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# **Guided through the "Red tape"? Information sharing and foreign direct investment**

BY

**Ragnhild Balsvik AND Line Tøndel Skaldebø**

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# Guided through the ‘Red tape’? Information sharing and foreign direct investment\*

Ragnhild Balsvik<sup>†</sup>      Line Tøndel Skaldebo<sup>‡</sup>

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## Abstract

What drives the observed tendency of new FDI, other things equal, to be attracted to locations where many other foreign investors are located? One explanation in the literature on FDI location is that expected benefits from agglomeration externalities make firms want to locate in agglomerated regions. Alternatively, potential investors get information about conditions in a host from firms in their own business network that already have experience from that country. We study how Norwegian FDI location choice depends on previous Norwegian presence, using information about institutional quality to separate the impact of information sharing from agglomeration externalities. The impact of previous Norwegian investors is larger in countries with low institutional quality. We interpret this as consistent with the presence of information sharing among Norwegian investors.

**JEL Classification: F23, D80**

**Keywords: FDI, location choice, networks, information, agglomeration**

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<sup>†</sup>Corresponding author. Norwegian School of Economics, Helleveien 30, 5045 Bergen, Norway; email: ragnhild.balsvik@nhh.no, phone +47-55959510

<sup>‡</sup>Chr.Michelsen Institute, P.O.Box 6033 Bedriftssenteret, 5892 Bergen, Norway; email: line.tondel@cmi.no

# 1 Introduction

As foreign direct investment (FDI) have increased immensely over the last decades, a large body of theoretical and empirical literature has emerged seeking to explain the magnitude and location of FDI.<sup>1</sup> Several studies find that even after controlling for the general attractiveness of a host region, new FDI seems to be attracted to regions where other foreign investors are already present. This evidence of a clustering pattern in FDI is typically explained by agglomeration externalities.<sup>2</sup> The number of FDI firms already active in a country when a new firm considers where to locate its FDI is used as a proxy for the strength of agglomeration externalities.<sup>3</sup> Other things equal, the potential for such benefits will make a location with many previous foreign investors (i.e. an agglomerated region) preferred over a less agglomerated one.

In the literature, two alternative and/or complementary explanations have been discussed. First, clustering could be a result of imitation; the presence of foreign investors in a host reduces uncertainty about expected profits by providing a signal of profit opportunities (Araújo, 2009; Campos and Kinoshita, 2003). Second, firms with FDI experience in a host country may share information that reduces the costs of locating FDI in the same host for other investors in the same business network (Blonigen, Ellis and Fausten, 2005).<sup>4</sup> Depending on the explanation proposed, the number of foreign firms already present in a host country has been used in the literature to proxy the potential for agglomeration ex-

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<sup>1</sup>See Blonigen (2005) and references therein for an overview of the empirical literature on FDI determinants.

<sup>2</sup>Studies concluding that agglomeration externalities are important for the location of FDI are e.g. Head, Ries and Swenson (1995); Head and Mayer (2004); Gross, Raff and Ryan (2005); Devereux, Griffith and Simpson (2007); Wheeler and Mody (1992); Devereux and Griffith (1998); Barrell and Pain (1999); Braunerhjelm and Svensson (1996); Belderbos and Sleuwaegen (1996); Crozet, Mayer and Mucchielli (2004); Du, Lu and Tao (2008); Hogenbirk and Narula (2004).

<sup>3</sup>Marshall (1920) identified three sources of agglomeration externalities in spatially concentrated industries: access to a pool of workers with specialized skills, thicker markets for intermediate inputs, and technological spillovers between firms.

<sup>4</sup>Note that the imitation explanation does not require any actual knowledge about the host to be shared between investors, while this is central to the information sharing explanation.

ternalities, the size of the business network that investing firms get information from, or the strength of the signal of profit opportunities.

In this paper, we contribute to the literature on FDI location decisions by investigating the role of information sharing among Norwegian investors as a determinant of Norwegian FDI location. Although we are not able to fully separate the agglomeration, imitation and information sharing explanations for the observed clustering patterns in FDI, we provide explicit arguments for how we can interpret our results as consistent with information sharing rather than the other two explanations. To the best of our knowledge, this is the first paper to consider all three potential explanations for clustering in FDI location choice. Blonigen et al. (2005) is the first empirical study attempting to distinguish between agglomeration externalities and networking effects in an analysis of FDI location choice. They study the FDI decisions of Japanese firms, and use information about formal Japanese business networks; the keiretsu system.<sup>5</sup> While several studies of Japanese FDI use information about vertical keiretsus in their study of FDI location (e.g. Head et al. (1995); Head and Mayer (2004); Gross et al. (2005)), Blonigen et al. (2005) use the distinction between vertical and horizontal keiretsu membership to distinguish between the effect on location choice from agglomeration externalities and information sharing, respectively.

Firms operating abroad need to overcome additional cost (Markusen, 1995) due to e.g. language barriers, the need to learn and adapt to local rules and regulations (both official and unofficial), and being outside local business and government networks. As informal barriers due to social, cultural and institutional differences are found to have significant negative effects on international transactions (Trefler, 1995; Obstfeld and Rogoff, 2001), the importance of business and social or ethnic networks in overcoming these barriers is

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<sup>5</sup>In the Japanese keiretsu system, vertical keiretsus are often groups of suppliers clustered around large downstream manufacturing firms, while horizontal keiretsus are groups of firms in often unrelated industries which are grouped around a large bank or trading company.

increasingly recognized.<sup>6</sup> Foreign firms already located in a host country will have acquired experience about about how to operate efficiently by for example gaining knowledge about where the best locations within a country are, and about how to best deal with government agencies and local firms. For a firm looking to invest in a host, access to information and knowledge from firms with more experience will be valuable by reducing the risk and costs involved in the investment. Due to better connections with firms from their home country, firms are more likely to get access to information from experienced investors from home. Further, information from same origin investors could prove particularly valuable as these companies will probably have a more coherent perception of the challenges, problems and opportunities at the foreign location.<sup>7</sup> Consistent with this argument, Crozet et al. (2004) and Du et al. (2008) find that the tendency for foreign investors to cluster within a host country is strongest for investors from the same source country.

While the nature of the Japanese keiretsu system provides information about formal business networks in the study by Blonigen et al. (2005), we cannot observe any formal networks between Norwegian firms in our data. The size of the Norwegian business community is, however, relatively small, we therefore find it likely that information is shared between firms within the same industry or between firms located close to each other in Norway. Thus, the number of Norwegian investors present in a host country could be used as a proxy for the network through which investment-relevant information is shared. However, as argued above, this could also capture the potential for agglomeration externalities. Our main identifying

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<sup>6</sup>For example, Rauch and Trindade (2002) and Coughlin and Wall (2011) find that ethnic networks between migrants and their home country facilitate international trade between these countries. Rauch (2001) refers to how business networks through former employees of the same company (IBM in Singapore) was an important location determinant for Singapore as a destination for FDI. Bandelj (2002) discusses similar issues with reference to Eastern Europe.

<sup>7</sup>Various Norwegian agencies recognize the importance of assisting the creation of networks in order to share FDI information and experience. One example is the government sponsored organization 'Innovasjon Norge' who offers a broad network through Norwegian embassies aimed at assisting Norwegian firms who invest abroad.(<http://www.innovasjon norge.no>). Another example is the appointment by the Norwegian business organization of an experienced former CEO to assist Norwegian firms with establishing affiliates in Uganda (Source:e24, a Norwegian internet business newspaper 13.10.2009).

assumption is that the costs of acquiring FDI-relevant information are larger in countries with extensive bureaucracy, less transparent government, more corruption and less political stability, and hence the value of information about a host country (before setting up operations) is higher when the institutional environment in the potential host country is weak. At the same time, we believe that the expected benefit from pure agglomeration externalities such as thick labour and input markets should be less sensitive to the institutional environment in the host country. Thus, if the presence of Norwegian investors in a host is more important for the location of new FDI by Norwegian firms in host countries with low institutional quality, we interpret this as consistent with information sharing playing a role in the location of FDI.<sup>8</sup>

In order to demonstrate that such an effect is not merely the result of new investors imitating previous investors because the presence of previous FDI acts as a signal of profit opportunities in the host, we compare the role of previous investors from two relatively similar countries on the location decisions of Norwegian FDI. Since there is little in the imitation argument that imply that the presence of same-origin firms provide a better signal of profit opportunities in a host than the presence of investors from other countries, the imitation argument should imply that previous Norwegian and previous Swedish FDI have roughly similar effects on the probability of location for new Norwegian FDI. Since potential information sharing through networks of firms is more likely between firms from the same country, this type of clustering force should imply that previous Norwegian investors play a more important role for Norwegian FDI location than the presence of Swedish investors in a host.

