



FACTORS THAT HAVE SHAPED THE EVOLUTION OF BILATERAL TRADE BETWEEN CANADA AND COLOMBIA IN THE LONG RUN (1953-2003)

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Introduction

Currently bilateral trade between Canada and Colombia is low. In 2003, this trade amounted to US \$489 million, with Colombian imports from Canada totaling US \$ 213 million (DOTS, 2004). Canada supplied approximately 4.0% of Colombia's total trade (total imports and total exports), in contrast Colombia supplied only around 0.1% of the Canadian total trade. In 2005, Colombia was the third largest Canadian partner in South America after Brazil and Venezuela.

The objective of this paper is to analyze the trade performance between Canada and Colombia using a modified gravity equation to identify the most relevant historical factors that have shaped the evolution of this bilateral trade in the long run (during the period from 1953 to 2003). The analysis includes traditional economic variables (such as population and income of the importing and exporting countries). In order to understand the qualitative nature

of the evolution of this bilateral trade the second objective is to review the evolving nature of trade including commodity composition and trade characteristics.

1. Evolution of Bilateral Trade Settings of Canada - Colombian Bilateral Trade

Canada and Colombia have been trade partners for over 136 years. This trade relation has been recorded since 1868 (Statistics Canada). In fact, between 1868 and 1920, they had some minor trade, especially concentrated in Canadian imports of Colombian coffee. The balance of trade was positive for Colombia in the first part of the 20th century with the exception of two years (1947 and 1950) (Dominion Bureau of Statistics Canada).

Canada and Colombia have some common features, and they have some economic and business links. They are agricultural producers and traders. Both of them are members of multilateral trade agreements



such as the World Trade Organization and Cairns group. Colombia as a member of the Andean Community signed the Canada-Andean Community Trade and Investment Cooperation Arrangement (TICA) in May 1999. Both of them are located in the Americas between the Pacific and the Atlantic. They also have common interest in the Asia-Pacific Region. Colombia is not yet a member of the Asia Pacific Economic Cooperation pact (APEC); however, since May 2000 Colombia belongs to the APEC Trade Promotion Working Group (WGPT) as an observer. Both of them are looking for new directions for their external policies and new markets for their exports. In addition, Canada and Colombia have held preliminary discussions on the possibility of eventual free bilateral trade negotiations.

This research analyzes the general economic environment of the bilateral trade relationship between Canada and Colombia. It reviews the importance of each country and some economic and social aspects such as total imports, total exports, bilateral trade value and commodity composition. Firstly, the evolution of trade in Canada and Colombia since 1953 is briefly examined. From this examination we make our econometric analysis.

Trade After 1953

Our research centers in the second part of the 20th Century. Diplomatic relations between Canada and Colombia were established on November 6, 1952. The Canadian Embassy

was established in Bogotá, Colombia on April 9, 1953 (Department of Foreign Affairs and International Trade Canada). The real value of bilateral trade increased during 1953-2003 (Fig. 1). Total bilateral trade (exports and imports) increased from US \$ 1.67 million in 1953 to US \$ 4.86 million in 2003 and the highest value of trade was in 1994 US \$ 5.48 million.

Generally in the course of evolution of this bilateral trade, there has been imbalanced trade (Colombian imports have been higher than Canadian imports). However, there were three sub periods with positive Colombian trade balance (sub-period I: 1953-1959; sub-period II: 1974-1976 and sub-period III: 1999-2003) (Fig. 1).

Before 1959, the Canadian imports from Colombia were slightly higher than the Colombian imports. Canadian bigger efforts to enter into Colombian market were before the 1960s, including visits, promotion etc. However, it seems that Colombia did not have a strong commitment to Canada during this early period. Between 1960 and 1970, Colombian imports from Canada were higher than Canadian imports from Colombia (Fig. 1). In the 1960s the Canadian imports reduced (from \$ 966,350 in 1958 to \$ 527,690 in 1966). The Canadian imports from Colombia were on average half the value of the Colombian imports from Canada.

