Private information for foreign investment in emerging economies

Yuko Kinoshita *Centre for Economic Research and Graduate Education, Charles University, and Economics Institute of the Academy of Sciences of the Czech Republic*

Ashoka Mody *Economic Policy and Prospects, World Bank*

Abstract. In previous studies it has been found that new foreign investment is significantly related to the stock of existing investment in the country/region. This paper's contribution is the finding that a Japanese firm's new investment in an emerging economy is positively correlated with its *own* previous investment in that economy and also with the current/planned investments by competitors. These two channels are primarily substitutes; that is, investment by competitors becomes less salient when the firm has experience in the market. The correlated behaviour is not explained by industrial agglomerations but appears to reflect the value of private information to investment in emerging economies.

Information privée et investissement étranger dans les économies en émergence. Des travaux antérieurs ont montré que les nouveaux investissements à l'étranger sont co-reliés de manière significative à la taille du stock d'investissement étranger dans le pays ou la région. La contribution de ce mémoire porte sur le fait qu'un nouvel investissement d'une entreprise japonaise dans une économie en émergence est co-relié positivement avec son propre niveau antérieur d'investissement dans cette économie mais aussi avec le niveau des investissements présents et anticipés de ses concurrents. Ces deux canaux d'information sont des substituts: le niveau d'investissement par les concurrents devient moins important à proportion que l'entreprise a acquis de l'expérience dans ce marché. Ce comportement co-relié n'est pas expliqué par les effets d'agglomération industrielle mais semble refléter la valeur de l'information privée quand on investit dans des économies en émergence.

[E]ither he should discover the truth about them for himself or learn it from some one else; or if this is impossible, he should take the best and most irrefragable of human theories and make it the raft on which he sails through life.

Plato

Introduction

Almost by definition, emerging market economies are characterized by limited information on business operating conditions and economic prospects. Under conditions of limited public information, private information can be extremely valuable and can lead, in turn, to correlation and/or persistence in investor behaviour.[1] This paper is motivated by the following empirical questions. Is privately acquired information important in the decision to undertake foreign investments in emerging market economies? If so, is the private information acquired mainly through direct experience, that is, through the firm's own investment in the country? Or is potential for economic returns inferred from actions undertaken by others who may have private information? What is the relationship between private information and publicly available information on a country? Finally, can the correlated investment outcomes generated by private information be distinguished from those generated by industrial agglomerations or by strategic behaviour of investors?

In this paper, we use a specially designed data set to answer these questions. We find that a firm's investment decisions are positively correlated to its *own* previous investment in the country. We interpret this as a learning effect. Investment decisions are also correlated with current/planned investments by competitors, implying the possibility that the private information held by others signals investment potential. In addition, it is found that these two channels are primarily substitutes, that is, investment by competitors comes less important when the firm already has experience in the market. These findings support the idea that private information is valuable. In reaching this conclusion, we control for firm and country characteristics and also for industrial clustering effects. However, it is not possible to rule out alternative interpretations of the evidence. A firm expanding on its base may be benefiting from economies of scale and also from agglomeration economies. More difficult to distinguish is whether competitors' actions signal privately held information or stimulate a strategic response. The absence of differentiated effects across industrial sectors favours an informational interpretation. Strategic positioning, for example, should be more prominent in specific industrial sectors where a 'first mover' advantage has a high payoff; however, no such differentiated response is found.

---

1 Bikhchandani and Sharma (2000) note that 'informational cascades' and 'reputational herding' are especially likely to occur in emerging markets where the environment is relatively 'opaque' and 'information is costly' on account of weak reporting requirements, lower accounting standards and/or lax enforcement of regulations. Calvo and Mendoza (1998) propose a model in which fixed costs of acquiring information lead to investors specializing in a few emerging markets while relying on other investors with respect to investment decisions in other emerging markets.

The setting for the empirical examination is investment by Japanese manufacturing firms in a number of key Asian countries in the early 1990s. To deal with scaled responses by firms, an ordered logit model is used to estimate the relationships. The stated likelihood of planned investments in a country is the dependent variable that is explained by whether the firm is already present in the country and by its perceptions of the likelihood of investments by competitors in that country. Since the results obtained may be consistent with alternative interpretations, we attempt to control for several other information sources and investment drivers that may influence the foreign investment decisions. Specifically, we control for firm, country, and industry characteristics. Firm dummies (or firm characteristics) are included in the estimated equation to determine if the 'private information' merely reflects firm attributes. The influence of public information on investment decisions is dealt with by introducing country dummies, which are assumed to embody information available to all. Finally, dummies for industrial sectors (and their interactions with past presence, expectation of rivals' actions, and country dummies) seek to isolate the influence of industry-specific factors, including agglomeration effects.