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<sup>8</sup>Harding and Javorcik (2011) argue similarly that information asymmetries between host countries and potential foreign investors are larger for developing countries where information about business conditions is less readily available and bureaucratic procedures are more burdensome. They find that Investment Promotion Agencies have a positive impact on FDI from the US to the developing world but not to industrialized countries.

We apply conditional logit estimation to the location choice for 2645 new FDI projects from Norway during the years 1997, 1999, 2001 and 2003-2005. These projects are located in 93 different countries. We find evidence that the presence in a host country of other Norwegian investors operating within the same sector in Norway increases the likelihood that new Norwegian investors locate their FDI in the same host country. Consistent with our hypothesis of information sharing playing a role in the location choice of new investors, the effect of previous Norwegian investors is larger in countries where the institutional quality is perceived as low, while the presence of Swedish firms in the host is of little importance in explaining the location choice of Norwegian investors. These results are robust to a number of robustness tests.

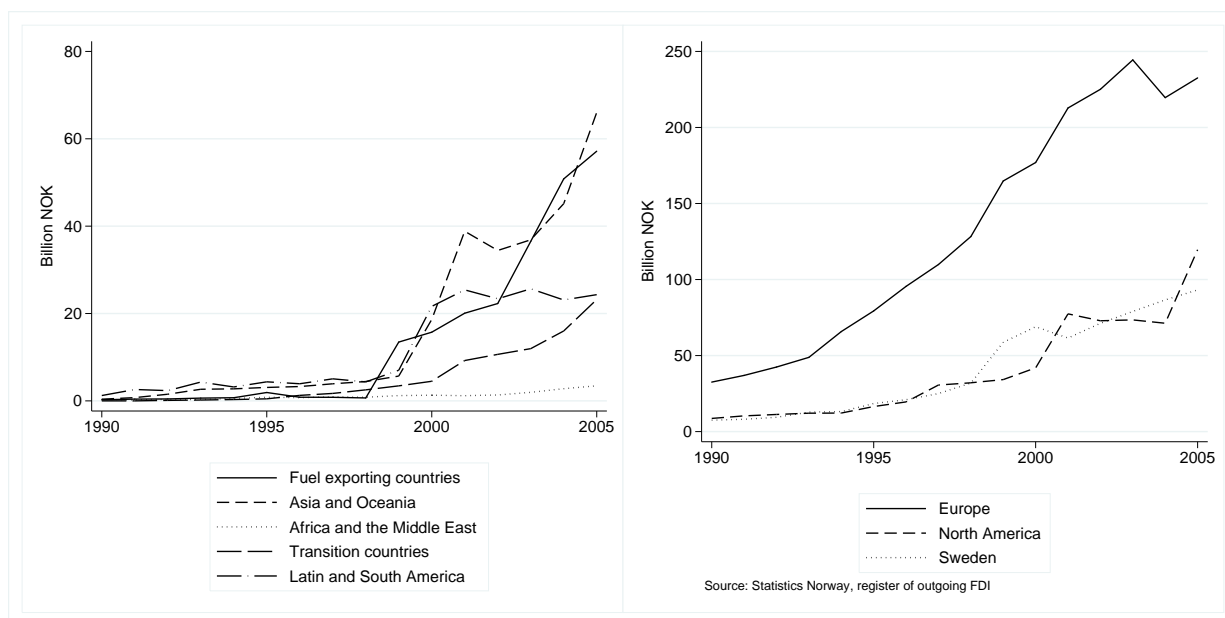
Section 2 describes our data and provides an overview of Norwegian foreign direct investment in the period from 1990 to 2005. In section 3 we give an outline of our empirical methodology, while section ?? presents our data and sample of Norwegian investments together with the definition of our control variables. Section 4 presents our conditional logit estimates, robustness checks are presented in section 5, and section 6 concludes.

## 2 Data

We use data from 1990-2005 from the register of outgoing FDI administered by Statistics Norway. The data record for each year the identity, location and sector of Norwegian firms that have ownership in firms located abroad. It provides an identity number for the affiliate abroad, the country where this affiliate is located and the ownership share of the Norwegian firm. The register contains some accounting data for the affiliate abroad, and some information about transactions between the affiliate and the Norwegian shareholder. The data is intended to provide a complete record of Norwegian firms' ownership interests abroad. Unfortunately, the data cannot distinguish between affiliates established by green-

field investment and acquisitions. Throughout the paper we restrict our analysis to foreign affiliates where the Norwegian owner holds at least a 20% ownership share.<sup>9</sup>

Figure 1: Value of Norwegian FDI 1990-2005, by host region



Note: Total equity capital in affiliates abroad are multiplied by the ownership shares of the Norwegian owners to arrive at the values of FDI.

Norwegian FDI has increased markedly during the period from 1990 to 2005. We measure the value of foreign assets held by Norwegian firms through FDI by multiplying total equity capital of affiliates with ownership shares of Norwegian owners. The value of assets held by Norwegian firms abroad was about 50 billion NOK in 1990. By 1999 the value was almost 300 billion and by 2005 it was around 620 billion.<sup>10</sup> Figure 1 shows the development in the value of Norwegian FDI in different regions from 1990 to 2005. The bulk of investments took place in Europe and northern America. Sweden is throughout the period the single most important host country for Norwegian firms investing abroad. The groups of countries receiving the largest increase in Norwegian FDI during this period are the fuel exporting

<sup>9</sup>If we use a 10% cut-off this will only add about 100 new investments to our analysis.

<sup>10</sup>Due to the lack of an appropriate deflator, we report nominal values.



countries, the transition countries of Eastern Europe and countries in Asia (notably China). For the transition countries there has been a steady increase in the value of investments since they opened up to foreign interest in the early and mid 1990's.

Table 1: Mean and median values of Norwegian FDI

Host region	1990		1995		2000		2005	
	Mean	Med.	Mean	Med.	Mean	Med.	Mean	Med.
Europe	20,9	0,5	56,2	1,2	92,4	1,9	124,4	2,2
Sweden	14,0	0,2	39,6	0,9	85,6	0,8	93,1	2,7
North America	19,1	0,2	43,0	2,2	90,2	3,4	258,9	5,5
Asia and Oceania	1,6	0,4	12,3	1,3	59,9	2,3	140,4	2,8
Fuel exporting countries	8,4	0,4	39,1	1,7	131,0	3,2	357,2	2,8
Transition countries	0,3	0,2	7,8	0,3	18,5	0,6	63,4	2,2
Africa and the Middle East	5,2	0,4	18,4	2,4	18,0	2,7	40,1	4,9
Latin and South America	8,4	0,6	34,1	1,5	126,5	4,2	111,0	3,2

Note: We report the nominal value in million NOK due to lack of a proper deflator. Values equal total equity capital in affiliates abroad multiplied by the ownerships shares of the Norwegian owners.

The increase in the value of Norwegian FDI has come about both by an increase in the average value of affiliates and an increase in the number of affiliates. Table 1 provides an overview of the development in mean and median values for affiliates by geographic region. For all regions the median FDI project is much smaller than the mean size of FDI projects, clearly suggesting that the total value of Norwegian FDI in all regions is heavily dominated by a small number of large investments. This is in line with Grünfeld (2005), who reports that most of Norwegian FDI in 2001 is undertaken by only five large corporations. Both the mean and median value of investments increase over time in most regions, but is particularly noticeable for the fuel exporting developing countries. This can be explained by the size of investments in the petroleum sector.

Table 2 shows the total number of countries where Norwegian firms have affiliates, along with the number of investing firms and the number of affiliates. In 1990 Norwegian firms invested in 89 countries, this increased to 130 countries in 2005. Almost one thousand Norwegian firms held ownership interests of above 20% in foreign affiliates in 1990, this

Table 2: Norwegian FDI: number of countries and investors

	1990	1995	2000	2005
Number of countries where Norwegian firms invest	89	102	124	130
Number of Norwegian firms investing abroad	991	753	1 106	1 248
The percentage of firms active in the 8 most important hosts	78	77	78	75
Number of affiliates abroad owned by Norwegian firms	2 947	2 742	4 064	4 962
The percentage of affiliates in the 8 most important hosts	71	68	66	60

Note: The 8 most important hosts are Denmark, Finland, Sweden, France, Germany, Netherlands, UK and USA.

increased to more than 1200 firms by 2005. The number of affiliates is larger than the number of investing firms, indicating that a number of firms have more than one affiliate abroad. Throughout the period, 22% of the firms that establish new foreign affiliates do so in one country only, and 16% of the firms invest in 2 different countries. The total number of foreign affiliates held by Norwegian firms increased with about 2000 from 1990 to 2005. Table 2 also accounts for the percentage of total activity that is concentrated in the top eight host countries: Sweden, Denmark, Finland, France, Germany, the Netherlands, the UK and USA. In 2005, as much as 75% of the firms with investments have affiliates located in at least one of these eight countries. This share falls to 60% in 2005.

