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Explaining Canada's Changing FDI Patterns

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Abstract

This paper is motivated by the following question: Why are Canadian multinational enterprises (MNEs) expanding so rapidly abroad (especially outside North America) and foreign MNEs locating in Canada less often? To answer this question, we explain trade and FDI patterns simultaneously, employing the standard gravity model to explain the former and an augmented gravity model to explain the latter. The augmentation takes into account elements of the Heckscher-Ohlin theory, new growth theories, public policy, and institutions. Our evidence for Canada and 29 trading partners from 1970 to 1998 measures the roles that each of these theories have in explaining Canada's FDI. We provide new or different results on the impact on FDI of exchange rate movements and volatility, financial market liquidity, R&D performance, institutional quality, and policies directed towards FDI. We also provide strong evidence of complementarity between trade and FDI.

Key Words: Foreign Direct Investment (FDI), Location Decisions

JEL Classifications: F21, F23

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1. Introduction

Canada's share of both the North American and global stocks of inward foreign direct investment (FDI) has fallen for many years (Figure 1). On the outward side, Canada's share of rapidly rising global FDI stocks has remained roughly constant. Although Canada's inward stock in 1970 was roughly four times larger than the outward stock, the relatively rapid growth in outward has resulted in it exceeding, in nominal dollars, the still large and growing inward stock.[1]

This study's goal is to improve our understanding of investment location decisions by multinational enterprises (MNEs). Canada is an ideal setting for such a study given the large changes in its FDI experience. Also, Canada provides an excellent test case of the effectiveness of public policies towards FDI, having moved to more restrictive policies in the 1970s and then to far less restrictive policies since the mid 1980s in an effort to attract such investments (Safarian (1993)). Furthermore, the evidence indicates that MNEs prefer nearby and similar markets (Brainard (1997)) and that the presence of FDI favors further FDI in the same location (Davidson (1980), Wheeler and Mody (1992), Mody and Srinivasan (1998)). This suggests that the economic pressures underlying Canada's changing FDI patterns have been quite strong.

The failure to attract more inward FDI is of concern given the link many researchers have made between FDI, increases in the stock of knowledge, and economic growth (Grossman and Helpman (1991), Barrel and Pain (1999), van Pottelsberghe-de-la-Potterie and Lichtenberg (2001)). Indeed, governments almost everywhere are trying to attract or retain inward FDI as they seek to develop or restructure industry towards higher-skilled and internationally-oriented activities (Hejazi and Safarian (1999)).

Our claim to originality lies partly in the simultaneity of the explanation of trade and FDI patterns and partly in the comprehensiveness of the approach taken to testing the determinants of FDI. Although many of the variables we use to explain FDI patterns have been used elsewhere (Brainard (1997)), we take a further step by classifying and testing these variables according to theories of international trade. Also, many of the careful empirical studies (including Brainard) that consider foreign production and trade are mainly cross-sectional and for the United States or Sweden, countries for which high-quality

data on MNE operations are available. We undertake both a time-series and a cross-sectional study covering Canada's trade and FDI relationships with 29 trading partners over the period 1970 to 1998. This is particularly useful in considering the impact over time of the introduction of government policies on FDI patterns, including free trade agreements and changes in the restrictiveness of FDI regimes.

We also introduce an innovative estimation procedure into the empirical FDI literature. Those who use the gravity model to explain trade patterns ignore FDI and those who use the gravity model to explain patterns of FDI simply condition on trade. If the interactions between trade and FDI are not taken into account, one cannot be confident of the measured relationship between trade and FDI. We explain trade and FDI patterns simultaneously, employing the standard gravity model to explain the former and an augmented gravity model to explain the latter. The augmentation takes into account elements of the Heckscher-Ohlin theory, new growth theories, public policies directed to FDI, and institutional quality.

Although many of our results are consistent with previous studies, there are some important differences as well as some new results. Specifically, we find that although the depreciating Canadian dollar has reduced the extent to which Canadian MNEs move abroad, it has not induced foreign MNEs to enter Canada. This result is consistent with finance theory, but contradicts much of the empirical FDI literature. Also, we find that a home country's R&D efforts do stimulate outward FDI as MNEs move to exploit the associated firm-specific advantages. However, host country R&D does not necessarily attract FDI.

Our results on Canada's experience with its policy on FDI are also an improvement over previous studies. We find that Canada's introduction of the Foreign Investment Review Agency in the mid-1970s did in fact have a strong negative impact on Canada's overall FDI patterns. This strong and statistically significant relationship is in contrast to previous estimates. We also introduce a measure of the volatility of exchange rates. We find that FDI is negatively related to such volatility. Finally, we introduce a novel test of financial liquidity. Others have used interest rates to measure financial liquidity. We use actual measures of liquid liabilities, bank deposits, bank credit, and claims on the non-financial private sector to measure financial liquidity. Although we find that FDI in fact is positively related to liquidity, the results

were statistically insignificant. Several variables reflecting new growth theories and institutional quality are also significant. Overall, our tests confirm the results of others on the high explanatory power of the gravity model, but also attribute significance to several additional variables.

The rise in outward FDI has raised questions about the impact on domestic production, capital formation and employment. What impact outward FDI has depends *in part* on whether FDI and exports are substitutes or complements. For example, foreign production by MNEs may substitute for the export of domestic production, with an initial reduction in domestic economic activity. On the other hand, FDI may also promote exports because it improves sales, service and distribution networks abroad. One cannot determine the relationship between outward FDI and exports a priori (Grubert and Mutti (1991)). The impact on domestic labour is also ambiguous for similar reasons (Skaken and Sorensen (2001)). Therefore, a thorough understanding of the relationship between FDI and trade is necessary to measure the impact of changing FDI patterns on the Canadian economy.[2] We provide strong evidence of complementarity between trade and FDI.

The format of this paper is as follows. Section 2 reviews the empirical literature on determinants of FDI. Section 3 explains the estimating procedure. Section 4 discusses the data and the empirical results. Section 5 concludes.

2. Empirical Literature on FDI Determinants

Other researchers have tested the determinants of FDI although none have utilized the comprehensive framework based on trade theory utilized here. Reviewing some relevant studies within the present framework will motivate our choice of variables used.

2.1 Gravity Model Studies of Trade and FDI

Brainard (1997) concentrates on the extent to which the production-location decisions by MNEs involve a tradeoff between the advantages of being close to customers (foreign production) and the advantages of concentrating production so as to achieve scale economies at the plant level relative to the corporate level (exports). In maximizing profits, MNEs decide on exports and foreign sales simultaneously. As a result, there are two endogenous variables in Brainard's gravity equation. This

simultaneity problem is absent when the model is estimated in shares, but not when estimated in levels. Careful consideration must be given to this simultaneity to avoid spurious significance. Brainard addresses the simultaneity in the levels regressions by using net exports (net imports), excluding exports (imports) mediated by both foreign and U.S. affiliates, as an instrument for gross exports (imports). Using data for the United States for 1989, she finds that overseas production relative to exports increases with trade barriers, transport costs, corporate-level scale economies, language similarity, political risk, and adjacency to the home country. The share of overseas production falls with higher barriers to investment in the host country and higher plant-level scale economies in the home country. She also finds a complementary relationship between U.S. MNE sales abroad and exports to that same location, as well as between foreign affiliate sales in the United States and the foreign parents' exports to the United States. It is worth noting that for the levels regressions, gravity models for each of outward sales, exports, inward sales, and imports are estimated separately, using instrumental variables to address the simultaneity. However, they are not estimated simultaneously as we do here.