The paper is organized as follows. In the next section we review the literature, focusing on the sources of public and private information relevant for foreign direct investment decisions. This is followed by a description of the questions asked in the survey, the data, and the analysis methodology. We then present our benchmark model, which allows for the possibility of substitution or complementarity between the two sources of private information and controls for publicly available information through the use of country dummies. To help to distinguish the informational interpretation favoured in this paper from agglomeration and strategic rivalry effects, we control for industry characteristics. Before concluding, we summarize several extensions (detailed in an earlier version of the paper, Kinoshita and Mody 1997) to highlight the robustness of the findings.

The literature and hypotheses

Physical agglomeration of foreign investment is commonly observed, as for example in the southeastern provinces of China and in northern Mexico close to the U.S. border. In studies of aggregate foreign investment flows the stock of existing investment has been found to have a significant influence on new investment into that area. For example, Wheeler and Mody (1992) found that U.S. investments into a country were strongly conditioned by existing stocks of foreign investment in that country (after controlling for a variety of factors, including market size). Subsequent analysis showed that new Japanese investment was equally influenced by the stock of past investment (Mody and Srinivasan 1998). The authors of these studies speculated that agglomeration benefits, relevant for industrial sectors relying heavily on intermediate inputs from suppliers in close proximity or those able to gain through labour or informational spillovers between firms, may drive the persistence.

Kogut and Chang (1996) used firm-level data for Japanese multinationals invest-ing in the United States and found past presence to be an important predictor of new investments, consistent with the aggregate studies. However, the evidence has alter-native interpretations. It may reflect agglomeration economies: firms in specific agglomerations may seek to grow as they experience the benefits of proximate location. Alternatively, the evidence can be interpreted as the consequence of a foreign investor's learning experience in a country. As greater familiarity with oper-ating in the country is acquired, and the specific opportunities for expansion are revealed, more investment is committed.

Not only may firms rely on their own experience, but they may also be directed by the current/planned investments of their competitors. Where information on competitors' behaviour is important, cascading of foreign investment may be observed. Persistence, punctuated by significant discontinuities, is commonly found for investments into specific countries. China has attracted a rush of investment not only from overseas Chinese but also from U.S., Japanese, and European investors, starting quite abruptly in the late 1980s and growing explosively into the mid-1990s. China receives about $40 billion a year of foreign investment despite cum-bersome procedures and uncertainty surrounding property rights and contract enforceability; in contrast, India, even after rolling back restrictions and despite a longer tradition of a market economy, chalks up $3–4 billion a year. During the early 1990s there also was a discontinuity for Vietnam as competing investors staked out positions.

Such evidence of synchronized investment is consistent with two alternative hypotheses. Strategic rivalry may be inferred where firms are staking out positions to obtain early-mover advantages. However, where firms mainly 'follow the leader,' they are driven less by strategic concerns than by the interpretation that the leader's investment decisions indicate the potential for profitable operations in the targeted location. Knickerbocker (1973) examined the response by firms to the investment decisions of competitors. Supporting the strategic interpretation in that pioneering study, he showed that the more oligopolistic an industry, the greater was the likeli-hood that foreign investments would be concentrated into a short period of time and hence display spikes or discontinuities in foreign investment flows.

Recently, Head, Ries, and Swenson (1995) have shown that Japanese investors in the United States tend to 'follow the leader,' affirming that decisions by other investors have a signalling value. Privately held information – or private beliefs – can have a significant impact on investment flows, even in the absence of a change in economic fundamentals, since a *perception* of change can drive a critical mass of investors, with a consequent snowballing effect. The 'herd' behaviour – actions based on others' actions – can be quite rational in as much as it economizes on the gathering of scarce information (see Scharfstein and Stein 1990; Bikhchandani, Hirshleifer, and Welch 1992; and Lee 1993 for models of information cascades and Calvo and Mendoza 1998 for a model in the context of emerging markets). Arthur (1995) discusses several examples from economics and finance in which private beliefs play an important role. Kuran (1995) explains the persistence of certain

social institutions as well as their abrupt breakdown on the basis of privately held but publicly concealed preferences.

Private information may be important, especially in the context of emerging economies, where investors seek information on a variety of operational conditions which are not publicly available, including the functioning of labour markets, industrial literacy of the workforce (as distinct from educational attainments), the practical implementation of foreign investment polices, and the timely availability of inputs. The importance of such information on operating conditions in a country is notably illustrated by General Motors' decision to locate its Asian hub in Thailand: 'the fact that 11 car manufacturers already operate in Thailand was a sign that the country's infamous physical infrastructure and labour bottlenecks could be overcome' (Bardacke 1996). The General Motors' investment decision, however, could also be consistent with strategic positioning for growth in the Thai and Asian markets.[2]

Data and methodology

The survey questionnaire was mailed by the Japanese Ministry of International Trade and Industry (MITI) to several hundred Japanese firms, of which 173 returned usable responses in March 1993. The sample thus obtained cannot be treated as representative of all Japanese firms – we do not know the characteristics of firms who did not respond. There is, however, sufficient heterogeneity among the respondents to permit a statistical analysis of their foreign investment behaviour. The firms in our sample are relatively large. The average annual sales are 330 billion yen (over $3 billion), the largest firm in the sample has sales of $70 billion and the smallest has sales of $2 million. This is also a set of firms that is prone to making significant foreign investments – in the three years prior to the survey, over a fifth of their investment was undertaken outside Japan.

