DETERMINANTS OF CANADIAN OUTWARD FOREIGN DIRECT INVESTMENT: A PANEL DATA ANALYSIS

by

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ABSTRACT

This report attempts to examine the trends and the impact of various factors on Canadian outward foreign direct investment (OFDI) from the perspective of the home and host countries. Using a panel data of 21 host countries and various regression techniques for the period of 1990 to 2017, we find that Canadian OFDI has a lag effect during the study sample period; the value of OFDI in the current period is significantly affected by the previous period. The GDP of both home and host countries, the distance between the two countries are important determinants of Canadian OFDI. Canadian enterprises tend to choose countries with a high level of economic development, close geographical proximity, and long and stable trade relations when selecting their OFDI location. The results of this Canadian study are largely consistent with the literature on similar studies for other countries.

Table of Contents

ABSTRACT..... ii
Table of Contents..... iii
List of Tables..... iv
List of Figures..... v
Chapter 1. Introduction..... 1
Chapter 2. Literature review..... 5
Chapter 3. Methods and data..... 11
4.1 Methods..... 11
4.1 Model specification..... 15
3.3 Data sources..... 18
Chapter 4. Results..... 19
4.1 Unit root test of panel data..... 19
4.2 Regression results of static panel model..... 20
4.2 Results with dynamic panel model..... 23
Chapter 5. Conclusions and policy recommendations..... 27
Appendix..... 29
References..... 32
Curriculum Vitae

List of Tables

Table 1: Unit root test for variables.....20
Table 2: Regression results of the static panel data model (Population).....21
Table 3: Regression results of dynamic panel data model..... 24
Table A1: Description of variables.....29
Table A2: Descriptive statistics of variables..... 29
Table A3: Regression results of the static panel data model (Wage)..... 30
Table A4: Regression results of the static panel data model (GDP per capita).....31

List of Figures

Figure 1: Canadian Outward Foreign Direct Investment flow (CAD$ billion).....2
Figure 2: The distribution of Canadian foreign direct investment (2018).....2

Chapter 1: Introduction

Outward Foreign direct investment (OFDI) is an investment made by a firm or individual in one country into business interests located in another country. The main form is the output of capital, equipment, technology and management skills and other intangible assets (UNCTAD, 1993). With the continuous advancement of economic globalization, OFDI has gradually become one of the important ways for countries to enhance their international competitiveness (Deng, 2007). Foreign direct investment is not only the strategy and guarantee for companies to compete in the international market, but also an important manifestation of economic globalization. It can not only expand overseas markets and increase new demand, but also make full use of foreign raw materials and production factors of host countries, reducing production costs (Knoerich, 2017). In recent years, the pattern of global OFDI has undergone great changes under the background of the US subprime crisis and European sovereign debt crisis (Brautigam, 2009).

Since the 1980s, the direct investment of transnational corporations has been growing rapidly in Canada. As shown in Figure 1, the total stock of Canadian OFDI reached $1.044 trillion in 2015. The corresponding figure for 2017 and 2018 was about $1.167 and $1.289 trillion (Statistics Canada, 2018).

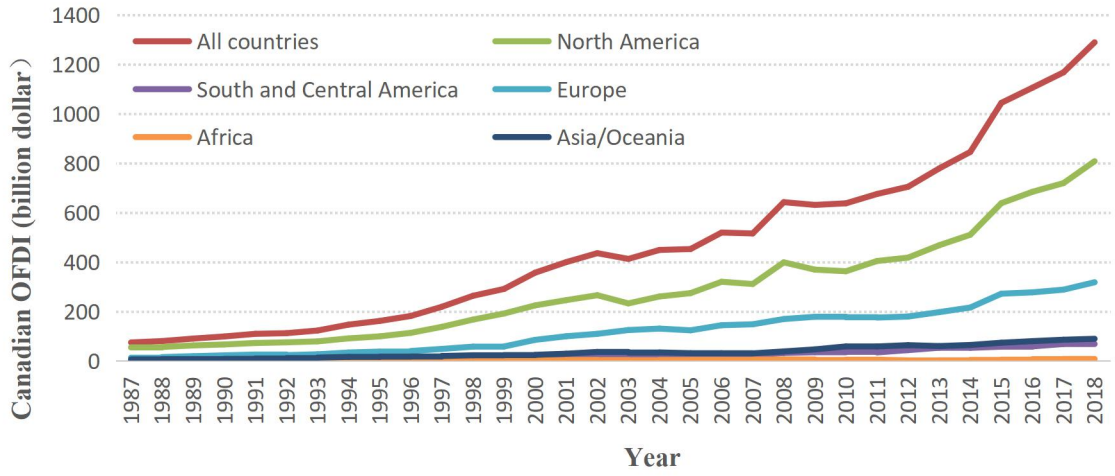

Figure 1. Canadian Outward Foreign Direct Investment flow (CAD$ billion)

Source: Statistics Canada

Although Canadian OFDI is growing rapidly, there exist regional imbalances. As Figure 2 shows, North America has the greatest percentage of Canadian OFDI which is 61%, followed by Europe, with 26%. The proportions from Asia/Oceania and South and Central America are respectively 7% and 5%. Africa seems the least considered destination in terms of Canadian OFDI, with only 1% (Statistics Canada, 2018).

