A Spatial-Sectoral Home and Host Country Assessment of United States Direct Investment in Canada

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There is a large body of empirical research describing the geographic patterns of, and the underlying reasons for, foreign direct investment (FDI). Generally, this research has been conducted at an aggregate level both spatially and sectorally. However, it is certain that more disaggregated approaches can yield important insights. This is particularly true for developed economies where regional differences influence investment decisions. General macro level knowledge can be assumed but regional-based knowledge will be less certain (Qu and Green 1997; Mariotti and Piscitello 1995).

In this paper, we provide a detailed spatial assessment of US foreign direct investment in Canada disaggregated by industrial sector, province and state. Moreover, we explore the importance of established economic conditions (as measured by trade flows, number of establishments and distance) on the spatial choices made by US foreign direct investors operating within the highly-integrated and compatible Canadian and US economies. Due to this explicit home and host location viewpoint in explaining spatial-sectoral direct investments patterns, we believe this itemised spatial appraisal of Canada FDI from the US is distinctive.

The host country approach is typified by Dunning's (1977) "Eclectic Paradigm of International Production". According to Dunning's model, a firm is unlikely to invest directly in a foreign country if firm (ownership)-specific,

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internalisation and country (location)-specific advantages are missing (see also Rugman et al 1985). Firm-specific advantages (which are chiefly knowledge-based or technology-oriented attributes) and internalisation properties (the ability to keep these advantages intact) provide the 'competitive edge' that a given multinational enterprise (MNE) has over rival firms operating in a market. However, consideration of differences in location-specific advantages is also important. In other words, host locations that are most frequently chosen are those that allow for the most profitable use of an MNE's firm-specific advantages. Some of the more common host country considerations that Dunning and others have recognised as important to foreign direct investors include:

- Market factors -- which consists of not only market size and growth potential but also the ability to maintain market shares and to promote trade between the subsidiary and parent company (and, thereby to realise transfer pricing advantages);
- Natural and created resource endowment;
- Cost factors -- which encompass factors influencing the cost of production (such as labour, energy and supporting industry);
- Societal and a financial infrastructure -- such as credit, legal, and educational facilities;
- Transportation and communication infrastructures;
- Economies of centralisation for R&D and marketing;
- Artificial barriers -- such as import controls on the trade of goods and services and exchange rate differentials;
- The investment climate -- which consists mainly of political stability, general attitudes toward FDI (which includes corporate tax rates and regulations), and industrial incentives and disincentives; and
- Cultural differences and similarities (Dunning 1977, 1993; Rugman 1980).

Although Dunning (1993) also recognised that home countries may benefit to varying degrees from the location-specific decisions of their MNEs, his theory is predominantly based on demonstrating what criteria enable host countries to attract FDI.

In 1990, Porter added to the FDI literature by providing a theory that helps to explain the global pattern of FDI (and trade) largely from the perspective of differing home country characteristics. With respect to FDI, Porter claims that firms that have attained success within the global market have done so because of their ability to extend their home-based advantages abroad. The home country, then, acts as an incubator and outward FDI is shaped by the country's: qualities of labour, appropriateness of production factors, market and demand conditions, support industries, competitive atmosphere, government policy and so on. Porter agrees that while host country characteristics (and a firm's proper selection of an investment site) are relevant, it is the projection of home-based advantages that, in his estimation, are more important in explaining why certain

corporations thrive in the international environment (and others do not).

Therefore, in attempting to ascertain which spatial factors explain the global pattern of FDI activity, it would seem reasonable to assume that the concurrent consideration of both home and host country conditions would be beneficial. Yet, there have been few empirical studies that have considered the case of direct investment into Canada from a detailed home and host country perspective. Most research has been directed toward testing only the "host-specific" (or Canada-based) factors that have influenced the spatial decisions of direct investment. Essentially, many of these Canadian studies have (at least implicitly) tested many of Dunning's location-specific criteria. Yet, for the specific case of US direct investment into Canada, this approach may be less than optimal. Globerman and Shapiro (1998) state that:

> "From study to study, the evidence varies on the effect of cost differentials, tariff and non-tariff barriers, natural resources, exchange rate stability, tax rates and political stability. The tendency is for these factors to be more important when the host countries are developing rather than developed economies" (Globerman and Shapiro 1998: 12).

Thus, in considering the determinants of US FDI into Canada, one must not only be mindful to incorporate both home and host country considerations, but also that many of these "traditional" determinants (as theorised by Dunning and Porter) may have only marginal effect in explaining the geographic pattern of FDI between two mature and highly-integrated economies. It may well be, then, that new FDI from the US into Canada is disproportionately driven by previous economic activity (in both home and host locations). In that, it can be surmised that areas of substantial economic activity (as measured by the number of establishments and trade flows) will experience more FDI activity than will those areas with more modest economic bustle. The result, then, will be an increased polarisation of US direct investment activity in regions of established economic clout and a significant dispersal of FDI activity into other regions (either as home-controlling or host-receiving) is less likely. Therefore, the intentions of this study are to not only provide a detailed spatial-sectoral view of US (home) and Canada (host) direct investments flows, but also to more specifically examine how regional differentials in established economic position influence US direct investment spatial-sectoral patterns in Canada.

The Geography of FDI in Canada: A Selection of Studies

While there has been considerable empirical inquiry into describing and explaining FDI in Canada, there have been far fewer studies that have a spatial empha-

sis. Most empirical research has concentrated on aggregated (total) investment inflows into Canada (typically in terms of value of investment) but with little consideration on where the investment agglomerates in Canada (beyond the national scale) or on assessing the particulars of the locations from which investment originates. For those interested in studies focusing on aggregate investment flows into Canada, please consult: Caves (1974), Rugman (1980), Owen (1982), Rugman (1990), Baldwin and Caves (1991), Baldwin and Gorecki (1991), Khemani (1991), Globerman et al (1994), Goldberg and Kolstad (1995), MacPherson (1996), Niosi (1996), Tan and Vertinsky (1996), Banerjee (1997), and Globerman and Shapiro (1998). Studies that have accentuated the "home" and "host" spatial patterns of Canadian FDI are provided by: Ray (1971), Blain and Norcliffe (1988), Green and McNaughton (1989), McNaughton (1992a, 1992b), and Edgington (1994, 1995, 1996).