Our dependent variable is based on the following question regarding the firm's expectation that it will invest in specific Asian countries: 'In each of the following countries, how likely are you to invest in the next three years?' Respondents were asked to check a space on a 1–7 scale provided, ranging from 'very unlikely' to 'very likely.'

VERY   VERY
UNLIKELY   LIKELY
:__:__:__:__:__:__:__:

The question was answered for the following seven countries: China, Thailand, Malaysia, Indonesia, Vietnam, Philippines, and India. These countries constitute the principal developing country recipients of foreign investment in Asia. Their

2 A perceived 'first mover' advantage has contributed to the rush of motorcycle investors to Vietnam. Referring to the interest in Vietnam, a German investor thus summarized his firm's interests: 'We simply cannot sit back and let the Japanese take over another market unchallenged' (*Financial Times*, 28 March 1995).

level of economic development is substantially lower than the level in the so-called Asian Tigers – South Korea, Taiwan, Hong Kong, and Singapore – with Malaysia being the closest to the Tigers by most development measures. For each of the seven countries, we have 173 responses, potentially creating 1,211 (173 × 7) observations (however, since all respondents did not answer all questions, for certain estimations fewer usable observations are available and, where appropriate, we have tested for selection bias).

Our two key independent variables are PAST and RIVAL. The questionnaire asked whether the firm already had a presence in each of the seven countries being studied. For each firm and each country, the PAST variable was coded 1 if the firm was present in the country and 0 if it was not. Recall that we infer a learning effect if past presence leads to a high likelihood of future investment. The other key variable referred to the information obtained from competitors. The question asked was: 'Are your competitors making investments in the following Asian countries?' Once again, the response allowed ranged on scale of 1 (very little) to 7 (very substantial).

The average value of the responses for the seven countries (and the standard deviations) are reported in table 1. Respondents to our survey were most likely, by far, to invest in China, the average measure on the 1–7 scale for China being 4.08; the perceived level of rivals' interests in China was also high, second to Thailand. However, only 20 per cent of the firms had existing investments in China, limiting the influence of past experience. Following China, four countries had similar likelihoods of investment: Thailand, Malaysia, Indonesia, and Vietnam. Of these, Malaysia and Thailand have traditionally attracted substantial Japanese interest, with 25 and 30 per cent of firms, respectively, reporting existing presence in those countries; and rivals were also reported to be strongly interested. In contrast, Vietnam had a low existing Japanese presence and also a relatively low level of interest from rivals. The least attractive sites were the Philippines and India, with low expected investment, low initial presence, and low rivals' activity. Thus, a simple comparison across countries indicated a positive correlation between expected investment by the firm and its perception of the strength of rivals' interest in the country. Since past presence is indicated only in 15 per cent of the possibilities, information provided by behaviour of rivals was likely to be valuable where the firm was entering new countries.

An ordered logit model was used to investigate these relationships more precisely. The ordered logit is an extension of the binomial logit and deals with situations where there exist multiple ordered choices (see Greene 1993). For the purpose of the regression, the likelihood of investment (LFDI) variable was rescaled to create three ordered choices. As illustrated above, the original data is on a scale of 1 through 7. The three rescaled categories are: 2 (highly likely to invest where the response was 6 or 7), 1 (moderately likely, where the response was 3, 4, or 5), and 0 (unlikely to invest, where the response was 1 or 2). As in the binomial logit model, we assume a latent regression model of the following form:

