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ABSTRACT

Foreigners' Trading and Price Effects Across Firms*

We study the investment behaviour of foreign investors in association with an equity market liberalization, and find a strong link between foreigners' trading and local market returns. In the period following the liberalization, foreigners' net purchases led to a permanent increase in prices, or equivalently, a permanent reduction of the cost of equity capital. We also find a strong link between a firm's fraction of foreign ownership and the magnitude of the reduction of cost of capital. Foreign investors seem to prefer large and well-known firms, and these firms realize the most sizeable cuts in capital costs. Furthermore, our analysis suggests that foreigners act like non-informed feedback traders. In particular, they increase their net holding in firms that have recently performed well. Analysing foreigners' performance, we find very little evidence of informed trading, suggesting that risk sharing is the most plausible explanation for the reduction in the cost of equity capital.

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1. Introduction

The relation between portfolio flows and market returns has recently received increased attention. This can be traced to two different, but related, strands in the international asset pricing literature.[1]

The first strand of the literature is concerned with the consequences for an equity market when it is opened up to foreign investors. On one hand, trading by foreign investors could lead to excess volatility, and potentially have a destabilizing effect (see De Long, Shleifer, Summers, and Waldmann, 1990). On the other hand, a stock market liberalization may reduce the country's cost of equity capital by allowing for risk sharing between domestic and foreign investors (see Stulz, 1999a). Bekaert and Harvey (2000), and Henry (2000) conduct empirical studies of liberalizations in emerging markets, and find that the cost of capital is reduced when markets are opened up to foreign investors.

The second strand of the literature on international asset pricing has its starting point in the well-documented home bias (see Lewis, 1995, 1999, for overviews of the home-bias puzzle). Most studies of the home bias use ownership data aggregated on a country level. However, Kang and Stulz (1997) study a specific market, namely the Japanese market, and find that foreigners also reveal preferences for certain firm-specific attributes. In particular, foreign investors prefer large, financially solid, and well-known firms. They argue that this ownership pattern can emerge if non-resident investors know more about large firms than small firms in the market in which they invest. Dahlquist and Robertsson (2001) find similar preferences among foreign investors in the Swedish market.

In this paper, we draw on the results from both strands of the literature. Building on the findings of Dahlquist and Robertsson (2001), we study the effects on cost of equity capital of individual firms when the Swedish equity market was liberalized. Using a rich dataset of ownership, flows, and returns, we investigate the patterns and impacts of foreigners' purchases and sales on individual firms, and relate them to firm-specific attributes. We study the period 1993–1998 on a monthly basis. This is the period immediately after the liberalization of the Swedish equity market, that is, when the restrictions on investments by foreigners were abolished.[2]

We are interested in addressing two main questions: First, how do foreigners invest when an equity market is liberalized, and secondly, how do their investment decisions af-

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[1] Articles analyzing the relation between portfolio flows and market returns include De Long, Shleifer, Summers, and Waldmann (1990), Warther (1995), Bohn and Tesar (1996), Brennan and Cao (1997), Choe, Kho, and Stulz (1999), Karolyi (1999), Kim and Wei (1999), Nofsinger and Sias (1999), Seasholes (2000), Bekaert, Harvey, and Lumsdaine (2001), Edelen and Warner (2001), and Froot, O'Connell, and Seasholes (2001). Stulz (1999b) provides an overview.

[2] The relation between flows and returns in the Swedish market has previously been analyzed by Sellin (1996) and Säfvenblad (1998). Säfvenblad (1998) considers flows and returns in debt instruments rather than equity flows and returns. Sellin (1996) studies the equity market but focuses entirely on aggregated flows and returns. Further, he investigates a period when there still were severe restrictions on foreigners' ownership.

fect firms with various characteristics? We analyze these questions in a vector autoregression (VAR) framework which enables us to study the dynamics of flows and returns. For instance, how are foreigners' trades related to lagged equity returns? Is there any persistence in the flows? More importantly, however, is that the VAR framework has the ability to separate between temporary and permanent price effects induced by foreign investors. A temporary effect reflects a pure price pressure, while a permanent effect can be motivated by risk sharing benefits of a capital market opening. An alternative explanation for a permanent effect is that foreign investors may have access to new (or different) information on Swedish firms that is incorporated into the prices by their trading.[3] If foreigners are better informed, they can earn significant profits by trading on their information. Hence, we study foreigners' trading performance to gauge the relative importance of the risk sharing and informational explanations of a permanent price effect.

The main result in this paper can be summarized as follows. We find that foreigners' net purchases are associated with significant increases in prices. These effects are not purely price pressure effects, since they do not reverse, suggesting that the market liberalization have led to permanent changes in the cost of equity capital. A crude measure of the aggregate effect indicates a reduction in the cost of equity capital of about one percentage point on an annual basis. This is in line with the findings of Bekaert, Harvey, and Lumsdaine (2001) who, in a similar framework, document that increased capital flows decrease the cost of equity capital in emerging stock markets. Even more interesting is that we find a strong link between the magnitude of a price impact and the fraction of foreign ownership of a firm; the higher the fraction, the larger is the price impact. Foreigners seem to prefer large, financially solid, and well-known firms. These firms also display the largest reductions in cost of equity capital due to trading by foreigners. At a first glance, this effect seems counter-intuitive given that these firms typically are multinational, and thus had access to international capital markets already before the domestic market liberalization. However, as argued in Kang and Stulz (1997), if foreign investors find themselves less informed when compared with their domestic counterparts, a rational response would be to invest in those firms where the informational disadvantage is minimized. Hence, we conclude that an equity market liberalization seems to reinforce, or even widen, the differences in cost of equity capital across firms. In that perspective, a liberalization effectively preserves the industrial structure of a country.

Our analysis further suggests that foreigners act as non-informed momentum investors, that is, they increase their net holding in firms which have recently performed well. This supports the findings of Karolyi (1999), Kim and Wei (1999), Froot, O'Connell, and Seasholes

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[3]It is often argued that foreign investors have an informational disadvantage compared with domestic investors when analyzing firms (see, for instance, Brennan and Cao, 1997). However, although foreigners may be less informed about the details of a domestic firm, they can be better informed about the general conditions of an industry, or when analyzing international competitors of Swedish firms.

(2001), Grinblatt and Keloharju (2000), and Seasholes (2000), who report that international flows are strongly influenced by past returns. Analyzing foreigners' performance, we find very little evidence of informed trading, suggesting that risk sharing is the most plausible explanation for the reduction in the cost of equity capital.

The remainder of this paper proceeds as follows. Section 2 presents the data and provides a preliminary analysis of trades by foreigners. This motivates the analysis of how flows are related to returns. Section 3 describes the methodology, discusses the identification assumptions made, and measures the relation between flows and returns. Section 4 presents the analysis of foreigners' performance. Section 5 summarizes the main results and conclusions.

2. Data Description

In this paper, we use monthly stock market data from Sweden. Our sample covers the period 1993–1998, and consists of gross purchases and sales of shares made by foreigner investors in 322 listed firms. Further, we employ the returns on individual stocks as well as several firm attributes to explore the determinants of foreign trading, and to characterize the cross-section. We also consider the return on the world market portfolio, for controlling purposes, in the analysis.

2.1. Foreign Investors' Trades

On a monthly basis, the central bank of Sweden, Sveriges Riksbank, collects reports from all the brokers, banks and other financial intermediaries that are involved in securities trading with foreign counterparts. We employ data referred to as "portfolio investments in Swedish listed stocks," where we have access to gross purchases and sales for all listed firms at an individual basis. Hence, we have the opportunity to analyze trades by foreigners at a disaggregated level.