The total number of new foreign affiliates (7365) established from 1991 to 2005 are split by host region and sector of the investing firm in table 3. Many of these investments are short-lived, as table 2 showed that the total number of foreign affiliates only increased with 2000 from 1990 to 2005. Overall, manufacturing and financial, business and property services are the most important sectors with respect to new affiliates established throughout the period.

The number of countries and new investments that we can use in our estimations are restricted by the availability of control variables for host countries, in particular the proxies for country level institutional quality. Thus, the final data set for our main analysis consists

Table 3: New foreign affiliates 1991-2005

Host region	Sector of investor						<i>Total</i>
	1	2	3	4	5	6	
Europe	274	1 011	416	415	977	135	<i>3 228</i>
Sweden	44	310	234	97	474	76	<i>1 235</i>
North America	69	234	47	82	213	28	<i>857</i>
Asia and Oceania	54	300	61	162	159	26	<i>762</i>
Fuel exporting countries	70	85	27	40	30	8	<i>260</i>
Transition countries	42	187	100	80	179	16	<i>604</i>
Africa and the Middle East	17	43	14	56	34	10	<i>174</i>
Latin and South America	52	154	20	120	69	14	<i>429</i>
<i>Total</i>	<i>622</i>	<i>2 324</i>	<i>919</i>	<i>1 052</i>	<i>2 135</i>	<i>313</i>	<i>7 365</i>

Sector 1: Primary sector and energy production  
Sector 2: Manufacturing  
Sector 3: Trade and repairs  
Sector 4: Transport,storage and communication  
Sector 5: Financial, business and property services  
Sector 6: Other

of 2645 new investments established in 93 countries in the years 1997, 1999, 2001 and 2003-2005.<sup>11</sup> Table 4 shows the distribution of these investments across sectors.

Table 4: New affiliates used in the regressions

Primary sector and energy production	263
Manufacturing	986
Trade and repairs	257
Transport,storage and communication	423
Financial, business and property services	685
Other	31
<i>Total</i>	<i>2645</i>

<sup>11</sup>We define a new investment to be the appearance of a new affiliate abroad where a Norwegian firm owns at least 20% of its shares, and we have information for the investing firm about the industry affiliation and location in Norway. Investments in affiliates that are already owned by another Norwegian firm, are not counted. If a Norwegian firm sets up more than one new affiliate in the same country within the same year, we count this as one new investment.

### 3 Empirical approach

The workhorse model in the empirical literature on FDI location decisions is the conditional logit model.<sup>12</sup> In location choice models, the underlying assumption is that a firm chooses a location for foreign investment that maximizes profits. Thus, there is a set of possible locations  $\mathcal{S} = (1, \dots, s, \dots, n)$ , where location  $s$  offers profit  $\pi_{js}(d)$  to an investor  $j$  locating affiliate  $d$ . If the profit from investing in country  $s$  is higher than the profit from locating in country  $l$  for a firm  $j$ , the firm will choose to invest in country  $s$  and the dependent variable takes the value 1 for the chosen location and zero for all other possible locations.

$$y_{js} = \begin{cases} 1 & \text{if } \pi_{js} > \pi_{jl}, \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

As the model assumes that the choice of location is determined by profits, the characteristics that matter for this decision are variables that affect profits. These could include both attributes of the choice alternatives as well as firm characteristics. We follow Head et al. (1995) and Blonigen et al. (2005) in assuming that an expression for the profitability of locating in country  $s$  can be derived from a Cobb-Douglas production function where agglomeration and information effects, infrastructure elements and variable inputs enter as arguments. In line with previous studies of location choice, we enter all explanatory variables with a one-year lag, to reflect the information upon which expectations are formed.

The resulting profitability of country  $s$  for investor  $j$  may then be represented by the following function:

$$\pi_{js} = \theta_s + \sum_{i \in \mathcal{A}} \alpha_i \ln A_{js}^i + \epsilon_{js}, \quad (2)$$

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<sup>12</sup>Examples includes Head et al. (1995), Hogenbirk and Narula (2004), Gross et al. (2005), Blonigen et al. (2005), Devereux et al. (2007), Hilber and Voicu (2010), Du et al. (2008) and Araújo (2009).

where  $\theta_s$  is a country specific fixed effect,  $A^i$  represents agglomeration and information externalities from source  $i$  and  $\epsilon_{js}$  is the error term. Country fixed effects capture a variety of host country effects that may influence the choice of location. These include factors that may be unobserved or hard to measure, as well as observable characteristics that are constant across investors. Thus infrastructure, factor prices, relative factor proportions etc that are common to all investors into the same host country will also be captured by  $\theta_s$ . Equations (1) and (2) do not have any time subscripts, thus we assume that the country specific factors that determines the attractiveness of one location over another are constant over time. In section 5 we discuss how the inclusion of region-year or country-year dummies could loosen this assumption and how that affects our results.

McFadden (1974) shows that logit choice probabilities can be derived from individual maximization decisions if unobserved heterogeneity takes the appropriate form. Hence, if the error term is distributed as a Type 1 extreme value random variable, the probability of choosing country  $s$  among the choice set of  $L$  countries is given by the following logit expression (based on the profit expression in equation 2).

$$Pr(y_{js}) = \frac{\exp(\theta_s + \sum_{i \in \mathcal{A}} \alpha_i \ln A_{js}^i)}{\sum_{i \in \mathcal{L}} \exp(\theta_l + \sum_{i \in \mathcal{A}} \alpha_i \ln A_{jl}^i)} \quad (3)$$

The main variables of interest in this model are the  $A^i$  variables. In Head et al. (1995) these are variables assumed to proxy different types of agglomeration forces in region  $s$ : agglomeration of domestic firms proxied by the number of domestic firms in the region, and agglomeration of previous Japanese investors to the region proxied by the number of other Japanese firms in the industry or from the same vertical keiretsu of investor  $j$  in the host. In Blonigen et al. (2005), these  $A^i$  variables are constructed to capture both agglomeration forces and networking/information effects. They use the number of previous investments (stock of investment) by other Japanese firms in the same vertical keiretsu to capture agglomeration effects, due to the supplier-buyer relationship between firms of the

same vertical keiretsu. They further argue that the effect of access to information about the host country, should come mainly from recent investments made by horizontal keiretsu members, since agglomeration externalities between these firms are unlikely to be important, as these firms are in unrelated industries.

We use several different variables to proxy for the agglomeration, imitation and information sharing effects that may affect (expected) profits and hence the location of new investments. We use variables counting the presence of other Norwegian investors in the host; counting both the number of firms from the same industry or the same county in Norway that have affiliates in the host.<sup>13</sup> As in Blonigen et al. (2005) and Araújo (2009), we also split these measures into the stock and flow of Norwegian firms with presence in the host, see table 5 for precise variable definitions. The finding of a positive coefficient on these variables for Norwegian presence in the host, means that there is a clustering tendency among Norwegian firms when investing abroad, and this could be due to any (or a combination) of the explanations for clustering once we have controlled for the general attractiveness of a location with the use of country fixed effects.

In order to distinguish the role of information sharing from the two other potential explanations for clustering, we include interaction terms between our variables for Norwegian presence and a proxy for the institutional quality of the host. Our argument is one the one hand that the ‘traditional’ marshallian agglomeration externalities, if present, should not depend on the institutional quality of the host country. In other words; the presence of a Norwegian cluster of given size in a host country should have more or less the same impact on the location decision of new Norwegian investors regardless of the institutional quality of the host country. A similar argument applies also to the signalling explanation for clustering. On the other hand, we argue that getting access to information about conditions in a host country from previous investors is of more value to potential new investors when

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<sup>13</sup>Firms are divided into 42 2-digit nace industries and 21 regions corresponding to the county (fylke) administrative level.

the host country has weak institutions. A negative sign on an interaction term between Norwegian presence in the host and institutional quality of the host tells us that previous investment by Norwegian investors is of less importance to new investors in countries with good institutions, or conversely, of more importance in hosts with weak institutions. Such an effect would be consistent with information sharing taking place between Norwegian investors. We also include measures of the firms' own experience in the host country and in all other countries. We expect that information gathered within the firm about host country conditions should play an important role in future location choices of the firm. We also expect the value of this internal information to be less important for location choice in countries with better institutional quality.

