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Immigration Wave Effects on Canada's Trade Flows

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Abstract:

This paper utilizes an enhanced gravity model to estimate the effect of lagged immigration waves on Canadian imports and exports, by province. Empirically, this model was tested using Canadian data on import and export flows to the top 40 countries of origin for immigrants to Canada based upon the composition of the most recent wave of immigrants. The results are consistent with previous studies, where immigrants increased both import and export trade flows. By adding the provincial immigrant wave variable, it was also found that immigrants most strongly affect imports after 5-10 years, whereas for exports, the immigrant effect is strongest after 10-15 years.

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I. Introduction

Immigration policy has taken on increased importance in Canada in the past five years for a number of economic reasons. First, with the need for more skilled labor in Canada, provinces are placing greater importance on immigration policy (Canada West Foundation, 2006). Second, provinces are promoting increased trade with countries from which immigrants originate. As a result, many provinces have formulated their own immigration policy, aimed largely at increasing the flow of immigrants to their province. To date, there has been minimal economic analysis of how immigration affects provincial economies. The focus of this paper is to examine how immigration impacts exports and imports at the provincial level in Canada for 2003/2004.

When new immigrants arrive, they bring with them an array of social, business, and political contacts from their home country, as well as preferences for consumer products. This set of contacts and preferences is often revealed in the linkages the immigrants make with their home country after arriving. Thus, while immigrants will enter the labor force and contribute to economic prosperity, they will also affect the trade flows between their new and old countries. In this paper, two main hypotheses are tested regarding the provincial trade effect of immigration. First, immigrants increase the level of trade. Second, because of transactions costs, immigrants' effect on imports is more rapid than on exports. Other propositions include i) geographical distance between new and old countries will negatively impact trade and ii) common language in new and old countries will positively impact trade.

In previous studies such as Head and Ries (1998) and Gould (1994), a positive relationship between immigration and bilateral trade with immigrants' home countries has been documented. This is due to a myriad of factors, including knowledge of home country markets, business contacts, language, and preferences. The above authors used the gravity model, which has served as a fundamental tool in estimating the determinants of trade flows for imports and exports. The basic gravity model relates bilateral trade flows to GDP, distance, and other factors that affect trade barriers (Anderson and Van Wincoop, 2003).

This paper utilizes an enhanced gravity model to determine the effects of lagged waves of immigration on Canadian import and export flows (for 2003/2004) to the top 40 countries of origin for immigrants to Canada based upon the composition of the most recent wave of immigrants (1995-2001). A wave of immigrants is defined by the number of immigrants from the same 40 countries[1] who emigrated to a particular province during a given time period divided by the province's base population at the beginning of that time period. Immigration waves are included to determine whether or not there is a time lag between when a group of immigrants arrive and when this same group impacts trade. It is expected that there will be a greater lag between the time when a wave of immigrants arrive in Canada and when this wave affects exports versus imports vis-à-vis their home countries. It is hypothesized that the discrepancy in time lags is due to the greater ease of importing compared to exporting.

The inclusion of lagged provincial immigration waves differentiates this paper from Head and Ries (1998), who considered the population of immigrants from country i

[1] The 40 countries chosen as the baseline were from the most recent immigrant wave in 1995-2001.

(an immigrant's home country) residing in country j (Canada). Gould (1994) considered the length of stay of immigrants in the U.S. by including the average stay of the immigrant stock as well as its squared value (to identify potential nonlinearities). In Gould's study, both immigrant stay and squared immigrant stay variables indicated that immigrant-link effects increase at a decreasing rate over time for import flows and that exports increase only after several years. More importantly, Gould found that overall, the length-of-stay effects were small and of low statistical significance. Our study adds to the previous literature by including lagged provincial immigration waves using Canadian data to determine whether or not, as hypothesized, immigration is positively related to imports from, and exports to immigrants' home countries.

This paper differs from previous studies by using provincial data instead of country level data for Canada (the immigrant destination country for this study). This enables the examination of the effects of population, distance, common language, and immigration by region on trade flows to countries outside of Canada. Therefore, trade flows can be examined at the provincial level versus the national level, which will have policy implications for how each province can best gain from international trade.

The findings have consequences for provincial immigration policy in that individual Canadian provinces stand to benefit from the gains of trade resulting from increased immigration to their province. The addition of lagged immigration waves to the standard gravity equation helps to define the length of time that is necessary for immigrant groups to have arrived in a province before their presence actually impacts trade flows between their new province and home country. Thus, the results will aid provinces in their formulation of immigration policies to enhance trade.

In what follows, section II reviews gravity models and the role of immigration. The next section describes the theoretical framework followed by section IV's description of the data. Section V presents the empirical findings followed by a concluding section.

II. Gravity Models and Immigration

There have been a number of past trade studies that specifically examine immigration as an explanatory factor for trade flows. A seminal study in this area was conducted by Head and Ries (1998), which used Canadian trade data with 136 partners from 1980-1992. Their hypothesis that immigrants may expand trade with their country of origin was tested using a gravity model. They found that a 10 percent increase in immigrants yielded a 1 percent increase in exports and a 3 percent increase in imports. A similar study using U.S. data is Gould (1994), which used a gravity model with a sample of 47 trading partners (plus the U.S.) for 1970-1986. He found that trade is positively influenced by immigration, with exports more strongly affected than imports.