The flow data, however, present some problems. Portfolio investments include all flows except direct investments, where the latter are transactions made by investors owning 10% or more of the capital or votes in a firm. Hence, if a foreign investor already holds 10% of the equity in a firm, and then decides to increase his ownership, this is not reflected in the portfolio investment data.[4] Unfortunately, firm-specific data on direct investments by foreigners in Sweden are not available. This internationally accepted accounting policy is particularly cumbersome in association with takeovers, since these events imply very large transfers of equity. For instance, if a foreign investor bids on a Swedish firm, the typical response is that a number of other foreigners accept the bid and sell their stocks. These

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[4]At the end of 1997, 43 foreign investors hold 10% or more in a Swedish firm. Together, these holdings have a market value of SEK 64.7 billion, which corresponds to 9.7% of total foreign ownership.

sales are reflected in the data since they are classified as portfolio investments. However, the acquiring firm is by definition making a direct investment, which is not included in the data. Hence, when a Swedish firm is acquired by a foreign investor, the portfolio investment data show (spuriously) that foreigners are net sellers of stocks to Sweden. To limit the impact of this idiosyncrasy, we ignore the observations that we know are biased. Specifically, we discard the last three months of data before a firm is de-listed (taken over). Another problem is that we underestimate the true trading volume for firms listed on multiple exchanges, since our data only include cross-border transactions. However, the trading in Swedish stocks on international exchanges is likely to be dominated by foreign investors. Since our main aim is to study the purchases and sales of Swedish stocks made by foreigners as a group, inter-foreigner trading is not immediately relevant.

Figure 1 depicts the purchases and sales of Swedish stocks by foreign investors for the period 1993–1998.[5] The long dashed line shows that there were cumulative net purchases of stocks worth approximately SEK 93 billion during the first half of the sample period. As a reference, total market capitalization was SEK 545 billion at the beginning of 1993. This interest in Swedish stocks reflects the deregulation, or liberalization, that took place in late 1992.[6] Between 1993 and 1995, foreign ownership of Swedish listed firms increased from slightly below 15% to almost 35% of the total market value (not reported). The latter half of the period shows a different pattern. The cumulative net purchases level off, that is, net purchases are close to zero. Hence, the share of foreign ownership in Swedish firms seems to stabilize around 35%. The figure also shows the gross purchases and sales of stocks. To facilitate a comparison of the flows over time, we divide them by the total market capitalization and refer to them as *normalized* purchases and sales. Again, we see that foreigners accumulated Swedish stocks between 1993 and 1995 (when the short dashed line showing purchases of stocks by foreigners is above the solid line that depicts sales by foreigners). On average, foreigners buy and sell stocks for an annualized value equivalent to 20% of market capitalization.

Figure 2 shows the cross-sectional distribution of foreign trading in 1997. The solid line depicts the cumulative distribution when firms are sorted on the basis of foreign trading, with the most traded stocks appearing on the left (reflected on the left scale). The dashed line shows the corresponding measure for the aggregate market. As seen in the figure, the 30 most traded stocks account for about 88% of foreign trading while the same stocks account for approximately 84% of the total turnover on the Swedish market. Hence, foreign trading

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[5]Throughout the paper we use the term *net purchases* as a measure of purchases minus sales, while purchases plus sales are referred to as *trading*. Since purchases and sales are non-stationary variables, we also employ *normalized* measures by dividing the raw variables by the contemporaneous market capitalization.

[6]Before 1993, most Swedish firms issued two classes of equity, restricted and unrestricted shares. Only the latter could be held by foreigners. The proportion of unrestricted shares was limited by law to 20% of the voting rights and 40% of the equity. These restrictions were formally abolished in January 1993, which is the starting point of our sample period.

seems to be slightly more concentrated to fewer stocks when compared with the aggregate market turnover. The bars show the corresponding turnover rates for foreign investors as well as for the aggregate market (reflected on the right scale). Foreigners' turnover rate (white bars) is defined as foreign purchases plus sales divided by foreign holdings at the end of the year; the aggregate turnover rate (cross-hatched bars) is defined as total turnover divided by the market capitalization at the end of the year. The figure reports average turnover rates for groups of five stocks. The first bar from the left shows that the average turnover rate for the five most traded stocks (in absolute value) is about 1.3. The corresponding aggregate turnover rate is about 0.7. The level of foreign turnover rates seems to be uncorrelated with the absolute amount of foreign trading in a stock. This indicates that foreigners simply trade more in firms with large market capitalization and less in smaller firms. Interestingly, the turnover rates of foreigners exceed the corresponding aggregate rate in all cases except for the four groups with the least trading by foreigners. This finding confirms the results from other markets, reported in Tesar and Werner (1995); they conclude that the turnover rate on international equity investments is high both when compared with the turnover rate in the investor's home country, and when compared with the market of the foreign security.

2.2. Returns and Firm Characteristics

The local return data are based on monthly closing prices from the Stockholm Stock Exchange (SSE), with the standard adjustments for splits, stock dividends and cash dividends. Hence, returns are generated by prices from the last trade on the SSE even if a stock is later traded on another exchange, as is typically the case when the stock is listed on the New York Stock Exchange (NYSE) or other later-closing exchanges. Further, we use the return on Financial Times world market portfolio. As a proxy for the riskfree rate we employ the return on a 30-day bill issued by the Swedish government.

We also use a number of firm-specific attributes to explore the determinants of foreign trading. They are:

(*i*) *Size*. This variable is the market capitalization of the firm at year-end. In the regressions, we consider the log of the market capitalization.

(*ii*) *Dividend yield*. The value of all dividends paid during the year divided by the market value of the firm.

(*iii*) *Book-to-market ratio*. This is a valuation measure of the firm. It is defined as the book value of equity divided by the market value of equity.

(*iv*) *Current ratio*. We use this as a proxy for financial distress. It is calculated as current assets divided by current liabilities.

(*v*) *Export rate*. Firms with large sales abroad are more likely to be familiar to foreign investors. The export rate is measured as export sales divided by total sales.

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(*vi*) *Turnover rate*. This is a measure of the liquidity of the firm's shares. It is defined as the annual value of traded stocks divided by the market value of the firm.

(*vii*) *Concentration ratio*. This measure of ownership concentration is defined as the proportion of votes held by the largest shareholder coalition.

(*viii*) *Foreign Listing*. This dummy variable takes a value of one if the firm's shares are listed abroad. Otherwise, the value is zero.

Stockholm Information Exchange (SIX) provided the return data and the variables (*i*) to (*vi*), whereas variables (*vii*) and (*viii*) are from SIS Ägarservice and SSE, respectively.[7]

Table 1 shows some preliminary regression results of foreign investments in Swedish firms. The two columns related to ownership highlight some of the results in Dahlquist and Robertsson (2001). They find that foreign ownership is related to several firm-specific attributes. Here, we see that many of these attributes also help to characterize foreign trading. The table reports a positive relation between foreign trading and the market capitalization of firms, and to the market liquidity of firms' shares, and a negative relation to firms' dividend yields and to the book-to-market ratios.

The fact that similar attributes characterize ownership and trading by foreigners is not surprising. After all, investors typically trade in the stocks that they already own. Coval and Moskowitz (1999, 2001) and Seasholes (2000) also present evidence that attributes that characterize stock holdings also characterize trading behavior. When we try to relate foreigners' net purchases to firm characteristics, we do not find any patterns at all. Even this finding touches upon the trivial, since many attributes have little time-variation, and investors cannot be net buyers or net sellers for a long period of time without exceeding the obvious ownership limits of 0% and 100%. Therefore, when characterizing the net purchases of foreign investors, we take a different route and relate them to the returns of the particular stocks in which foreigners trade.

3. The Dynamics of Flows and Returns

In this section, we employ a vector autoregression (VAR) that allows us to study the dynamics between flows and returns. In this framework, we can measure the effects of an unexpected shock to flows on current returns, and see whether its dynamics have temporary or permanent effects. In other words, can we see price pressures or permanent changes in the cost of equity capital? Further, we can observe whether past returns affect current flows, that is, whether foreigners are feedback traders.