Ray (1971) found that the determinants of Canadian manufacturing FDI could not be explained by economic factors alone, but that two place-specific criteria played an integral role: the size of US metropolitan areas and their distance from Canada. He found that the strongest parent-subsidiary connections (as measured by frequency of investment) with the US involved Toronto (especially with New York and Chicago). In fact, Toronto's influence as a manufacturing subsidiary target was so strong that other Canadian cities beyond Toronto (relative to the distances from US centres) suffered "economic shadow" (a diminished ability to attract US investment). Arguably, Ray was the first to establish (using data from the 1960s) the relevance of structural qualities (in terms of regional market size and distances) in explaining US-based manufacturing FDI into Canada.

Blain and Norcliffe (1988) provide a sectoral and temporal view (from 1965 to 1984) of Japanese investment in Canada. While the study does not provide disaggregated information on the spatial origins of the investment, it does provide a regional account of where investment has accumulated in Canada. They found that Ontario and British Columbia accounted for most Japanese direct investment (72 %) and that Toronto (especially for the trade sector) and Vancouver (particularly for resource activities) captured most of the provincial shares. In general, the authors found that Japanese investment was very polarised in Canada (as Toronto, Vancouver, Montreal and Calgary contained virtually all of it). While not directly tested, the authors surmised that intrinsic differences between the countries explain much of the investment. Namely, that Canada's low population to resource endowment ratio, highly urban-based labour force and relative absence of capital created a complementary climate for investors from Japan.

In describing overall merger and acquisition (M and A) activity in Canada, Green and McNaughton (1989) did provide a brief section on the home and host patterns of foreign-controlled mergers in Canada. From 1962 to 1984, they found that the US was by far the greatest contributor and, at the city level, that London (UK) was the only non-US centre of any great consequence (in terms of

investment frequency). The targets of these investments were highly clustered in Canada: Toronto particularly (at 34.1 % of all foreign M and As) but Montreal, Vancouver and Calgary were also frequently chosen. As a result, the authors concluded that the size of metropolitan markets (in particularly the US-origin and Canadian-target centres) is a vital component in explaining foreign M and A activity in Canada.

Similar conclusions are found in McNaughton's (1992a) specific view of US direct investment in Canada. By utilising data (1985-1989) containing both US-origin and Canada-target information, he was able to provide valuable spatial-sector observations (including the importance of Toronto as target and the disproportionate influence of US market size in influencing the spatial pattern). Yet, it was found, that the overall "US-metropolitan" to "Canada-metropolitan" flow of investment does differ slightly by industrial sector and, in some cases, was influenced by distance between the centres. To augment these findings, McNaughton (1992b) discovered that there were differences in the spatial investment tendencies of US direct investors and non-US direct investors. Specifically, it was established that "core to core" connections were indeed important for US-origin Canadian FDI, but that non-US investors concentrated on Canadian core (large market) areas to an even greater degree.

Japanese direct investment in Canada is emphasized in a trio of studies by Edgington (1994, 1995, 1996). The 1994 study provides a spatial and sectoral overview of Japanese FDI that showed (from 1980 to 1989) that not only had investment frequency increased, but that greater sectoral diversity in investment type had occurred, especially in southern Ontario. However, the author argues, that on the strength of Japanese tourism in British Columbia and Alberta (in the 1990s), it is predictable that greater Japanese investment frequency and diversity may also soon be achieved in Canada's two most western provinces. In fact, at least for real estate activity, a subsequent study by Edgington (1996) confirmed this shift of Japanese investment emphasis away from central Canada in favour particularly of Vancouver. The author argues that this is a result of spatial differences in Japanese insight (which tends to be very extensive regarding real estate and other related matters in Vancouver but comparatively quite moderate in central Canada). Edgington expects this trend of diversification to continue and projects that Japanese investment in Canada's west will agglomerate significantly in retail and tourism activities.

The specific case of Japanese-controlled manufacturing FDI in southern Ontario was also explored by Edgington (1995). It illustrates that this region has been one of the favoured North American locations for Japanese investors (since the early 1980s). More precisely, it is shown that most of this manufacturing investment has taken place between metropolitan Toronto and the US border and that the majority of firms can be classified into four types: auto-assembly firms, auto-parts suppliers, a diverse number of industrial part makers (from metalised film producers to industrial gas manufacturers) and consumer electronics firms. Interestingly, based on a survey of companies in each of these four classes, the

North American Free-Trade Agreement is not a threat to the existing stock of Japanese direct investments. Edgington assessed that since most of the Japanese subsidiaries located in southern Ontario have put high value on the skilled labour force and proximity to key US and Canadian markets, few benefits would be reaped by relocating in Mexico.

These studies represent a subset of the total universe of Canadian FDI literature and are distinguished by their deliberate geographic approach (by considering sub-national locational patterns). While these studies often imply the importance of structural economic characteristics in explaining the patterns, only Ray (1971) explicitly verified the significance of the market (by origin and destination) and distance (for US manufacturing firms operating in Canada during the 1960s). As a result, we approach the question of US investment into Canada from a detailed "home" and "host" country perspective and directly address the importance of "spatial" differentials in market, trade and distance in explaining spatial-sectoral patterns.

The Data and the Dominance of US Direct Investment in Canada

The primary data used in this study are Canadian foreign direct investments (CFDIs) made by US-based investors (for the years 1985 to 1998) from the *Trade Information Enquiry Retrieval Systems (TIERS)* database (maintained by Statistics Canada). In all, 3,661 direct investment cases have complete information: the name of the investor and investee, the four digit Canadian standard industrial codes (SIC) of the investment, the investor's home state and the province or territory in which the investment was made in Canada. Another 6,927 direct investments are incomplete (with, most often, location information missing) but were still utilised in various parts of the analysis.

The immense significance of the United States as source nation for direct investment in Canada is obvious. Table 1 shows that from 1985 to 1998, more than 60 % of all new foreign direct investments made in Canada have originated from the United States. The United Kingdom (at almost 10 %) also makes up a sizable component of CFDI and other core nations are notable, but, as has been the case in the entire post-WWII period, the US was clearly unrivalled as Canada's most important source country for CFDI. The importance of the United States is also illustrated on Figure 1. The temporal pattern of global direct investments into Canada and US direct investment into Canada has been similar. This indicates the enormous influence of the United States on Canada's overall trend.