Lipsey and Weiss (1981) use industry-level exports to 44 foreign destinations by the United States and 13 other major exporting countries for 1970, to show that U.S. MNE exports to foreign destinations are increasing in their foreign production in that location, but are decreasing in the foreign production of other countries in that location. Other host country characteristics accounted for in their trade model include GDP, manufacturing imports, distance and membership in a trade bloc. The complementary relationship between U.S. exports and foreign production is sustained in Lipsey and Weiss (1984), which improves upon their earlier study by using unpublished firm-level data. A shortcoming of the Lipsey and Weiss studies is that there are two endogenous variables in one equation, a point which is not addressed.

Grubert and Mutti (1991) estimate a gravity model using 1982 data to explain patterns of the stock of plant and equipment for U.S. MNE manufacturing affiliates abroad in a cross section of 33 countries. They show that a reduction in host country tax rates increases U.S. affiliate plant and equipment in that country. GDP, GDP per capita and distance were all positive, though distance was

statistically insignificant. They also estimate the impact of these gravity model variables on U.S. exports as well as on local sales of U.S. affiliates abroad, and report results consistent with those of Lipsey and Weiss (1981,1984). To address the simultaneity bias in their export regression, Grubert and Mutti undertake instrumental variables estimation using taxes to instrument for affiliate sales. The result is that affiliate sales become insignificant. Although both exports and affiliate sales are increasing in distance, neither is affected by tariffs.

Grosse and Trevino (1996) also use the gravity model to examine the influences on FDI to the United States over the period 1980-91. Larger home countries and those with exports to the United States were more likely to have FDI there. Both cultural and geographic distance to the United States reduced the amount of FDI by the home country, while increases in the home country's currency raised its FDI in the United States. No attempt is made to account for the simultaneity between trade and FDI.

Stein and Duade (2001) explain patterns of bilateral outward FDI stocks for 1996 from 28 OECD home countries to some 63 host countries. In addition to GDP, GDP per capita, distance, language, colonial ties, adjacency, and regional dummies, they also include measures of average wages, education, inflation, taxes, infrastructure, institutions, corruption, rule of law, crime, political instability, shareholder rights, and measures of FDI restrictiveness. The gravity variables have the expected sign, with distance being negatively related to FDI stock patterns but adjacency being insignificant.

2.2 Heckscher-Ohlin Studies

Many studies use relative wages to proxy for factor endowment differences. Brainard (1997) uses the per-worker income differential to control for factor-proportions differences, and, consistent with the Linder hypothesis (1961), finds this to be significant but incorrectly signed. Barrel and Pain (1999) show that relative labor costs are an important variable in explaining U.S. FDI into Europe. Stein and Duade (2001) find average wages and schooling insignificant. Dunning (1993) notes that a number of tests of relative labour costs have given mixed results in terms of attracting FDI.

Eaton and Tamura (1994) find that factor endowments are significant in explaining Japanese and U.S. trade and FDI patterns. They capture factor endowment differences by using income per capita to

proxy for capital-labor ratios, as well as using measures of population density and human capital. They find that a country's low population density increases Japan's propensity to import from that country but reduces the U.S.'s propensity. Low population density also increased Japan's propensity to invest there. The level of host-country education raised U.S. FDI and trade, but had no significant effect on Japan's. Also, U.S. FDI was attracted more to richer markets than was Japanese FDI. Their data cover the period 1985 to 1990 and represent Japanese and U.S. trade and FDI relationships with about 100 countries.

There are a set of tests which explain intra-industry trade volumes in terms of factor proportions and income similarities between countries. Brainard (1993) applies these tests to U.S. MNEs in 1989 and finds that only a small proportion of this trade is explained by differences in factor proportions.

Mody and Srinivasan (1998) compare the determinants of U.S. and Japanese outward investment flows to several countries over many years. They take into account measures of country size, cost of labour, cost of capital, trade propensity, country risk, infrastructure and education, accumulated stocks of past investments, and regional and country dummies. They find that labour cost differences between countries are not an important driver of U.S. outward flows, but changes in these costs over time reduce the outward flows. Although these results also hold for outward Japanese flows, these flows are far more responsive to slower wage inflation. A measure of primary school enrollment rates was a more important driver for Japanese investments than U.S.

2.3 New Trade Theory Studies

The new trade theories and the related new growth theories emphasize the effects of the innovation capacity of a home country in determining outward FDI and also influencing such FDI to seek knowledge-intensive locations abroad. Barrell and Pain (1999) study the determinants of U.S. direct investment in manufacturing in six EU countries from 1981 to 1994. The most important factors which are common to all countries are the growth of the EU market on the one hand, and the increased U.S. stock of R&D which spurred U.S. outward FDI on the other. Two measures of agglomeration (country shares of EU production and of research) had significant positive effects on the allocation of U.S. FDI in

the EU. They also find that the relative decline in the size of the U.K. research base has more than offset the gains it achieved from lower labor costs.

Brainard (1997) uses parent advertising as well as R&D expenditures to proxy for proprietary advantages. The results for outward affiliate sales and exports indicate that brand advantages associated with high advertising intensity require a local presence, whereas those associated with R&D are compatible with either foreign production or exports. In contrast, both variables were negative and statistically significant in the inward affiliate sales and imports regressions, a result contrary to expectations. Imperfect competition and scale economies are also related to new trade theories. Brainard (1997) is the first to measure scale economies in the MNEs decision-making process. These variables have the predicted sign in explaining the behaviour of U.S. MNEs abroad as well as foreign MNEs operating in the United States.

New growth theories have linked openness of an economy to economies of scale, knowledge transfers, increased competitiveness, and hence to economic growth. Mody and Srinivasan (1998) find that U.S and Japanese investors differ in their overall response to trade intensities of the host country, with U.S. investors reducing their investments whereas Japanese investors increase theirs. The Japanese result was particularly strong for its FDI with East Asia, and less so elsewhere. Stein and Duade (2001) consider the sensitivity of FDI patterns to trade integration. Membership in a free trade area and the size of the total free trade area's GDP are statistically insignificant.

2.4 Public Policy Studies

Public policy is often directed towards inward FDI. Sometimes it is restrictive in the sense of limiting or preventing entry or by reviewing it to secure larger local benefits. A policy may also subsidize firms or change regulations and taxes to persuade firms to enter, to stay, or to change their economic performance. The evidence on the success of such policies is mixed. Globerman and Shapiro (1998) found the Canadian Foreign Investment Review Agency (FIRA) had negative effects on both inflows to and outflows from manufacturing, but its effects on overall FDI were overwhelmed by flows into and out of energy. The National Energy Program (NEP) reduced inflows to both energy and manufacturing, and,

more strongly, led to outflows.[3] Globerman and Shapiro (1999) found the effects of these two policies on inward and outward FDI were not statistically significant, except for the NEP on the outward side. Stein and Duade (2001) found their FDI restrictiveness variable statistically insignificant.

Loree and Guisinger (1995) found the coefficient on performance requirements was significant and negative with regard to new U.S. investments abroad in 1977 but not significant in 1982.[4] Investment incentives were a positive influence on FDI flows to the developed countries only. Effective tax rates on corporate income were strongly positive for FDI, that is, outward FDI rose with the inverse of the effective tax rate. Grubert and Mutti (1991) show that plant and equipment expenditures by U.S. manufacturing affiliates abroad are strongly related to tax rates. Hines (1997) reviews several studies showing the significance of taxation policies on MNE location decisions.

A subset of these policy studies considers how regional arrangements for freer trade impact on FDI. The general conclusion is that such arrangements are associated with increases in both inward and outward FDI, with some qualifications by sector and time period. Globerman and Shapiro (1998,1999) found that the Canada-U.S. Free Trade Agreement (CUFTA) and the North American Free Trade Agreement (NAFTA) increased both inward and, especially outward FDI. They note one cannot conclude these agreements caused a net outflow from Canada since outward FDI rose particularly to destinations other than the United States.