We consider three variables in the VAR: The return on a world market investment, the return in the local market, and flows. Let r_{wt} and r_{lt} denote the world market return and the local market return over a period from $t-1$ to t. Both returns are measured in the local

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[7]We thank Henrik Cronqvist and Mattias Nilsson who collected the data on ownership concentration.

currency in excess of a local riskfree investment. The flows (either net purchases, purchases, or sales) over this period are denoted by f_t. In the VAR we assume that the world market return is not, in any way, determined by flows or local market returns. This assumption hence acknowledges the fact that Sweden is a small open economy, and, for instance, when we measure price effects in the local market due to flows, we control for world-wide movements in prices. Following Froot, O'Connell, and Seasholes (2001) and Bekaert, Harvey, and Lumsdaine (2001), we also make the following important identification assumption. Current flows affect contemporaneous returns, and future flows and returns, whereas current returns only affect future returns and flows. This assumption is consistent with the view that current flows contain information about the value of firms. Naturally, we allow the world market returns to affect both flows and local returns.

3.1. The VAR Model

The dynamics of flows and returns are assumed to follow a trivariate first-order vector autoregression

$$y_t = \mu_A + A_1 y_{t-1} + \varepsilon_t, \tag{1}$$

where y_t is a vector of world market returns, flows and local returns at date t, μ_A and A_1 are constants, and ε_t is an independent and identically distributed error term with $\mathrm{E}(\varepsilon_t \varepsilon_s') = \Omega$ for $t = s$, and zero otherwise. This specification could easily be extended to allow for higher-order autocorrelation by writing it in a companion form. However, the results do not change to any significant degree when it is extended, and the first-order VAR specification is also supported by formal statistical lag-length tests. For this reason, we present it in its first-order VAR form.

We estimate the parameters of the VAR by least squares, and calculate impulse-response functions via bootstrapping and the percentile method as described in Hamilton (1994). The functions describe the response of flows and returns to a one-time impulse in orthogonalized flows or returns, with the other variable held constant. To be able to understand the impulse-response functions and interpret the effects in the VAR, we have to make additional assumptions. Consider the following structural model of flows and returns

$$B_0 y_t = \mu_B + B_1 y_{t-1} + \eta_t, \tag{2}$$

where

$$B_0 = \begin{bmatrix} 1 & -b_{12}^{(0)} & -b_{13}^{(0)} \\ -b_{21}^{(0)} & 1 & -b_{23}^{(0)} \\ -b_{31}^{(0)} & -b_{32}^{(0)} & 1 \end{bmatrix}, \quad B_1 = \begin{bmatrix} b_{11}^{(1)} & b_{12}^{(1)} & b_{13}^{(1)} \\ b_{21}^{(1)} & b_{22}^{(1)} & b_{23}^{(1)} \\ b_{31}^{(1)} & b_{32}^{(1)} & b_{33}^{(1)} \end{bmatrix},$$

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and

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y_t = \begin{bmatrix} r_{wt} \\ f_t \\ r_{lt} \end{bmatrix}, \mu_B = \begin{bmatrix} \mu_{B1} \\ \mu_{B2} \\ \mu_{B3} \end{bmatrix}, \eta_t = \begin{bmatrix} \eta_{1t} \\ \eta_{2t} \\ \eta_{3t} \end{bmatrix},
$$

with $E(\eta_t \eta_s') = D$ being a diagonal matrix for $t = s$, and zero otherwise. Pre-multiplying each side of equation (2) by B_0^{-1}, the result is the VAR model in equation (1) with $\mu_A = B_0^{-1}\mu_B$, $A_1 = B_0^{-1}B_1$, and $\varepsilon_t = B_0^{-1}\eta_t$. Thus, a VAR can be viewed as the reduced form of a general dynamic structural model. Moreover, if B_0 is triangular, a unique mapping exists from the reduced-form parameters (μ_A, A_1, and Ω) to the structural parameters (μ_B, B_0, B_1, and D), implying that the structural model is exactly identified.

The first critical assumption in our model is that we restrict $b_{12}^{(0)} = b_{13}^{(0)} = 0$. In other words, flows and local market returns do not affect the contemporaneous world market return. Consistent with these structural assumptions, we restrict the A_1 matrix such that world market returns are not affected by previous flows nor previous local market returns. The second critical assumption is that we restrict $b_{23}^{(0)} = 0$. This means that we allow foreigners' net purchases to affect the contemporaneous returns as well as future flows and returns, whereas current returns only affect future flows and returns. Further, we restrict the A_1 matrix such that lagged returns do not affect current returns. However, these last restrictions do not affect the results qualitatively.

3.2. Results for the Aggregate Market

The results from the VAR analysis are shown in figures depicting impulse-responses to innovations (or shocks) in aggregate net purchases or local market returns when the magnitude of the shocks is one standard deviation. The responses are shown with 90% confidence bands that are derived from a bootstrap simulation. The horizontal axes are expressed in months.

The responses of foreigners' net purchases to impulses in local market returns are shown in Figure 3. The trades are significantly affected by past returns. There is a positive response of net purchases on returns, indicating that foreigners buy stocks when prices have increased and sell stocks when prices have decreased. For instance, a 10% (2.2 standard deviations) price increase in the local market implies that foreigners' net purchases increase by 0.11% of the market capitalization in the subsequent month, which corresponds to about SEK 1.2 billion using the market capitalization at the end of 1995. When splitting net purchases into gross purchases and sales we found an asymmetry in the responses of purchases and sales to innovations in returns. This is depicted in Figure 4. Returns affect purchases positively, and statistically significantly, whereas sales are not significantly affected. This asymmetry may be due to short-sales restriction and tax considerations that affect sales decisions differently

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than the decisions to buy stocks. Foreign investors involvement in positive feedback trading is also documented by Kim and Wei (1999), Karolyi (1999), Grinblatt and Keloharju (2000), Froot, O'Connell, and Seasholes (2001), and Seasholes (2000) in other markets. That foreigners are momentum traders also has implications for the behavior of domestic investors, as the aggregate domestic investor then has to be a contrarian. Our data do not enable disaggregation of domestic investor categories, but the fact that domestic non-institutional investors typically are contrarians has been documented by Barber and Odean (2000) and Grinblatt and Keloharju (2000) in the U.S. and Finnish market, respectively.

Figure 5 shows the response of net purchases to an impulse in net purchases. A positive flow is followed by another positive flow and vice versa, and the persistence is significant for up to five months. We also analyzed gross purchases and sales separately and found persistence in both cases but longer-lived in sales (not reported). Our findings are consistent with the results of Froot, O'Connell, and Seasholes (2001), who also report high persistence in portfolio flows.

Figure 6 shows the response of market returns to an impulse in net purchases. A significantly positive contemporaneous correlation is revealed between net purchases and returns. The effect is not a temporary price pressure, as there is no reversal. Instead, all lagged responses are close to zero. This pattern has two implications: First, the shock has a permanent effect on prices, which can be interpreted as a permanent reduction in investors' required rate of return, or equivalently, a reduction in the cost of equity capital. Second, foreigners do not seem to have market timing ability, since positive net purchases are not followed by positive returns.