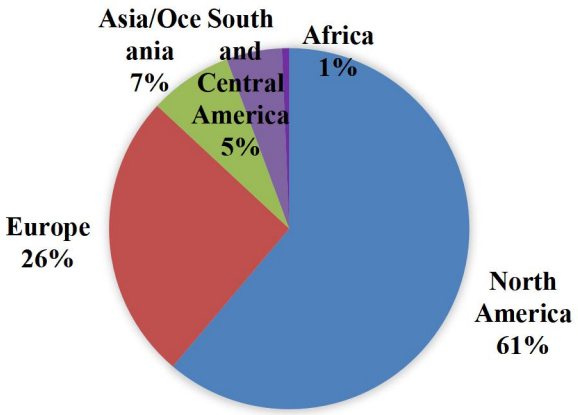

Figure 2. The distribution of Canadian foreign direct investment (2018)

Source: Statistics Canada

Theoretically, the surge of OFDI can be attributed to various factors including savings, investment, and management gap between home and host countries (Todaro, 2013). Empirically, a number of studies have examined the various determinants of OFDI. Aybar (2016) suggests that economic condition of host countries, bilateral trade flows, and natural resource endowments play important roles in the recent increase in Turkish OFDI. Ross (2015) suggests that the OFDI of China is mainly driven by host countries' market size, economic stability, infrastructure capacity, and openness. Despite significant scholarship in the area of OFDI, to the best of our knowledge, there is no study which examines the determinants of Canadian OFDI. A tremendous surge of Canadian OFDI also warrants an investigation of the factors affecting such flows.

Based on the existing research on the determinants of international investment and the current international economic environment, this study identifies a number of determinants for OFDI related to the home and host countries. Using a panel data of 21 host countries and various regression techniques for the period of 1990 to 2017, I find that Canadian OFDI has a lag effect during the study sample period; the value of OFDI in the current period is significantly affected by the previous period. The GDP of both home and host countries, and the distance between the two countries are important determinants of Canadian OFDI. Canadian enterprises tend to choose countries with a high level of economic development close geographical proximity, and long and stable trade relations when selecting their OFDI location. Our findings can help guide Canadian OFDI. The rest of the report is organized as follows. Chapter 2 provides a literature review on determinants of OFDI; Chapter 3 explains the methods and data; Chapter 4 presents

empirical results and analysis; and Chapter 5 draws the conclusions and provides some policy recommendations.

Chapter 2: Literature Review

There are several theories that explain the determinants of OFDI. Monopoly advantage theory (Hymer, 1960) is the earliest theory to study OFDI. The theory creates a new field of research on international direct investment and makes the theoretical research on international direct investment an independent discipline. This theory explains an investment behavior in which a multinational company transfers some processes (especially labor-intensive ones) to foreign countries in order to maintain its monopoly position. Enterprises of investing countries can choose countries with low labor force costs for direct investment, making full use of the cheap labor force in host countries and reducing production costs. It shows indirectly that labor force is an important determinant of OFDI. According to the theory, multinational companies should choose competitive host countries when they make outward foreign direct investment.

Vernon (1966) uses the dynamic analysis method to explain the foreign investment behavior of American manufacturers and proposes the product cycle theory. This theory divides the product life cycle into three different stages, namely the new product stage, mature product stage, and standardized product stage. Enterprises must combine their unique advantages with the specific advantages of the host country in order to make direct investment and gain profits. This theory can also well explain the phenomenon that developed countries transfer labor-intensive industries to developing countries through foreign direct investment. It indicates that labor force is the major determinant of labor-intensive enterprises' OFDI. The product cycle theory is also a transfer theory of international production area, which reflects the direct investment process of international

enterprises from developed countries to new industrialized countries and developing countries. It also becomes the basis for studying the determinants of OFDI in developed countries.

Buckley and Casson (1976) put forward the internalization theory. They argue that the market is incomplete, not only in the final product market, but also in the intermediate product market, especially the market of proprietary technology, patent, management, and other information and knowledge products. The incomplete market will increase the transaction cost. When the cost of the enterprise is too high, the enterprise will establish the internal market through OFDI. Therefore, transnational corporations are the products of the internalization of enterprise operation across national boundaries. The determinants of the internalization process are industry-specific factors, region-specific factors, country-specific factors, and enterprise-specific factors. This indicates that the factors that determine an enterprise's OFDI are various. It includes not only the nature of the product, the geographical location of the host country, the cultural difference, but also the political, legal, and economic policies of the host government.

Further, Hirsch (1976) studies the location selection of investment in multinational enterprises from the perspective of cost. Hirsch establishes a decision-making model for enterprises and suggests that enterprises are more likely to invest in a location where OFDI is superior to export. This advantage is reflected in the low cost of direct investment, including the cost of multinational operations; manufacturing, marketing, and management costs; etc. This shows that the production and operation costs of the host country are the key factors affecting OFDI.

Dunning (1977) is the first scholar who studies the relationship between geographic location and OFDI, suggesting that location factor is a significant condition for determining OFDI. Geographic location not only determines the direction of OFDI, but also determines the industrial structure and international production activities of OFDI.

Based on the characteristics of Japan's OFDI, Kojima (1979) puts forward the theory of comparative superiority, suggesting that a country's OFDI should start from marginal industries. According to this theory, OFDI should start with marginal industries that are already or will be at a disadvantage in the country, and proceed in sequence. The purpose of this approach is to obtain raw materials, intermediate products and markets of the host country, so as to exert the comparative advantages of the host country. Therefore, Kojima divides the motivation of OFDI into natural resource-oriented, production-factor-oriented, and market-oriented. Kojima believes that the amount of OFDI is influenced by the host country's natural resources, production factors, and market size. The direct investment between the two countries will increase as trade increases.

Tinbergen (1962) was the first one who uses a gravity model to explain trade flows between countries and concludes that trade flows mainly depend on the economic size and geographical distance between two countries. Trade and investments are complementary; therefore, Anderson (1979) also uses the gravity model to explain the determinants of investment flows. Anderson concludes that the income and population are the main influencing factors of the investment flow of the two countries, with a positive relationship. The study also reports an inverse relationship between investment flow and geographical distance between the home and host countries.