The Spatial-Sectoral Patterns of US Direct Investment in Canada

Comparison by industrial classifications of these CFDIs from the US provides some illustrative observations (Table 2). To allow for compatibility with trade and establishment data utilised later in this paper, the Canadian SICs were converted to their equivalent US counterparts using concordances provided by Haverman (1998). From US SIC 1 to 89, 75 different economic activities can be differentiated and all but three of these classifications had at least one case of CFDI. However, 88.3 % of these CFDIs from the US could be classified into 31

TABLE 1 Number of Investments in Canada by Foreign Investors 1985 to 1998

Investor Country	Frequency	Percent	Cumulative Percent
United States	6,535	61.7	61.7
United Kingdom	1,013	9.6	71.3
Japan	432	4.1	75.4
France	422	4	79.4
Germany	343	3.2	82.6
Hong Kong	237	2.2	84.8
The Netherlands	234	2.2	87
Switzerland	215	2	89.1
Australia	142	1.3	90.4
Sweden	122	1.2	91.6
Italy	83	0.8	92.3
Norway	65	0.6	93
Belgium	56	0.5	93.5
Finland	51	0.5	94
79 others	638	6.1	100
missing	3	--	--
Total	10,588	--	--

Source: TIERS database, based on unaudited cases and all industrial classes.

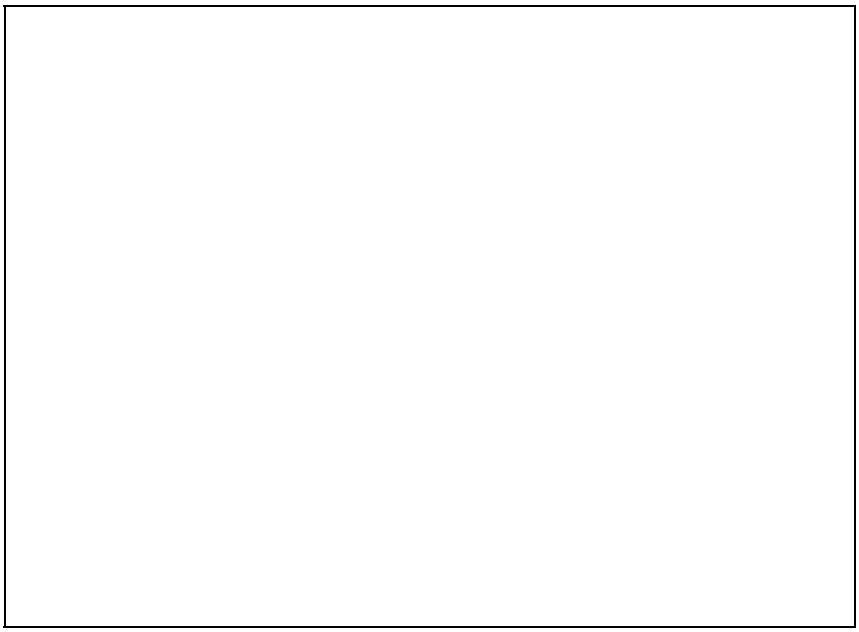

FIGURE 1 Foreign Direct Investment in Canada

TABLE 2 Industry of Inward Canadian FDI 1985 to 1998

	Frequency	Percent
Wholesale durable goods	1,665	15.85
Business services	1,064	10.13
Wholesale nondurable goods	795	7.57
Oil and gas extraction	557	5.30
Industrial, computer equipment	428	4.07
Engin accting res mgt services	349	3.32
Chemicals	343	3.27
Food	329	3.13
Real estate	329	3.13
Fabricated metal products	316	3.01
Electronic except computers	271	2.58
Misc retail	197	1.88
Rubber	195	1.86
Eating and drinking places	186	1.77
Stone,clay, glass	168	1.60
Accommodations	157	1.49
Personal services	150	1.43
Motor freight	146	1.39
Printing	142	1.35
Transportation services	142	1.35
Misc manufacturing	141	1.34
Insurance agents	137	1.30

Primary metal industries	136	1.29
Motion pictures	130	1.24
Paper and allied products	120	1.14
Nondepository credit institutions	120	1.14
Textile mill products	117	1.11
Transportation equipment	116	1.1
Measuring instruments	116	1.1
Lumber and wood	108	1.03
Utilities	106	1.01
Others, 41	1,228	11.69
Total	10,504	100
Missing	84	--

Note: 1. US Industrial Classes: anthracite mining (SIC 11) and pipelines, except natural gas (SIC 46) had no recorded investments, the US Postal Service (SIC 43) was not included in the data collection.

Source: 1. TIERS database.

of the SIC categories. Wholesaling was the most frequent direct investment activity: durable and non-durable wholesaling made up a combined 23.4 % of the total 10,504 cases considered. Other endeavours that have been disproportionately important to US investors include: business services (10.1 % of the total), oil and gas extraction (7.5 %) and industrial computer equipment (4.1 %).

Table 3 provides a detailed breakdown of the most frequent CF DI industrial

TABLE 3 Detailed Membership of Important 2 Digit US SIC Groupings by Canadian 4 Digit SIC Headings

Business Services SIC= 73	Frequency	Percent
Computer and related services	506	47.6
Other business services n.e.c.	151	14.2
Advertising services	129	12.1
Security and investigation services	76	7.1
Employment agencies	68	6.4
Industrial machinery and equipment leasing	50	4.7
Photographers	13	1.2
Audio-visual equipment rental	11	1
13 others	60	0.8
Total	1,064	5.6
Wholesaling SIC = 50 (durable goods)	**Frequency**	**Percent**
Electronic machinery exc computing	264	15.9
Industrial equipment	179	10.8
Professional machinery equipment	169	10.2
Waste materials	101	6.1
Other products n.e.c.	101	6.1
Hardware	76	4.6
Plumbing/heating/AC	68	4.1
Other motor vehicle parts	61	3.7
Mining machinery	48	2.9

Other machinery n.e.c.	47	2.8
Amusement and sporting gods	46	2.8
Electronic household appliances	38	2.3
Other building materials	38	2.3
Electrical wiring supplies	36	2.2
27 others	359	21.6
Total	1665	100
Wholesaling SIC= 51 (non durable good)	Frequency	Percent
Petroleum products	221	27.8
Industrial and household chemicals	106	13.3
Other food	72	9.1
Apparel	55	6.9
Toilet soaps	42	5.3
Drugs	40	5
Nonalcoholic beverages	30	3.8
Stationery and office supplies	24	3
Books, periodicals and newspapers	24	3
18 others	181	22.8
Total	795	100

Source: TIERS database.