$$y^* = \boldsymbol{\beta}\mathbf{x} + \epsilon. \tag{1}$$

TABLE 1
Firm characteristics by sector and future investment plans

	Past presence (Yes = 1, No = 0)	Rivals' activity (Scale: 1–7)	Automobiles	Building materials	Chemicals	Food	Electrical equipment	Non-electrical equipment	Light manufacture[a]	All
Number of firms			22	20	33	14	27	34	23	173
Average size of firms (billion yen)			3623	2870	2940	494	9820	767	1649	3289
R&D/sales (%)			3.05	2.72	3.63	3.64	4.08	3.13	2.56	3.32
Exports/sales			0.13	0.04	0.09	0.15	0.30	0.12	0.03	0.13
			Future investment plans (Scale: 1–7)							
China	0.20	3.67	3.18	3.79	4.60	5.21	4.38	3.53	4.25	4.08
India	0.03	1.94	1.59	2.37	1.55	1.58	2.54	1.26	1.32	1.72
Indonesia	0.18	3.31	2.24	3.39	3.59	2.77	3.20	2.16	2.53	2.84
Malaysia	0.25	3.53	2.50	2.89	3.37	3.00	3.70	2.22	2.37	2.85
Philippines	0.06	2.54	2.14	2.06	2.07	2.17	2.50	1.61	1.74	2.02
Thailand	0.30	4.10	2.52	3.33	3.40	3.46	4.04	2.71	2.68	3.16
Vietnam	0.01	1.92	1.91	3.60	2.67	2.46	2.75	1.81	2.89	2.53
All	0.15	3.02	2.30	3.07	3.04	3.00	3.32	2.19	2.55	2.75

a Light manufacture contains garments, electronics and other light manufactured products

A vector of variables, **x**, which includes PAST and RIVAL, and the vector of coefficients, **β**, determine a latent variable, y^*. Though y^* is not observed, the response indicating the likelihood of investment is observed. The observed responses are related to the latent variable in the following manner:

$y = 0$ if $y^* \leq 0$

$y = 1$ if $0 < y^* \leq \mu$

$y = 2$ if $\mu \leq y^*$. $\qquad\qquad$ (2)

Then, for the logistic cumulative distribution function, λ, the model predicts the following probabilities for each of the responses:

$\text{Prob}(y = 0) = \lambda(-\boldsymbol{\beta}\mathbf{x})$

$\text{Prob}(y = 1) = \lambda(\mu - \boldsymbol{\beta}\mathbf{x}) - \lambda(-\boldsymbol{\beta}\mathbf{x})$

$\text{Prob}(y = 2) = 1 - \lambda(\mu - \boldsymbol{\beta}\mathbf{x})$. $\qquad\qquad$ (3)

The joint probability or likelihood function is

$$L = \prod_{i=1}^{n} \left[\text{Prob}(Y_i = 0)\right]^{d_{i0}} \left[\text{Prob}(Y_i = 1)\right]^{d_{i1}} \left[\text{Prob}(Y_i = 2)\right]^{d_{i2}}. \qquad (4)$$

where d_{ik} ($k = 0,1,2$) is an indicator function equal to 1 if $y_i = k$ and zero otherwise. The number of observations is n, where the observational unit is a firm's investment plans for each country, implying up to seven observations per firm. The parameters, β and μ, are estimated by maximizing the log of the likelihood function.

The value of private and public information: the benchmark model

In the benchmark model, we regress the firm's likelihood of investing in a particular country on its past presence (or absence) in that country (PAST), perceptions about competitors' interest in that country (RIVAL), the interaction between PAST and RIVAL, firm and country dummies (table 2, column 4). Both the firm's past presence and its perception of competitors' behaviour have a strong influence on its plans to invest in a country. The inclusion of the PAST*RIVAL variable improves the log-likelihood and from the likelihood ratio test we can conclude (at the 2.5 per cent significance level) that the interaction term belongs to the model. The negative sign on the interaction term (PAST*RIVAL) indicates that the two channels of private information are primarily substitutes for each other.

Inclusion of firm dummies is possible because we have multiple observations on each firm (with a maximum of seven observations where a likelihood was reported for each country). If firm j's unobserved characteristics (h_j), which are part of the composite error term ($e_{ij} = h_j + g_{ij}$), are correlated with PAST and RIVAL, then the coefficients will be biased. By adding firm dummies to the regression, the unob-

TABLE 2
The base model: value of private information

	Dependent variable: LFDI (likelihood of FDI)			
	[1]	[2]	[3]	[4]
Intercept	−3.29***	−3.46***	−7.32***	−7.59***
	(0.17)	(0.18)	(0.49)	(0.57)
Past	1.55***	2.79***	3.11***	3.46***
	(0.21)	(0.46)	(0.64)	(0.69)
Rival	0.37***	0.42***	0.61***	0.56***
	(0.03)	(0.04)	(0.06)	(0.07)
Past*rival	–	−0.27***	−0.29**	−0.29**
		(0.09)	(0.12)	(0.13)
μ	1.54	1.55	2.25	2.65
Firm dummies	no	no	yes	yes
Country dummies	no	no	no	yes
China	–	–	–	1.52***
				(0.35)
India	–	–	–	−2.03***
				(0.40)
Indonesia	–	–	–	−0.25
				(0.34)
Malaysia	–	–	–	−1.03***
				(0.38)
Philippines	–	–	–	−1.64***
				(0.37)
Thailand	–	–	–	−0.79**
				(0.38)
n	875	875	875	875
log likelihood	−686.74	−682.30	−494.30	−430.66

NOTES
*** and ** indicate 1 per cent and 5 per cent significance level, respectively.
Figures in parentheses are standard errors. μ is the second intercept defining the threshold for the transition from LFDI equal to 1 to 2.

served characteristics become part of the set of regressors and the error term now has only the white-noise component, g_{ij}.[3] The results show that adding the firm dummies improves the statistical fit in standard ways (table 2, column 3).