The increase of Colombian imports from Canada (from \$ 1.01 million in 1975 to \$2.69 million in 1981) seems to be ex-



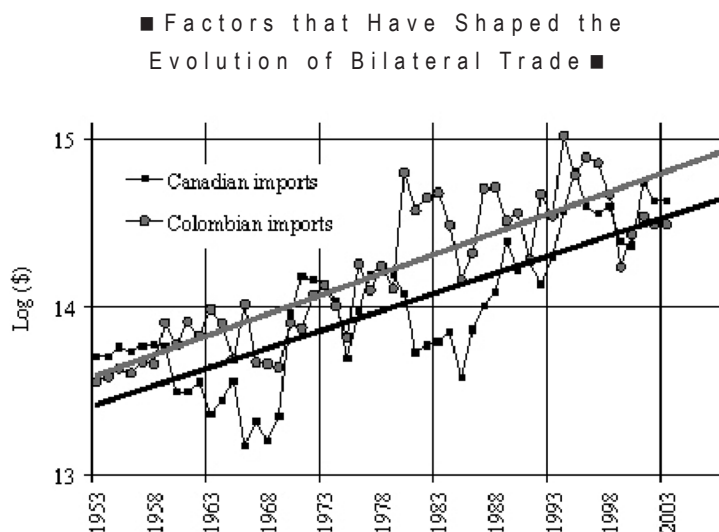


Figure 1. Bilateral trade between Canada and Colombia (1953-2003)

plained by the increase of the Colombian income due to the “coffee boom” between 1975 and 1979. And the increase of Colombian imports in 1993 seems to be the result of the openness and trade liberalization of Colombia during the 1990s.

Trade Openness

Figure 2 shows the openness index of Colombia versus Canada. Openness is a measure of the importance of external trade to an economy and it is measured by the sum of real exports and imports as a percentage of real GDP. The Canadian openness is shown by the black curve lying above the histogram for Colombian openness. For both countries (Canada and Colombia), the degree of openness has been changing over time. The openness of Canada on the average was 24.99 % compared with 11.19

% in Colombia over the period from 1953 to 2003. Both countries have increased their openness significantly during the last decade, Colombia has the highest openness in 1998 (23.05%) and Canada in 2001 (41.18%).

The commodity composition of Colombian imports from Canada has been changing over time (from newsprint paper, plastic and changing to aircraft and cereals). In 2003, Colombian imports include cereals (33%), electrical machinery, paper, pulp, chemical products and pharmaceutical products (Proexport, 2003). In contrast, over the last fifty-one years, the commodity composition of the Canadian imports from Colombia has been predominantly coffee. Coffee remains the number one Colombian export to Canada; it represented more than 40% of the total Colombian exports to Ca-



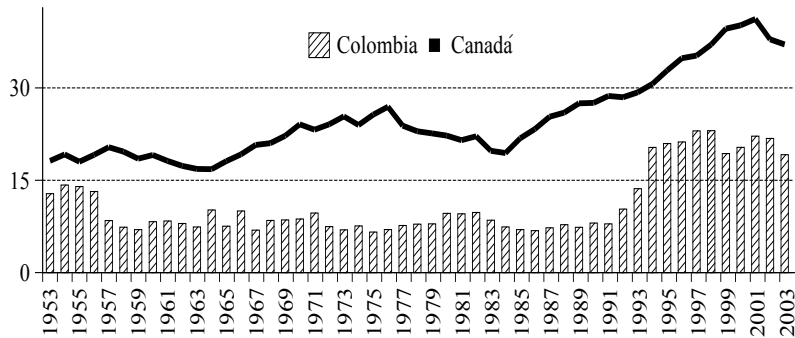


Figure 2. Openness of Colombia vs. Canada Commodity composition of trade

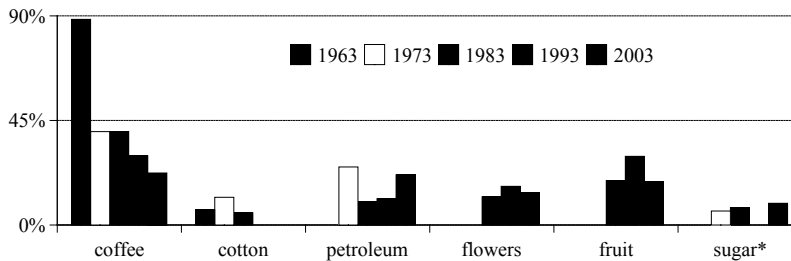


Figure 3. Commodity composition of the Canadian imports over time

nada in the last decade. Coffee is followed by a diversified group of commodities. The most important items are fresh-cut flowers, cotton, bananas, sugar cane, molasses, cacao, fruit, petroleum, coal, emeralds, textiles, beef, chemical and electrical products (Statistics Canada) (Figure 3).