Several studies empirically test the factors influencing OFDI. For example, Froot and Stein (1991) use quarterly data from 1973 to 1988 and find that the exchange rate is a major determinant of OFDI outflow. They put forward the "relative wealth" theory which asserts that the devaluation of the host country's currency will increase the "relative wealth" of investors. It makes foreign assets relatively cheap, lowering investment costs and thus promoting the outflow of OFDI from the investing country. Caves (1996) takes the United States as the research object, discovers that international trade is also the influencing factor of foreign investment. The conclusion is that there is a positive relationship between trade and OFDI. Noobakhsh (2001) analyzes the human capital level of the host country in the light of the evolution in the structural characteristics of FDI and empirically tests the hypothesis that the level of human capital in host countries may affect the geographical distribution of FDI. Alderson (2002) uses random effect estimation method, analyzing 16 OECD nations from 1967 to 1992. The conclusion shows that the government's social democracy, strike strength, and the union density control system of a country have a positive impact on the size of the OFDI.

Oum and Park (2004) investigate the location selection of transnational corporations in East Asian countries. By evaluating the potential of host countries for developing regional logistics hubs, they find that geographic location, transportation contact and market entry, market size and market growth potential, transportation infrastructure, and labor force are important determinants of OFDI. Cheng and Ma (2007) use the data of 134 host economies from 2003 to 2005 and the fixed effect model, examining the impact of each host country's relevant macroeconomic factors (such as the host country's market

size, tax policy, exchange rate, wage level and governance basis, etc.) on the home country's OFDI.

Furthermore, Yamakawa et al. (2008), Lu et al. (2010), and Cui et al. (2011) theoretically explain the investment motivation and investment strategy selection of OFDI from three points of view: Resource Based View (RBV), Industry Based View (IBV), and Institution Based View (IBV). They argue that the technological competitive advantage, R&D density, and government support of the home country will affect resource-seeking OFDI investment, while export, industry competitiveness, and government support will affect the market-seeking OFDI. All those are factors affecting an investing country's OFDI.

Easterly (2009) analyses the relationship between FDI and trade agreements, openness and inflation rate, Using a multinomial logit regression model, this study finds that both investing country's GDP and host countries' GDP has a significantly positive relationship with OFDI; the degree of trade openness and inflation have a negative relationship with OFDI In examining the impact of corruption on OFDI, Habib and Zurawicki (2002) use data of 89 countries from 1996-1998 and apply the probit estimation method, finding that corruption is a serious obstacle to investment. Fahad and Ahmed (2016) reach the same conclusion using the dynamic ordinary least squares (DOLS) method and data from five African countries from 1984 - 2013. There is a significant negative relationship between corruption and OFDI.

As for the model, the gravity model (originating from Physics) was first introduced into the economic field by Tinbergen (1962) to explain the bilateral trade flow between two countries. Tinbergen replaced the mass in the gravity model with GDP, the size of

the economy, and the distance between countries to replace the distance between the centers of mass. Through a large number of empirical studies, Tinbergen concluded that the trade flow from one country to another mainly depends on the economic size of the country as measured by GDP and the geographical distance between the two countries. Furthermore, Tinbergen (1962) claims that trade has a positive relationship with the economic size and negative relationship with the geographical distance between trading partners. Since then, many economists (e.g., Anderson (1979), Fidrmuc et al. (2000), Buckley et al. (2007)) have argued that trade and investment have a complementary rather than a substitute relationship, and that the gravity model of trade can also be used to study foreign investment. Fidrmuc et al. (2000) study the relationship between the total GDP of two countries, the spatial distance between national capitals and bilateral trade, as well as their relationship with investment flows. After focusing on the countries in Central and Eastern Europe, their study concludes that bilateral trade and investment flows have a positive relationship with GDP and negative relationship with distance. According to the analysis, the coefficient of the distance variable varies from -1.5 to -0.7.

In summary, a lot of research on the determinants of OFDI has been done. While they provide insights regarding the guiding significance for OFDI location selection, there is no unified theory on international investment location and there is little research on Canadian foreign investment in the existing literature. Moreover, many existing studies are of theoretical nature, lacking a systematic empirical analysis. Most of them ignore the lag effect of OFDI and didn't take care of endogeneity issue. To address these deficiencies, I use the dynamic GMM model and a panel data consisting of 21 countries from 1990 to 2017 to empirically investigate the determinants of Canadian OFDI.

Chapter 3: Methods and data

As an empirical study, this section first explains the variable selections, then the model specification, and the data.

3.1. Methods

Our dependent variable in the model is Canadian OFDI flow to 21 host countries. I choose the independent variables based on the existing literature.

As reviewed in Section 2, the literature has identified many factors that affect the outward foreign direct investment including host countries' GDP, trade, exchange rate, and so on. Enterprises should consider a series of factors when choosing the location. It should not only consider the strength and goal of the enterprise, but also consider whether the investment environment of the host country is suitable. In addition, it should be influenced by the policies, systems, and economic development of the investment country (Alam et al., 2019).

First, Gross Domestic Product (GDP) of the host countries is an important index that reflects economic capacity of a country which affects foreign investimates. Several studies have included this variable as a determainant of OFDI. (e.g., Schneider and Frey (1985), Lunn (1980),Scaperlanda & Balough (1983)). At present, about half of the world's OFDI stock goes to a few countries, such as the US, the UK, Germany, and France. In developing countries, some countries with huge market potential have also become hot spots for multinational companies to choose locations for overseas investment, such as Singapore, Mexico, and Thailand (Alam et al., 2019). Hence, I include the GDP of the host countries as a determinant of Canadian OFDI.