Feinberg et al (1998) use U.S. BEA firm-level data to measure the impact of tariff reductions over the period 1983-1992 on the allocation of U.S. MNE capital and employment across Canada and the United States. They found that as Canadian tariff rates fell, U.S. MNEs increased their capital and employment in Canada, contradicting the view that tariff liberalization would lead to an exit of U.S. firms from Canada.

Brainard (1997) finds that survey measures of openness to trade and FDI have the correct sign - that is, overseas sales of U.S. MNEs are increasing in openness to FDI but decreasing in their openness to trade, whereas U.S. MNE exports are increasing in their openness to trade but decreasing in their openness to FDI.

2.5 Institutional Studies

Measures of institutional quality yield mixed results as a determinant of FDI. Brainard (1997) found that overseas production relative to exports increases with the degree of political risk in the host country. Grosse and Trevino (1996) found political risk in the home country weakly positively related to their FDI in the United States. Mody and Srinivasan (1998) found both U.S. and Japanese outward investments were deterred by country risk. Recent evidence indicates that the share of FDI in total capital inflows is higher in riskier countries, with risk measured as a country's credit rating or other indicators of country risk (Albquerque (2001) and Hausmann and Fernandex-Arias (2000)).

Wheeler and Mody (1992) concluded that an index of bureaucratic red tape, political instability, corruption, and the quality of the legal system does not affect the location of U.S. affiliates. In contrast to Wei (2000) who reports that corruption reduces FDI, Stein and Wei (2001), using the same measures, find the opposite, but the results are sensitive to the inclusion of GDP per capita. Overall, however, Stein and Duade (2001) find that the quality of institutions has a strong positive effect on FDI patterns. They also find a measure of shareholder rights is strongly positively related to FDI patterns.

Habib and Zurawicki (2002) study the absolute difference in the corruption levels between host and home countries. The analysis provides support for the negative impacts of both, suggesting that foreign investors generally avoid corruption because it is considered wrong and can create operational inefficiencies. Stein and Duade (2001) found that improvements in the government's overall regulatory burden, government effectiveness, and a summary measure of governance to be very important factors in FDI location. The authors suggest that larger and richer countries are getting more FDI because of their better institutions.

3. Framework for Testing the Determinants of FDI[5]

In this section, Canada's experience with FDI is explained by estimating a model using a number of the determinants noted above. There are two general approaches to testing the determinants of FDI. One could take a microeconomic approach as in Brainard (1997) and look at the MNE decision-making process. This requires a great deal of detailed data on the operation of MNEs that is only readily available

for the United States (and less so for Sweden). On the other hand, one could take a macroeconomic approach and consider the factors that drive FDI patterns, which is the approach adopted here.

3.1 The Gravity Model for Trade

The gravity model for trade is developed briefly first, followed by a more extended analysis of the model for the determinants of FDI. The gravity model has been used to explain bilateral trade flows among large groups of countries and over long periods of time (Feenstra, Markusen and Rose (2001), Hejazi and Safarian (2001), Hejazi and Trefler (1996), Frankel, Stein, and Wei (1995)). The gravity model has also been used to explain patterns of FDI as noted earlier. Since this study is on the determinants of FDI, the model of trade that has been employed elsewhere will be used and the focus will be mainly on developing the model for FDI.

The trade model variables are presented in Table 1. The idea is that countries of similar size and per capita GDP have similar needs both in terms of intermediate inputs (Ethier, 1982) and consumption patterns. Also, two countries' trade should be positively related to these countries' incomes, and countries that are close together and have similar languages will have smaller transactions costs of doing business and correspondingly larger levels of bilateral trade. Trade flows are also sensitive to movements in the exchange rate. Dummy variables are included for several regional groupings. These variables are meant to measure persistent patterns of trade within regional areas which are not captured by the gravity variables. The reader familiar with the literature will recognize that this section follows as closely as possible the trade studies noted above. This allows for simple comparisons with previous work.

Table 1. Variables in the Gravity Model for Trade

Variable (V^T_{1jt})	Description	Expected sign
$GDPPC_{Cjt}$	Product of per capita GDPs in Canada and country j at time t.	+
GDP_{Cjt}	Product of GDPs in Canada and country j at time t	+
$Distance_{Cj}$	A measure of distance between Canada and country j	-
$Language_{Cj}$	A dummy variable equal to 1 if Canada and country j share the same language, 0 otherwise.	+

Exchange rate$_{Cjt}$	Value of the foreign currency in terms of the Canadian dollar	- for imports + for exports
Dummy variables		
ADJ	Equal to 1 for the United States, 0 otherwise	+
EC	Equal to 1 for countries in the EC, 0 otherwise	?
EA	Equal to 1 for countries in EA, 0 otherwise	?
LA	Equal to 1 for countries in LA, 0 otherwise	?
ADJ = adjacency, EC = European Community, EA = East Asia, LA =Latin America		

We extend the gravity model for trade to include FDI as an additional determinant of trade.[6] Intuitively, FDI fits nicely into the gravity model. According to the gravity model, the source of the comparative advantage is transactions costs, broadly defined. The presence of MNEs would indicate that the links or networks in the foreign country have already been established, and hence the costs associated with trading should be lower. As a result, exports and imports should be higher with MNE investments. We hypothesize, therefore, that trade and FDI are complementary. We denote the gravity model variables for trade listed in Table 1 as V^{T}_{1jt}.

3.2 The Trade Theory Approach to FDI Determinants[7]

In line with various trade theories, we have grouped the determinants of FDI as presented in Table 2. The first grouping would be a gravity model for the determinants of foreign trade, focused on market size, transport costs, trade barriers, cultural distance and the exchange rate. Where the costs of market entry are high as reflected in such variables, FDI would be preferred to trade. The second grouping would test for evidence of traditional trade theories, particularly the Heckscher-Ohlin theory which emphasizes differences in factor endowments. The third grouping would concentrate on some of the variables emphasized by more recent trade and growth theories. A fourth grouping goes beyond trade protection to reflect other public policy variables as they affect FDI. Finally, a variety of measures of institutional quality are introduced to reflect different kinds of risk. This trade theory approach is our framework for the empirical analysis.

Table 2. Trade Theory Approaches to Modeling FDI	
Trade theory	Variables Used
1. Gravity Model Denote these variables V_{1jt}, where j denotes trading partner and t denotes year.	1. Real GDP on a PPP basis 2. Growth in real GDP 3. Distance between countries 4. Language dummies 5. Nominal exchange rates 6. Regional dummies EC, EA, and LA
2. Heckscher-Ohlin Theory Denote these variables V_{2jt}	1. GDP per capita 2. Liquid liabilities, bank deposits, bank credit, and claims on non-financial private sector. Each is measured relative to some base (see data appendix for details).
3. New Trade Theories Denote these variables V_{3jt}	1. Openness to trade (exports plus imports relative to GDP) 2. Openness to FDI (inward plus outward FDI relative to GDP) 3. Total expenditure on R&D relative to GDP 4. Secondary school enrolment rates
4. Policy Denote these variables V_{4jt}	1. NAFTA dummy 2. A survey measure of how open a country is to FDI 3. A survey measure of how generous FDI incentives are 4. FIRA dummy 5. NEP dummy 6. Exchange rate volatility, measured as the standard deviation of monthly nominal exchange rates, relative to the annual average value of the exchange rate
5. Institutions Denote these variables V_{5jt}	1. A survey measure of the quality of a country's institutions 2. A survey measure of a country's economic risk 3. A survey measure of a country's political risk