The effect on prices and cost of equity capital can be measured economically by considering a simple example. Figure 6 shows that the immediate effect of a one standard deviation shock in flows is a 0.85% increase in prices, which coincides with the long-term effect (not reported). As seen in Figure 5, a one standard deviation shock in normalized net purchases corresponds to 0.25% of market capitalization. This is equivalent to about SEK 3 billion using the market capitalization at the end of 1995. Recall from Section 2.1 that net purchases totaled SEK 93 billion for the period 1993–1995. Given the persistence of flows, SEK 52 billion can be regarded as expected flows, and, consequently, the remaining SEK 41 billion as a shock. Hence, the cumulative effect of these shocks represent a 12% increase in prices.[8] To translate this price increase in terms of the effect of cost of equity capital, we follow Stulz (1999a) and utilize the dividend discount model with the additional assumption of constant dividend growth rate, that is, the Gordon (1964) model. Hence, the current stock price can be expressed as $P = D/(r - g)$, where D is following period's dividend payment, r is the required rate of return (or the cost of equity capital), and g is the growth rate in dividends.

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[8]This estimate is conservative as we use the end-of-period market capitalization. Using the period average yields a one standard deviation shock of less than SEK 2.4 billion and a price increase of 15%.

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Assuming the same growth rate in dividends before and after the liberalization, we can express the relation between the required rate of return before and after the liberalization according to

$$r^{after} = \frac{1}{1 + \Delta} r^{before} + \frac{\Delta}{1 + \Delta} g, \tag{3}$$

where Δ is the percentage change in prices before and after the liberalization (i.e., $1 + \Delta = P^{after}/P^{before}$). Assume an annual nominal growth rate in dividends of 6% and a cost of equity capital before the liberalization of 15%. Then, the observed 12% price increase caused by foreign investments yields a cost of equity capital after the liberalization of 14%. That is, the cumulative net purchases result in a change in the cost of equity capital corresponding to one percentage point on an annual basis, a non-trivial reduction. Bearing in mind all of the caveats about inferring the change in cost of equity capital, this example is instructive and highlights the economic importance of the effect of foreigners on prices. In the next subsection we discuss the price effect in the cross-section of individual firms, and how the effects vary with firm characteristics.

The positive correlation between flows and returns is in line with the evidence provided by Sellin (1996). However, our results differ from his in one important aspect: He concludes that foreign investors tend to be noise traders, affecting prices temporarily, but that they reverse so the long-term effect is zero. What we find is a permanent effect, with no reversal. It is worth noting that Sellin (1996) considers a very different sample period, namely 1983–1995. In other words, his analysis covers more than ten years before the liberalization and only two years with significant foreign ownership and trading. This is the most likely reason for the difference in results.

When interpreting the results, recall that the correlation between flows and returns is measured on a monthly basis. Froot, O'Connell, and Seasholes (2001) explore daily data on flows and returns, and brake down the contemporaneous effect using a longer horizon into a series of daily effects. They find that the positive contemporaneous correlation between flows and returns on a quarterly horizon is partly due to the fact that returns lead flows on a daily horizon. However, Edelen and Warner (2001) show that the contemporaneous correlation in daily data reflects trading affecting return.

Finally, the relative importance of the various innovations in the VAR can be assessed using the forecast error variances (not reported). We find that about 81% of the variance in net purchases is due to the variance in net purchases in itself and 19% is due to world market returns or local market returns. The decomposition of the local market return show that about 2% can be attributed to innovations in net purchases, and 98% to world or local market returns.

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3.3. Results for Individual Firms

The previous subsection reported that foreigners' net purchases over the period 1993–1995 caused a permanent price increase for the aggregate market of about 12%. To shed further light on the behavior of foreign investors, we also analyze net purchases and returns for individual firms. This enables us to detect cross-sectional patterns in the dynamics of flows and returns. We are particularly interested in the distribution of price impacts, in other words, whether foreigners' net purchases affect the cost of equity capital differently across firms. The reason for our interest in the distribution of price impacts is that previous studies, including Kang and Stulz (1997) and Dahlquist and Robertsson (2001), have documented that foreign investors prefer to invest in firms with certain characteristics. In particular, they tilt their portfolios towards large, financially solid, and well-known firms. For this reason, a natural hypothesis would be that these firms also benefit the most in terms of positive price impacts from foreigners' net purchases. Hence, for each individual firm listed during the full period 1993–1998, we re-run the VAR and calculate the price impact as described in previous subsection. This leaves us with 114 firms whose price impacts vary from an increase of 54% to a decrease of 35% with an (equally weighted) average of 3.3%. Recall that the price impact of the aggregate market (a value-weighted average) is 12%, indicating that large firms are more affected by foreigners' net purchases over this time period. To formally test this, we regress price impacts on firm size.

Table 2 reports the results of the cross-sectional regressions. The first column of Panel A shows that when the price impact is regressed on the log of market capitalization at the end of 1992, the coefficient is positive and significant. Hence, large firms display the largest price impacts as a result of the net purchases by foreign investors. Put differently, large firms seem to be the primary beneficiaries of the lower cost of equity capital that is a result of the trading by foreign investors. To further analyze this, we also regress the price impacts on the fraction of foreign ownership in the firms. The resulting coefficient is 0.29 which is highly significant. The coefficient means that a one percentage point higher fraction of foreign ownership is associated with a 0.29% higher price. This illustrate the explicit link between foreigners' investment decisions and the cost of equity capital for firms.

Standard asset pricing models suggest that the cost of equity capital is proportional to the covariance between the returns on the firm's equity and the returns on the local or world market portfolio, depending on whether markets are segmented or integrated (see, for instance, the recent overview by Karolyi and Stulz, 2001). With such a model as a starting point, Chari and Henry (2001) argue that when countries open their stock markets to foreign investors, firms are repriced according to the difference in the covariance of their returns with the local and world market. They also provide empirically support of their argument. We calculate the covariances of firms based on weekly returns and define the covariance

difference as the covariance with the local market during a three-year period preceding the market liberalization less the covariance with the world market during a three-year period following the liberalization. Defined in this way, a positive covariance difference is associated with a higher premium before the liberalization, which, in turn, implies a positive price impact when being repriced.

We test whether the cross-sectional patterns of price impacts can be explained by this argument. The third column of Panel A shows that the coefficient from the regression of price impacts on covariance differences is positive, but not significantly different from zero. Note, however, that this should not be interpreted as a rejection of the implications from asset pricing models, since these models explain cross-sectional differences in total risk premia rather than the part directly induced by foreigners' trading. Given that firm size explains the difference in cost of equity capital across firms, it is interesting to analyze the relation between the covariance difference and the size of firms. This is presented in Panel B, which reports a significantly positive relation between the covariance difference and firm size. This may be interpreted as support of the result that large firms benefit more from a market liberalization than smaller firms, beyond the direct effect from net purchases by foreign investors.

The cross-sectional patterns in the reduction of cost of equity capital have an interesting implication. The largest firms in Sweden are multinational firms that had access to international capital markets before the liberalization of the domestic market. In other words, large firms already benefited from a relatively low cost of equity capital compared with other domestic firms. Hence, as foreign investors prefer to invest in already well established firms, a liberalization effectively preserve the existing industrial structure by making differences in cost of equity capital between firms even wider.

4. Foreign Investors' Trading Performance

In this section, we study the trading performance of foreign investors. If foreigners have information that is not yet incorporated in the prices, they can potentially earn significant profits by trading on this information. Hence, such informational advantage can explain the permanent effect that foreign investors have on prices. Grinblatt and Keloharju (2000) report that foreign investors outperform the domestic investors in the Finnish stock market, and Seasholes (2000) finds that foreigners investing in emerging markets are better informed about asset values than their local counterparts. On the other hand, Shukla and van Inwegen (1995) show that American money managers outperform U.K. money managers when trading U.S. stocks, and Choe, Kho, and Stulz (2000) find that foreigners buy at higher prices and sell at lower prices compared with resident investors. Hau (2001) reports that proprietary traders on the German stock market do better when they are geographically closer to Frankfurt.

