{t+1},$$

$$\tilde{e}_r=e_2\rho A(1-\rho A)^{-1}w_{t+1},$$

$$\tilde{e}=e_1w_{t+1},$$

$$\tilde{e}_d=\tilde{e}+\tilde{e}_r+\tilde{e}_e,$$

where e_1 is an L-element column vector whose first element is one and whose other elements are all zero. e_2 is an L-element column vector whose second element is one and whose other elements are all zero. See Campbell and Hamao (1992), Campbell and Ammer (1993), and Campbell and Mei (1993) for the derivation of the above equation and the selection of state variables.

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