3.3 The Estimating Procedure

The estimating equation for imports and inward FDI can be written as follows:

$$\ln(M_{Cjt}) = \alpha_M + \beta_{M1} \ln(V^T_{1jt}) + e_{Mjt} \quad (1)$$

$$\ln(IFDI_{Cjt}) = \alpha_I + \beta_{I1} \ln(V_{1jt}) + \ldots + \beta_{I5} \ln(V_{5jt}) + e_{Ijt} \quad (2)$$

and for exports and outward FDI:

$$\ln(X_{Cjt}) = \alpha_X + \beta_{X1} \ln(V^T_{1jt}) + e_{Xjt} \quad (3)$$

$$\ln(OFDI_{Cjt}) = \alpha_O + \beta_{O1} \ln(V_{1jt}) + \ldots + \beta_{O5} \ln(V_{5jt}) + e_{Ojt} \quad (4)$$

where t denotes year, C denotes Canada, and j represents the trading partner. M_{Cjt} and X_{Cjt} denote bilateral imports and exports, respectively, between Canada to country j in year t. Let $IFDI_{Cjt}$ denote Canada's inward FDI stock from country j in year t and $OFDI_{Cjt}$ Canada's outward FDI stock to country j in year t.

V_{1jt} to V_{5jt} denote the variables as presented in Table 2. Note that V^T_{1jt} differs from V_{1jt} because, although both are gravity model variables, the way these variables enter the trade equation differs from their entry in the FDI equation. We explain these differences below.

The theory indicates that there is an interaction between FDI and trade. That is, FDI patterns are highly dependent upon patterns of trade, and vice versa. It is typically the case that MNEs first export to a country, followed by movement of production facilities abroad so as to avoid transportation costs and import protection, guarantee access to the local market, and generally to compete more effectively with local firms.[8] As discussed in Grosse and Trevino (1996), "the analysis supports the notion that FDI is used to preserve markets that were previously established by exports". It is also the case that FDI promotes trade. Eaton and Tamura (1994) indicate U.S. FDI follows exports, whereas Japanese FDI has a beachhead effect in promoting subsequent Japanese exports. The argument that U.S. FDI abroad serves as a beachhead for U. S. exports has been advanced also in Encarnation (1993) and Graham (1993). Reasons for this include: FDI abroad markets home products and home-made inputs; and MNE retailers are more likely to sell home products. All of this is consistent with much U.S. trade being intra-firm (Hejazi and Safarian (2001)).

Given the market-access motivation for FDI, we let trade depend upon lagged levels of FDI. Since FDI often follows trade, we add lagged outward FDI to the export regression and lagged exports to the outward FDI regression. Similarly, we add lagged inward FDI to the import regression and lagged imports to the inward FDI regression.[9]

In making decisions on servicing foreign markets, MNEs decide upon domestic and foreign production simultaneously (Brainard (1997)). Since we use FDI stocks rather than foreign production, the simultaneity bias is somewhat mitigated. It is further mitigated because we use lagged FDI in the trade equation and lagged trade flows in the FDI equation. Using lagged endogenous variables as regressors allows us to treat them as exogenous, and hence avoid the simultaneity problems plaguing many studies on FDI.

Two sets of regressions are estimated. For imports and inward FDI:

$$\ln(M_{Cjt}) = \alpha_M + \beta_{M1} \ln(V^T_{1jt}) + \delta_M IFDI_{Cjt-1} + e_{Mjt} \quad (5)$$

$$\ln(IFDI_{Cjt}) = \alpha_I + \beta_{I1} \ln(V_{1jt}) + \ldots + \beta_{I5} \ln(V_{5jt}) + \delta_I M_{Cjt-1} + e_{Ijt} \quad (6)$$

For exports and outward FDI:

$$\ln(X_{Cjt}) = \alpha_X + \beta_{X1} \ln(V^T_{1jt}) + \delta_X OFDI_{cjt-1} + e_{Xjt} \quad (7)$$

$$\ln(OFDI_{Cjt}) = \alpha_O + \beta_{O1} \ln(V_{1jt}) + \ldots + \beta_{O5} \ln(V_{5jt}) + \delta_O X_{Cjt-1} + e_{Ojt} \quad (8)$$

There are several important points to note. First, the dependent variables, Canada's bilateral trade and FDI with each country, are measured in logs. Second, the right-hand side variables in the FDI equations are all the trading partner's determinant relative to Canada's. In these FDI regressions, when the RHS variable increases, this is equivalent to Canada's value falling relatively. The model is estimated in this form because in deciding on how to service foreign markets, MNEs consider the benefits of producing abroad in comparison to undertaking local production and exporting. Here, MNEs are considering producing in the foreign market or the Canadian market. Third, the model is not estimated with country fixed-effects because they would be collinear with the distance variable.

It is hypothesized that the errors in the import equation (e_{Mjt}) are correlated with the errors in the inward FDI equation (e_{Ijt}). That is, changes to the equilibrium level of imports will affect the equilibrium level of inward FDI as imports and FDI are simultaneously determined, and vice versa. An estimating procedure is used that can exploit these correlations. If the error terms in the regressions were contemporaneously uncorrelated, that is the error-covariance matrix is diagonal, there would be no benefit to simultaneous estimation. On the other hand, to the extent there are correlations between the errors in the trade equation and the errors in the FDI equation, this allows estimation of the variance-covariance matrix of the residuals and the generation of the estimated generalized least squares estimator. Using these lagged endogenous variables as regressors creates reduced-form estimates that are asymptotically unbiased (Judge et al (1988), Kennedy (1998)).

The models for trade and FDI are estimated simultaneously using the seemingly unrelated regression (SUR) framework of Zellner (1963) which allows us to exploit interactions between the trade

and FDI equations. The parameters on the lagged endogenous variables in each equation will determine whether trade and FDI are complementary.[10] Since the equations are estimated in logs, the parameters in the above equations can be interpreted as sensitivities.[11] They measure how FDI and trade change as a result of a change in each of their determinants. The δ parameters measure the interaction between international trade and FDI. These impacts are estimated after all of the determinants of Canada's trade and FDI have been taken into account.

4. Empirical Results

4.1 Data Description

Data were collected on Canada's inward FDI stocks from and outward FDI stocks to 29 countries over the period 1970 to 1998 as well as on the FDI determinants discussed above. Details on definitions and sources of these data are provided in the data appendix.

Before turning to the estimation results, we can summarize the actual trade and investment stock data over time as follows (Figure 2). Canadian MNEs have been increasingly locating outside the United States and U.S. MNEs have been increasingly locating outside Canada, except for the last few years. Although Canada's exports are increasingly concentrated in the United States, the share of Canada's imports from the United States has flattened out at about 70%. It is these patterns we explain below.

4.2 The Rationale and Results for the FDI Equation

Equations (5) and (6) are estimated simultaneously as are equations (7) and (8). The regression results are provided in Table 3. Panel A provides the FDI regression results (equations 6 and 8) and Panel B the trade results (equations 5 and 7). Along the left hand side of the table, the five tested theories are listed. The second column lists the variables used. Columns 3 and 4 relate to the expected and measured impacts that each variable has on Canada's inward FDI, and columns five and six on outward FDI.

In what follows, we provide an explanation of the expected relationship between FDI and each determinant. We provide empirical estimates (Table 3) with elaborations on the results and how they differ from or contribute to earlier findings. We proceed with discussions of each of the five theories.

4.2.1 The Gravity Variables

Recall that the variables in the FDI regression are the trading partner's determinants relative to Canada's. Therefore, as the right hand side variables increase, the foreign country's variable is increasing relative to Canada's. It is anticipated that Canada will experience both larger inward and outward FDI with the other country the larger is the other country's GDP relative to Canada's. The empirical results conform to this expectation. Also, as the GDP *growth rate* variable increases, the foreign country becomes relatively more attractive as a location for investment, hence inward FDI into Canada should fall and outward should rise. The signs of the estimates coincide with this, but they are statistically insignificant.