We use the regulatory quality measure from the Governance indicators to proxy for institutional quality (World Bank, 2009).<sup>14</sup> Regulatory quality reflects perceptions about 'the ability of government to formulate and implement sound policies and regulations that permit and promote private sector development' (Kaufmann, Kraay and Mastruzzi, 2010, p.6). Governance is measured in units that follow a normal distribution with a mean of zero and a standard deviation of one in each period. Most scores range between -2.5 and 2.5, with higher scores indicating better regulatory quality. In order to ease the interpretation of coefficients on the variables where institutional quality is interacted with Norwegian presence in the host country, we first use the sign preserving transformation of our proxy for institutional quality (Busse and Hefeker, 2007):  $v = \ln(x + \sqrt{x^2 + 1})$ . We then add 2 to the resulting variable to ensure all positive values of institutional quality.

As agglomeration, imitation and information sharing effects may not only come from Norwegian investors, we include a variable for aggregate FDI inflow in our regressions.<sup>15</sup>

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<sup>14</sup>These measures have been used in a wide range of empirical studies, see e.g. Globerman and Shapiro (2002), Aggarwal and Goodell (2009) and Kenisarin and Andrews-Speed (2008). The Governance indicators are available for 180 countries in 1996. The measure has been reported also for 1998, 2000, and annually from 2002.

<sup>15</sup>The data is collected from UNCTAD (2009). The real FDI inflow is obtained by using the US GDP deflator collected from the Bureau of Economic Analysis, <http://www.bea.gov/national/index.htm>.

Table 5: Variables for Norwegian presence in host countries

Variable	Definition
<i>Total presence</i>	<i>The number of other firms with affiliates in the host in t-1:</i>
-industry	-from the same 2-digit NACE industry in Norway as the investor.
-county	-from the same county of Norway as the investor.
<i>Stock</i>	<i>The number of other firms with affiliates in the host in t-2:</i>
-industry	-from the same 2-digit NACE industry in Norway as the investor.
-county	-from the same county of Norway as the investor.
<i>Flow</i>	<i>The number of other firms that establish new affiliates in the host in t-1:</i>
-industry	-from the same 2-digit NACE industry in Norway as the investor.
-county	-from the same county of Norway as the investor.
<i>Own experience</i>	
-in chosen host	number of affiliates the investor has in the host in t-1.
-in other countries	number of affiliates the investor has in other countries in t-1.

In addition, we include as a control variable a measure of the presence of Swedish FDI in the host countries. The data on Swedish presence gives information about the number of Swedish firms by industry that have affiliates in a country and is therefore very similar to the measurement of our Norwegian presence variable.<sup>16</sup> The use of Swedish presence in host countries as a control variable means that we must exclude Norwegian investments in Sweden from our analysis. Positive coefficients on the variables for overall FDI and Swedish presence could be consistent with all three explanations of clustering in FDI, while negative coefficients on the interaction terms with institutional quality would be consistent with information sharing. Assuming that there is much less sharing of information from Swedish to Norwegian firms than between Norwegian firms, we expect the effect of Swedish presence on Norwegian FDI location to be much smaller than the effect of Norwegian presence. Summary statistics of our main regression variables are reported in Table 6

<sup>16</sup>The data on Swedish investments abroad is collected from the web page of the Swedish Agency for Growth Policy Analysis: <http://statistikportalen.tillvaxtanalys.se/>. We are not able to split this measure into stock and flow of Swedish investors.



Table 6: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Invest (2622 positive outcomes)	0.011	0.105	0	1	236677
<i>Total presence:</i>					
-industry	0.446	0.711	0	4.174	236677
-county	0.995	1.068	0	5.094	236677
<i>Stock:</i>					
-industry	0.424	0.690	0	4.174	236677
-county	0.962	1.05	0	5.13	236677
<i>Flow:</i>					
-industry	0.122	0.346	0	3.045	236677
-county	0.348	0.61	0	3.892	236677
<i>Own experience:</i>					
-in host	0.05	0.247	0	5.226	236677
-in other countries	0.176	0.807	0	5.557	236677
Swedish affiliates in host	1.081	1.889	0	8.621	236677
Total FDI flow	7.434	3.144	-9.872	13.35	236677
Regulatory quality	2.288	0.74	0.182	3.474	236677

## 4 Regression results

In table 7 we report our results from conditional logit estimations of various versions of equation (3). The first two columns report results where the decision to invest is explained by the total previous presence of Norwegian firms (measured in t-1), while the remaining columns split previous presence into stock (measured in t-2) and flow (new investments during t-1). In columns 1-4 the Norwegian presence variables are calculated as the log of the number of investors present in the host, after adding 1 to avoid taking the log of zero.<sup>17</sup> In column 5 we simply use the number of investors as defined in table 5 as our Norwegian presence variables.

Overall we see that previous presence of Norwegian firms has a positive effect on the location decision for new investments. This holds whether we consider total Norwegian presence in the host country in t-1 (columns 1 and 2), or split total presence into the stock of Norwegian presence in t-2 and the flow of new investments during t-1 (columns 3-5).

<sup>17</sup>This is a common approach in the literature, see e.g. Head and Mayer (2004).

The effect is stronger within industries, while presence in the host by other firms from the same county of Norway has little effect on location decisions. The probability of choosing a particular host for new investment increases if the firm has previous experience from the same host, as can be seen from the variable for own experience in the host. From the positive and significant coefficient on the variable for the presence of affiliates of Swedish multinationals in the host country (columns 1 and 3), it could be argued that Norwegian firms tend to find also the presence of Swedish affiliates in a host as a positive signal for location. The coefficients on total FDI inflows and regulatory quality are insignificant in table 7.

The results in column 1 and 3 of table 7 do not contain interaction terms, and the coefficients can therefore be interpreted and compared to the results of previous studies. The magnitude of the coefficients in columns 1 and 3 can be interpreted as average probability elasticities (over all choosers and location choices) by multiplying the coefficients with the ratio  $\frac{S-1}{S}$  where  $S$  is the number of choices (Head et al., 1995).<sup>18</sup> Thus, our results in column 1 suggests that a 10 % increase in total Norwegian presence of firms within the same industry increase the likelihood of the average host being chosen as a location for new investments by close to 5,6 %, while the presence of firms in other industries whose headquarters are located in the same Norwegian county has no significant effect on location decisions. These results are quite similar to those found in both Head et al. (1995) and Head and Mayer (2004).<sup>19</sup>

In column 3 we split total Norwegian presence into the stock of Norwegian firms present in t-2 and the flow of new investors in t-1. Here the results suggest that a 10 % increase in either the stock or the flow of same industry investors from Norway increases the likelihood of an average host being chosen for a new investment by around 3-4 %. These results are comparable to those of Araújo (2009) who finds that a 10% increase in the number of Swedish

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<sup>18</sup>In our case we have 93 possible locations, thus the ratio  $\frac{S-1}{S}$  is very close to 1.

<sup>19</sup>Head et al. (1995) find that the presence of other Japanese firms within the same industry in an average state in the US would increase the likelihood of that state being chosen by a subsequent Japanese investor by 5-6 %. The results in Head and Mayer (2004) indicate that a 10% increase in the presence of other Japanese firms in a European region would increase the likelihood of a location being chosen for new investments by approximately 8.5%.