We investigate the relation between foreigners' net purchases in month t and returns of individual stocks s months ahead. This enables us to observe whether foreigners act the way informed investors do, by buying more of future winning stocks than of the losing stocks. Next, we study the cross-section of foreigners' trading profits by characterizing the firms in which foreigners show superior trading performance. Finally, by using the data on foreign ownership reported in Dahlquist and Robertsson (2001), we are able to calculate monthly returns on the aggregate portfolio held by foreign investors, and to evaluate its performance against benchmark portfolios.

4.1. Do Foreign Investors Buy Winning Stocks?

As a starting point, we follow Grinblatt and Keloharju (2000) and study whether foreigners act the way informed investors act. More specifically, for each month and for each of the 322 firms in the sample, we record the value of foreigners' purchases divided by the value of their total trading (purchases plus sales). This is referred to as the buy ratio. If the buy ratio of a firm is above 0.5, foreign investors are net buyers of the firm's stocks. For example, recall from Figure 1 that foreigners accumulated Swedish stocks during the first half of the sample period while net purchases were close to zero in the second half. This behavior corresponds to aggregate buy ratios of 0.552 in the first half of the period and 0.499 in the second.[9]

We study how foreigners' net purchases are related to future returns by examining the buy ratio of future winning stocks compared with that of future losing stocks. Specifically, we collect the buy ratios for all stocks in month t and the returns on the stocks in month $t+s$. Thereafter, firms are ranked on the basis of their returns in month $t + s$ and divided in two groups, namely future winning and future losing stocks. Finally, we compute the average buy ratio for the two groups and record their difference.[10] A positive buy-ratio difference (BRD) suggests that, in month t, foreigners buy more of the stocks with the highest returns s months ahead. We repeat this procedure for all months $t = 1, 2, \ldots, 72 - s$, and calculate the average BRD for various horizons $s = 1, 2, \ldots, 6$. We also consider the average return difference (RD) as a complementary measure. This measure is computed in a similar way to the BRD except that firms are ranked according to their buy ratios (instead of returns), split in two groups—more and less purchased stocks—and the return difference between the two groups is recorded.[11]

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[9]We also considered alternative ratios when measuring whether foreigners were net buyers or seller. Specifically, we employed purchases minus sales divided by market capitalization, and purchases minus sales divided by purchases plus sales. The results were qualitatively not affected.

[10]We also consider firms sorted into quartiles, and considered the difference between the upper and lower quartiles. The results were very similar.

[11]As a robustness check, we also run regressions of the buy ratios on the returns for various horizons. The results from these regressions are very similar to those based on the ranking procedure. For the sake of brevity, we only report the results from the ranking procedure.

In Panel A of Table 3, we report the average BRD and RD for various horizons. As seen in the first column, we also show the computations for $s = -6, -5, \ldots, 0$, in other words, the relation between buy ratios, and the past and contemporaneous returns. Column two shows that the average BRD is close to zero for all horizons except when firms are ranked according to the returns in the contemporaneous month (where $s = 0$), and previous month's return (where $s = -1$). P-values from a test of whether the average BRD is equal to zero are reported in the third column. This result supports the above finding that foreigners seem to be momentum traders. Section 3 reported that foreigners' aggregate net purchases increase following a market rise. Now, we also find that foreigners buy more of the individual stocks that performed best in the previous month. In other words, foreigners are momentum traders even in a cross-sectional perspective. Studying the forward-looking horizons (where $s > 0$), there is no evidence of informed trading, suggesting that foreigners do not buy more of the future winning stocks. The fourth column reports that, over time, the BRDs are positive in 75% of the months when ranked on contemporaneous month's returns, and 67% of the months when ranked on previous month's returns, indicating that the positive average BRD is not driven buy a few months with very large BRDs. Column five and six report the return differences and the corresponding p-values, respectively. We find, as we did for the BRDs, that the average RD is close to zero for all horizons except $s = 0$ and $s = -1$. The stocks that foreigners prefer to buy realize on average a 1.10% higher return in the contemporaneous month and 0.91% in the previous month compared with the stocks that foreigners prefer less. Interestingly, though, the average RD is positive for all future horizons suggesting that a positive relation exists between foreigners' purchases and future returns although it is not statistically significant for any individual monthly horizon. Therefore, in Panel B we report the average BRD and RD for the relation between buy ratios and *cumulative* returns on various horizons. Our main result in this section is reinforced: Foreigners are momentum traders. The forward-looking horizons now reveal weak signs of informed trading. In particular, when firms are ranked according to their future three and six months cumulative returns, we find that foreigners buy significantly more of the future winning stocks. An analysis of the RDs shows that the two to six months cumulative return differences are positive, although only marginally significant in a statistical sense.

Given the mixed results in the empirical asset pricing literature, the prior on whether foreigners have market timing ability is far from clear. However, it is noteworthy that Rouwenhorst (1998) studies the profitability of momentum strategies in 12 European countries. He reports positive excess returns from following a momentum strategy in 11 countries; Sweden being the exception.

Seasholes (2000) studies the trading profits of foreigners investing in Taiwan, and finds that the ability of foreign traders to profit is related to the underlying firm's market capitalization, leverage, and the liquidity of its shares. He suggests that the firm-specific prefer-

ences of foreign investors described by Kang and Stulz (1997) and Dahlquist and Robertsson (2001), may be due to their desire to own firms in which they have a comparative informational advantage, in other words, firms in which they make trading profits. Coval and Moskowitz (1999, 2001) find similar evidence in the U.S. market; they show that domestic mutual fund managers prefer geographically proximate investments, and that these investments perform better than those located far from the headquarter of the mutual fund.

These findings motivates us to ask: Are there any particular firms in Sweden in which foreigners show positive trading profits? To answer this question, we study the relation between buy ratios and returns for individual firms. Specifically, for each firm i, we run a regression of the excess buy ratio at time t on the excess return s periods ahead,

$$BR_{it} - \overline{BR}_t = \alpha_{is} + \beta_{is}\left(r_{it+s} - \overline{r_{t+s}}\right) + \varepsilon_{it}, \tag{4}$$

where $\overline{BR}_t$ and $\overline{r_t}$ are the cross-sectional averages of the buy ratios and the returns at time t, respectively. A positive beta indicates that foreigners buy relatively more of firm i when its return is higher than the (cross-sectional) average s periods ahead. Next, we relate the betas to the firm characteristics presented in previous sections. The result from this exercise (not reported) is straightforward: We find no relation between trading profits and any of the characteristics over any horizon. This is in stark contrast to Seasholes' (2000) results on emerging markets.

We conclude that almost no relation exists between foreigners' net purchases and their future returns—neither on an aggregate level nor over individual firms. However, the analysis based on buy ratios is limited to a study of the performance of marginal investments, in other words, changes in the portfolio. To gauge whether foreign investors outperform the Swedish market in a more general context, we need to study the realized return of the aggregate portfolio held by foreigners. This is the scope of the following subsection.

4.2. Foreign Investors' Portfolio Performance

We employ the data on foreign ownership presented in Dahlquist and Robertsson (2001) to calculate monthly return series for the aggregate portfolio held by foreign investors. Since we know the fraction of Swedish stocks held by foreigners at the end of December each year, we adjust the portfolio weights on a monthly basis using the data on trading by foreigners presented in this paper. However, the data do not include exact trading dates; for this reason, we make the simplifying assumption that the transactions take place in the middle of the month and therefore earn, as an approximation, half the monthly return in the contemporaneous month. As a consequence, we ignore returns earned on stocks purchased before the middle of the month, but include returns earned on stocks sold before the middle of the month. Moreover, we are unable to account for any intra-month trading, that is, when a

security is bought and sold within the same month.