Although the hypothesized negative relationship between distance and trade is clear, it is less clear what the relationship should be between distance and FDI. The closer the countries, the larger the information flows and hence the larger the bilateral FDI stocks. However, the closer the countries, the lower are transportation costs and hence the more likely countries are to service foreign markets through trade rather than FDI. It is unclear which of these effects is dominant.[12] The tests show that both inward and outward FDI are negatively related to distance, with only the former being statistically significant. This suggests that the former effect dominates. These results are similar to those documented by Grosse and Trevino (1996) who find distance negatively related to U.S. inward FDI. However, Brainard (1997), who actually measures the amounts paid for transport, finds that overseas production is relatively larger with such costs.

Perhaps surprisingly, the adjacency dummy is negative and statistically significant for both outward and inward FDI. This indicates that Canadian MNEs have opted to supply the U.S. market more through trade than FDI given the low transport costs between Canada and the United States. These results are also consistent with the positive adjacency dummy in the trade equation. This is certainly plausible given the rapid growth in Canada's share of exports destined to the United States and the accompanying reduction in the U.S. share of Canadian outward FDI. It is less clear on the import side, where the U.S. share of Canadian imports has not surged and the U.S. share of Canadian inward FDI has not fallen as

dramatically (Figure 2). Brainard (1997) also found the adjacency dummy negative and statistically significant in her inward sales regression, but statistically insignificant in the outward sales regression.

It is hypothesized that communication and other transaction costs between them would be lower if two countries speak the same language, resulting in larger amounts of both outward and inward FDI. The results show FDI is positively related to these patterns of language, but statistically significant only on the outward side.

As the value of the foreign currency appreciates, one may expect foreign MNEs to be more likely to enter the Canadian market and Canadian firms less likely to move abroad. Of course, depreciating exchange rates may reflect lagging productivity and other negative developments in the local economy, so that FDI may in fact not move into countries that are experiencing a depreciation in their currency. We control for many of these other factors. It has also been argued that since revenues that flow from the purchase of foreign assets are denominated in the local currency, this offsets the increased desire to buy foreign assets. In addition, as the foreign currency appreciates, it becomes more desirable for Canadian firms to export to that foreign economy rather than undertake FDI. It is therefore unclear what impact exchange rate movements will have on FDI patterns. Our empirical results indicate that outward FDI from Canada does in fact fall when the foreign currency appreciates. On the other hand, there is no statistically significant relationship between FDI into Canada and the depreciation in the value of the Canadian dollar over the sample period. This evidence on the inward side is similar to that reported in Schembri (2002).

We have also used dummy variables to capture persistent amounts of FDI between Canada and regional groupings that are unexplained by our model. Canada's FDI relationship with Latin America corresponds to the model's predictions in that the LA dummies are statistically insignificant. The results for the EC and EA dummies were negative and positive, respectively, whereas that with EA exceeds what the model predicts. Canada's FDI with the EC is below what the model predicts.

4.2.2 Heckscher-Ohlin Variables

As wages abroad rise relative to those in Canada, outward FDI should tend to decrease and inward to increase. However, it is typically the case that human capital and skills are increasing with

wage rates, hence the additional productivity offered by labour would offset the higher wages. This has to some extent been addressed as we have also used measures of human capital in the next section. It is found that inward FDI is not statistically related to wages, whereas outward FDI is negatively related.

King and Levine (1993), using a sample of 90 countries over 30 years, show that several measures of financial market development and financial liquidity[13] are important determinants of economic growth. We hypothesize here that outward FDI will increase and inward will fall as financial liquidity abroad rises relative to that in Canada. This fits well with the findings of a home bias for national savings (Feldstein and Horioka (1980) and Feldstein (1995)) since much FDI is financed by local sources. Consistent with the hypothesis, financial liquidity is positively related to Canada's outward FDI and negatively related to inward, although the results are statistically insignificant. These results are consistent with Grosse and Trevino (1996) who find the relative cost of borrowing in home as against the host was insignificant in explaining inflows into the U.S. market. The results overall indicate that factor endowments play a small role in explaining Canadian FDI patterns, a finding consistent with Brainard (1993).

4.2.3 New Growth Theory Variables

New growth theories have linked openness of an economy to economies of scale, knowledge transfers, increased competitiveness, and hence to economic growth. One would expect that the more open a country is to trade, all else constant, the less FDI that economy receives as the local market is serviced more through trade. On the other hand, the more open a country is to FDI from the world, the more FDI one would expect that country to have with Canada. It is important to separate this effect from the bilateral trade-FDI relationship with Canada which is discussed below. The results indicate that as the trading partner becomes more open to trade to the world relative to Canada's openness, the less inward and outward FDI that country has with Canada. In contrast, as the trading partner is more open to FDI with the world, the more outward and inward FDI Canada has with that country.[14]

As firms acquire firm-specific assets through R&D expenditure, they seek to exploit this knowledge through FDI abroad. FDI abroad allows the firm to spread the fixed costs associated with

R&D. It is less clear, however, whether firms locate in foreign locations that have high levels of R&D, although this is often advanced as a reason for some types of FDI. The question is whether the agglomeration advantages of the further concentration of R&D at home are offset in any given case by the advantages of locating such R&D in other favorable locations abroad. Our results indicate that as the foreign country's R&D intensity increases relative to that of Canada's, Canadian inward FDI from that country increases. On the other hand, Canada's FDI locating in that country falls. The former result is consistent with those of Barrel and Pain (1999) who report U.S. R&D efforts are an important driver of U.S. outward FDI. However, Canadian MNEs are not attracted by R&D intensity, which is consistent with the patterns seen in Figure 2, namely a reduction in the share of Canadian FDI locating in the R&D-rich economies of the United States and Europe.

As the foreign country's levels of human capital increase relative to that in Canada, it is expected that Canada's outward FDI to that location should increase whereas Canada's inward FDI from that country should fall. These are the actual results although the impact on the inward side is statistically insignificant.

4.2.4 Public Policy Variables

Free trade has had a significant impact on Canada's trade patterns (Trefler (1999)). However, it is unclear what the impact on FDI should be. As barriers between Canada and the United States have come down, it becomes more desirable for some firms to locate in Canada because investors would have easier access to the much larger North American market. At the same time, firms can locate in the United States near larger and richer markets and have access to the Canadian market. Our estimates indicate the NAFTA has resulted in reduced Canadian inward FDI and increased Canadian outward FDI, both to the United States and especially beyond.

It is also hypothesized that both inward and outward FDI should fall as a country becomes more restrictive on inward FDI. The negative impact on outward FDI results from the increased domestic activities of domestic MNEs which take advantage of the increased protection they are receiving at home. As foreign government policy on entry by foreign firms becomes relatively more restrictive, Canadian

outward FDI and inward with that country are expected to decrease, and the empirical results confirm this.

Offsetting a government's policies on restrictiveness are its incentives to encourage investment. As foreign governments provide relatively more incentives, they should attract more Canadian outward FDI, but less inward to Canada. The former expectation is consistent with our results, whereas the latter is insignificant.

Measures were also included to capture the impact of the Foreign Investment Review Agency (FIRA) and the National Energy Program (NEP). The actual impact of these policies was negatively related to both outward and inward FDI. This is consistent with expectations. As Canada instituted the FIRA, it reduced the amount of inward FDI, and hence outward as Canadian MNEs exploited their increased domestic protection. The NEP was also a policy tool used by the Canadian government to increase protection for Canadian firms operating in the Canadian energy sector. In the case of the NEP, the signs were as expected but the results were not statistically significant.