The country dummies capture, in summary form, the relative attractiveness of the different countries. An alternative specification would include specific country

3 Introduction of the firm dummies strengthens the result both in the size of the coefficients and statistical significance. The increased coefficient sizes on the PAST and RIVAL variables suggests that the composite error term is negatively correlated with these variables: in other words, those who have past presence or perceive active rivals are generally more conservative in reporting their investment likelihood.

features, such as infrastructure, market size, and labour costs. As Head, Ries, and Swenson (1995) have argued, a full elaboration of country characteristics is difficult, and hence a country dummy, which reflects the country's attractiveness to the 'average' investor, is preferred in this situation. In the final section of the paper, we do examine the effects of specific country features. The regression leaves out Vietnam, which is consequently the reference against which the attractiveness of other countries is measured.

The robustness of the PAST and RIVAL effects is evident. However, these effects are complemented by publicly available information: widely held perceptions of a country's potential, as summarized by the dummy variable representing the country, are influential in driving investment flows. The significantly improved log-likelihood indicates that important information is contained in these country dummies. With Vietnam as the reference, investors, on average, express a strong preference for China. The Indonesian coefficient is not significantly different from that of Vietnam. Malaysia and Thailand come next in the country dummy rankings. Thus, the surveyed Japanese firms indicated a shift from their previously favoured destinations, Malaysia and Thailand, to China, Indonesia, and Vietnam, countries with lower wage labour and potentially large domestic markets. Agglomeration diseconomies in Malaysia and Thailand reflected, for example, in high land prices, could also be factors inducing the shift.[4] However, note from table 1 that despite the shift in general sentiment, the average likelihood of investment in Malaysia and Thailand continues to be high because the sample firms with presence in the two countries remain committed to further investments, and also because perception of relatively high competitor interest further drives investment into the two countries. The countries lowest on the preference list are the Philippines and India, where past presence, competitor interest, and a perception of untapped country potential all are at low levels.

Basing our calculations on Greene (1993, 675–6), we compare the model's predictions with the actual stated likelihood of foreign investment. The model correctly predicts 78 per cent of the firms' investment plans (table 3, panel B). The 'very unlikely' declarations are almost fully predicted. In the 'likely' category the prediction rate is about 55 per cent. The addition of country dummies especially improves the prediction rate for the 'very likely' category. The model's predictive power of about three-fifths in the 'likely' and 'very likely' categories (as against 90 per cent in the 'very unlikely' category) indicates that a number of firms with PAST and RIVAL equal to zero have aggressive foreign investment plans – possibly, high production costs in Japan have the general effect of pushing firms to seek lower cost production locations.

---

4 After the crisis in July 1997, foreign investment in Thailand experienced a surge following a sharp decline in land prices and depreciation of the exchange rate.

TABLE 3
Model predictions: "hits and misses"

A: Model: lfdi=f(past, rival, past*rival, and firm dummies)

	Predicted			
	Very likely	Likely	Unlikely	Total
Observed				
Very likely	81 (0.57)	47	15	143
Likely	24	105 (0.54)	65	194
Unlikely	6	54	478 (0.89)	538
Total	111	206	558	875 (0.76)

B: Model: lfdi=f(past, rival, past*rival, firm dummies, and country dummies)

	Predicted			
	Very likely	Likely	Unlikely	Total
Observed				
Very likely	89 (0.62)	46	8	143
Likely	29	107 (0.55)	58	194
Unlikely	4	51	483 (0.90)	538
Total	122	204	549	875 (0.78)

NOTES
In parentheses are the percentage of observations that are correctly predicted. For example, in Panel A, 81 out of 143 (57 per cent) reported 'very likely' observations are correctly predicted. Also in Panel A, (81+105+478) out of 875 or 76 per cent of all observations are correctly predicted.

How important are agglomeration and strategic effects?

In our discussion above, we have implied that the variables PAST and RIVAL represent information flows that influence the decisions of foreign investors. However, both these variables have alternative interpretations. If particular industrial sectors within a country are favoured on account of agglomeration benefits, then a firm's past investment in that country may reflect the agglomeration potential; moreover, new investments would result from the validation of that potential. Private information, proxied by past investment, in that case would be collinear with agglomeration benefits. Similarly, the variable RIVAL may be collinear with strategic reactions to the actions of competitors.