From 1961 to 1966, Canada imported coffee and cotton from Colombia. In 1963, coffee contributed with 90% of the total Canadian imports from Colombia. Canada imported also petroleum from 1970s and flowers and fruit since 1980s.

In 1969, Colombian imports from Canada were represented by: chemicals

and vegetable fibers (Dominion Bureau of Statistics Canada). In 1983, the Colombian imports consisted of newsprint and paper and agricultural products. Canadian exports to Colombia while still containing the traditional items like agricultural products, have also diversified. The diversification is in several directions, there are now more cereals and there are more value added products. In 2003, major Colombia imports from Canada are agricultural products (wheat, other cereals, lentils, peas, beans, chickpeas, canary seed and mustard seed), dairy products, newsprint and paper, plastic and rubber, motor vehicles and

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parts, machinery equipment, steel, asbestos, chemicals, telecommunications and aircraft (Statistics Canada) (Figure 4).

In real terms bilateral trade between Canada and Colombia had grown unstable and characterized by a faster growth rate in Colombian imports from Canada (4.6%) than Canadian imports from Colombia (3.6%). The highest growth rate of the Canadian imports from Colombia is in 1970 with 84.44% and the highest annual growth rate of the Colombian imports from Canada is in 1980 with 100.07%. That was due mainly to the increase in the income of the country and the price of coffee. Also, there were two sub-periods of four and three years respectively with continuous annual percentage reduction of Canadian imports from Colombia, from 1972 to 1975 and from 1979 to 1981.

The share of the bilateral trade to its respective global trade is small. In regard to the Canadian imports from Colombia, the noticeable annual percentage increases

were: in 1970 (84.4%) due to oil imports from Colombia and in 2001 (45.7%) due to the Canadian imports of raw materials from Colombia. During the first phase of the study, Canadian imports from Colombia show the highest percentage share of Canadian total imports (ranging from 0.35% in 1954 to 0.10% in 1966). On the other hand, in the Colombian side the first period showed the lowest percentage share (ranging from 0.09% in 1966 to 0.02% between 1953 and 1954). However, these percentage shares are low in the total Canadian trade (In 2003, bilateral trade represented on average 0.08 % of total Canadian exports and 0.11 % of the total Canadian imports). From 1987 to 2003, the percentage share of bilateral trade over the total Colombian trade has been rising (In 2003, 3.95% of Colombia's total exports and 4.04% of the total imports).

In the 1990s, a combination of factors such as the new external trade policy moves towards the opening up of Colombian

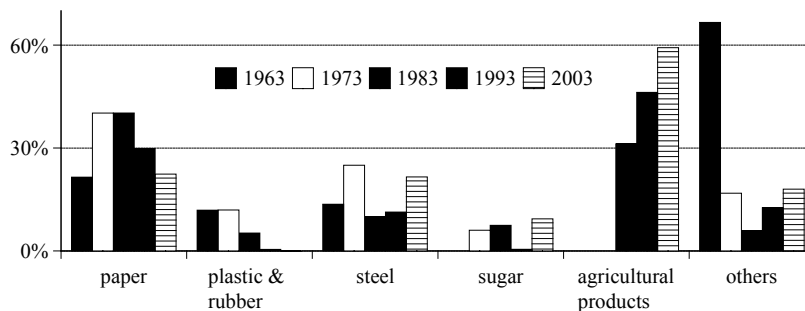


Figure 4. Commodity composition of the Colombian imports over time



economy. Colombia's trade liberalization included the elimination of import licensing and the liberalization of the financial, investment, exchange rate, and tax regimes. In 1996, Canadian trade surplus with Colombia was US \$ 754,000 compare with the Canadian trade deficit of US \$60,000 in 1995. It is worth noting that 1999 was the first trade surplus year for Colombia in several years. From 1999 to present the balance of trade has been positive for Colombia with the exception of the year 2000 with a Canadian surplus of US \$121,000. The main reason of this trend seems to be that Colombia reduced the Canadian grain imports from US\$103 million in 1998 to US\$48 million in 1999. During the whole period studied (1953-2003) 17 years (34%) have been positive for the Colombian bilateral balance and 33 years (66%) have been positive for the Canadian balance.

2. Model Description

The theoretical framework to evaluate the trade relationship between Colombia and Canada is based on the gravity model which has been used successfully for four decades by many scholars (For example, Geraci and Prew, 1977; Bergstrand 1985 and 1989 and Sanso, Cuairan and Sanz, 1993).