Second, the level of regional integration of countries plays an important role in terms of choosing OFDI location. In the past 20 to 30 years, the development of regional integration in the world economic pattern has broken various barriers between countries and made the flow of elements and commodities in the region more convenient, so that the extension of market size exceeds the boundaries of countries. The investment layout of a country can radiate to the whole region, and the scale of investment can also be considered from the perspective of the size of the whole regional market. Therefore, when considering the flow of investment to the region the higher the level of regional integration, the stronger the ability to attract foreign investment.

Third, as in the gravity model, distance between host and investing country is likely to affect the decision to locate OFDI. The gravity model of trade reflects that the cost of transportation, communication, and coordination increases with the increase of the distance between the home country and the host country. The OFDI also has similar features; therefore, distance is likely to work as an important determinant of OFDI location. Distance may lead to increasing difficulty and cost of locating OFDI. Zwinkels and Beugelsdijk (2010) verifies that distance is an obstacle to FDI flows into the region when studying FDI in the Caribbean region. However, some scholars believe that the distance is the same as the high tariff barrier such that the farther the distance, the smaller the trade between the two countries. The distance between the investor and the host country is an important factor affecting investment. Especially for manufacturing enterprises, the longer the distance, the more difficult it is to transport products and raw materials with the foreign country. For many outward foreign direct investment enterprises, their raw materials and products are related to the transportation of raw

materials in the country. The farther the distance is, the higher the transportation cost will be for the enterprises. The greater the distance, the greater the cost and risk of investment management and control. Therefore, I include distance as one of the determinants of OFDI in our analysis.

Fourth, trade and investment are complementary and can reinforce each other (Liu et al. 2002). Generally, the growth of bilateral trade between domestic country and the host country will promote domestic enterprises to make an investment in the host country. Many studies observe that strong bilateral trade relations have a positive impact on FDI flows to host countries. The bilateral trade relation is an important factor that can easily affect the decision of foreign investors. Rose and Spiegel (2004) suggest that a larger inflow of FDI leads to a higher volume of trade as well as other associated benefits based on their analysis of the relations between FDI and trade. Buckley et al. (2007) note that imports to a country from host economies also capture the intensity of trade relations and affects bilateral trade. Chaisrisawatsuk and Chaisrisawatsuk (2007) use simultaneous equation estimation and the data of 29 OECD and 6 ASEAN countries from 1980 to 2004, finding that an increase in FDI inflows can stimulate more imports to home and host countries from the rest of the world. In this study, I use the sums of the exports and imports as the proxy variable of bilateral trade.

Fifth, Froot and Stein (1991) using quarterly data from 1973 to 1988 claim that the exchange rate is a major determinant of OFDI outflow. They put forward the "relative wealth" theory: The devaluation of the currency of the host country will increase the "relative wealth" of investors, thus promoting the outflow of OFDI from the investing country. Exchange rate is one of the important determinants of FDI. An overvalued

currency encourages OFDI since the value of foreign assets decline relative to home country assets. An unexpected appreciation of Canadian currency could make foreign assets attractive for Canadian MNEs or vice versa. Therefore, I add exchange rate to our models as another determinant of OFDI.

Sixth, a well-developed financial system of host countries can attract more FDI inflows. Nasser, Omar, and Gomez (2009) use the panel data that consists of 15 countries from 1978 to 2003. They suggest that financial development is a significant factor in FDI inflows to Latin American countries because it affects the cost structure of investment projects. Hermes and Lensink (2003) find a positive association between FDI and host country's financial development in 37 countries out of 67 in the sampled data. Sghaier and Abida (2013) discover a strong relationship between different components of financial intermediary development and FDI inflows. Most researches reveals a positive relation between host countries' financial development and FDI inflow.

Seventh, Weber (1949) divides economic factors affecting industrial location into regional factors and location factors. Weber argues that the actual regional factors that play a role in the location are mainly transportation costs and labor costs. Enterprises will first choose to produce in the minimum freight point; when the saving of labor cost is greater than the increase of freight, enterprises will choose to produce goods in the region with low labor cost. Based on the fact that labor cost is an important factor affecting production costs, enterprises will primarily determine the location adjustment according to the level of labor cost. In terms of efficiency, the most common reason for which companies chose to relocate their production abroad is cheap labor (Popa, 2013). A country's population is not only a reflection of its labor force (Chang, 2014), but also

closely related to its market demand (Miniesy et al. 2015). Therefore, this work added the population variable to the model. However, population cannot always fully reflect the labour cost, therefore, I use two other alternatives variables. I use "Wage". A number of authors (eg: Stevens, 1972; Kwack, 1972; Boatwright & Renton, 1975; Cushman, 1987) assume wages are a reflection of labor costs, so they use wage in the estimated models to examine the general belief that FDI will flow from high labor cost to low labor cost areas. Our wage information for a number of countries are missing, therefore, I use an alternative variable "GDP per capita" to capture the impact of labour cost in investing country. GDP per capita is a measure of a country's economic output that accounts for its number of people. It is a good measurement of a country's standard of living. It tells you how prosperous a country feels to each of its citizens. OFDI is positively influenced by a country's stage of development, conventionally measured in terms of GDP per capita (Liu et al., 2005). It also reflects labor costs to some extent, so I put it in the model.

3.2. Model specification

Following the existing literature and the model of Alam, Sami, and Turay (2019), I selected the following logarithmic linear model[1] to identify the determinants of OFDI in our study:

$$Ln(OFDI_{it}) = C_0 + C_1 Ln(GDP_{it}) + C_2 Ln(HGDP_{it}) + C_3 Ln(D_{it}) + C_4 Ln(TRADE_{it}) + C_5 Ln(ER_{it}) + C_6 Ln(FD_{it}) + C_7 Ln(LC_{it}) + u_{it} \quad (1)$$

Where $OFDI_{it}$ represents Canada's OFDI flows; GDP_{it} represents Canada's total GDP, and $HGDP_{it}$ is the total GDP of the host country. D_{it} is the distance between

[1]Detail description of the variables can be found in Table A1 of the Appendix.