   In this section we examine if the alternative interpretations can be empirically distinguished. We do so by controlling for the industrial sectors of the firms in our

sample. First, we control simultaneously for country and industry effects to allow for the possibility that firms within an industrial sector in a particular country act differently from firms in other sectors investing in that country.[5] If these sectoral differences are important, then their omission could be responsible for incorrectly attributing significance to the PAST and RIVAL variables. Second, we interact PAST and RIVAL with industry dummies to test if these effects are especially pronounced for particular sectors. Specifically, if the influences of the PAST or RIVAL are associated with certain sectors, then, respectively, the agglomeration and strategic rivalry effects are likely to be important. The benefits of agglomeration apply where firms value co-location with producers of high-quality intermediate inputs or if they rely on knowledge spillovers from similar firms (through, for example, high labour turnover). Strategic effects are important, as noted by Knickerbocker (1973), in oligopolistic sectors where the advantage gained from preemptive positioning is significant. In such sectors, a first mover advantage can be significant if, for example, brand-name recognition creates customer loyalty. Note, however, that these tests are suggestive rather than conclusive. To appropriately test for agglomeration economies, we would need to know the extent of investment by all other firms in the same industrial sector in the same location (rather than only the firms in our sample). Moreover, our sectoral characterization may be too broad: agglomeration and strategic effects may well operate in more finely defined sectors.

The first column in table 4 shows the basic model with only the industry dummies, which are reported, and the second column includes also the country dummies, which are not reported.[6] In either case, the PAST, RIVAL, and the PAST*RIVAL variables remain highly significant, as before. The industry that was used as the base was garments and footwear (and other light manufacturing firms that could not be elsewhere classified). Relative to this base, industrial sectors that expect similar levels of foreign investment are building materials, chemicals, and food. Sectors for which the industry coefficient is negative and significantly different from zero (and that therefore have a lower propensity for foreign investment than the base) include electrical equipment, non-electrical equipment, and automobiles and auto parts. The significant differences in industry dummy coefficients could imply either the existence of agglomeration economies in specific host locations or rising costs of production in Japan for those sectors. However, while agglomeration economies possibly exist, PAST is not a proxy for agglomeration, since the effect of past presence remains an additional and important investment driver.

---

5 We are not able to control for industry *and* firm characteristics at the same time, since firms within an industrial sector tend to have similar investment plans, such that when firm dummies are included, the standard errors on the industry dummies tend to be very large. This also implies that firm-level dummies are proxying for the same information as industry-level dummies. As such, when we drop the firm-level dummies and include instead the industry-level dummies, we can expect the basic results to remain the same.

6 Inclusion of industry dummies does not change the relative rankings of the country dummies. However, the extent of country differentials changes since, for example, firms in industrial sectors with a high propensity to invest are especially likely to invest in China.

TABLE 4
Industry effects on investment plans

	Dependent variable: LFDI (likelihood of foreign investment)				
	[1]	[2]	[3]	[4]	[5]
Intercept	−3.16***	−2.79***	−2.77***	−2.73***	−2.82***
	(0.36)	(0.31)	(0.58)	(0.32)	(0.44)
Past	2.82***	2.94***	2.92***	2.41***	2.94***
	(0.47)	(0.48)	(0.50)	(0.89)	(0.49)
Rival	0.44***	0.42***	0.44***	0.43***	0.42***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.11)
Past*rival	−0.26***	−0.27***	−0.28***	−0.29***	−0.29***
	(0.09)	(0.09)	(0.10)	(0.10)	(0.09)
Industrial sectors				Industry dummy* past	Industry dummy* rival
Automobile	−0.66**	−0.69**	−1.47*	1.15	0.35**
	(0.32)	(0.28)	(0.89)	(0.91)	(0.17)
Building materials	0.25	0.26	0.86	−0.18	−0.17
	(0.30)	(0.31)	(0.74)	(1.02)	(0.15)
Chemical	−0.29	−0.24	−0.17	1.28	0.02
	(0.27)	(0.28)	(0.70)	(0.84)	(0.13)
Food	−0.13	−0.14	−0.27	0.23	0.06
	(0.33)	(0.34)	(0.79)	(1.08)	(0.16)
Electrical equipment	−0.52*	−0.49	−0.78	−0.07	−0.13
	(0.29)	(0.31)	(0.77)	(0.84)	(0.14)
Non-electrical equipment	−0.81***	−0.85***	−1.12	0.73	0.03
	(0.27)	(0.29)	(0.73)	(0.86)	(0.14)
μ	1.58	1.69	1.73	1.70	1.71
Industry dummies	Reported above	Reported above	Reported above	Yes	Yes
Country dummies	No	Yes	Yes	Yes	Yes
Country/industry Interactions	No	No	Yes	No	No
n	875	875	875	875	875
Log likelihood	−671.30	−634.69	−622.55	−630.56	−627.52

NOTES
Parentheses are standard errors. ***, ** and * indicate 1 per cent, 5 per cent, and 10 per cent significance level, respectively.
μ is the second intercept defining the threshold for the transition from LFDI equal to 1 to 2.
For industry dummies, light manufacture was used as base.
For country dummies, Vietnam was used as the base.