TABLE 4 Investment Mix by Province by Industry Classes

	% of all Investments	# of Investments	# of Industries	industry coverage	Sector shares for province for shares in excess of 10%
AL	11.4	1212	54	75.01%	Oil and gas extraction (39.0%)
BC	11.5	1216	62	86.1%	Wholesale durable goods (10.9%) Real estate (9.9%)
MN	1.8	190	41	56.9%	Wholesale nondurable goods (16.8%) Wholesale durable goods (13.2%)
NB	0.5	54	21	29.2%	Wholesale durable goods (18.5%) Food (16.7%), Business services (13.0)
NF	0.3	36	19	26.4%	Oil and gas extraction (13.9%) Wholesale durable goods (13.9%)
NS	1.3	142	42	58.3%	Wholesale nondurable goods (14.8%)
ON	57.5	6092	71	98.6%	Wholesale durable goods (18.4%) Business services (12.2%)
PE	0.1	11	7	9.7%	Building construction (27.3%) Wholesale nondurable goods (27.3%)
QC	13.9	1467	62	86.1%	Wholesale durable goods (15.9%) Wholesale nondurable goods (10.5%)

SK	1.3	142	33	45.8%	Oil and gas extraction (19.0%) Wholesale nondurable goods (16.9%) Wholesale durable goods (11.3%)
NW	0.1	10	5	6.9%	Metal mining (50.0%) Wholesale durable goods (20.0%) Construction (10.0%), Accom. (10.0%) Wholesale nondurable goods (10.0%)
YK	0.2	16	10	13.9%	Metal mining (31.3%) Motor freight (12.5%) Wholesale nondurable goods (12.5%)
Total		10,588	--	--	--

Note: 72 industry classes with at least one investment were used to calculate the percentage of industries covered.
Source: TIERS database.

types (wholesale and business services activities). Interestingly, computer-related activity (for business services and durable wholesale) made up a large proportion of these direct investments. Also, for non-durable wholesale goods, petroleum products were very important. Thus, wholesale and business service CFDIs have clearly been very important. More specifically, computer activities have driven most of the US-based interest. Moreover, petroleum-related activity has actually comprised 7.4 % of the total (557 oil and gas transactions plus 221 wholesaling petroleum products). Regarding the spatial properties of US direct investment in Canada, Ontario is by far the preferred province (as shown on Table 4). About 58 % of the total 10,588 investments enumerated have been made in Canada's most populous province. Alberta, Quebec and British Columbia have been reasonably important as targets while in contrast, the remaining (less populated) provinces and territories have been comparatively unimportant as targets.

US investment diversity has also been most prevalent in the largest provinces with Ontario, again, being the best example. Of the 72 industrial classifications that had at least one investment, all but one were present in Ontario. Quebec (86.1 %), British Columbia (86.1 %) and Alberta (75.0 %) have shown impressive diversity as well. Yet, despite the strong investment diversity exhibited by these provinces, the overall importance of wholesaling is again reinforced. Only in Alberta (with a disproportionate emphasis on oil and gas) was wholesaling activity not the most (or amongst the most) important industrial classifications for investment.

Much like the targets, the origin-locations of these investments have been relatively few in number (at least in terms of substantial investment frequency) and, again, the pattern would seem to be strongly associated with market and economic power. Specifically, the top five states (New York, California, Texas, Illinois and Michigan) collectively controlled 46.2 % of all CFDIs (see Table 5). The inclusion of the next five states (Ohio, Pennsylvania, Massachusetts, New

Jersey and Connecticut), brings the collective proportion to 67.9 %. Also, for these ten states, wholesale and (to a lesser degree) business services dominated the classifications (with the exception of Texas, where oil and gas extraction was most important). In addition, as with the Canadian destinations, the states exhibiting the most frequency of investments also had the greatest diversity (ranging from 77.8 % for New York to 58.7 % for Connecticut).

Essentially, then, ten states (at 67.8 %) and four provinces (at an overwhelming 94.3 % of the total) effectively comprise the origin-destination pattern of US direct investment into Canada (from 1985 to 1998). A closer look at the most important state-provincial flows is shown on Figures 2a and 2b. In all there were 254 state-province pairings that had at least one investment linkage and the most striking observation is the overwhelming dominance of Ontario. Ontario is the province present in 16 of the top 20 most numerous direct investments linkages. In fact, only Alberta's link with Texas prevents Ontario from exclusively dominating the top 10. As will be discussed, these provincial-state direct investment linkages (in a slightly simplified form) comprise the dependent variable used to test the "home" and "host" determinants of US direct investment in Canada.

The Relevance of 'Established Economic Position' in Explaining Spatial-Sectoral Patterns

Many FDI empirical studies have been put forth, often using the theories of Dunning (1977, 1993) and Porter (1990) as starting points, to test the connection between FDI levels and the place-distinctive characteristics of market, labour, income, tax, culture, currency valuation and so on. Yet, given the strong economic ties between Canada and the United States, it is conceivable that much of the direct investment flow into Canada can be explained by established economic

TABLE 5 Investment Mix by State by Industry Classes

	# of Invest.	# of Industries	Industry coverage	Shares of state investment by sector for shares in excess of 10%
Alaska	5	1	1.6%	Construction not bldg (20%), Wholesale nondurable (20%), Auto dealers (20%), Accommodations (20%), Amusement (20%)
Alabama	23	15	15.9%	Oil and gas extraction (13.0%), Bus. serv. (17.4%)
Arkansas	11	8	14.3%	Motor freight (18.2%), Wholesale durable goods (27.3%)
Arizona	22	13	19.1%	Wholesale durable goods (22.7%) Business services (23.5%)
California	432	55	73.0%	Wholesale durable goods (21.1%) Business services (18.5%)
Colorado	68	26	25.4%	Oil/gas extraction (10.3%), Bus. services (13.2%) Wholesale durable goods (10.3%)
Connecticut	123	34	58.7%	Wholesale dur. goods (21.1%), Bus. serv. (13.8%)