Canada and the host country. $TRADE_{it}$ is the total bilateral trade between Canada and the host country, and ER_{it} is the exchange rate between Canada and host country. FD_{it} is domestic credit to private sector by banks as a measure of the home country's financial condition. LC_{it} is the labor cost of host countries. In the subsequent empirical analysis, this report will capture labor cost using three alternative variables, population; wage; and GDP per capita. C_0 is the constant term, and u_{it} is the residual term.

Several researchers use a static model similar to this model with some modifications. However, due to the dynamic nature of OFDI flows, the results based on the static model could be misleading. It is likely that the flow of OFDI in the past may have established the distribution networks and continue to induce the flow of OFDI in the current period. A country which invests in another country for a given year tends to continue to do so the next year. Therefore, the performance of OFDI made the previous year provides a basis for OFDI activities of the current year (Kahouli & Maktouf, 2015). Investment is a continuous and dynamic process, and the outward direct investment of the previous period has some influence on the current investment. Therefore, it is more realistic to introduce lag dependent variable (Doytch & Uctum, 2011) and estimate a dynamic model. In this study, I estimate both static and dynamic models to identify the determinants of Canadian OFDI. Our dynamic model is as follows:

$$\begin{aligned} Ln(OFDI_{it}) &= C_0 + C_1 Ln(OFDI_{it-1}) + C_2 Ln(GDP_{it}) + C_3 Ln(HGDP_{it}) + C_4 Ln(D_{it}) \\ &+ C_5 Ln(TRADE_{it}) + C_6 Ln(ER_{it}) + C_7 Ln(FD_{it}) + C_8 Ln(LC_{it}) + u_{it} \end{aligned} \quad (2)$$

The newly added variable $Ln(OFDI_{it-1})$ is the outward direct investment of Canada to host country i in year t-1, and other variables have the same meaning as the static model.

Given the time dimension of our data, it is necessary to first test the stationarity of the series. Based on the results of the stationarity, I then choose the appropriate estimation techniques. If the variables are stationary, I may proceed to estimate our static model by using Pooled OLS, Fixed Effect, and Random effect estimation method. However, in the presence of the dynamic model and the issue of endogeneity, the estimates based on OLS would be biased and inconsistent (Baltagi, 2008). Arellano and Bond (1991) recommended the usage of instrumental variables to resolve the issues in dynamic panel data (García-Herrero et al., 2009; Athanasoglou et al., 2008). Therefore, the generalized moment estimation method (GMM) is adopted in this paper for regression. The GMM method allows the heteroscedasticity and sequence correlation of random error terms, and it is not necessary to know the accurate distribution of random error terms (Greene, 2003). It can effectively solve the problems of general endogeneity and inherent endogeneity by estimating parameters through instrumental variables. In order to obtain the unbiased estimate of Equation (2), it is necessary to select the appropriate instrumental variable. For this problem, Arellano and Bond (1991) proposed to use the first-order difference GMM estimation method to solve it. However, Blundell and Bond (1998) pointed out that the first-order difference GMM estimation method is susceptible to the influence of weak instrumental variables and obtains biased estimation results. In order to overcome the influence of weak instrumental variables, Arellano and Bover (1995) and Blundell and Bond (1998) proposed another more effective method: system

GMM estimation method. For the GMM estimation of the system, the original equation and difference equation are integrated. In general, it has better properties and can solve endogeneity. In the end, I decide to use the System Generalized Method of Moments (Sys GMM) for our dynamic panel data model thought I also use other methods for comparison purpose.

3.3. Data sources

Panel data contains three-dimensional information of time, cross section, and variable indexes, which increases the sample size and improves the sample degree of freedom. Using panel data can reflect the problem more authentically, reduce the multicollinearity influence of explanatory variables and the estimation error (Wooldridge, 2015).

Based on the data availability of variables of interest in Canada and the host country, we select 21 OFDI recipient countries from 1990 to 2017. The 21 countries are Australia, Barbados, Belgium, Brazil, Chile, China, Colombia, France, Germany, Hong Kong, India, Ireland, Japan, Korea, Mexico, Netherlands, Spain, Sweden, Switzerland, United Kingdom, and United States. These 21 countries are the major foreign direct investment countries of Canada, accounting for more than 80% of Canada's OFDI. For example, in 2017, Canadian outward direct investment totaled $834,757 million and invested $729,016 million in 21 countries, accounting for 87.33% of the total (Statistics Canada, 2017). Data sources and processing are shown in Table A1 of the Appendix.

Chapter 4: Results

4.1. Unit root test of panel data

In order to alleviate potential heteroscedasticity, logarithmic treatment was adopted for each variable before empirical analysis (Wooldridge, 2015). To avoid spurious regression, I tested the stationarity of each variable in logarithmic form. The selection of estimation method depends on the stationarity of the variables considered (Wooldridge, 2015).

The unit root test is generally used to test the stationarity of variable (Wooldridge, 2015). In this study, Levin-Lin-Chu (LLC) and Augmented Dickey Fuller (ADF) detection methods are used in this paper to perform unit root detection on panel data of 21 countries. The test results are shown in Table 1. According to the results of LLC tests, the variables LDGDP and LER are non-stationary. Those variables are stationary after differencing them. Since regression requires that all variables are stationary, the first order difference processing of non-stationary variables is carried out to make them become stationary variables.

Table 1

Unit root test for variables.