Modeling of bilateral trade flows was initially independently started by Tinbergen (1962) and Pöyhönen (1963) based on the theory that trade between any two countries is determined by their national incomes and their geographical distance (Taplin, 1967).

Pulliiainen (1963) included resistance/enhancement variables affecting the flow of goods among the members of the market-area and the use of temperature variable to reflect differences in resource endowments. The trade flow model by Tinbergen (1962); Pöyhönen (1963) and Pulliiainen (1963) is called the gravity model. The economic meaning of "gravity" is not clear. This approach "... appealed to physical laws of gravitation and electrical forces to arrive at the conclusion that the flow of goods from country *i* to country *j* equals the product of the potential trade of trade capacity measured by *F*, the values of the foreign sector at the two points ($F_i \times F_j$), divided by the resistance or distance (perhaps squared)" (Leamer and Stern, 1970: 158).

Linnemann (1966) modified Tinbergen and Pöyhönen model by incorporating the population of the importing and exporting countries. Linnemann's included static variables, relative factor endowments and natural and artificial trade resistance such as government actions (artificial impediments which can be manipulated), distance (proxy variable for natural trade resistances) and trade preferences. There are some limitations to Tinbergen-Pöyhönen- Linnemann's approach: (1) it is static and does not consider the development of trade over time (Taplin, 1967); (2) it seems that the import flow is more important than the export flow; (3) they excluded price variables (Leamer & Stern, 1970). Waelbroeck (1976) further





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modified Tinbergen-Pöyhönen approach by introducing the aggregate price index to the model. Geraci and Prewo (1977) found preferential trading group membership and common language to have a significant impact upon trade. The endowment factors differences and non-homothetic tastes were incorporated to the gravity equation by Bergstrand (1985). Thursby and Thursby (1987) added absolute per capita income differences to a generalized gravity equation without population. In general, according to gravity approach bilateral trade between two countries is directly related to their incomes and inversely related to distance between them.

Rebecca (1989) developed a gravity type model of U.S bilateral trade including economic and political variables and excluding price and exchange rate variables. Rebecca introduced a measure of the potential import demand and potential export supply.

Leamer and Stern's (1970) trade flow model is summarized by equation (1):

$$(1) F_i = f(Y_i, E_i, U_i, R_i)$$

where:

i = subscript indicating country i .

F_i = value of the foreign sector

Y_i = gross national product

E_i = resource endowment

U_i = utility or demand structure

R_i = general resistance to trade (transport cost, tariffs, etc).

In the trade flows, the income of the exporting and importing countries reflect

the supply potential and the market size and demand potential respectively. A common characteristic in these studies is that distance and GDP were determinants in bilateral trade flows. However, over the time the initial gravity equation has been transformed. It seems that some of the variables have been loosed. For instance, Sanso et al., (1993) do not include resource endowments or artificial resistance. They write the basic formulation of the gravity equation as equation (2):

$$(2) M_{ij} = AY_i^{\beta_1} Y_j^{\beta_2} L_i^{\beta_3} L_j^{\beta_4} D_{ij}^{\beta_5} e^{u_{ij}}$$

where:

M_{ij} = value of sales from country i to country j

A = constant

Y = value of income

L = population

D_{ij} = distance between i and j

u_{ij} = normal random error.

Some authors as Anderson (1979), Bergstrand (1985), Bergstrand (1989), used its basic formulation as a log-linear function. Recently, Sanso, et al. (1993) used the basic formulation of the gravity equation with a functional form defined by Box-Cox transformations. The theoretical framework to evaluate the bilateral trade flow between Canada and Colombia will be based on the gravity model described by Leamer & Stern (1970) and Waelbroeck (1967) and adapted to time series by Cortés, Sanyal and Ross (2005) in equation 3:

$$(3) M_{nit}^* = AY_{nt}^{\beta_1} Y_{it}^{\beta_2} L_{nt}^{\beta_3} L_{it}^{\beta_4} e^{\epsilon t}$$

where:

A = constant

β_j = elasticity of the explanatory variables, $j = 1, 2, \dots, 4$

y_{nt} = Canada's per capita income in period t

y_{it} = Colombia's per capita income in period t

L_{nt} = Canadian population in period t

L_{it} = Colombian population in period t

e is the exponential and ϵt is an independently distributed error term with fixed variance and zero mean.