The allocation by foreigners across industries is very stable over the sample period. In short, the portfolio is overweighted in engineering, and in chemicals and pharmaceuticals, but underweighted in construction, paper and pulp, and in the miscellaneous group. The stability in allocations leads us to begin with an analysis of the returns on buy-and-hold portfolios over an annual horizon. The third column of Panel A in Table 4 reports the portfolio return of the investments by foreigners conditional on the assumption that the allocation as of December 31 in one year is unchanged in the subsequent year. In 1993, foreigners' buy-and-hold portfolios realized a 56.6% return, almost 15% below that of the value-weighted market portfolio of Swedish stocks (column four). The major reason for the poor performance was the extraordinary turn-around experienced by the Swedish economy. The devaluation of the Swedish currency in November 1992 resulted in sharp price increases for firms in cyclical businesses, while non-cyclicals lagged behind. In particular, the construction index outperformed the market portfolio by more than 50% while chemicals and pharmaceuticals underperformed the market by 50%. After 1994, the return deviations from the market portfolio are much smaller. This is not because the allocation of foreigners is closer to that of the market portfolio, but rather because the returns on the different industry portfolios are less disperse. Column two shows the annual returns on the portfolio of foreigners, accounting for monthly rebalancing. The returns are similar to those of the buy-and-hold portfolio yielding relatively low returns in 1993. Interestingly, in all years, the rebalanced portfolio realizes higher returns than the buy-and-hold portfolio, indicating that the trading by foreigners add value to the portfolio performance. To test this formally, we regress the monthly returns on the rebalanced portfolio on the returns on the buy-and-hold portfolio. The estimates, reported in Panel B, do not suggests any superior performance of the rebalanced portfolio. Panel B also reports the result from a test of whether the rebalanced portfolio outperforms the market portfolio; the result is the same—the alpha is negative, although not significantly different from zero. Hence, foreign investors do not outperform the Swedish market.

5. Conclusion

By using a rich dataset on cross-border transactions, foreign ownership, returns, and firm characteristics, we analyze the behavior and impact of foreign investors in association with a stock market liberalization. We find that foreigners' net purchases are coupled with significant increases in prices. This is not pure price pressure effects, as prices do not reverse, suggesting that the market liberalization generated a permanent reduction in the cost of equity capital. A crude measure indicates a reduction of about one percentage point on an annual basis. Interestingly, we also find a strong relationship between the magnitude of the price

impact and the firm's fraction of foreign ownership: The higher fraction, the larger price increase. If foreign investors have an informational disadvantage compared with domestic investors, a rational response would be to invest in those firms where this disadvantage is minimized. Since well-known firms are often large firms, a consequence of foreigners' informational disadvantage is that large firms obtain the largest price impacts, or the most significant cuts in cost of equity capital. Our analysis further suggests that foreigners are non-informed feedback traders. In particular, they increase their net holding in firms which have recently performed well. When analyzing foreigners' performance, we find very little evidence of informed trading, suggesting that risk sharing is the most plausible explanation for the reduction in the cost of equity capital.

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Figure 1: Foreigners' Trades on the Swedish Stock Market

The figure shows monthly trading by foreign investors on the Swedish market for the period 1993–1998. The long dashed line shows the cumulative net purchases by foreign investors expressed in SEK billion (reflected on the left scale). The short dashed and solid lines depict normalized gross purchases and sales, respectively (both reflected on the right scale). Normalization is performed by dividing the monthly gross purchases and sales by the contemporaneous market capitalization.
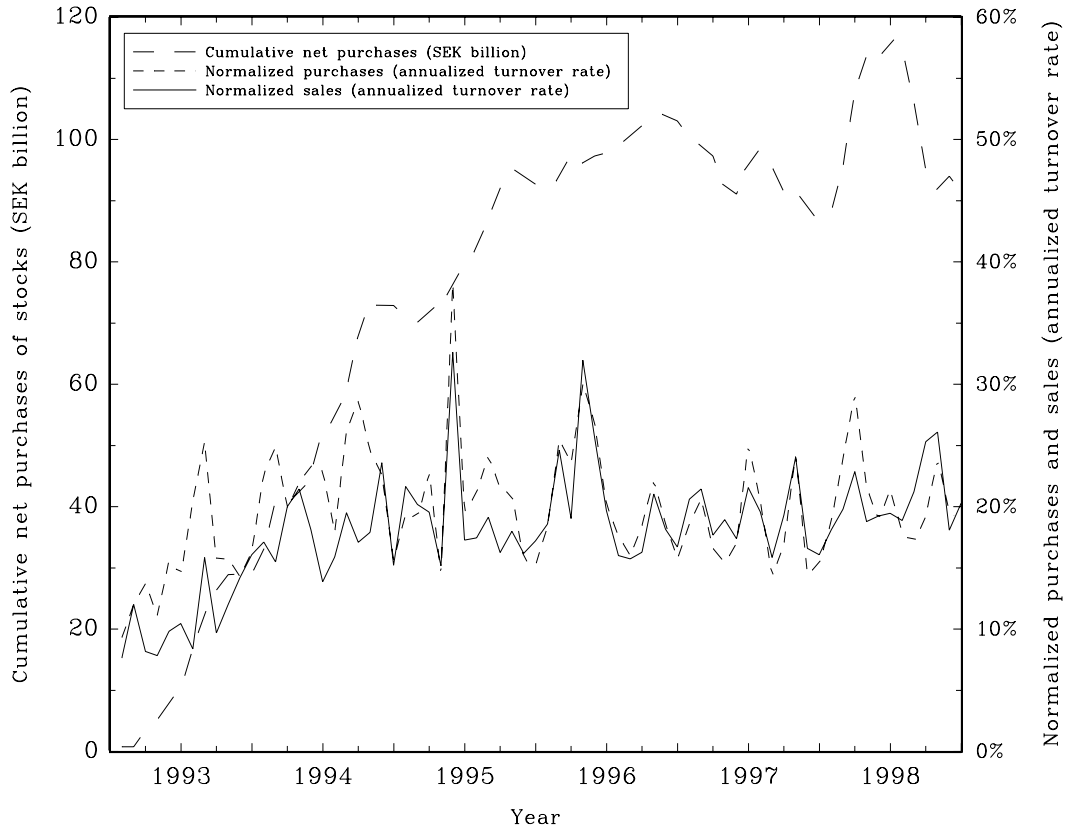
Figure 2: The Cross-Section of Foreigners' Trades