As the foreign country's exchange rate becomes relatively more volatile, Canada's outward FDI to that country should fall whereas inward FDI should increase. The empirical results show outward FDI is statistically significant and negatively related to exchange rate volatility, whereas no statistically significant relationship was found with regard to inward FDI.

4.2.5 Institutional Variables[15]

Finally, the model included a measure of the quality of institutions. This is an average of measures reflecting three characteristics: transparency, bureaucracy, and the legal system. As this institutional variable increases, the quality of the trading partner's institutions are improving relative to that of Canada's. It is not clear how this will impact on the relative use of trade versus foreign production given earlier findings. We find that the improvement in the foreign country's institutions reduces Canadian outward FDI to that country and increases Canadian inward FDI from that country. That is, as the institutional structures in an economy improve, there is less reliance on FDI.

We also introduce measures of country political and economic risk. As the variables increase, the level of risk in the foreign country relative to that in Canada increases. The effect is expected to be negative on the outward side but positive on the inward side. The results are consistent with our hypotheses on the outward side only.

4.3 The Interaction Terms

Traditionally, it has been hypothesized that FDI occurs to avoid the costs associated with trade such as transportation costs and trade barriers. However, the fall in trade barriers over the past 30 years has seen a surge in both trade and FDI, indicating a complementary relationship. FDI now moves into markets to avoid transportation costs, because a local presence is required especially in local (non-traded) service industries, as well as to gain access to local technology. Furthermore, such FDI is often vertical in nature, thus giving rise to the export from the home country of intermediate inputs as well as the export of final products from the host back to the home or to a third country. That is, much trade and FDI are likely complementary. This effect is tested by entering the bilateral FDI stock into the trade equations.

The results presented are for trade lagged one year. Outward FDI does in fact impact exports, and inward FDI does impact imports. That is, after accounting for the determinants of FDI as well as the determinants for trade, we find a complementary relationship between trade and FDI, thus adding to the growing body of evidence finding such a relationship.

4.4 The Trade Model

The results of the trade regressions are presented in Panel B of Table 3. There is an important difference in the specification of the trade and FDI models. Although the variables in the FDI model are the foreign country relative to the Canadian variable, this is not the case in the trade model. This is why V_{1jt} in the FDI model is denoted differently from V^{T}_{1jt} in the trade model. Note that this difference applies to only two variables: in the trade model, the product of GDPs and GDP per capita are entered and these are not relative. On the other hand, in the FDI model, we have GDP of the other country relative to the GDP in Canada, and the growth rate in GDP in the other country relative to the growth rate in the GDP of Canada. The other variables in the gravity model enter the trade and FDI models in exactly the same way.

The results are consistent with the hypothesis that bilateral trade will be greater the higher the levels of GDP and GDP per capita. Also, as expected, bilateral trade is lower the greater is the distance between countries. It was also hypothesized that countries sharing a common border, captured by the adjacency dummy, will have a higher level of trade. The result is positive and highly significant when trade is estimated alone (not reported), but the significance disappears in our simultaneous estimation. It is also confirmed that two countries which share the same language will have lower costs of communication and hence higher levels of trade.

Economic theory predicts that as the value of the foreign currency appreciates, Canada should export more to that country and import less. The estimates indicate the opposite for imports and no statistically significant result for exports. The regional dummies for the trade model are consistent with the results when the trade model is estimated alone (not reported): Canada's trade with the EC is lower than the model predicts whereas its trade with EA is greater. Although Canada imports more than the model predicts from LA, Canada's exports to LA accord with the model's predictions.

The FDI variables in the trade model indicate a strong complementary relationship: after conditioning on all the determinants of trade, inward FDI creates increased imports in the future, and outward FDI creates increased exports in the future.

5. Conclusions and Policy Implications

Global FDI has risen much more rapidly than global trade or domestic production over recent decades: whereas trade flows doubled over the past two decades, FDI flows have increased by a factor of ten (United Nations (2000)). Despite some qualifications about the effects of FDI and of a large MNE presence, governments have generally fostered a more welcoming attitude towards them since the 1970s. The object of this study has been to explain why Canada's share of such investment has fallen on the inward side, while the country's share on the outward side has been constant.

In explaining Canada's trade and FDI relationship with 29 countries over the 1970 to 1998 period, two literatures have been brought together. The empirical trade literature has made extensive use of the gravity model to explain bilateral trade patterns. Such studies, however, ignore patterns of FDI as a

determinant of trade. In the international business literature, the gravity model has been used extensively to explain bilateral FDI patterns. Although the latter studies generally do include bilateral trade patterns as a determinant of FDI, the interactions between trade and FDI are ignored.

Using a standard gravity model for trade and an augmented gravity model for FDI, we estimate the determinants of trade and FDI simultaneously. The augmentation takes into account elements of the Heckscher-Ohlin theory, new growth theories, policy, and institutions. Our evidence shows that each of these theories has some role to play in explaining Canada's FDI patterns with the world. We confirm the overall value of the gravity approach, while providing additional insights on the link between distance and FDI. We provide new or different results as they relate to the impact on FDI of exchange rate movements and exchange rate volatility, financial market liquidity, R&D performance, institutional development, as well as policies directed towards FDI.

The results on policy are particularly important. Most previous studies have been unable to tie down precisely the impact Canadian investment policies have had on FDI. In contrast, the present study shows that the direct impact of the NAFTA was to reduce Canada's inward FDI stock but to increase the outward stock. Also, the implementation of the Foreign Investment Review Agency in the mid 1970s served to reduce inward FDI as well as outward as Canadian MNEs took advantage of their increased domestic protection.

We confirm that the R&D efforts of a country are an important driver of a country's outward FDI: MNEs undertake FDI to exploit firm-specific assets derived through their R&D efforts as well as to spread the fixed costs involved in undertaking R&D. But we raise doubts about the common view (ie. Dunning (1993)) that R&D intensive host countries necessarily attract FDI. Canada's FDI abroad, while concentrated in the United States and the European Union, is attracted on the margin to non-R&D intensive host countries. This may simply indicate Canadian MNE advantages are other than R&D.[16] Their firm-specific advantages clearly lie elsewhere.

Most studies do not use as many determinants as we do here nor address the simultaneity between trade and FDI. Although traditionally MNE activity abroad has been considered as a substitute for

exporting, we provide strong evidence of a complementary relationship between trade and FDI. Our results therefore contribute to the growing body of evidence which shows that trade and FDI (MNE foreign production) are complementary in nature.

Surprisingly, the theory that provides the least explanatory power for Canadian FDI patterns is the Heckscher-Ohlin theory. If the industry-level data were available to test our model, the relative importance of each theory would probably differ by industry. The lack of such data underscores an important weakness of the present study.

Data Appendix

FDI Data: The FDI data were obtained from Statistics Canada. The data cover the period 1970 to 1998 and are on a bilateral basis to and from 29 countries. All FDI data are reported at historical costs. We did not use the flow data because they are unavailable for some periods for some countries for reasons of confidentiality and because they are highly volatile with many positive and negative entries.

Trade Data: The bilateral aggregate import and export data were obtained from CANSIM. These trade data are converted to real dollars using price indexes for imports and exports also obtained from CANSIM.

GDP and GDP growth rates : GDP data were obtained from the PENN World Tables.

Distance: The distance variables are those used in Hejazi and Trefler (1996).

Language : The language variables are those used in Hejazi and Trefler (1996).

Exchange Rates and Exchange Rate Variability: Nominal exchange rates were obtained from the IMF data tapes.