2.1 The Adjusted Gravity Model

Taking into account that the standard gravity model is for cross-section analysis, Cortés et al (2005) fix a country pair and use the time variation of gravity variables to explain the variation of bilateral trade. They refer to their model as an adjusted gravity model. Denoting by M_{nit}^* the equilibrium value of imports from New Zealand (n) by country i in period t , we write the non-linear form of the equation as:

$$(4) M_{nit}^* = AY_{nt}^{\beta_1} Y_{it}^{\beta_2} L_{nt}^{\beta_3} L_{it}^{\beta_4} e^{\beta_5 D_1} e^{\beta_6 D_2} e^{\beta_6 D_3} e^{\beta_7 D_4} e^{\beta_8 D_5} e^{\epsilon t}$$

where:

A = constant

β_j = elasticity of the explanatory variables, $j = 1, 2, \dots, 5$

β_j = coefficient of the dummy variables, $j = 6, 7, \dots, 10$

y_{nt} = Canadian per capita income in period t

y_{it} = Colombian per capita income in period t

L_{nt} = Canadian population in period t

L_{it} = Colombian population in period t

e is the exponential and ϵ_t is an independently distributed error term with fixed variance and zero mean.

Cortés et al (2005) use binary variables: D_1 differentiates years separated by structural breaks; D_2 and D_3 for contemporaneous and one-year lagged effect of constitutional political change and D_4 and D_5 for contemporaneous and one-year lagged effect of violent change of regimes.

They transform (4) to a linear form by logarithmic transformation:¹

$$(5) \ln(M_{nit}^*) = \beta_0 + \beta_1 \ln(Y_{nt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(L_{nt}) + \beta_4 \ln(L_{it}) + \beta_5 \ln(Exr_{nit}) + \beta_6 D_1 + \beta_7 D_2 + \beta_8 D_3 + \beta_9 D_4 + \beta_{10} D_5 + \epsilon_t$$

This equation (5) has been used for each bilateral trade separately with D_1 being determined endogenously. We will use equation (5) and we will introduce dummy variables only if it is required by the equation.

$$(6) \ln(M_{nit}^*) = \beta_0 + \beta_1 \ln(Y_{nt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(L_{nt}) + \beta_4 \ln(L_{it}) + \epsilon_t$$

¹ Some authors, e. g. Bergstrand (1985, 1989), use a log-linear function in their basic formulation. Some others, e. g. Sanso et al (1993), begin with a very general nonlinear equation and transform it with Box-Cox transformation.



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The reason for choose this model is because it was successfully applied to understand bilateral trade between a developed country (New Zealand) and a set of developing countries (Latin American), similar case to our study (Canada- Colombia). The empirical model is formulated and tested as a representation of the trade between Canada and Colombia using time series analysis. Economic variables are per capita real GDP and population.

3. Empirical Exercise Report

The purpose of this section is to report the results of the empirical exercises. The section has the following structure. The second part discusses the sources of data, outlines the empirical procedure, and discusses the results of diagnostic analysis of the data. The third part states and explains the results of the estimation exercises for Canadian import and Colombian import functions in the long run (time series analysis). Because of the nature of the material in this section, there is no concluding report; however, the implications of these results will be discussed.

Data

Data and information have been obtained from several sources. The main sources are IMF (IFS and DOTS) and Statistics Canada (Yearbooks of International Trade Statistics). Data has been collected on aspects of different economic, political and social variables that influence imports and

exports of the potential trade with Canada. Data was available from authorities such as the Ministry of Foreign Affairs and Trade, the Statistics Department and private firms in Canada and their counterparts in Colombia.

Because the work is based on time-series data, we had to proceed through the following steps prior to estimating. The software used was Shazam 10 for Windows.

Economic Variables

Studies of long-run evolution of trade variables have generally found an appropriately defined income variable a useful regressand. However, often those studies are related to total imports, exports and trade of nations, where absolute or per capita income appears important, even on *a priori* grounds.

Economic variables for the model are obtained from the econometric analyses. Data for the model is in real currency (1995 \$), and the data collected was transformed into log (Figure 5). We used: import price index Canada P_{Can}^M and Colombia P_{Col}^M ; GDP deflector Canada IDP_{Can} and Colombia IDP_{Col} ; export price index Canada P_{can}^X and export price index Colombia P_{col}^X .

In order to use the linear regression model, we assume:

- Expected value of uni equal zero, $E(uni| \text{independent variables}) = 0$ for all i .