Washington DC	19	11	22.2%	Wholesale durable goods (15.8%), Wholesale nondurable (15.8%), Eating and drinking (10.5%), Business services (15.8%), Prof. services (10.5%)
Delaware	24	16	25.4%	Chemicals (12.8%) Wholesale durable goods (10.3%)
Florida	78	31	34.9%	Wholesale durable goods (16.0%) Business services (12.3%)
Georgia	93	34	42.9%	Wholesale durable goods (21.3%) Wholesale nondurable (13.8%) Business services (14.9%)
Hawaii	0	0	0.0%	none
Iowa	12	9	14.3%	Fabricated metal products (16.7%) Wholesale durable goods (25.0%)
Idaho	11	9	9.5%	Metal mining (18.2%) Lumber & wood (18.2%)
Illinois	250	44	68.3%	Wholesale durable goods (22.0%)
Indiana	53	18	25.4%	Wholesale durable goods (30.2%)
Kansas	27	17	20.6%	Oil & gas extraction (11.1%), Ind computer equip (11.1%), Business services (11.1%)
Kentucky	17	10	9.5%	Ind computer equip (17.6%), Electronic equip (11.8%), Wholesale durable goods (17.6%), Business services (17.6%)
Louisiana	9	2	3.2%	Oil & gas extraction (77.8%) Professional services (22.2%)
Massachusetts	160	36	42.9%	Wholesale durable goods (20.0%) Business services (23.8)
Maryland	37	19	19.1%	Wholesale durable goods (13.5%) Business services (21.6%) Professional services (10.8%)
Maine	8	6	9.5%	Ind computer equipment (25.0%), Wholesale durable goods (25.0%), Wholesale nondurable (12.5%), Apparel stores (12.5%), Insur. agents (12.5%), Real estate (12.5%)
Michigan	189	42	55.6%	Wholesale durable goods (18.4%)
Michigan	189	42	55.6%	Wholesale durable goods (18.4%)
Minnesota	84	26	49.2%	Wholesale durable goods (19.0%)
Missouri	41	22	42.9%	Wholesale durable goods (24.4%) Business services (10.5%)
Mississippi	22	15	3.2%	Primary metals (13.6%), Business services (13.6%)
Montana	3	4	6.3%	Wholesale durable goods (33.3%), Personal services (33.3%), Business services (33.3%)

TABLE 5 Continued, Investment Mix by State by Industry Classes

	# of Invest.	# of Industries	Industry coverage	Shares of state investment by sector for shares in excess of 10%
North Carolina	47	21	27.0%	Textile mills (10.6%), Wholesale durable goods (19.1%), Wholesale nondurable goods (10.6%), Business services (10.6%)
North Dakota	2	2	3.2%	Insurance carriers (50.0%), Personal services (50.0%)
Nebraska	25	13	15.9%	Wholesale durable goods (12.0%), Wholesale nondurable goods (24.0%) Business services (16.0%)
New Hampshire	27	12	20.6%	Construction special (11.1%), Chemicals (11.1%), Wholesale durable goods (37.0%)

New Jersey	154	41	47.6%	Wholesale durable (18.2%), Bus. services (14.3%)
New Mexico	5	5	6.3%	Primary metals (20.0%), Utilities (20.0%), Motion pictures (20.0%), Health services (20.0%), Educational services (20.0%)
New York	535	57	77.8%	Wholesale durable goods (16.2%) Business services (16.6%)
Nevada	6	6	7.9%	Furniture (16.7%), Measuring instruments (16.7%), Transportation services (16.7%), Wholesale durable goods (16.7%), Auto dealers (16.7%), Social services (16.7%)
Ohio	177	44	60.3%	Wholesale durable goods (18.6%)
Oklahoma	48	12	17.5%	Oil and gas extraction (52.1%)
Oregon	29	15	23.8%	Wholesale durable goods (31.0%) Wholesale nondurable (10.3%)
Pennsylvania	172	40	61.9%	Wholesale durable goods (17.4%) Business services (11.6%)
Rhode Island	26	12	19.1%	Rubber (11.5%), Misc mfg (11.5%), Wholesale durable (38.5%)
South Carolina	15	9	9.5%	Rubber (13.3%), Wholesale durable (40.0%)
South Carolina	15	9	9.5%	Rubber (13.3%), Wholesale durable (40.0%)
South Dakota	3	2	3.2%	Wholesale durable goods (33.3%) Accommodations (66.7%)
Tennessee	37	22	23.8%	Wholesale durable goods (10.8%) Business services (16.2%)
Texas	276	42	61.9%	Oil and gas extraction (17.4%) Wholesale durable goods (19.2%)
Utah	18	11	14.3%	Wholesale nondurable (16.7%) Business services (33.3%)
Virginia	48	20	27.0%	Wholesale durable goods (18.8%) Business services (20.8%)
Vermont	6	6	6.3%	Paper (16.7%), Wholesale dur. goods (16.7%), Wholesale nondur. goods (16.7%), Genl merchandise (16.7%), Amusement (16.7%), Educational services (16.7%)
Washington	92	31	44.4%	Motor freight (15.2%), Wholesale durable goods (12.0%), Business services (10.9%)
Wisconsin	62	22	33.3%	Computer equipment (19.4%) Wholesale durable goods (21.0%)
West Virginia	5	5	3.2%	Furniture (20.0%), Chemicals (20.0%), Fab metal (20.0%), Wholesale nondurable goods (20.0%), Prof services (20.0%)
Wyoming	1	1	1.6%	Oil and gas extraction (100%)
Subtotal	3661	--	--	--
Missing	6727	--	--	--
Total	10588	--	--	--

Source: TIERS database.