Industry dummies are also interacted with country dummies (column 3). The estimates continue to show that past investment has an effect that is independent of any agglomeration benefits: after the introduction of country and industry interactions, the coefficient on past investment remains positive and highly significant. Similarly, the coefficients on the RIVAL variable and the PAST*RIVAL retain their signs and statistical significance. Also, the country and industry interactions are not statistically significant.[7]

Table 4 also reports the interactions between PAST and industry dummies (column 4) and between RIVAL and industry dummies (column 5).[8] Once again, the variables of interest to us, PAST, RIVAL, and PAST*RIVAL, remain highly significant, and, moreover, the interactions, with one exception, are not significant. These results, therefore, imply that PAST investment is not associated with any specific industry characteristic. Since, as discussed above, agglomeration effects are likely to be more pronounced for some industrial sectors than others, we infer that past presence is important in and of itself and is, therefore, a plausible proxy for learning about operating conditions in the economy. Similarly, the value of observing competitors is also independent of the sector, with automobiles and auto parts being the exception. Note that Japanese auto firms have a low propensity to invest relative to other sectors; however, those who do invest appear driven by strategic concerns.

Robustness tests

To test the robustness of the findings, several extensions were examined. To conserve space, only the main results are reported here (details are available in the working paper version of this paper, Kinoshita and Mody 1997). Replacing firm dummies with specific firm characteristics left our principal results unchanged. Larger firms have higher expected foreign investment. R&D has only a weak positive relationship to expected investment; since R&D and size are correlated, once size is taken into account, any independent influence of R&D is not discernible. Finally, firms with a high likelihood of investment in Asia have a low export propensity (for further discussion, see Mody, Dasgupta, and Sinha 1999).

Instead of using country dummies in a pooled regression, we also ran regressions for individual countries. Again, while the basic results remain unchanged, some interesting country variations are worth highlighting. For India, Philippines, and Vietnam, where the PAST variable is not statistically significant, the extent of

---

7 As noted above, stocks of foreign investment by industrial sector are not available. However, the United Nations Conference for Trade and Development (UNCTAD) does provide estimates of a country's entire stock of foreign investment. We interacted the country's average stock of foreign direct investment in the years 1990–92 with the industry dummies. If foreign investment into a country is attracted by specific industry characteristics, then past and new investments may primarily reflect those attractions, in which case the past and rival variables should have no independent effects. However, as is the case with the industry and country interactions, the introduction of the stock of foreign direct investment and industry interactions does not change the key results.

8 The industry dummies are not reported here, since the relative rankings do not change.

past presence is also very small, limiting the statistical predictive power of that coefficient. For Vietnam, the coefficient on RIVAL is very large, suggesting that firms are very sensitive to perceived actions of rivals, hence the possibility of a cascading effect. Though the effect is smaller, a similar force may well be operative for India. At the other extreme, in Malaysia, where significant past presence exists, the effect of RIVAL is negligible for those who are already operating in that country (PAST = 1); however, even in Malaysia, new entrants are significantly guided by the actions of rivals. In this respect, Thailand is different from Malaysia: though a significant past presence exists there, existing investors in Thailand also appear influenced by the behaviour of their rivals.

Finally, instead of country dummies, we explored how perception of specific country characteristics – market size, labour costs, and foreign direct investment (FDI) policy – influenced the likelihood of investment.[9] Perceptions of large market potential and low labour costs tend to increase the attractiveness of countries. FDI policy was explained to respondents to include elements such as the ability to repatriate earnings, restrictions on foreign ownership, and the requirements to export and source inputs locally. Perceptions of FDI policy are strongly influential in conditioning future plans to invest in a country. The coefficient on FDI policy is positive and significant at the 5 per cent level. However, since the coefficients on PAST and RIVAL also remain positive and significant at the 1 per cent level, the evidence seems to suggest that FDI policy is information additional to that obtained by from past investment experience and actions of competitors. Perceptions of FDI policy interact in interesting with ways with PAST and RIVAL. The coefficient on the interaction term, FDIplcy*past, is negative. When PAST is equal to 1 – that is, when the firm has a past presence in that country – the effect of FDI policy is more than wiped out. In other words, perceptions of FDI policy matter little when the firm has first-hand operational experience in the country. The corollary is that perceptions of good FDI policy are especially important in attracting new investors.