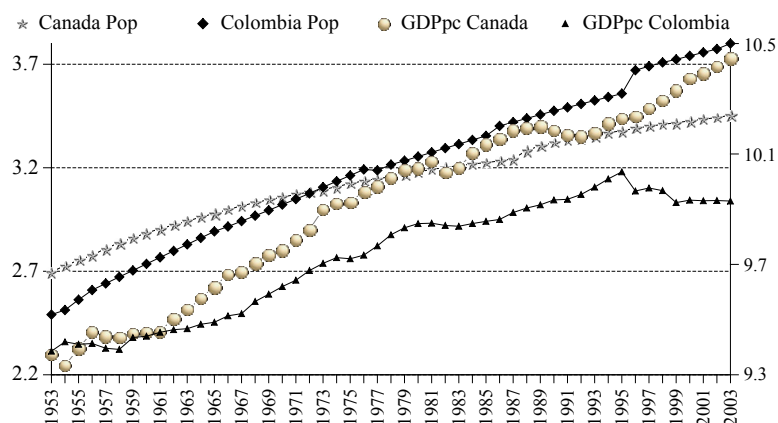


Figure 5. Log of the traditional economic variables (income and population).

Expected sign of the coefficients

Table 1, is a summary of the commonly used variables and the expected sign of their estimated coefficients.

Table 1.
Variables in Gravity Equation and Estimated Signs

Variables	Estimated Sign	Reference
GDP (Y)	(+)	Rebecca (1989); Bergstrand (1989).
	(-)	Sanso et al (1993)
	(+ or -) for exporters	Thursby & Thursby (1987).
Population	(-)	Rebecca (1989) and Ratnayake & Townsend (1999)
	(-) importer country	Cheng & Wall (1999)
	(+) exporter country	Cheng & Wall (1999)
Per capita income	(+)	Bergstrand (1989) and Sanso et al (1993)
Ratio of per capita income	(+)	Linder (1961)
	(-)	Thursby & Thursby (1987)



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- No serial correlation, $\text{cov}(U_{ni}, U_{ni}) = 0$ for n not equal to i .
- Homoscedasticity, $\text{var}(U_{ni}) = \sigma^2$.
- Covariance between u_{ij} and each independent variable is equal to zero.
- There is no exact collinearity among the variables and
- The model is linear in the parameters.

Test for Stationarity

The series for the economic variables were first tested for stationarity. These tests were carried out by using Phillips-Perron procedure. Table 2 shows the unit root test for the dependent variable and Table 3 shows the test for the explanatory variables. The only log variable stationary is Canadian population (for both test Canadian imports and Colombian imports). The unit root hypothesis can not be rejected in other log variables. Rejected means, the rejection of the null of unit roots. Therefore, the unit root hypothesis was tested in the first differenced variables and found stationary. Critical value for the tests is -2.57 at 10 per cent level. The results are shown in Table 2. In the analysis of Canadian imports and Colombian imports, the hypothesis of unit root was rejected in the in the first differences series (we found stationarity).

Structural Stability

In view of the suspected structural breaks, we used the Sequential Chow and Goldfeld-Quandt test. The test requires estimating a regression equation without

the period dummy D1, and first testing it for cointegration. The cointegration test has been done with the Augmented Dicky-Fuller test. After ensuring cointegration, the equation is subjected to the sequential Chow and Goldfeld-Quandt test. The test returns Chow's statistic values for alternative partitions of the sample. In both cases partition returns a insignificant value of the statistic; the hypothesis of structural break was rejected for both equations.

Table 2 provides a summary statement of structural stability statistics for the equation that was finally estimated. Using Chow's test and Goldfeld-Quandt's test we find that in both time series (Canadian imports and Colombian imports), we reject the hypothesis of structural break.

The traditional explanatory variables used in the gravity model (i.e. income, and population) have been good variables to explain Colombian imports and Canadian imports (See Table 4). There is no multicollinearity between the predictor variables in the model.

The traditional gravity variables have been sufficient to explain 76% of the Canadian imports and 71% of the Colombian imports. In the Canadian imports, the Canadian income and Canadian population do not show significant p-values to be included as explanatory variables.

Maybe the success of the gravity equation in this bilateral trade is because after a long period of time (51 years), this relationship is well established and it has been



Table 2.