Wages: Indexes of real wages were obtained from the IMF data tapes. We also use GDP per capita as a proxy for wages, obtained from the PENN World Tables.

Financial Liquidity: The financial liquidity measures are the same as those used by King and Levine in their 1993 *Quarterly Journal of Economics* paper. They construct four measures of financial market development. The first is a measure of liquid liabilities to GDP. This is a measure of financial depth. The second variable is constructed as the ratio of deposit money bank deposits relative to the sum of deposit money bank deposits and central bank deposits. The third variable is constructed as the ratio of claims on the non-financial private sector relative to total domestic credit. A similar measure is PRIVY which King and Levine construct as the ratio of total claims on the non-financial private sector relative to GDP. These measures were constructed for sample countries over the period 1970 to 1998.The required data to construct these measures were obtained from the IMF data tapes.

Openness to Trade: Openness to trade is the sum of exports and imports, relative to GDP. Obtained from the PENN World Tables.

Openness to FDI: Openness to FDI is the sum of outward and inward FDI, relative to GDP. This was constructed using our GDP data and with FDI data from various issues of the World Investment Report.

R&D Expenditure: These data are obtained from the OECD R&D ANBERD DATABASE, and are supplemented by R&D data from various issues of the World Competitiveness Yearbooks.

Human Capital measures of school enrolments are obtained from NBER homepage (See Barro and Lee (1996)).

NAFTA: North American Free Trade Agreement. The NAFTA dummy equals one over the period 1989 to 1998, and zero otherwise.

Policy restrictiveness to FDI and Incentives to FDI: Obtained from the World Competitiveness Yearbook, various years.
The first measures is defined as follows:

1 if foreign investors are free to acquire control in a domestic company
10 if foreign investors may not acquire control in a domestic company

The second measure is an offset to restrictiveness, and reflects government incentives:

1 if incentives are not attractive to foreign investors
10 if incentives are attractive to foreign investors

FIRA: Foreign Investment Review Agency. The FIRA dummy equals one over the period 1974 to 1986, and zero otherwise.

NEP: National Energy Program. The NEP dummy equals one over the period 1981 to 1985, and zero otherwise.

Volatility of exchange rates. Using monthly data, the volatility (standard deviation) of the nominal exchange rate was calculated for each year for each country. The volatility of the exchange rate for each country is then defined as the ratio of the volatility to the mean of that country's exchange rate.

The following institutional variables were obtained from the World Competitiveness Yearbook, and are based on surveys of international business viewpoints.

Institutions: The measure of the quality of a country's institutions is an average of the following three indices:

a) Legal Framework
1 = detrimental to competitiveness of the economy
10 = is supportive of competitiveness of the economy
b) Transparency
1 = government does not communicate intentions successfully
10 = government does communicate intentions successfully
c) Bureaucracy
1 = hinders business development
10 = does not hinder business development

Economic Risk: Risks associated with domestic economic activity
0 = minimum risk in economic activity
100 = maximum risk in economic activity
Political risk: Risk of domestic political instability
0 = minimum political risk
100 = maximum political risk

Countries used in the study

The countries used in this study are as follows. Those in Europe are: United Kingdom, Ireland, Netherlands, Germany, Switzerland, France, Belgium-Luxembourg, Greece, Spain, Italy, Portugal, Austria, Denmark, Norway, Sweden. Those in East Asia are: Singapore, Indonesia, Hong Kong, Japan, Taiwan, Malaysia, South Korea. Those in Latin America are: Mexico, Brazil, and Venezuela. Other countries are: United States, South Africa, Australia, and India.

Table 3. Testing Five Theories of FDI Determinants: SUR Results
PANEL A. The FDI Equations Results

		Inward FDI (equation 6)		Outward FDI (equation 8)	
	Variable	Expected	Actual	Expected	Actual
Gravity Model V_{1jt}	GDP	+	0.853 (0.100)**	+	0.736 (0.089)**
	GDP growth	-	-0.018 (0.014)	+	0.003 (0.015)
	Distance	?	-1.736 (0.276)**	?	-0.112 (0.298)
	Adjacency	+	-4.395 (0.514)**	+	-1.847 (0.558)**
	Language	+	0.240 (0.158)	+	0.471 (0.153)**
	Exchange Rate	?	0.022 (0.031)	?	-0.099 (0.023)**
	EC	?	0.093 (0.165)	?	-0.344 (0.161)**
	EA	?	0.431 (0.183)**	?	-0.376 (0.186)**
	LA	?	-0.183 (0.306)	?	0.292 (0.324)
Heckscher-Ohlin Theory V_{2jt}	Wages	+	0.068 (0.126)	-	-0.221 (0.125)*
	Financial Liquidity	-	-0.130 (0.213)	+	0.332 (0.216)
New Growth Theories V_{3jt}	Openness to trade	-	-0.648 (0.121)**	-	-0.441 (0.125)**
	Openness to FDI	+	0.798 (0.057)**	+	0.724 (0.058)**
	R&D Expenditure	+	0.692 (0.074)**	?	-0.269 (0.080)**
	Human Capital	-	-0.157 (0.252)	+	0.870 (0.220)**
Policy V_{4jt}	NAFTA	?	-0.172 (0.105)*	?	0.337 (0.115)**
	FDI Restrictions	-	-0.779 (0.342)**	-	-0.803 (0.391)**
	FDI Incentives	-	0.152 (0.329)	+	1.616 (0.285)**
	FIRA	-	-0.288 (0.092)**	-	-0.235 (0.097)**
	NEP	-	0.063 (0.108)	-	0.002 (0.115)
	Volatility of exchange rates	+	-0.019 (0.047)	-	-0.040 (0.022)*
Institutions V_{5jt}	Institutions	?	2.270 (0.481)**	?	-2.019 (0.542)**
	Economic Risk	+	-0.639 (0.138)**	-	-0.337 (0.136)**
	Political Risk	+	-0.505 (0.072)**	-	-0.138 (0.071)*
Interaction Terms	Imports	+	0.776 (0.075)**		
	Exports			+	0.610 (0.068)**
R^2			0.887		0.763

PANEL B. The Trade Equations

		Imports (equation 5)		Exports (equation 7)	
	Variable	Expected	Actual	Expected	Actual
Gravity Model V^T_{1jt}	GDP	+	0.497 (0.027)**	+	0.697 (0.028)**
	GDP per capita	+	0.185 (0.053)**	+	0.425 (0.046)**
	Distance	-	-0.806 (0.120)**	-	-0.986 (0.122)**
	Adjacency	+	0.389 (0.250)	+	0.266 (0.281)
	Language	+	0.376 (0.072)**	+	0.192 (0.078)**
	Exchange Rate	-	0.051 (0.013)**	+	0.005 (0.011)
	EC	?	-0.325 (0.062)**	?	-0.212 (0.072)**
	EA	?	1.100 (0.075)**	?	0.100 (0.078)**
	LA	?	0.967 (0.118)**	?	-0.101 (0.122)
	Inward FDI	+	0.242 (0.016)**		
	Outward FDI			+	0.192 (0.019)**
ADJUSTED R^2			0.872		0.762

1. Entries marked with * are statistically significant at 90%. Those marked with ** are significant at 95%.
2. These results are generated using the Seemingly Unrelated Regressions (SUR) approach.

Endnotes

1. Over the period 1970-1998, Canada's outward FDI stock has grown at a compound rate of 13.63% whereas the inward stock has grown at 7.68%. These data are reported at historical costs. The growth rates for real exports and real imports over the same period were 6.16% and 7.02%, respectively.
2. At the same time, inward FDI may stimulate domestic investment and employment, but also may stimulate further imports as foreign MNEs improve their networks domestically.
3. The Foreign Investment Review Agency (FIRA) reviewed larger inward FDI proposals to assure that significant economics benefits were involved for Canada. The National Energy Program (NEP) had several objectives, one of which was to reduce foreign ownership of the energy sector through discriminatory tax and other policies. Both policies were substantially loosened or reversed in the mid 1980s.