Variables	LLC	LLC (1)	ADF	ADF (1)
LOFDI	-4.222***	-8.071***	-1.301*	-8.596***
LGDP	-0.477	-11.5339***	4.783	-8.432***
LHGDP	-2.608***	-10.918***	1.998	-10.117***
LTRADE	-2.192**	-8.289***	2.288	-9.874***
LER	-0.137	-9.986***	-0.879	-9.172***
LFD	-2.658***	-5.570***	0.226	-8.335***
LP	-1.525*	-3.081***	3.801	-2.267**
LWAGE	-37.643***	198.956	-7.861***	-10.162***
LGDPPC	-2.209**	-14.186***	1.723	-11.727***

Note: *, **, *** indicated it is significant at the level of 10%, 5% and 1%.

4.2. Regression results of static panel model

For robustness purpose, I first estimate the static model using ordinary OLS, fixed effect (FE), and random effect (RE). I use F test to determine whether to use ordinary OLS or fixed effect. Then, Hausman tests is performed to determine whether to use FE or RE. The conclusion shows that fixed effect is better than random effect. After a series of further tests, the results show that the model has autocorrelation, serial correlation, and heteroscedasticity. Accordingly, I chose Feasible Generalized Least Squares (FGLS) and Panel-Corrected Standard Error (PCSE) estimator (Buckley et al., 2007). PCSE is a method that can solve the problem of intra-group autocorrelation. FGLS estimation method also considers the problem of intra-group autocorrelation, inter-group heteroscedasticity, and contemporaneous correlation (Greene, 2003). Therefore, FGLS and PCSE estimation methods are used in this study to regress the static panel data model

though the estimation results of ordinary OLS, fixed effect (FE) and random effect (RE) are also included for comparison purpose.

Table 2: Regression results of the static panel data model (Population)

Variable	OLS	FE	RE	FGLS	PCSE
LGDP	0.870	0.849**	0.806**	0.870	0.870
	(0.667)	(0.379)	(0.385)	(0.662)	(1.028)
LHGDP	-0.470***	0.604***	0.544***	0.470***	0.470***
	(0.090)	(0.127)	(0.124)	(0.089)	(0.066)
LD	-0.040	omitted	0.425	-0.040	-0.040
	(0.113)		(0.370)	(0.112)	(0.089)
LTRADE	1.150***	0.641***	0.826***	1.150***	1.150***
	(0.079)	(0.108)	(0.097)	(0.079)	(0.067)
LER	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LFD	-0.320	-1.089***	-0.961***	-0.320	-0.320**
	(0.205)	(0.293)	(0.284)	(0.204)	(0.129)
LP	0.190**	4.530***	0.167	0.190**	0.190***
	(0.075)	(1.479)	(0.300)	(0.074)	(0.043)
Constant	12.528***	-45.231***	-15.625***	12.528***	12.528***
	(2.110)	(10.809)	(4.333)	(2.095)	(1.703)
R^2	0.583	0.257	0.486	0.532	0.583
F	110.93***	125.13***	729.78***	787.65***	8073.16***
Obs	564	564	564	564	564

Note: *, **, ***indicated it is significant at the level of 10%, 5% and 1%.

The results of ordinary OLS, fixed effect (FE), random effect (RE), FGLS, and PCSE are reported in Table 3. It shows that the results of different estimation methods are largely consistent, and the coefficients are fairly close. The estimated results of FGLS and PCSE are more significant, which most variables reject the null hypothesis at a

significance level of 1%. The results of the FGLS and PCSE model shown that Canada's GDP growth rate has a positive relationship with OFDI, the higher the economic growth is, the more foreign investment there is. There is a positive relationship between the growth rate of host countries' GDP and OFDI flow, which indicates that the economic aggregate of the sample country has a certain attraction to investment. The total trade between Canada and the host countries also shows a significant positive relationship with the OFDI. From the perspective of coefficient, Canada's direct investment in the host country will increase by 1.150% for every 1% increase in the trade. The distance has a negative relationship with the OFDI. The closer the two countries are, the more likely to invest, which is same as the findings of Buckley et al. (2010). However, our results that the impact of exchange rate of OFDI is an insignificant factor influencing the OFDI. One explanation is that Canada has a floating exchange rate regime which is determined by the international current market instead of the government. The sign of the financial development (FD) variable is negative, which is contrary to the finding of Hermes and Lensink (2003). Sghaier and Abida (2013) also discover a strong relationship between different components of financial intermediary development and FDI inflows. One of the possible reasons of contradictory findings in our case is the variable used for financial development. The literature suggest various alternatives to measure the financial development including M2/GDP (Kar & Pentecost, 2000), total loans as a percentage of GDP (Boyd et al., 2001; Agarwal & Mohtadi, 2004; Al Nasser & Gomez, 2009), or total private sector loans as a percentage of GDP (Levine & Zervos, 1998; Rousseau & Wachtel, 2000; Boyd et al., 2001; and Beck & Levine, 2003). However, none of them are a true reflection of the development of financial sector, therefore, the results based on

those proxies should be taken cautiously. I also obtain a positive relationship between OFDI and population. The countries with larger population attract more Canadian OFDI. This finding is in line with existing literature (Miniesy et al. 2015). In addition, I obtain a positive relationship between OFDI and wage, which is contrary to the existing literature (Cushman, 1987). One of the possible reasons is the data incompleteness, and another possible reason is existing endogeneity issue. Due to the unavailability of data, the regression results do not include the "LWAGE" data for Barbados, Brazil, China, Colombia, Hong Kong (China), India. This will lead to a biased result. We also obtain a positive relationship between OFDI and GDP per capita of host countries, which is a same conclusion as Liu, Buck, and Shu (2005). However, this result is contrary to expectation. The results of "Wage" and "GDP per capita" variables are attached in Table A3 and A4 of the Appendix.