Table 7: The effect of Norwegian presence on the location of new FDI

	1	2	3	4	5
<i>Total presence:</i>					
-industry	.56 (.04)**	1.38 (.15)**			
-industry*inst. quality		-.29 (.05)**			
-county	.03 (.05)	-.36 (.14) <sup>(*)</sup>			
-county*inst. quality		.13 (.04)*			
<i>Flow:</i>					
-industry			.32 (.05)**	.90 (.28)*	.57 (.12)**
-industry*inst. quality				-.19 (.09) <sup>(*)</sup>	-.16 (.04)**
-county			-.02 (.04)	-.38 (.25)	-.07 (.09)
-county*inst. quality				.11 (.08)	.02 (.03)
<i>Stock:</i>					
-industry			.37 (.04)**	1.02 (.17)**	.33 (.05)**
-industry*inst. quality				-.23 (.06)**	-.10 (.02)**
-county			.03 (.05)	-.28 (.16)	-.02 (.02)
-county*inst.				.10 (.05) <sup>(*)</sup>	.01 (.01)
<i>Own experience:</i>					
-in chosen host	.80 (.06)**	4.11 (.30)**	.81 (.06)**	4.04 (.30)**	.83 (.10)**
-in host*inst. quality		-1.03 (.09)**		-1.00 (.09)**	-.25 (.03)**
-in other countries	-.06 (.04)	-.14 (.04)**	-.07 (.04)	-.15 (.04)**	.01 (.00)*
Swedish presence	.12 (.02)**	.12 (.07)	.12 (.02)**	.12 (.07)	-.00 (.00)*
Swedish pres*inst. quality		.00 (.02)		.00 (.02)	.00 (.00)*
Total FDI flow to host	.01 (.01)	-.05 (.04)	.01 (.01)	-.02 (.04)	-.07 (.04)
Total FDI*inst. quality		.02 (.01)		.01 (.01)	.02 (.01)
Institutional quality	-.16 (.14)	-.04 (.18)	-.16 (.14)	.01 (.18)	-.05 (.17)
Observations	236677	236677	236677	236677	236677
Pseudo R <sup>2</sup>	.22	.23	.22	.23	.21
Log likelihood	-9218	-9138	-9227	-9148	-9345

Note: Conditional logit estimates of choice of location for 2645 new Norwegian FDI projects in 93 countries for the years 1997, 1999, 2001, and 2003-2005. Country dummies are included in all regressions. \*\*,\*,<sup>(\*)</sup> indicate significance at 0.1%, 1%, and 5% respectively. Columns 1-4 use log transformations of the counts of Norwegian presence according to the following formula:  $v = \ln(x + 1)$ . In column 5 the Norwegian presence variables are the original counts of the number of other investors present in the host. The measure of institutional quality used is the Regulatory quality index from the Good Governance indicators (World Bank 2009).

affiliates established during the previous 2 years increases the the likelihood of location with 1.6 %.<sup>20</sup>

Our main interest lies in the variables for Norwegian presence and the interaction terms between previous presence and the institutional quality in host countries. We include these interaction terms in columns 2, 4 and 5. Our main hypothesis, that getting access to information from previous investors in a host is of more value to potential investors when they consider investing in countries with a poor institutional environment, is supported by the negative interaction terms between institutional quality and previous presence of investors in the host from the same industry in Norway. The coefficients for the variables on Swedish presence in the host, and the interaction term with institutional quality are insignificant in column 4 and very small in column 5. This is consistent with information sharing among Norwegian investors, but limited information sharing from Swedish investors as well as negligible signalling effects from Swedish investments.

In our regressions, the interpretation of the coefficients are complicated by the inclusion of the interaction terms. Hence, the impact of previous Norwegian presence on the localization of new investments depend in a non-linear way on the regulatory quality of the host.<sup>21</sup> In order to assess the magnitude of our results we therefore calculate the predicted probabilities from the regressions in column 5 of table 7, and then recalculate the predicted probabilities of choosing each destination if we add one additional investor to each of the variables capturing previous same-industry Norwegian presence in the host. We choose the results in column 5

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<sup>20</sup>Blonigen et al. (2005) use a somewhat different method of quantifying their conditional logit results, and calculate the change in probability for a regression variable as:  $(\frac{S-1}{S} \times coefficient \times st.dev) \times 100$ . They find that a one standard deviation increase in previous-year investment (flow) of firms belonging to the same horizontal keiretsu would increase the likelihood that a region is chosen for new investment by around 5.3%, while a standard deviation increase in the stock of investments within the same industry and same vertical keiretsu imply, respectively, a 23 % and 26 % increase in the probability. Implementing their method on our results from column 3 in table 7, we find that the effect on the probability of choosing a country for new investment from a one standard deviation increase in the within-industry flow and stock variables are 10.8 % and 25,2 % respectively.

<sup>21</sup>See Ai and Norton (2003) for an exposition of how the non-linear nature of logit estimation complicates the interpretation of coefficients when interaction terms are included

in this calculation because of the intuitive interpretation of adding one additional investor when the Norwegian presence variables are measured as count variables. We then assess the relative change in probability of choosing a host country for different levels of regulatory quality.<sup>22</sup> The results from this exercise are exhibited in table 8 and figure 2.

Table 8: Quantifying the impact of additional Norwegian presence

Quartiles of host country institutional quality:	Q1	Q2	Q3	Q4
<i>Average baseline probability of choosing a host country:</i>	0,3	0,5	0,6	3,2
<i>Relative change in probability due to one additional investor from the same industry in t-1(flow):</i>	27,7	12,4	2,1	-5,2
<i>Relative change in probability due to one additional investor from the same industry in t-2(stock):</i>	15,5	7,2	1,3	-2,9

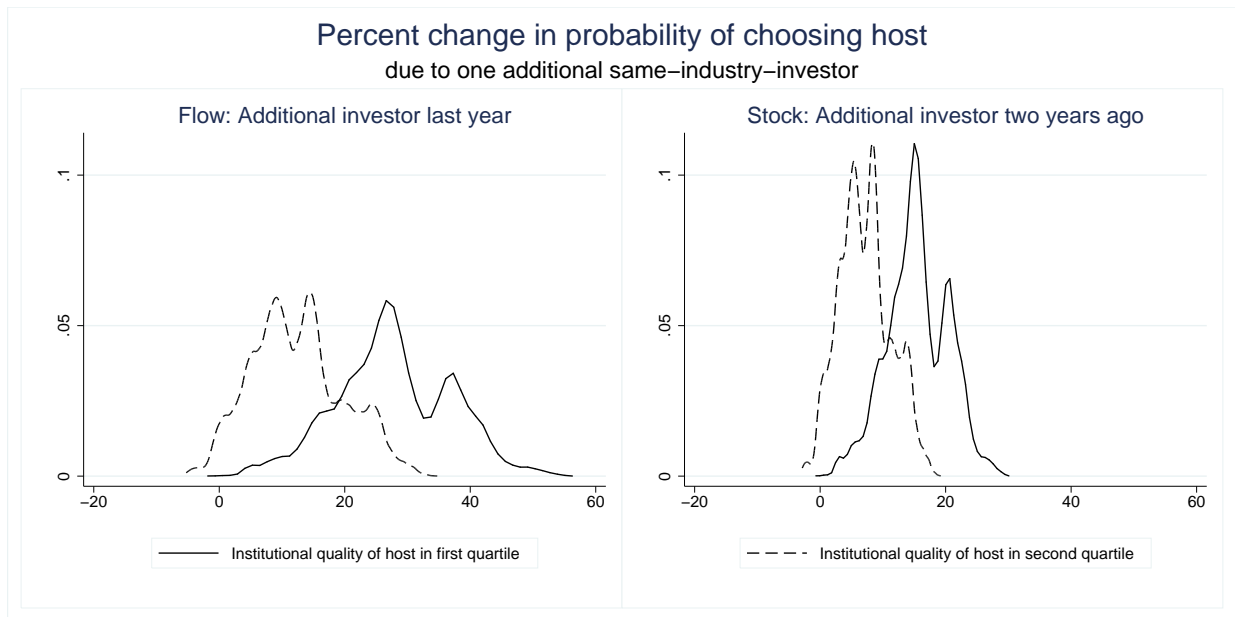
Table 8 shows in the first row the average baseline probabilities of locating new FDI to one of our 93 countries, depending on their institutional quality. The average probability of locating FDI in a country in the lowest quartile of institutional quality is only 0.3%, while the average probability of locating investments in countries within the top quartile of regulatory quality is 3.2%. After adding one additional investor to the variable that captures previous-year investments in the host by Norwegian firms from the same industry (the flow variable), the second row of table 8 shows an average increase in the probability of location by 27,7% for countries in the lowest quartile of regulatory quality. This change in probability following an extra Norwegian investor falls as regulatory quality increases. For countries in the top quartile of regulatory quality the average change in probability is small and negative.<sup>23</sup> In the last row of table 8 we add one additional investor to the variable capturing the number of Norwegian firms present in the host in the year  $t - 2$  (the stock variable). Again, additional

<sup>22</sup>This approach to quantifying effects of a conditional logit with interaction terms is similar to the exercise, although in a different setting, conducted by Martin, Mayer and Thoenig (2008).

<sup>23</sup>This is due to the nature of conditional logit estimation. The predicted probabilities for the location choice of a single investment sums to one, hence the sum of changes in probabilities following our experiments are zero.

Norwegian presence in a host increase the probability of new location the most for countries in the lowest quartile of institutional quality.