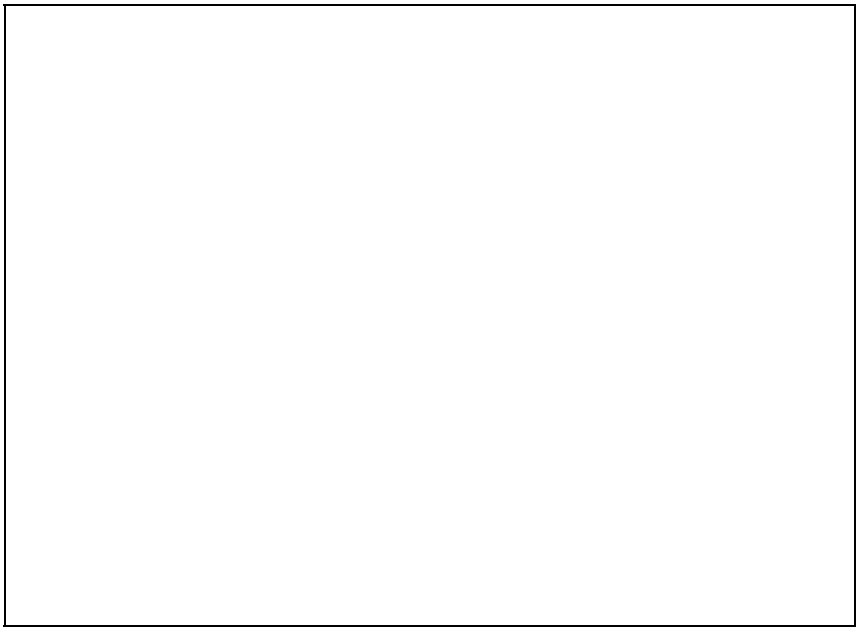

FIGURE 2a Major Investments by Number into Canada by State and Province

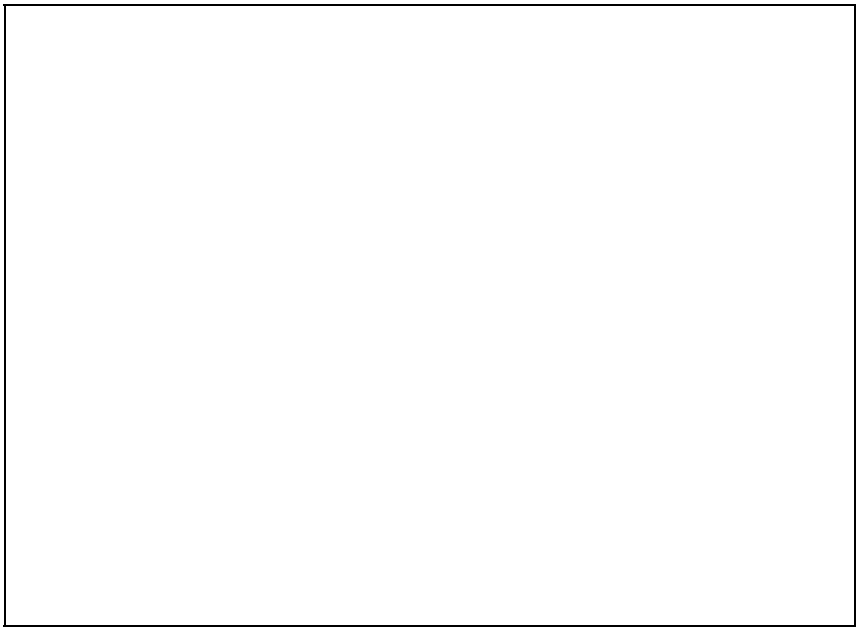

FIGURE 2b Minor Investments by Number in Canada by State and Province

conditions in both the receiving and investing regions. Thus, it may be surmised that larger regional economies in the US and in Canada are likely to play a greater role in direct investment activity than are smaller economies (regardless of more specific intrinsic socio-economic differences). Yet, it may also be expected that the importance of "established economic position" in explaining US direct investment in Canadian will vary by sector.

In this study, such differentials are examined by using foreign direct investment presence or absence (between 51 states and 12 provinces/territories) within a logistic regression format against five independent variables: the number of establishments by state, the number of establishments by province/territory, imports values (state to province/territory), exports values (province/territory to state) and Canada-US border proximity. Unfortunately, investment frequency data (used in the previous section of the paper) had to be converted to binary form. This was necessary for several reasons. First, there is no dollar value associated with the investments so it is unknown how accurately frequency data reflects the importance of investment. Second, the data in frequency form is truncated in that no flow state-province connections are ignored. Such truncated data are normally best handled by tobit or logistic regression approaches (Breen 1996). Such an approach maximises the sample size in estimating the parameters because both nonzero and zero count state-province linkages are used. This is a more conservative approach than using Poisson regression where sample sizes for some industrial classes would be very small.

Separate logistic regression "runs" were analysed specifically by industrial sector. Each dependent variable (by sector) consisted of 612 cases (51 states by 12 provinces/territories) and was coded as either 1 (if at least one investment linkage occurred) or 0 (if no investments were made between the state-province/territory pair). It is recognised that there may be instances where recorded zeros may in fact represent nonzero levels of investment. This is inevitable in sample data. The error term in the regressions should ameliorate the effect.

Using the concepts of spatial interaction modelling, we maintain that the number of establishments (in the origin state and the target province/territory) provides a reasonable measurement of the "established economic position" of these areas and we hypothesized that this could bias the spatial pattern of new US direct investment into Canada. In addition, we also expect that the volume of state-provincial/territorial trade should complement, and not replace, direct investment (as is the prevailing condition within mature economies) and, thus, that regional trading patterns should also be good predictors of US direct investment into Canada. As such, regional trading is another good measure of "established economic position". A similar logic was employed by Grosse and Trevino (1996) in their examination of FDI into the United States. Finally, we include a "border" dummy independent variable to determine if the structural force of distance still biases US investment decisions.

Canadian establishment data were taken from the *Small Area and Labour Database* maintained by Statistics Canada (1992). For the US establishment data, information from the US Bureau of the Census (1992) was utilised. The import and export data were taken from the *Trade Information Enquiry Retrieval System* (Statistics Canada 1988-1996). Specifically, we considered the value of state-based imports into each province/territory and the value of exports from the provinces/territories to the states. Unfortunately, trade data are only available for US SIC codes 1 through 39 (SIC 7, 11 15, 16 and 17 have no trade data); so only the primary and secondary sectors of the economy could be examined in this component of the analysis. The "border" independent variable was tested in binary form: "1" if the origin state and receiving province share the Canada-US border, "0" if this is not the case.

It should be noted that the independent variables that measure trade are the sums of trade values (in real dollars) for all years from 1988 to 1996. The low degree of variation of trade values (from state to province by sector) made consideration of temporal variation unnecessary. This was confirmed by an aggregate principal components analysis of the sectorally defined trade data by year.