4.3. Results with dynamic panel model

After adding OFDI's lag variable as an additional explanatory variable, the model becomes dynamic. When carrying out Hausman test on the model, it is found that the null hypothesis that "all explanatory variables are exogenous" is rejected under the condition of 1% level of significance, so the model has endogeneity problems. There is endogeneity between Canadian GDP and OFDI. It is difficult to solve intrinsic endogeneity problem by general static model. In order to solve the possible endogenous problems in the model, the generalized moment estimation method (GMM) is adopted in this study for regression. Given that system GMM is more stable compared with difference GMM, I selected the system GMM as the appropriate method for our main estimation. The estimation results of both methods are reported in Table 3.

Table 3: Regression results of dynamic panel data model

Variable	Difference GMM	System GMM	Difference GMM	System GMM	Difference GMM	System GMM
L.LOFDI	0.793***	0.853***	0.772***	0.847***	0.793***	0.853***
	(0.032)	(0.025)	(0.036)	(0.029)	(0.032)	(0.025)
LGDP	0.375**	0.539***	0.441**	0.631***	0.375**	0.539***
	(0 .181)	(0.175)	(0 .222)	(0.218)	(0 .181)	(0.175)
LHGDP	0.152*	0.024	0.170*	0.039	1.074**	0.072
	(0.087)	(0.078)	(0.094)	(0.080)	(0.525)	(0.086)
LD	-2.031**	-0.413**	-0.246	-0.376**	-2.030**	-0.413**
	(1.012)	(0.179)	(0.454)	(0.188)	(1.011)	(0.179)
LTRADE	-0.034	0.091	-0.032	0.115	-0.034	0.091
	(0.078)	(0.063)	(0.088)	(0.071)	(0.078)	(0.063)
LER	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LFD	-0.284	-0.455***	0.274	-0.361**	-0.284	-0.455***
	(0.259)	(0.149)	(0.256)	(0.165)	(0.206)	(0.149)
LP	2.125*	0.112				
	(1.185)	(0.079)				
LWAGE			-0.121	-0.130		
			(0.370)	(0.176)		
LGDPPC					0.923*	0.048
					(0.515)	(0.034)
Constant	Omitted	-3.569 (2.261)	Omitted	-1.785 (2.821)	Omitted	-3.569 (2.261)
F	382210.73** *	4013.03***	235834.14** *	3201.30***	382210.27** *	4013.02***
Obs	518	541	364	381	518	541

Note: *, **, ***indicated it is significant at the level of 10%, 5% and 1%.

When the labor cost is represented by Population, the results of the system GMM show that the coefficient of the variables is consistent with expectation. The coefficient of is positive and significant: the OFDI of last year increase by 1%, will increase current OFDI by 0.853%. A 1% increase in domestic GDP will increases OFDI by 0.539%. The GDP of the host countries is also significant and positive. Indicating that the more economic progress the host country has, the more likely they are to be invested.

As for the distance, the regression results are basically consistent with earlier findings (Aybar, 2016; Chang, 2014). The greater the distance between the two countries, the higher the cost and difficulty of investment. The relationship between OFDI and trade in the dynamic model is positive but insignificant. In addition, the results show that the impact of growth rate of the exchange rate on OFDI is extremely small, which is similar to the conclusion of Al-Shammari and Behbehani (2017). Our FD is variables maintains similar results from the static model. The variable, population, has a positive relationship with OFDI albeit insignificant in the System GMM estimation. As claimed earlier, the larger the population is, the more the labor force will be, and the less production cost will be. Hence, population of the host country is positively linked with the flow of Canadian OFDI.

When use “Wage” and “GDP per capita” to represent the labor cost, the result is still not in line with our expectation. However, the sign of the wage variable is negative, which means that the higher the wage growth rate of host country, the less OFDI will be. Because higher wages mean higher costs, and the increase of wages lead to the costs rise. The variable, GDP per capita, has a positive relationship with OFDI albeit insignificant in the System GMM estimation. It’s likely that our GDP per capita variable did not capture

the labor cost as expected. Despite increase in GDP per capita the labor cost may not have increased in the industries where Canadian enterprises invest. Our results are robust as we claim similar findings using different estimation methods. We also corrected various problems relevant to the error structure and found no major change in our results.

Chapter 5: Conclusions and policy recommendations

This is an empirical study that uses both static and dynamic panel data models to identify the determinants of Canadian OFDI. Using data from 21 host countries from 1990 to 2017, I find that the current year flow of OFDI from Canada has a strong relationship with the flow from previous year; the economic development level of the host country also has a positive impact on the attractiveness of OFDI of Canada, and Canadian investments tend to flow into countries with higher economic development level. When choosing OFDI location, Canada tends to choose countries and regions with long-term and stable trade contacts. One of the reasons of having a complement relationship between trade flows and OFDI is that countries with strong trade relations are less risky to invest. These countries provide a stable economic and political environment for their companies to invest. On the other hand, by making use of the complementary relationship between trade and investment, upstream and downstream enterprises can be set up in the host countries. They can cooperate with each other to gain a larger market share. The trade between the two countries does promote the mutual investment to some extent. The results of the Difference GMM show that population in the host country has a positive relationship with the flow of Canadian OFDI. However, it is insignificant from the System GMM estimate.

With respect to policy implications, first Canada's diplomatic relations with neighboring countries should be improved in order to increase its OFDI; since the geographical distance has found to be significant and has a negative relationship with the investment flow. Second, Canadian enterprises can continue to increase investments in countries with fast-growing economies and high growth potential. For example, China's

economy has developed rapidly in recent years and the investment environment has been greatly improved. Canadian enterprises can consider investing in countries like China.