The figure shows the cross-section of foreign trading in 1997. The 222 firms with complete turnover data are sorted according to the amount traded by foreign investors (most traded firms on the left). The solid and dashed lines depict the cumulative distributions of foreign and total trading, respectively (both reflected on the left scale). The white bars show (in groups of five firms) the distribution of turnover rates by foreign investors, that is, foreign trading divided by the value of foreign holdings at the end of the year (reflected on the right scale). The cross-hatched bars show the corresponding distribution for the total market, that is, total market turnover divided by market capitalization at the end of the year (reflected on the right scale).
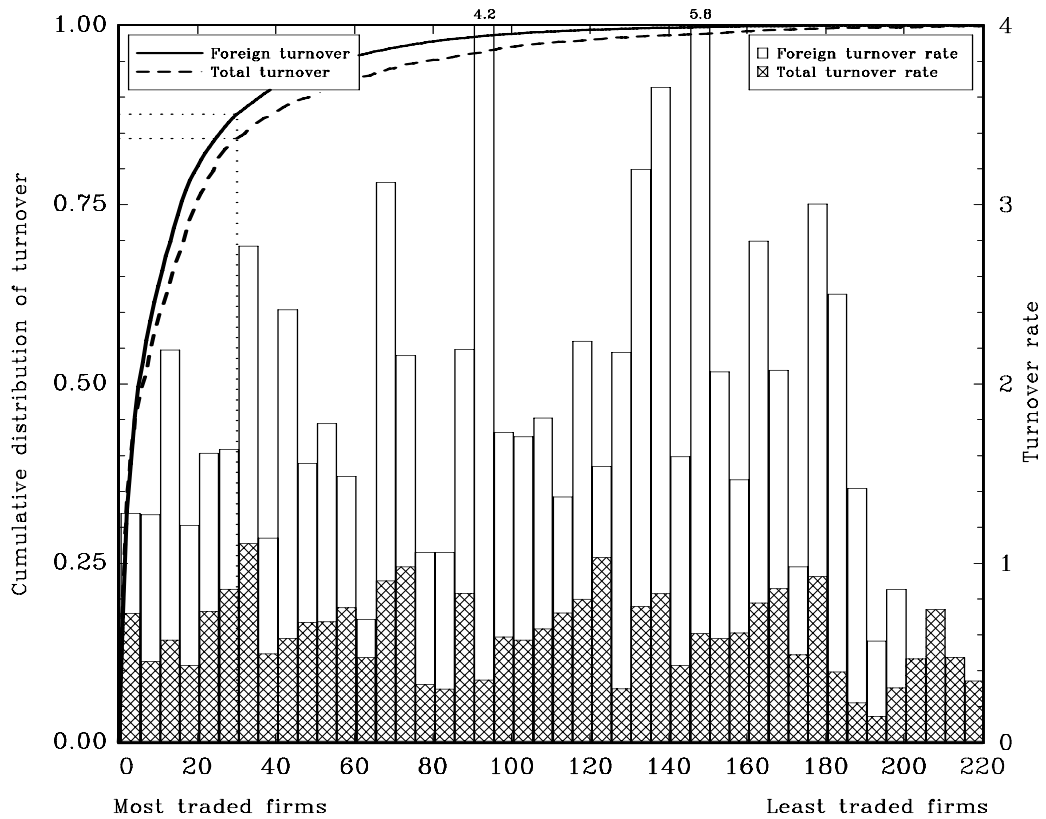
Figure 3: Response in Net Purchases to an Impulse in Local Returns

The figure shows the impulse-response function of a one standard deviation shock with 90% confidence bands from a VAR system with world market returns, aggregate net purchases and local returns. The vertical axis is expressed in normalized net purchases and the horizontal axis is expressed in months.
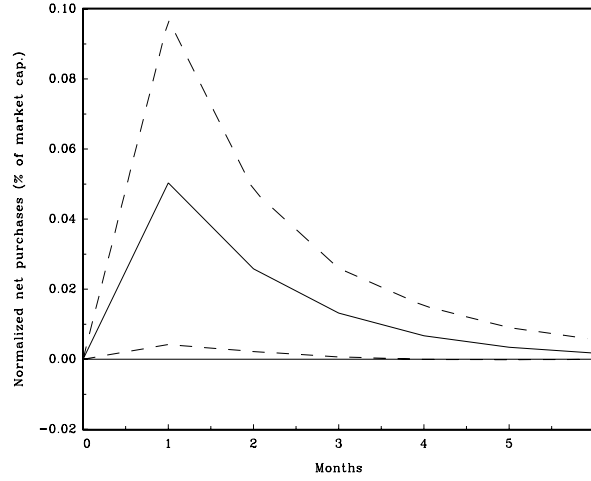
Figure 4: Responses in Purchases and Sales to an Impulse in Local Returns

The figures show the impulse-response functions of a one standard deviation shock with 90% confidence bands from a VAR system with world market returns, gross flows (either purchases or sales), and local returns. The vertical axes are expressed in gross purchases and sales, respectively, and the horizontal axes are expressed in months.
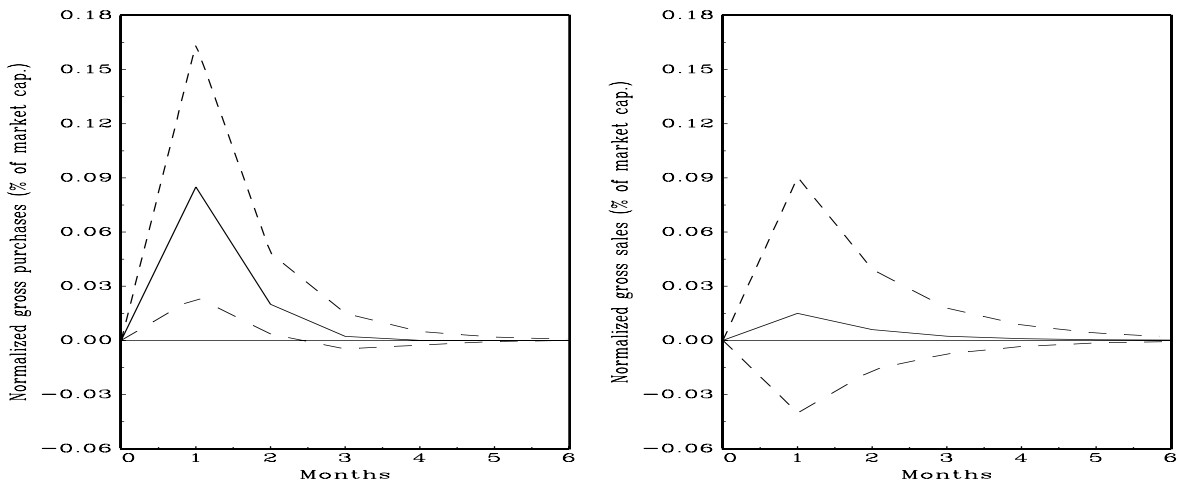

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Figure 5: Response in Net Purchases to an Impulse in Net Purchases
The figure shows the impulse-response function of a one standard deviation shock with 90% confidence bands from a VAR system with world market returns, aggregate net purchases and local returns. The vertical axis is expressed in normalized net purchases and the horizontal axis is expressed in months.
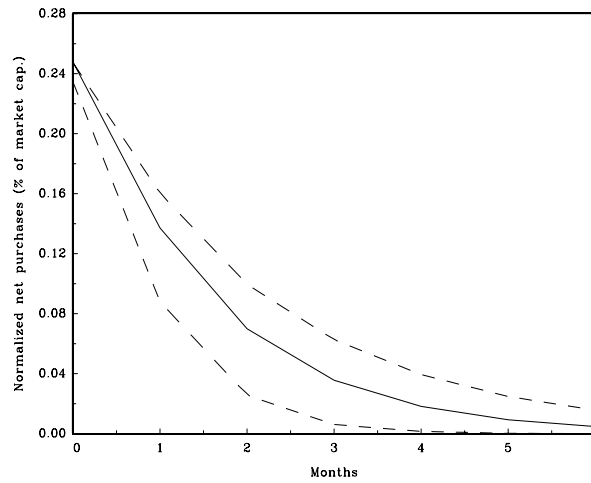

Figure 6: Response in Local Returns to an Impulse in Net Purchases
The figure shows the impulse-response function of a one standard deviation shock with 90% confidence bands from a VAR system with world market returns, aggregate net purchases and local returns. The vertical axis is expressed in local returns (% per month) and the horizontal axis is expressed in months.