Appendix 1 provides the detailed results of the sector-specific multiple logistic regression equations (and Table 7 provides a summary of the results). We have included one multiple logistic regression equation for each SIC listing (except for instances in which there was no information).

Overall, the analysis was quite successful in terms of the number of significant independent variables yielded and that these significant variables were positively related to the dependent variables (and, thus, consistent with our suppositions). The exception was the negative coefficients for the border dummy variable; which indicates that distance does tend to inhibit investment activity from the United States. To explain further, the comparison value for the border variable is set as 1. Therefore, the odds ratios indicate the decreased likelihood (a negative coefficient) of investment if the firm investing is not in a border state (border= 0). Furthermore, given the small number of predictive variables used in each equation (three or five), the analysis was also successful in attaining respectable Nagelkerke coefficient of determination (Nagelkerke 1991) values (although considerable variance by sector is noticeable).

In general terms, this study provides evidence that direct investment into Canada is very much a function of the structural economic properties that exist between the US and Canada. As shown in Appendix 1, trade and direct investment patterns were clearly complementary (with positive relationships in all significant outcomes). In comparing the two trade independent variables, imports to Canadian provinces/territories from the various states were generally better predictors of CFDI than were exports to US states (see Table 6). This reinforces the notion of trade and FDI complementarities and that US-originating imports and US-based direct investments will often follow similar spatial paths within Canada.

The "establishment" independent variables were considerably stronger in the analysis. The number of Canadian establishments was, in overall terms, the dominant independent variable. In fact, this variable was a significant predictor of US-based CFDI in all but four economic sectors. One can conclude that the

Table 6 Summary of the Independent Variables Used in the Logistic Regression Equations (shown as: number of times the dependent variable was significant/number of possible times of variable significance)

Sector	US export to Cdn	Cdn import from US	# of Cdn est	# of US est	Border	Total
Primary and Secondary	10/29	15/29	25/29	20/29	8/29	78/145 (53.8)
Tertiary and Quaternary	--	--	37/37	28/37	14/37	79/111 (71.2)
Total	10/29 (34.4)	15/29 (51.7)	62/66 (93.9)	48/66 (72.7)	22/66 (33.3)	157/256 (61.3)

Notes: 1. In all cases, the dependent variable is the number of Canadian direct investments (by province) made by US-based investors (by state) by sector. For cases with state investment in a Canadian province, the case was coded as "1"; if no investment was made, the case was coded "0".
2. Percentages are given in parentheses.

quantity of economic activity over Canadian space (as measured by the number of establishments by province) is an important influence on new investment from the US. Similarly, but less striking, foreign investment in Canada was also frequently explained by the number of establishments in each state (for 72.7 % of the sectors). Thus, this provides evidence to suggest that FDI from the US into Canada tends to reinforce the prevailing proportion of economic activity rather than spatially diversifying it.

For several sectors, as shown on Table 7, a sizable portion of the spatial variation of US FDI into Canada was explained by only a few independent variables. In fact, of the 67 sectors that had at least one state-province/territory investment linkage, 26 of these industrial classes reached a reasonable Nagelkerke r^2 of at least .40. Moreover, another 19 of these sectors had attained r^2 values of between .30 and .40 (which represents a moderate correlation with the dependent variable). Hence, while the importance of "established economic position" differentials over space (in explaining US-based CFDI) does indeed vary by sector, 45 of the total 67 sectors (or 67.2 %) were united by an at least moderate coefficient of determination value. And, in several instances (such as with various manufacturing activities and business and wholesale endeavours), CFDI from the US was almost entirely explained by regional differences in economic condition.

Conclusions

This study featured a deliberately geographic approach to understanding the spatial-sectoral properties of US direct investment in Canada (from 1985 to 1998). It was found that, spatially, direct investment activity has been very polarized: ten states (at 67.8 % of all US outflows) and four provinces (at 94.3%

TABLE 7 Summary of Logistic Regression by Sector (Ranked by r^2)

Industry	Nagelkerke r^2	Significant independent variables (in order of entry)
Petroleum refining	.80	Import, export, Cdn est, US est
Rubber manufacturing	.80	Import, US est, Cdn est
Miscellaneous repair	.62	US est, Cdn est
Stone, Clay, Glass	.61	Export, US est, Cdn est
Miscellaneous manuf.	.55	Import, Cdn est, US est
Fabricated metal	.55	Import, export, US est, Cdn est
Furniture manuf.	.53	Export, Cdn est, border
Electronics (not computers)	0.53	Import, Cdn est, US est
Business services	0.52	US est, Cdn est
Wholesale durables	.52	US est, Cdn est
Chemical manuf.	.51	Import, US est, Cdn est
Securities and commodity brokers	0.5	US est, Cdn est
Food manuf.	0.49	Export, Cdn est, border
Printing	.49	Export, Cdn est, US est
Measuring instruments	.48	Cdn est, US est
Miscellaneous retail	0.47	Cdn est, US est
Water transport	0.47	US est, Cdn est
Industrial computer equipment	0.46	Import, Cdn est
Transportation equip.	.45	Import, Cdn est, US est
Oil and gas extraction	.43	Import, Cdn est, US est
Auto repair	.43	Cdn est, US est
Insurance agents	.42	US est, Cdn est, border
Social services	.41	Cdn est, US est, border
Textile mill product	.41	Import, Can est, US est, border
Insurance carriers	.40	US est, Cdn est
Transportation services	.40	US est, Cdn est, border

of Canadian inflow) dominated the origin-destination pattern of US direct investment into Canada (New York, California, Texas, Illinois, Michigan, Ohio, Pennsylvania, Massachusetts, New Jersey and Connecticut, Ontario, Quebec,

Alberta and British Columbia). While these fourteen regions were also characterised by considerable diversity in investment type (as measured by industrial sectors 1 through 89); in overall terms, wholesale activities, business services, oil and gas extraction and computer-related endeavours were the most frequently exploited sectors.

Given the maturity of the Canadian-US economic milieu and the liberalising effect of trade agreements on direct investment activity, we hypothesized that new US direct investments into Canada would largely reinforce the status quo (and be disproportionately attracted to powerful economies in Canada and disproportionately originate from influential economies in the US). The utilisation of a logistic regression procedure (using independent variables that measure regional differences in economic position) largely confirmed this notion (although results did vary by sector). It was also found that close proximity to the Canadian border was a catalyst for US investment frequency (and, interestingly, this was true for all 66 industrial sectors tested). These observations do have interesting ramifications for government policy that attempts to redistribute income through industrial incentives. In that, it may be that it has become too expensive to lure US-based investment away from prospering Canadian areas; this study implies that incentives in many sectors of the economy would have to be very lucrative to offset the "natural" spatial tendencies of US foreign investors operating in Canada.