Figure 2: Quantifying the impact of additional Norwegian presence in host countries



While table 8 shows that an additional same-industry Norwegian investor in the host on average lead to a larger relative change in the probability of choosing the host for low levels of regulatory quality, we plot the the distribution of the relative changes in probability following our two experiments for the groups of host countries within the two lowest quartiles of regulatory quality in figure 2. The left hand panel shows the distribution following our first experiment of increasing the flow variable, while the right hand panel shows the distribution following an increase in the stock variable. It is clear from the figure that the whole distribution of the change in probability for countries in the bottom quartile dominates that of countries with better regulatory quality. These results are consistent with our hypothesis that information about a host country (before setting up operations) is more valuable to potential investors when the institutional environment in the host country is weak. Thus, increasing the information base (i.e. other Norwegian investors) in hosts with weak insti-

tutions facilitate further investments in these countries. Our results are also in line with the findings of Du et al. (2008) who study the link between institutional quality and foreign agglomerations in different regions of China. They find that regions with better institutions are more appealing to foreign enterprises, and also that the presence of foreign firms from the same industry have stronger effects on the localization decision of new FDI in regions with weaker institutions.<sup>24</sup>

The larger relative changes in location probabilities following an increase in the number of recent investors suggests that the information from the recent investors is more important for location choice than information from firms that have been present in the host for a longer time. This result is in line with the arguments and findings of Blonigen et al. (2005) who argue that the information/networking effect from the recent Japanese investors is stronger than from the Japanese investors having been in a host region for a longer time.

## 5 Robustness

In the regressions in table 7 we have only included country dummies. We have experimented with including different time varying host country variables to proxy for possible time varying attractiveness of host countries. Thus we included real GDP to measure market size, growth in GDP to measure market potential, trade openness measured by trade as a share of GDP, and macroeconomic stability proxied by the exchange rate.<sup>25</sup> However, these variables proved insignificant and did not affect our results, we therefore chose to exclude them from our regressions. We are also concerned that our finding of a clear pattern of clustering of Norwegian FDI could be driven by certain markets or countries opening up as clear investment opportunities with a flow of investments over a few years going to these countries. When markets become attractive for investment, this could be because they are experien-

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<sup>24</sup>Their measure of institutional quality is based upon results from a firm survey (the Chinese Private Enterprise Survey 1995-2002).

<sup>25</sup>The data is collected from the Penn World Tables (Heston, Summers and Aten, 2006).

cing economic growth, thus we have added GDP and the interaction between GDP and the Norwegian presence variables in our regressions, and also done a similar exercise with GDP growth. These specifications did not alter our results.

An alternative approach to control for omitted variable bias related to macroeconomic events that might affect the attractiveness of a country as location for FDI is to follow Blonigen et al. (2005) and include region-year dummies in the regressions. In the appendix we report how the results from columns 4 (reported in table A2) and 5 (reported in table A3) of our main regressions in table 7 are affected by including different additional fixed effects. First, in the second columns of tables A2 and A3 we include region-year dummies based on dividing the host countries into 10 different geographical regions. Results are very similar to our baseline regressions reported in the first column of these tables.<sup>26</sup>

Our conditional logit estimates reported in table 7 are grouped on the identifier of the new affiliate. This means that both year and industry dummies are constant over the potential choices of a single chooser (investor). Hence, neither year or industry dummies can be included. An alternative approach is to group the estimations on the identifier of the investing firm at home. As at least some investors invest in several countries and at different points in time, it is then possible to include industry-year dummies. Thus in the last three columns of tables A2 and A3 we report results of conditional logit estimates grouped on the identifier of the investing firm, with different fixed effects included. Also these results show the same picture as previously reported, if anything the impact of Norwegian presence in countries with low quality institutions seem even stronger when grouping the conditional logit on the investing firm identifier and including both region-year and industry-year fixed effects. From the AIC and BIC values shown in these tables, it is not entirely clear which regression should

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<sup>26</sup>We have also tried to include country-year dummies (not reported). This does not change the coefficients much, but measures of model diagnostics like the Akaike and Bayesian information criteria, the log likelihood and pseudo R squared all suggest that the simpler model with region-year fixed effects should be preferred.



be preferred based on these model diagnostics as they are sometimes conflicting. Thus, we have chosen the simplest version as our main specification in table 7.

A further robustness check we do is to use alternative proxies for institutional quality. Our preferred measure is the index of regulatory quality, and in table A1 of the appendix we report results from using different proxies for institutional quality from the World Bank Governance indicators. These are respectively rule of law, control of corruption, and political stability. All definitions are from Kaufmann et al. (2010).<sup>27</sup> The direction and significance of our results with respect to the variables for stock and flow of previous investors from the same industry are not affected by which measure of institutional quality we employ. The coefficients on the stock of presence by investors from the same county (but not the same industry) are not significant, while the coefficients on the variables capturing the recent investors from other industries in the same county are significant in some of the regressions and with the opposite sign as the variables for recent investors from the same industry. This may reflect that Norwegian FDI from different industries tend to go to different types of countries.<sup>28</sup>

The main concern about the conditional logit model is the assumption of independence from irrelevant alternatives (IIA). This implies that the ratio of probabilities of choosing two locations is independent of the characteristics of a third location. Violating IIA may lead a model to incorrectly predict the probability of choosing a particular destination while at the same time underestimate the probability of choosing another location. Hausman and

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<sup>27</sup>The control of corruption index is intended to capture "perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests." Rule of law is intended to measure "perceptions on the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence". The political stability index is intended to capture "perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism".

<sup>28</sup>In unreported regressions we have repeated the regressions of table A1 when we group our conditional logit estimates on the investing firm identifier and include both region-year and industry-year interaction dummies. These regressions show consistently the same patterns of signs and significance of coefficients as that of column 1 of table A1.

McFadden (1984) suggest that IIA can be tested by first estimating the model on the full set of alternatives and then estimate the model on a subset of alternatives. If IIA holds then the two sets of estimates should not be statistically different. Head et al. (1995) argue in addition that unobserved characteristics of the choosers might make some choices closer substitutes from the perspective of certain choosers such that the IIA assumption is violated. Therefore the coefficient estimates may not only depend on the sample of choices, but also on the sample of choosers.

To test the validity of the IIA conditions we therefore exclude subsets of countries and subsets of investors from our base model (column 5 of table 7) and report the results in table 9. In the first column 1 we exclude the transition countries of Eastern Europe from the choice set. Our results are largely unchanged, thus our results do not seem to be driven by the opening up of Eastern Europe as an investment location during this period. In the second column we exclude the four countries where the number of investors present in the host exceed 45 investors in at least one year, these countries are Denmark, the US, UK and Germany. In columns 3-6 we exclude in each case one of the most important industries in terms of FDI (at the two digit NACE level). These are NACE 11 (petroleum sector), NACE 51 (wholesale trade and commission trade), Nace 61 (foreign shipping) and NACE 74 (business services). The last column of table 9 reports the result of our main regression when we only include investors without previous experience in the host country they choose to invest in. In this case we do not include the variables for the firms' own FDI experience.

The Hausman test for equality of the full set of regressors cannot be used when excluding countries from the choice set as this also changes the number of country fixed effects that are included in the regressors. Thus, both Head et al. (1995) and Blonigen et al. (2005) focus on the coefficients of main interest in their respective studies when discussing the IIA assumption. We follow this approach here. The test that all coefficients, apart from the country dummies, are equal to those of column 5 in table 7 is rejected for most the columns

of table 9 (the exception being when excluding the US from the choice set). When testing the equality of individual coefficients, for most coefficients the null hypothesis that the coefficient is equal to the corresponding coefficient in column 5 of table 7 cannot be rejected. Looking across the columns of table 9, signs, magnitude and significance of the estimated coefficients remain remarkably stable.

As an alternative to excluding certain countries from the choice set of investors, we have also divided the 89 countries of our sample into 4 groups according to the average of the four indices of institutional quality from the Good Governance indicators. We have then estimated the conditional logit within each quartile of countries according to institutional quality. In this case we have not included the interaction terms between Norwegian presence and institutional quality. Results from these four conditional logit estimations show the same pattern as our previous results, and the odds ratios from these regressions are reported in table 10. Again, it is only the variables for Norwegian presence from the same industry that have significant effects, while previous investors from the same county do not seem to have an impact on subsequent Norwegian investments into the host. For the countries with the lowest institutional quality (column 1) increasing the flow of Norwegian presence with one investor multiplies the odds of investing in that host by about 2.5, i.e. more than doubles the odds. For the countries with the best institutional quality (column 4) increasing the flow of Norwegian presence with one investor hardly changes the odds of investing in that host with an odds ratio of 1.03. The pattern is similar, but less striking for the stock of previous investors. As institutional quality improves, the impact from recent investors on location choice falls. This is consistent with the role of information sharing among investors being less important for countries with good institutions.