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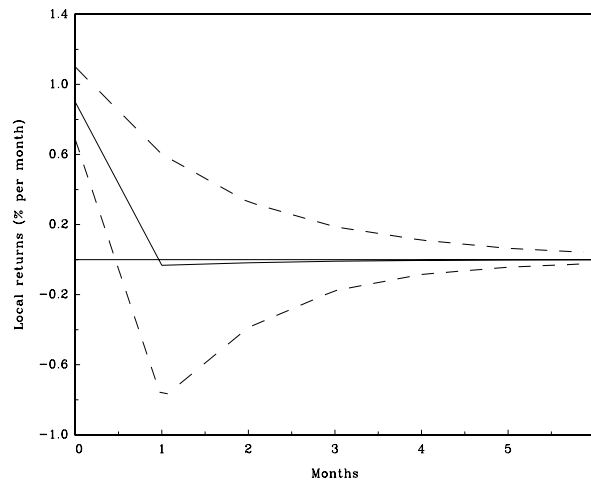
Table 1: Foreign Ownership, Trading, Net Purchases, and Firm Characteristics

	Ownership	Trading	Net Purchases	Ownership	Trading	Net Purchases
Market capitalization	4.59	9.73	–0.51	10.9	14.8	0.80
	(3.17)	(2.63)	(0.85)	(1.48)	(1.49)	(0.52)
Dividend yield	–3.95	–2.98	–0.34	–3.81	–2.30	–0.27
	(2.16)	(1.50)	(0.37)	(0.86)	(0.58)	(0.14)
Book-to-market ratio	–34.5	–23.1	–0.94	–12.7	–12.0	–0.78
	(13.2)	(8.18)	(1.98)	(4.79)	(3.50)	(0.96)
Current ratio	11.0	0.74	–0.34	8.27	2.05	–0.00
	(2.97)	(1.74)	(0.27)	(1.43)	(1.35)	(0.60)
Export rate	22.4	2.19	–4.05			
	(15.3)	(5.86)	(2.19)			
Turnover rate	32.0	52.7	0.84	21.6	53.4	0.94
	(10.7)	(7.78)	(1.99)	(5.13)	(11.2)	(1.59)
Concentration	–57.5	–12.0	–3.20	–32.2	–3.91	–3.42
	(14.2)	(6.17)	(2.48)	(9.61)	(5.33)	(1.87)
Foreign listing	37.2	0.74	2.01	27.2	–3.46	–1.40
	(12.8)	(3.72)	(1.50)	(8.53)	(3.37)	(1.30)
R^2_{adj}	29.3	33.5	7.9	26.6	34.5	1.6
	[0.00]	[0.00]	[0.08]	[0.00]	[0.00]	[0.14]
N	317	317	317	841	841	841
N_0	1	30	30	12	136	136

The table shows the results of panel regressions of foreign ownership, trading, and net purchases on characteristics pooled over the period 1993–1997. Foreign ownership is defined as the ratio of the weight of a firm in the portfolio of foreign investors to the firm's weight in the market portfolio. Trading is the annual value of foreigners' gross trading (purchases plus sales) in a firm divided by its market value, while net purchases refers to the annual value of foreigners' net trading (purchases minus sales) in a firm, divided by its market value. Constants for fixed (year) effects in the regressions are not shown. Market capitalization is logged. Dividend yield is defined as the ratio between the yearly dividend and the market capitalization of the firm (in %). Book-to-market ratio is defined as the book value of equity divided by the market value of equity. Current ratio is current assets divided by current liabilities. Export rate is measured as export sales divided by total sales. Turnover rate is the value of the annual trading in the firm's stocks divided by the market value of the firm. Concentration is defined as the share of votes held by the largest shareholder coalition. Foreign listing is a dummy variable for firms listed on a stock exchange abroad. Heteroskedasticity-consistent standard errors are reported in parentheses. Adjusted R-squares are reported in % with P-values from a Wald test of the joint significance in square brackets. N is the total number of observations, and N_0 is the number of zeros in the dependent variable.

Table 2: Foreign Investors' Price Impact and Firm Characteristics

Panel A. Price Impact			
Market capitalization	2.93 (1.31)		
Foreign Ownership (in %)		0.29 (0.03)	
Covariance Difference			0.43 (0.32)
R^2_{adj}	3.2	12.1	1.2
N	114	114	111
Panel B. Covariance Difference			
Market capitalization	2.60 (0.40)		
R^2_{adj}	20.7		
N	160		

Panel A reports the regression results of price impacts on firm attributes, and Panel B shows the results when covariance difference is the dependent variable. The price impact is calculated as described in the text. The covariance difference is the covariance with the local market during 1990–1992 minus the covariance with the world market during 1993–1995. Constants are not shown. Market capitalization is from the end of 1992 and is logged. Foreign ownership is the fraction (in %) of a firm held by foreign investors at the end of 1995. Heteroskedasticity-consistent standard errors are reported in parentheses. Adjusted R-squares are reported in %. N is the number of observations used in the regressions.

Table 3: Cross-Sectional Performance Analysis Using Buy Ratios

Lag/Lead	Buy Ratio Difference			Return Difference	
	Average	P-value	Proportion of Positive	Average	P-value
Panel A. Buy Ratio Differences and Return Differences					
−6	−0.35	0.572	0.43	0.36	0.445
−5	−0.02	0.979	0.46	0.28	0.295
−4	0.60	0.208	0.58	0.56	0.020
−3	0.38	0.416	0.54	0.38	0.145
−2	0.83	0.151	0.58	0.02	0.954
−1	1.97	0.000	0.67	0.91	0.000
0	3.24	0.000	0.75	1.10	0.000
1	−0.01	0.980	0.44	0.24	0.351
2	0.38	0.416	0.51	0.40	0.134
3	0.77	0.261	0.61	0.30	0.128
4	0.28	0.548	0.53	0.01	0.971
5	0.08	0.905	0.48	0.16	0.323
6	−0.07	0.910	0.42	0.32	0.177
Panel B. Buy Ratio Differences and Cumulative Return Differences					
−6	1.03	0.109	0.61	0.46	0.002
−5	0.91	0.169	0.57	0.51	0.000
−4	1.51	0.004	0.58	0.56	0.000
−3	1.64	0.040	0.64	0.52	0.000
−2	1.75	0.003	0.62	0.56	0.002
−1	1.97	0.000	0.67	0.91	0.000
0	3.24	0.000	0.75	1.10	0.000
1	−0.01	0.980	0.44	0.24	0.351
2	0.66	0.231	0.59	0.33	0.083
3	1.12	0.023	0.62	0.27	0.080
4	0.79	0.188	0.56	0.20	0.144
5	0.40	0.493	0.52	0.17	0.152
6	1.12	0.021	0.53	0.18	0.105

The table shows a cross-sectional performance analysis using buy-ratio differences for the period 1993–1998. Foreigners' buy ratio [purchases/(purchases + sales)] for month t, and the return for month $t+s$ are collected for each stock. The month t buy ratio difference is computed by subtracting the average buy ratio for the stocks with lower than median returns from the average buy ratio for the stocks with higher than median returns. The time-series average of the buy-ratio differences for various horizons are reported in column two, with corresponding p-values in column three. Column four reports the time-series proportion of positive buy ratio differences. The return differences for various horizons are reported in column five, and p-values in column six. The monthly return difference is computed by subtracting the average return for the stocks with lower than median buy ratios from the average return for the stocks with higher buy ratios than the median ratio.

Table 4: Performance Analysis Using Portfolio Returns

Year	Rebalanced Portfolio	Buy-and-Hold Portfolio	Market Portfolio
Panel A. Raw Returns			
1993	59.8	56.6	70.3
1994	16.1	15.6	15.1
1995	25.8	22.8	26.6
1996	53.8	49.0	55.4
1997	41.1	34.5	40.8
1998	41.1	19.5	17.1
Panel B. Regression Results			
Alpha		−0.24	−0.36
		(0.36)	(1.44)
Beta		1.01	1.00
		(0.01)	(0.03)

Panel A reports three return measures (in %) on the aggregate portfolio held by foreign investors, and for the market portfolio, for the period 1993–1998. The return on the buy-and-hold portfolio is calculated based on the assumption that the allocation as of December 31 in one year is unchanged in the subsequent year. The return on the rebalanced portfolio is calculated when portfolio weights are adjusted to the net purchases on a monthly basis. The return on the market portfolio is calculated as a value-weighted average. Panel B reports the coefficients from the regression of the rebalanced portfolio return on different benchmark portfolio returns.