Future research might be devoted toward understanding how these "economic position variables" vary by country of origin (in terms of explaining Canadian-destination spatial-sectoral patterns of direct investment). The addition of investment value denominated data would be a step forward. Hopefully such data will become available in the future. This framework could be widened to contrast FDI by type (and cross-compare merger, acquisition, greenfield, real estate and direct investment increases). Industry specific studies are also needed, with business services being of particular importance. A series of case studies would be quite revealing in determining the importance of a regional economic context in determining levels of inward CFDI.

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Appendix 1

TABLE A1 Logistic Regression Results SIC 1 to 39

SIC Dependent	# Nonzero flows	Constant	Export factor	Import factor	# of CDN establishments	# of US establishments	Border effect	Nagelkerke r
1 to 17 (Crops to Construction)	2340	-4.2115	.0004 (1.0004)	.0007 (1.0007)	.0001 (1.0001)	1.62E-05 (1.000)	-.4935 (.6105)	0.105[2]
Crops	3	-6.1666	#2 .0070 (1.0071)	#1 .0011 (1.0011)	#3 --	#4 --	#5 --	0.321
Livestock	3	-5.3132	#2 --	#1 --	--	--	--	0.022
Agricultural Services	6	-5.7419	--	na	.0073 (1.0073)	na	--	0.068
Forestry	5	-6.8357	na .0584 (1.0602)	--	.0102 (1.0103)	na	--	0.252
Fishing and Hunting	1	none	#1	--	#2	--	--	--
Metal Mining	14	-4.9081	--	--	.0048 (1.0049)	na	--	0.109
Anthracite Mining	0	none	--	--	--	--	--	--
Bituminous Mining	0	none	--	--	--	--	--	--

TABLE A1 Continued, Logistic Regression Results SIC 1 to 39

SIC Dependent	# Nonzero flows	Constant	Export factor	Import factor	# of CDN establishments	# of US establishments	Border effect	Nagelkerke r_2
Building Construction		-5.5704			.0003 (1.0003)	.0001 (1.0001)	-2.3913 (.0915)	
variable or parameter	13							0.367
Construction not building		-5.2129	na	na	.0008 (1.0008) #1	.0006 (1.0006) #2	#3 -1.0512	
	19						(.3495)	0.246
Construction special trades		-5.2935	--	--	#1 .0002 (1.0002)	2.32E-05 (1.000) #2	-.9192 (.3988) #3	
	21							0.302
20 to 39 (Food to Misc Manufact.)	--	-3.9395	--	-.0020 (1.0020)	.0008 (1.0008) #1	.0003 (1.0003) #2	-.2774 (7578) #3	0.309
Food		-4.7089	--		.0021 (1.0021) #2		-4.7089 (3944) #4	
	27		.0028 (1.0028)	#1		#3		0.493
Tobacco		none	#1	--	#2	--	#3	
	0							
Textile Mill Products		-4.2963	--	-.0054 (1.0054)	-.0014 (1.0014)	-.0025 (1.025)	-.9190 (.3989)	--
	27							405
Apparel		-5.9406	--	.0175 (1.0176) #1	#2	#3	#4	0.363
	4							
Lumber and Wood		-4.2369	--	.0017 (1.0017)	-.0004 (1.0004)	-.0010 (1.0010)	-1.3359 (.2629)	
	23							0.229
Furniture		-4.9623	--		.0029 (1.0029)		-.9941 (.3701)	
	21		(1.0058) #1	#1	#3	#2	#4	0.53
Paper and Allied Products		-5.8026		--	..0065 (1.0065) #2	-.0049 (1.0049)	#3	
	22		(1.0004) #1					0.381
				--	#2	#3	--	

TABLE A1 Continued, Logistic Regression Results SIC 1 to 39

SIC Dependent	# Nonzero flows	Constant	Export factor	Import factor	# of CDN establishments	# of US establishments	Border effect	Nagelkerke r^2
Chemicals				.0010 (1.0010)	.0041 (1.0041)	.0017 (1.0017)		
variable or parameter	39	-5.107						0.511
Petroleum Refining		-150.042*	--	.0214 (1.0216)	1.3921 (4.0234)	-.1082 (.8975)	--	
	4		.0493 (1.0505)	#1	#3	#2		0.802
Rubber				#1	#3*	#4	--	
	27	-5.1573	#2	.0032 (1.0032)	.0023 (1.0023)	.0015 (1.0015)		0.802
Leather		-15.3438	--		.0176 (1.0177)	.0126 (1.026)	9.1983 (9880)	
	4			#1	#3	#2		0.202
Stone, Clay and Glass		-6.7513	.0105 (1.106)	--	.0046 (1.0046)	.0014 (1.0014)	#3	
	27				#2	#1		0.611
Primary Metal Industries		-4.4498	#1	.0021 (1.0021)	.0042 (1.0042)	.0022 (1.0022)	--	
	30				#3	#2		0.363
Fabricated Metal Products		-5.3206	-.0026 (.9974)	.0048 (1.0048)	.0018 (1.0018)	.0007 (1.0007)	--	
	36			#1	#3	#2		0.553
Industrial, Computer Equipment		-3.6861	#2	.0016 (1.0016)	.0008 (1.0008)		--	
	57			#1	#4	#3		0.459
Electronic except Computers		-5.236	--	.0003 (1.0003)	.0044 (1.0044)	.0014 (1.0014)	--	
	45			#1	#2			0.53
Transportation Equipment		-5.9251	--	.0003 (1.0003)	.0072 (1.0072)	.0015 (1.0015)	--	
	24			#1	#2	#3		0.447
Measuring Instruments		-6.101	--		.0108 (1.0109)	.0019 (1.0019)	--	
	28			#1	#2	#3		0.484
Miscellaneous Manufacturing		-5.5667	--	.0088 (1.0088)	.0022 (1.0022)	.0010 (1.0010)	--	
	33				#1	#2		0.545

Note:

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#1 #2 #3