Table 9: Excluding selected countries and investors from the choice set

	Excluded countries			Excluded investors			
	Eastern Europe	Countries with >45 investments	Nace 11	Nace 51	Nace 61	Nace 74	Investors without exp. in host
<i>Flow:</i>							
-industry	.53 (.13)**	.35 (.14)(*)	.54 (.13)**	.62 (.13)**	.57 (.16)**	.56 (.13)**	.63 (.13)**
-industry*inst. quality	-.15 (.04)**	-.04 (.05)	-.16 (.04)**	-.18 (.04)**	-.16 (.05)*	-.16 (.04)**	-.19 (.04)**
-country	-.04 (.09)	-.23 (.11)(*)	-.06 (.09)	-.03 (.09)	-.05 (.09)	-.02 (.09)	-.01 (.10)
-country*inst. quality	.01 (.03)	.07 (.04)(*)	.02 (.03)	.01 (.03)	.02 (.03)	.01 (.03)	.01 (.03)
<i>Stock:</i>							
-industry	.33 (.05)**	.36 (.05)**	.29 (.06)**	.34 (.05)**	.32 (.06)**	.37 (.05)**	.36 (.06)**
-industry*inst. quality	-.10 (.02)**	-.09 (.02)**	-.09 (.02)**	-.10 (.02)**	-.10 (.02)**	-.11 (.02)**	-.11 (.02)**
-country	-.00 (.03)	-.09 (.03)(*)	-.01 (.03)	-.02 (.03)	-.02 (.03)	-.03 (.03)	-.02 (.03)
-country*inst. quality	.00 (.01)	.03 (.01)(*)	.00 (.01)	.01 (.01)	.01 (.01)	.01 (.01)	.01 (.01)
<i>Own experience:</i>							
-in chosen host	.73 (.11)**	.71 (.12)**	1.44 (.14)**	.80 (.10)**	.80 (.10)**	.76 (.11)**	
-in host*inst. quality	-.22 (.03)**	-.19 (.04)**	-.44 (.04)**	-.24 (.03)**	-.25 (.03)**	-.23 (.03)**	
-in other countries	.00 (.00)(*)	.00 (.00)	.00 (.00)	.01 (.00)*	.01 (.00)*	.01 (.00)**	-14.06 (367.66)
Swedish presence	-.00 (.00)*	-.00 (.00)	-.00 (.00)*	.00 (.00)	-.00 (.00)*	-.00 (.00)*	-.00 (.00)(*)
Swedish pres.*inst. quality	.00 (.00)**	.00 (.00)	.00 (.00)*	-.00 (.00)	.00 (.00)*	.00 (.00)*	.00 (.00)*
Observations	178788	141330	219874	218027	216411	210088	178322
Pseudo R <sup>2</sup>	.24	.15	.22	.21	.22	.21	.22
Log likelihood	-7742	-6235	-8574	-8647	-8515	-8300	-7001
Number of locations	80	89	93	93	93	93	93
Number of investments	2335	1652	2457	2435	2419	2348	1994

Note: Conditional logit estimates of choice of location for new Norwegian FDI projects in the years 1997, 1999, 2001, and 2003-2005. Country dummies are included in all regressions. Total FDI inflow and institutional quality are included in all regressions, but not reported to save space coefficients were not significant. \*\*, \* (\*), indicate significance at 0.1%, 1%, and 5% respectively. The Norwegian presence variables are the original counts of the number of other investors present in the host. The measure of institutional quality is the Regulatory quality index from the Good Governance indicators (World Bank 2009).

Table 10: Conditional logit estimates on location of FDI: odds ratios:

	Q1	Q2	Q3	Q4
<i>Norwegian presence: Flow</i>				
-industry	2.49 (.49)**	1.19 (.16)	1.16 (.08) <sup>(*)</sup>	1.03 (.01)*
-county	.93 (.12)	.94 (.09)	1.02 (.05)	1.00 (.00)
<i>Norwegian presence: Stock</i>				
-industry	1.24 (.08)*	1.12 (.05)*	1.11 (.04)*	1.02 (.01)*
-county	.96 (.07)	.92 (.03) <sup>(*)</sup>	1.00 (.02)	1.00 (.00)
<i>Own experience:</i>				
-in chosen host	2.48 (.68)**	2.23 (.30)**	1.51 (.11)**	1.03 (.01)**
-in other countries	.99 (.01)	1.00 (.00)	1.00 (.00)	1.01 (.00)**
Swedish presence	1.00 (.00)	1.00 (.00)	1.00 (.00)	1.00 (.00) <sup>(*)</sup>
Total FDI inflow to host	.93 (.03)	.89 (.11)	1.06 (.05)	1.01 (.01)
Observations	3796	7619	8864	36678
Pseudo R <sup>2</sup>	.18	.16	.20	.17
Log likelihood	-427	-849	-993	-4440
Number of investments	168	319	401	1757
Number of locations	23	24	24	22

Note: Conditional logit estimates of choice of location for new Norwegian FDI projects in 1997, 1999, 2001, and 2003-2005. Odds ratios are reported. Country dummies are included in all regressions. \*\*, \*, <sup>(\*)</sup> indicate significance at 0.1%, 1%, and 5% respectively. Column 1 (2, 3 and 4) includes investments located in countries within the lowest (second, 3rd and 4th) quartile of institutional quality.

## 6 Conclusions

In this paper our aim has been to assess whether access to information about conditions in host countries plays a role in the location decisions of Norwegian foreign direct investment. We argue that getting access to information about a host from other investors with previous experience is valuable to new investors. Such information may reduce the fixed costs of FDI or may reduce operating costs once the affiliate in the host has been established. We believe that these benefits of information sharing are important in the planning phase for foreign direct investment, and that they are different from the potential benefit from ‘Marshallian’ agglomeration externalities once the investment has taken place. The actual sharing of information among firms can of course not be observed. Our approach to disentangle information effects from traditional agglomeration externalities is based on the argument that on the one hand the value of getting access to information about host country conditions in the planning phase for an investment is greater when an investor considers investing in a country where the institutional environment is weak, government policies are not transparent, corruption is regarded as a problem, etc. On the other hand, we believe that the potential benefit from agglomeration externalities, like access to a pool of labour or intermediate inputs, should be less dependent on the institutional environment of a host country.

We estimate conditional logit models of location choice for 2645 new Norwegian FDI projects in 93 countries in the period 1997-2005, where we include interaction terms between measures of previous presence of Norwegian firms in the host and proxies for institutional quality from the World Bank Good Governance indicators. We find that the interaction terms between previous Norwegian presence from the same industry and institutional quality have negative and significant coefficients, while previous presence of Norwegian investors from the same industry have a positive and significant effect on location choice. These results are consistent with the hypothesis that previous investors to a host country share information

that affect the FDI decisions of other Norwegian firms in the same industry. This result is in line with the findings in Blonigen et al. (2005) for Japanese FDI. They argue that information-sharing may allow a firm to better navigate the tax/regulatory environment of a foreign country and better site its plant, lowering initial setup costs, as well as operating costs. This would then make location in the region more likely. What we add, is the finding that such information-sharing has a larger effect for countries with poor institutions. We find that the establishment of one additional Norwegian investor in a host country in year  $t-1$  increases the probability of a new investor locating in that country in year  $t$  by around 25 % for countries in the lowest quartile of institutional quality. The effect of previous Norwegian investors from the same industry falls quickly as institutional quality improves.

From a somewhat different perspective, Harding and Javorcik (2011) find that host country efforts to attract FDI by using investment promotion agencies (IPAs) are more effective for host countries where the information asymmetries between the host and potential foreign investors are large. Their interpretation is that these IPAs reduce transaction costs facing foreign investors by providing information on business opportunities and helping foreign investors deal with bureaucratic procedures. Our results complement theirs on the role of information in promoting FDI. While their analysis focus on the role of information spread by host country governments, our focus is on information sharing among investors from the same home country. Taken together, the results would perhaps suggest that IPAs that target one or a few source countries for FDI would be even more effective as the host governments efforts to provide information could be supported by information sharing within networks of source country firms.