Test statistics of the equations dependent variables

Test and values	Canada imports	Colombia imports
Unit Roots Tests for log variables		
Phillips-Perron	-0.27	-0.97
Critical value 10%	-2.57	-2.57
H: unit root	Not Rejected	Not Rejected
Unit Roots Tests for first differencing variables		
Phillips-Perron	-14.43	-24.21
Critical value 10%	-2.57	-2.57
H: unit root	Rejected	Rejected
Chow and Goldfeld-Quandt Sequential Test for Structural Break		
Chow	1.46	1.15
p value	0.23	0.34
Goldfeld-Quant test	0.55	0.83
p value	0.14	0.33
H: structural break	Rejected	Rejected

concentrated in few commodities. In the Canadian imports equation Canadian income does not show significant *p-value*.

Colombian variables have high coefficients compared with Canadian variables. In the Colombian imports equation, Canadian income coefficient (0.589) is lower compare with Colombian per capita income coefficient (0.943). Therefore, Colombian import has a higher elasticity with respect to the importer country income than to the income of the exporter country.

With the specification of the adjusted gravity model relevant variables were taken. The coefficient of Colombian per capita income is positive and significant at 5 % level related with the Colombian imports as it was expected, however it is

positive and significant only at 10% level for Canadian imports. The coefficient of Canadian per capita income is positive and significant at 5% level related with the Colombian imports and it is not significant for Canadian imports.

When examining the results of the model, it is important to take into account the following theoretical expectations: the signs and the values of the coefficients of per capita income of importing and exporting countries represent the market size of bilateral trade, and the commodity composition of trade (type of goods). From Section II we know that the main Canadian imports from Colombia are agricultural products. These products are primary commodities (and we will expect low income elasticity for

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Table 3.
Test explanatory variables (Log and first differentiation)

Imports	M_{Ca}	Y_{Ca}	Y_{Col}	L_{Ca}	L_{Col}
Canada	-0.27	-1.01	0.81	-5.16	-1.84
	Not rejected	Not rejected	Not rejected	Rejected	Not rejected
First difference	-14.43	-45.47	-12.75		-154.49
	Rejected	Rejected	Rejected		Rejected
Colombia	-0.98	-1.00	0.81	-4.50	-1.75
	Not rejected	Not rejected	Not rejected	Rejected	Not rejected
First difference	-13.78	-58.37	-15.23		-155.2
	Rejected	Rejected	Rejected		Rejected

these products). Table 3, reports the long run estimates for this bilateral trade. In fact 0.263 is a low per capita income elasticity of the exporter country. On contrast, Colombian imports have an ample range of products and they have higher income elasticity (0.943) as income of the importer country. The value of the own income coefficients obtained 0.943, means that if there is an increase of 1% in the Colombian per capita income (above the average growth rate of the actual time series), the increase of Colombian imports from Canada is expected to be 0.943%.

Comparing our results with those of other scholars, Colombian income elasticity with Canada as importer country (0.263 in our study) has a similar value to the coefficients found by Kalirajan (1999). Colombian own income coefficient as importer country seems high (0.943), however this value is comparable with Ratnayake & Townsend (1999).

In our model, the variable population is only relevant for the exporter coun-

tries. In the case of Colombian imports, Canadian population (as population of the exporter country) has a negative relation with the explanatory variable in the equation (-0.052). On contrast Colombian population (as population of the exporter country) has a positive relation with Canadian imports. In the case of Canadian imports, Colombian population is positive related and its coefficient is higher (0.867). Population is a traditional explanatory variable in gravity models, as it represents the physical size of a country and therefore is a measure of the diversification of its economy. A bigger population usually means both a more diversified and more self-sufficient economy. Nevertheless, diversification tends to induce more international trade and self-sufficiency tends to restrict it. Population of the importer countries is not significant for the estimated equations.

Comparing our population coefficients results with those of other scholars, Colombian population elasticity with Canada

Table 4.
Long-run Estimates

Variable	Canadian imports	Colombian imports
Y_{Cat}		0.589
<i>P value</i>		0.031
Y_{Colt}	0.263	0.943
<i>P value</i>	0.067	0.029
L_{Cat}		-0.052
<i>P value</i>		0.023
L_{Colt}	0.867	
<i>P value</i>	0.000	
Adjusted R^2	0.769	0.712
F	92.215	45.406
<i>P value</i>	0.000	0.000

as importer country (0.867 in our study) has a similar value to the coefficients found by Cortes (2005). Canadian population coefficient as exporter country seems low (-0.052), however this value is comparable with Ratnayake & Townsend (1999) and Sanso et al (1993).