4. Performance requirements are employment, export, research and other conditions agreed to by a company as a condition of entry or to receive a particular investment incentive. See Safarian (1993) for analysis of policies on MNE investments.
5. This framework was also utilized in Safarian and Hejazi (2001), which contains a non-quantitative assessment of the determinants of FDI in Canada.
6. This parallels Lipsey and Weiss (1981,1984) and Grubert and Mutti (1991) who take a standard gravity model for trade and add to it measures of U.S. MNE activity abroad.
7. The reader will note that we are dealing with the issue where FDI will be located, and not whether, other things equal, the organizational form of the MNE will be chosen in preference to trade or some form of alliance. The issue of choice of organizational form can be effectively tested only if sectoral or firm-level data are available, which is not the case for the countries and period involved. See Rugman (1980) for internalization and FDI.
8. See, for example, the considerable literature on the product life cycle, inspired by Vernon (1966).

9. An extensive analysis has been undertaken to identify the optimal lag length. Estimating the gravity model for trade alone and adding contemporaneous FDI stocks yields marginally significant coefficient estimates on the FDI stocks. However, adding FDI stocks which are lagged one to ten years yields coefficient estimates which are highly significant. The one-year lagged FDI stock had the largest statistical impact on trade. We therefore add FDI stocks lagged one period.

10. Although the inward FDI and import equations are estimated simultaneously, as are the outward FDI and export equations, the model can be extended to have linkages across these two sets of equations. Specifically, it is likely the case that outward FDI stimulates exports to that foreign location as well as imports into the home country. Similarly, inward FDI stimulates both imports from the home country as well as exports from the host economy to the home. These extensions are left to future work.

11. Obviously, the dummy variables are in levels, and hence to calculate the estimated impact on the dependent variable, one would take the exponential of the coefficient estimate.

12. In the case of trade, the further away countries are from one another, all else constant, the less communication there is and the larger are transportation costs, both of which work to reduce bilateral trade.

13. See the data appendix for a definition of these data.

14. In calculating the foreign country's openness to trade and FDI, that country's trade and FDI with Canada are excluded.

15. The institutional data used in this section along with the FDI restrictiveness and incentives variables in the previous section were derived from surveys, and are perhaps the least reliable of the data used.
16. There is a consensus that R&D is generally not one of the more important firm-specific advantages driving outward Canadian FDI (Rugman (1987), McFetridge (1994)).

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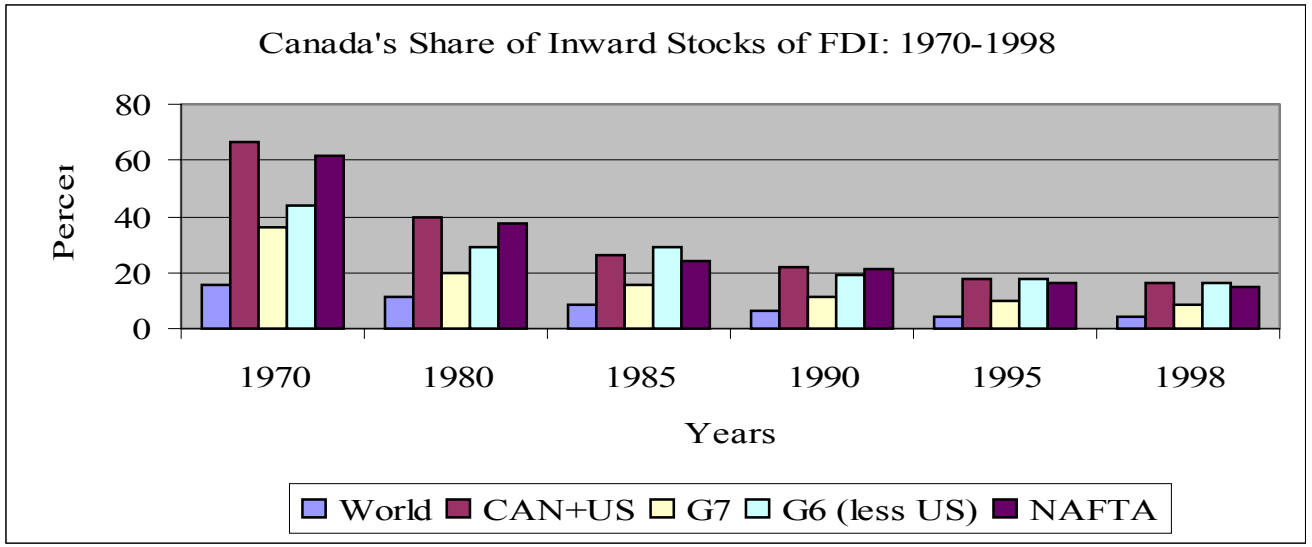
Figure 1. Canada's Changing FDI Shares



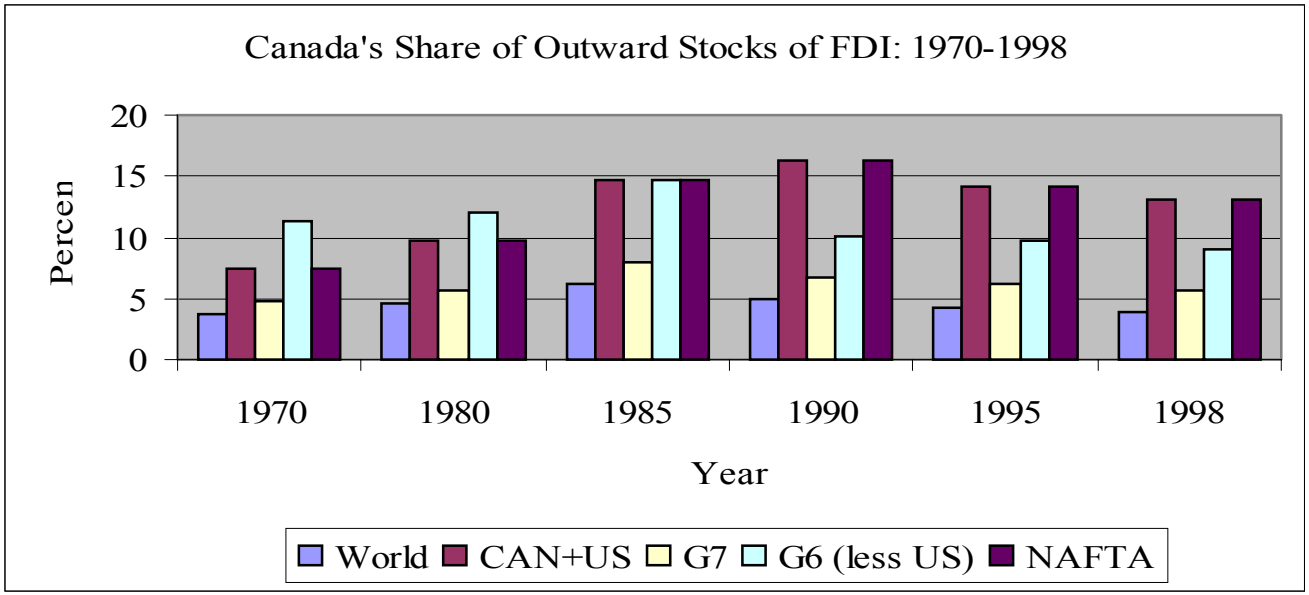


Figure 2. Canada's FDI and Trade Patterns: 1970 – 1988

(relative distribution)