Conclusions and discussion

Using a firm-level data set, we explored the empirical importance of privately held information in foreign investment location decisions. Though the limitations of a one-time survey did not permit us follow an information 'cascade' over successive generations, the value of private information, which is central to the cascade phenomenon was consistently evident.

The data permitted us, moreover, to distinguish between information obtained through direct experience in the host country and information inferred from observing competitors. Direct experience is seen to provide the more credible information, as may be expected. However, in the early phases of investing in a new country

---

9 These country characteristics were coded on a 1–10 scale by firms, with 10 representing the most favourable.

when few firms have experience in the country, the actions of competitors are likely to dominate, leading to an apparent herd behaviour. Such was apparently the case for China and Vietnam, which attracted new investors in the early 1990s. In contrast, countries, such as India and the Philippines, that did not draw the attention of a critical mass of investors are in danger of being bypassed for significant periods of time.

We also found privately held information was complementary to publicly available information. Thus, while firms form 'average' perceptions about countries, leading all of them to view particular locations favourably, considerable variation in investment plans exists around these averages; an important element of such variation is explained by privately held information. Industry agglomeration effects were not found to be significant, though, as noted, they could not be eliminated conclusively.

For policymakers, these findings represent a challenge. A generally favourable view of the country based on its fundamentals as well as perceptions of good policy and low labour costs lead to increased foreign investment. However, creating the right conditions for investors to directly experience the rigours of operating in a country is empirically important, as is the opportunity to observe competitors. This raises the controversial issue of special zones for foreign investors. While successful in many instances, especially in East Asia, they have also been a waste of scarce investment resources where not appropriately planned. An emerging approach is for the government to take the lead in creating the policy conditions for the creation of such zones but allow private investors to undertake the necessary investments, thus ensuring greater efficiency. Mexico offers an example. Under the *maquiladora* program, the policy environment has been created to attract foreign investors. Several private initiatives have resulted in so-called shelters that provide early hand-holding services to new foreign investors.

References

Arthur, Brian (1995) 'Complexity in economic and financial markets,' in *Complexity* (New York: John Wiley)

Bardacke, Ted (1996) 'General Motors' Thai hub will boost drive into Asia,' *Financial Times*, 31 May

Bikhchandani, S., and S. Sharma (2000) 'Herd behavior in financial markets: a review,' International Monetary Fund Working Paper 2000-56, 1–39

Bikhchandani, S., D. Hirshleifer, and I. Welch (1992) 'A theory of fads, fashion, custom, and cultural change as informational cascades,' *Journal of Political Economy* 100, 922–1026

Calvo, Guillermo, and Enrique Mendoza (1998) 'Rational herd behavior and globalization of securities markets,' mimeo, University of Maryland

Greene, William (1993) *Econometric Analysis*, 2nd ed. (Englewood Cliffs, NJ: Prentice-Hall)

Head, Keith, John Ries, and Deborah Swenson (1995) 'Agglomeration benefits and location choice: evidence from Japanese manufacturing investments in the United States,' *Journal of International Economics* 38, 223–47

Kinoshita, Yuko, and Ashoka Mody (1997) 'The usefulness of private and public informa-
tion in foreign investment decisions,' Policy Research Paper 1733, World Bank, Wash-
ington DC

Knickerbocker, Fredrick T. (1973) *Oligopolistic Reaction and Multinational Enterprise*
(Boston: Harvard University, Graduate School of Business Administration)

Kogut, Bruce, and Sea Jin Chang (1996) 'Platform investments and volatile exchange
rates: direct investment in the U.S. by Japanese electronic companies,' *Review of Eco-
nomics and Statistics* 78, 221–31

Kuran, Timur (1995) *Private Truths, Public Lies: The Social Consequences of Preference
Falsification* (Cambridge, MA: Harvard University Press)

Lee, I. H. (1993) 'On the convergence of informational cascades,' *Journal of Economic
Theory* (December) 395–411

Mody, Ashoka, and Krishna Srinivasan (1998) 'Japanese and United States firms as for-
eign investors: do they march to the same tune?' *Canadian Journal of Economics* 31,
778–99

Mody, Ashoka, Susmita Dasgupta, and Sarbajit Sinha (1999) 'Japanese multinationals in
Asia: drivers and attractors,' *Oxford Development Studies* 27, 149–64

Scharfstein, D., and Jeremy Stein (1990) 'Herd behaviour and investment,' *American Eco-
nomic Review* 80, 465–79

United Nations Conference on Trade and Development (Various years) *World Investment
Report* (Geneva)

Wheeler, David, and Ashoka Mody (1992) 'International investment location decisions:
the case of US firms,' *Journal of International Economics* 33, 57–76