Third, enterprises need to keep abreast of the economic cooperation between countries, trade, investment flows, and relevant preferential investment policies, in order to reduce the risk of investment and make full use of the advantages of investment to improve the efficiency of investment.

Finally, Canadian enterprises should also consider the population and wage of the host countries while making the decision to invest. Labor-intensive enterprise should choose the countries with relatively dense population and low wage level and growth rate to investment and make full use of the local labor. By taking advantage of cheap labor to reduce the cost of the enterprise.

As for the Canadian governments, first, it should continue to strengthen its trade with other countries and promote friendly relations with them, in order to boost the confidence of enterprises in foreign direct investment.

Despite our robust estimates, the results of this exercise should be taken cautiously due to several data and econometric issues. First, Due to limited data availability, I could not include several important factors, such as the level of corruption and government effectiveness. The omission of these factors could mean that our estimates are biased, Second, the number of countries are limited as I could not find enough data points to include all of the countries where Canadian OFDI invested. This means our estimates may not be as precise. Finally, the instruments used in the GMM estimations are internal instruments only. I could not find any reliable external instruments which could have made the results more robust.

Appendix

Table A1: Description of variables.

Variables		Explanation	Symbol	Data Source
Canada's OFDI flows		Canada's OFDI flow to host countries	OFDI	Canada's national statistical agency
Canada's GDP		Canada's real gross domestic product	GDP	IMF's official website
Host countries' GDP		Host countries' real gross domestic product	HGDP	IMF's official website
Geographical distance		The geographical distance (kilometers) between the two countries' capital	D	The distance calculator on the website: http://www.indo.com.
Trade		Canada's total import and export trade with the host country	TRADE	World Bank
Exchange rate		The nominal exchange rates between Canada and host countries	ER	World Bank
Financial development and business environment		Domestic credit to private sector by banks (% of GDP)	FD	World Bank Development Indicators
Labor cost	Population	Population of host countries	P	World Bank Development Indicators
	Wage	Average wages	WAGE	OECD's official website
	GDP per capita	Total GDP divided by population	GDPPC	IMF's official website

Table A2: Descriptive statistics of variables.

Variables		Obs	Mean	St.D	Min	Max
OFDI		564	8.019	1.814	2.639	13.132
GDP		567	0.038	0.076	-0.143	0.163
HGDP		567	27.280	1.289	24.356	30.596
D		567	8.749	0.664	6.599	9.687
TRADE		567	6.770	1.575	3.572	11.654
ER		567	26.132	356.167	-2158.472	7104.242
FD		567	1.892	0.303	0.986	2.345
Labor cost	Population	567	7.603	0.803	5.417	9.142
	Wage	400	10.570	0.340	9.482	11.071
	GDP per capita	567	9.774	2.004	5.517	14.117

Table A3: Regression results of the static panel data model (Wage)

Variable	OLS	FE	RE	FGLS	PCSE
LGDP	0.612	0.413	0.427	0.612	0.612
	(0.797)	(0.433)	(0.435)	(0.788)	(0.524)
LHGDP	-0.534***	0.023	-0.017	0.534***	0.534***
	(0.102)	(0.140)	(0.138)	(0.101)	(0.079)
LD	0.264*	omitted	0.186	-0.264**	-0.264***
	(0.135)		(0.627)	(0.133)	(0.065)
LTRADE	1.266***	0.924***	0.978***	1.266***	1.266***
	(0.084)	(0.115)	(0.112)	(0.083)	(0.050)
LER	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LFD	-0.327	-0.487	-0.352	-0.327	-0.327**
	(0.246)	(0.360)	(0.347)	(0.244)	(0.139)
LWAGE	0.509**	2.950***	2.522***	0.509**	0.509**
	(0.211)	(0.461)	(0.425)	(0.208)	(0.199)
Constant	6.757**	-29.310***	-25.930***	6.757***	6.757***
	(2.624)	(4.960)	(7.163)	(2.560)	(1.574)
R^2	0.499	0.371	0.393	0.496	0.508
F	57.26***	109.44***	646.16***	409.03***	1938.99***
Obs	397	397	397	397	397

Note: *, **, ***indicated it is significant at the level of 10%, 5% and 1%.

Table A4: Regression results of the static panel data model (GDP per capita)

Variable	OLS	FE	RE	FGLS	PCSE
LGDP	0.870	0.849**	0.806**	0.870	0.870
	(0.667)	(0.379)	(0.385)	(0.662)	(1.028)
LHGDP	-0.387***	2.571***	0.617***	0.387***	0.387***
	(0.098)	(0.640)	(0.180)	(0.098)	(0.068)
LD	-0.040	omitted	0.425	-0.040	-0.040
	(0.113)		(0.370)	(0.112)	(0.089)
LTRADE	1.150***	0.641***	0.826***	1.150***	1.150***
	(0.079)	(0.108)	(0.097)	(0.079)	(0.067)
LER	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LFD	-0.320	-1.089***	-0.961***	-0.320	-0.320**
	(0.205)	(0.293)	(0.284)	(0.204)	(0.129)
LGDPPC	0.082**	0.197***	0.073	0.083**	0.082***
	(0.033)	(0.642)	(0.130)	(0.032)	(0.019)
Constant	12.528***	-45.231***	-15.625***	12.528***	12.528***
	(2.110)	(10.809)	(4.333)	(2.095)	(1.703)
R^2	0.583	0.257	0.486	0.564	0.583
F	110.93***	125.13***	729.78***	787.65***	8073.16***
Obs	564	564	564	564	564

Note: *, **, ***indicated it is significant at the level of 10%, 5% and 1%.

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