Gravity Equations

1. Long-run equations have been successfully estimated. We do reject the hypothesis of the presence of a structural break in these time series. Long-run Canadian imports show the influence of income and population of the exporter country. Colombian imports show the influence of income from the importer and exporter countries and population of the exporter country. It seems that the population of the exporter country can be related with the commodity composition of the trade.

2. The variable Colombian per capita income has a positive and significant coefficient for Canadian imports and Colombian imports equations (as importer and also as exporter country). On contrast, Canadian per capita income is only significant as exporter country in the Colombian imports equation. Canada's income and Colombia's income show a positive effect for all cases.

3. Population shows different effects. Population of the exporter country is positive in the Canadian imports. However, in the Colombian imports population of the exporter country is negative related.

4. The constant terms are not significant in the equations.

Canadian imports from Colombia can be studied using equation (7), where the influence of the Colombian income and Colombian population are significant:



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$$(7) \ln M_{Can} = 0.26 \ln Y_{Col} + 0.87 \ln L_{Col}$$

Colombian imports from Canada can be studied using the equation (8) in the long-run. The influence of the Canadian income, Colombian income and Canadian population are significant.

$$(8) \ln M_{Col} = 0.59 \ln Y_{Can} + 0.94 \ln Y_{Col} - 0.05 \ln L_{Can}$$

The adjusted gravity model is valid to use and it seems to be accurate and a good estimator of the reality of the bilateral trade relationship between Canada and Colombia during the period 1953-2003.

4. Discussion and Conclusions

The evolution of the Canada-Colombia trade over 51 years (from 1953 to 2003) was studied. It seems that economic variables have governed the choice of products in the bilateral trade under review. The ups and downs of this trade in value terms are correlated with purely economic variables like income in participating countries; however, it seems that they are also correlated by other parameters influencing the fortunes of trade such as Colombian trade Policy and International events such as the oil boom. When suddenly Colombian income increases it seems that it has produced an increase in the Colombian imports from Canada. International events especially the oil shocks have influenced this bilateral trade both countries have

been influenced by the oil shocks. However, Colombia seems to be more vulnerable to external shocks than Canada.

Gravity equation with time series analysis is an element that makes a difference in the formulation of traditional gravity equations. The Canadian imports from Colombia seem to be full explained by the gravity variables (Colombian income and Colombian population). One possible explanation is the characteristic of the commodity composition with a high concentration in coffee. Coffee is considered as a traditional commodity to be consumed in winter, and it does not have domestic competition. During the total period studied, Canadian imports maintain a stable commodity composition of the imports from Colombia. This characteristic contrasts with Colombian imports, which had an ample range of commodities and it seems to have a good adaptation to new market requirements and diversification. In the whole period, commodity composition was concentrated on agricultural products. Economic factors have been relevant in this bilateral trade.

This bilateral trade has three features: 1) the composition of the Canadian imports from Colombia was concentrated in raw products (agricultural products) and the Colombian imports from Canada have been changing over time, they have been basically cereals, paper, plastic, steel, motor vehicles and equipment; 2) the real trade value of the Canada-Colombia





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bilateral trade has been low compared with their respective global trades and 3) the Colombian imports from Canada have been higher than Canadian imports.

Although current trade between Canada and Colombia is based on a small range of products, opportunities exist for expansion. Colombia is showing increasing interest in developing further ties with Canada. Significant Canadian export opportunities exist in sectors such as environment, telecommunications, mining, transportation, agriculture and processed foods. Potential exists for Colombian export expansion in Canada for agricultural products (fish, flowers, fruit and corn) and other products (carbon, iron, oil, plastics, precious stones and leather). We believe there are opportunities for traders prepared to persevere and to challenge the reliance on agricultural and raw material products.

Logistic is important in this trade, direct connections can be helpful to increase trade, for example, direct air travel

between Canada and Colombia has been difficult during the whole period of study. Only after the second semester of 2004, Air Canada implemented a direct air link between Toronto and Bogotá in selected days of the week. Future trade relationship between Canada and Colombia will be influenced by trade reforms promoting free trade and regional integration including the agendas of free bilateral trade agreement (2004) and the possibility of the formation of a trade group linking the Americas.

It is our belief that the bilateral trade relationships could improve in the future because of the following reasons: (1) The new trade policy of openness in Colombia increases the possibility of trade in commodities, investments and services; (2) Both Canada and Colombia are eager to improve their trade relationships and (3) Neoclassical and traditional economy suggest that both countries will benefit from greater economic cooperation.



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