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# Appendix

Table A1: Robustness: Different measures of institutional quality

	1	2	3	4
<i>Flow:</i>				
-industry	.57 (.12)**	.50 (.11)**	.39 (.10)**	.51 (.11)**
-industry*inst. quality	-.16 (.04)**	-.14 (.03)**	-.10 (.03)**	-.15 (.04)**
-county	-.07 (.09)	-.19 (.09)*	-.18 (.07)*	-.28 (.07)**
-county*inst. quality	.02 (.03)	.06 (.03)*	.05 (.02)*	.09 (.02)**
<i>Stock:</i>				
-industry	.33 (.05)**	.38 (.04)**	.37 (.04)**	.22 (.03)**
-industry*inst. quality	-.10 (.02)**	-.11 (.01)**	-.10 (.01)**	-.07 (.01)**
-county	-.02 (.02)	-.05 (.03)	-.04 (.02)	.00 (.01)
-county*inst. quality	.01 (.01)	.02 (.01)	.01 (.01) <sup>(*)</sup>	.00 (.00)
<i>Own experience:</i>				
-in chosen host	.83 (.10)**	1.34 (.09)**	1.21 (.08)**	.21 (.07)*
-in host*inst. quality	-.25 (.03)**	-.40 (.03)**	-.34 (.02)**	-.07 (.03)*
-in other countries	.01 (.00)*	.00 (.00)	.00 (.00)	.01 (.00)**
Swedish presence	-.00 (.00)*	-.00 (.00)	-.00 (.00)	-.00 (.00)**
Swedish pres*inst.quality	.00 (.00)*	.00 (.00)	.00 (.00)	.00 (.00)**
Total FDI flow to host	-.07 (.04)	-.07 (.04)	-.07 (.04)	-.10 (.04)*
Total FDI*inst. quality	.02 (.01)	.02 (.01)	.02 (.01)	.04 (.01)*
Institutional quality	-.05 (.17)	.22 (.26)	.11 (.23)	-.11 (.18)
Observations	236677	236677	236677	236677
Pseudo R <sup>2</sup>	.21	.22	.22	.21
Log likelihood	-9345	-9264	-9262	-9359

Note: Column 1 repeats column 5 of table 7. Columns 2-4 uses alternative measures of institutional quality from the Good Governance indicators (World Bank 2009); respectively rule of law, control of corruption and political stability. \*\*, \*, <sup>(\*)</sup> indicate significance at 0.1%, 1%, and 5% respectively.

Table A2: Robustness to various fixed effects: 1

	1	2	3	4	5
<i>Flow:</i>					
-industry	.90 (.28)*	.92 (.29)*	.88 (.28)*	1.38 (.28)**	1.52 (.28)**
-industry*inst. quality	-.19 (.09) <sup>(*)</sup>	-.21 (.09) <sup>(*)</sup>	-.19 (.09) <sup>(*)</sup>	-.36 (.09)**	-.40 (.09)**
-county	-.38 (.25)	-.19 (.27)	-.38 (.25)	.29 (.27)	.29 (.27)
-county*inst. quality	.11 (.08)	.03 (.09)	.11 (.08)	-.11 (.09)	-.12 (.09)
<i>Stock:</i>					
-industry	1.02 (.17)**	.94 (.18)**	1.03 (.17)**	1.36 (.17)**	1.22 (.18)**
-industry*inst. quality	-.23 (.06)**	-.19 (.06)*	-.23 (.06)**	-.27 (.06)**	-.23 (.06)**
-county	-.28 (.16)	-.51 (.18)*	-.31 (.16) <sup>(*)</sup>	.11 (.17)	-.13 (.17)
-county*inst. quality	.10 (.05) <sup>(*)</sup>	.20 (.06)**	.11 (.05) <sup>(*)</sup>	.12 (.06) <sup>(*)</sup>	.20 (.06)**
<i>Own experience:</i>					
-in chosen host	4.04 (.30)**	4.17 (.30)**	4.17 (.31)**	4.38 (.32)**	4.54 (.32)**
-in host*inst. quality	-1.00 (.09)**	-1.05 (.09)**	-1.02 (.09)**	-1.09 (.10)**	-1.14 (.10)**
-in other countries	-.15 (.04)**	-.15 (.04)**	-.20 (.04)**	-.17 (.04)**	-.17 (.04)**
Swedish presence	.12 (.07)	.10 (.07)	.12 (.07)	.20 (.06)*	.21 (.06)*
Swedish pres*inst.quality	.00 (.02)	.00 (.02)	.00 (.02)	-.01 (.02)	-.01 (.02)
Total FDI flow to host	-.02 (.04)	-.05 (.05)	-.02 (.04)	.02 (.04)	.05 (.04)
Total FDI*inst. quality	.01 (.01)	.01 (.02)	.01 (.01)	-.00 (.01)	-.01 (.01)
Institutional quality	.01 (.18)	-.11 (.21)	-.06 (.18)	.40 (.10)**	.39 (.10)**
Observations	236677	236677	236677	236677	236677
Pseudo R <sup>2</sup>	.23	.23	.21	.20	.20
Log likelihood	-9148	-9109	-10526	-10613	-10612
AIC	18512	18525	21268	21377	21314
BIC	19632	20112	22388	22155	21781
Grouped by affiliate id	Yes	Yes			
Grouped by investing firm id			Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes		
Region-year fixed effects		Yes		Yes	Yes
Industry-year fixed effects					Yes

Note: Column 1 repeats column 4 of table 7. \*\*, \*, <sup>(\*)</sup> indicate significance at 0.1%, 1%, and 5% respectively. Variables for Norwegian presence are log transformations of the counts of Norwegian presence after adding 1. There are 10 regions and 12 industries used in the interaction dummies.

Table A3: Robustness to various fixed effects: 2

	1	2	3	4	5
<i>Flow:</i>					
-industry	.57 (.12)**	.57 (.13)**	.56 (.12)**	.81 (.13)**	.85 (.13)**
-industry*inst. quality	-.16 (.04)**	-.17 (.04)**	-.16 (.04)**	-.24 (.04)**	-.25 (.04)**
-county	-.07 (.09)	-.02 (.09)	-.08 (.09)	.01 (.11)	.06 (.11)
-county*inst. quality	.02 (.03)	.01 (.03)	.03 (.03)	-.01 (.03)	-.02 (.03)
<i>Stock:</i>					
-industry	.33 (.05)**	.26 (.05)**	.33 (.05)**	.53 (.05)**	.47 (.05)**
-industry*inst. quality	-.10 (.02)**	-.08 (.02)**	-.10 (.02)**	-.15 (.02)**	-.13 (.02)**
-county	-.02 (.02)	-.05 (.03)	-.01 (.02)	.11 (.03)**	.04 (.03)
-county*inst. quality	.01 (.01)	.02 (.01)	.00 (.01)	-.03 (.01)**	-.01 (.01)
<i>Own experience:</i>					
-in chosen host	.83 (.10)**	.86 (.10)**	.89 (.10)**	.87 (.11)**	.86 (.11)**
-in host*inst. quality	-.25 (.03)**	-.26 (.03)**	-.27 (.03)**	-.27 (.03)**	-.26 (.03)**
-in other countries	.01 (.00)*	.01 (.00)*	.00 (.00)	.00 (.00)**	.01 (.00)**
Swedish presence	-.00 (.00)*	-.00 (.00)*	-.00 (.00)*	-.00 (.00)*	-.00 (.00)*
Swedish pres*inst.quality	.00 (.00)*	.00 (.00)*	.00 (.00)*	.00 (.00)*	.00 (.00)*
Total FDI flow to host	-.07 (.04)	-.09 (.05)	-.07 (.04)	.02 (.04)	.06 (.04)
Total FDI*inst. quality	.02 (.01)	.03 (.02)	.02 (.01)	.01 (.01)	.00 (.01)
Institutional quality	-.05 (.17)	-.07 (.20)	-.06 (.17)	.73 (.11)**	.73 (.12)**
Observations	236677	236677	236677	236677	236677
Pseudo R <sup>2</sup>	.21	.22	.19	.16	.16
Log likelihood	-9345	-9311	-10728	-11116	-11120
AIC	18905	18928	21672	22382	22460
BIC	20026	20515	22793	23160	23601
Grouped by affiliate id	Yes	Yes			
Grouped by investing firm id			Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes		
Region-year fixed effects		Yes		Yes	Yes
Industry-year fixed effects					Yes

Note: Column 1 repeats column 5 of table 7. \*\*, \*, (\*) indicate significance at 0.1%, 1%, and 5% respectively. Variables for Norwegian presence are log transformations of the counts of Norwegian presence after adding 1. There are 10 regions and 12 industries used in the interaction dummies.

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# NHH

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**Norges  
Handelshøyskole**

Norwegian School of Economics

NHH  
Helleveien 30  
NO-5045 Bergen  
Norway

Tlf/Tel: +47 55 95 90 00  
Faks/Fax: +47 55 95 91 00  
[nhh.postmottak@nhh.no](mailto:nhh.postmottak@nhh.no)  
[www.nhh.no](http://www.nhh.no)