McCallum (1995) used a basic gravity model to explain trade flows between Canadian provinces and U.S. states, compared with inter-provincial trade. Variables included in McCallum's gravity equation were: shipments of goods from region i to j, gross domestic product in regions i and j, distance from i to j, and a dummy variable to depict inter-provincial trade versus province-to-state trade. McCallum found that, *ceteris paribus*, trade between two provinces is more than 20 times larger than trade between a province and a state (using 1988 data). This can be interpreted as the existence of a large "border effect" between the U.S. and Canada. Subsequent papers have questioned the magnitude of McCallum's exceptionally large border effect. For example, Anderson and Van Wincoop (2003) found (using 1993 data) that a primary basis for McCallum's large

border effect was omitted variable bias in McCallum's gravity model, resulting from the exclusion of a multi-lateral resistance variable. Specifically, Anderson and Van Wincoop contend that trade between two countries such as Canada and the U.S. is influenced by trade barriers erected by their *other* trading partners. Despite any limitations, McCallum's basic gravity equation still remains the workhorse for a conventional starting point for empirical trade models that attempt to explain factors that affect a country's import and export flows.

The model described below builds upon the work of the aforementioned studies to include a provincial immigration wave effect on trade. The augmented gravity model considers lagged immigration waves by province to accommodate a potential time lag in immigrants' impact on trade. Thus, this modified model should predict both the actual impacts of immigration on trade as well as the timing of these impacts by province. This relates back to the main hypotheses of this paper: 1) immigrants will increase trade and 2) immigrants' effect on imports is more rapid than on exports.

III. The Model

The framework for the model used in this paper is similar to the McCallum (1995) gravity model. A point of departure from the McCallum model is that this paper explores trade flows between Canada and the top 40 immigrant countries of origin for immigrants to Canada based upon the composition of the most recent wave of immigrants. Population is included in this model as a measure of the size of the economy instead of gross domestic product (GDP) because many of the countries included in the sample are developing countries that lack accurate data on GDP. However, specifications estimated

using GDP in place of population yielded comparable results. Since one of the main hypotheses is to determine whether or not immigrants to Canadian provinces affect trade, a vector of variables is included to capture arrival of immigrants in various waves (pre-1960, 1961-1970, 1971-1980, 1981-1990, 1991-1995, and 1996-2001). Dummy variables for English and French are also included to determine the influence of a common language between home country and province. For example, if one of the primary or secondary languages spoken in a country is English, the English dummy variable takes on a value of 1, and 0 otherwise. (The same holds true for French). The full model can be seen in equation 1 depicted below:

$$(1)\ TRADE_{pc} = a + bPOP_p + cPOP_c + dDIST_{pc} + eWAVES_{cp} + fLANG_c + e_{cp,}$$

where $TRADE_{pc}$ is the logarithm of exports of goods from province p to country c or the logarithm of imports of goods into province p that were produced in country c; POP_p and POP_c are the logarithms of population by province and trading country, respectively; $DIST_{pc}$ is the logarithm of the distance from the capital of province p to the capital of country c; $WAVES_{cp}$ are the logarithms of lagged provincial immigration waves (number of provincial immigrants in a wave divided by the base population of the province at the beginning of a wave) from country c to province p; $LANG_c$ is a vector of dummy variables that indicate whether one of the primary or secondary languages spoken in a country is English or French; and e_{cp} is the error term. Other models include provincial and country dummy variables to capture provincial and country fixed effects, respectively.

The above model, which includes TRADE as a dependent variable and POP and DIST as independent variables, is a standard gravity model that is utilized in many trade studies to forecast import and export flows. This model adds two new variables to the standard gravity model, WAVES and LANG, to determine their impact on TRADE. WAVES is included to allow for a lagged effect on trade. For example, a wave of immigrants having arrived in a province in the last five years may have a smaller effect than a wave of immigrants having arrived in the last ten or fifteen years. The rationale behind the disparity in effect based on immigrant length of stay is that it takes time for migrants to establish themselves in their new locale and make the contacts that would enable trade. Immigrants may need time to establish business connections with their home countries for exports just as they may need time to establish themselves in their new country to impact imports. Relating back to the second main hypothesis that immigrants' effect on imports is more rapid than on exports, it is presumed that exports take a longer time to establish than imports because of the greater complexity of setting up an export business versus simply importing goods from a foreign country.

The LANG variable is included to measure if there is an effect on trade of similarities in language between an immigrant's home country and their new country since it is hypothesized that common language in new and old countries will positively impact trade. Thus, dummy variables for English and French language as the primary or secondary language spoken in the home country are included.

IV. Data

The trade data are from Statistics Canada and the U.S. Census Bureau (U.S. Department of Commerce) and are for an average of exports of goods in Canadian dollars for 2003-2004 from each of the 10 Canadian provinces to the 40 aforementioned countries and an average of imports of goods in Canadian dollars for 2003-2004 into the 10 provinces from the 40 countries. The 2003-2004 average was used because the data is somewhat lumpy for smaller provinces, so that the average of the last two years worth of trade flows provides a more accurate picture of exports and imports than just including 2004 exports or imports.

The population data is the July 1995 estimated population by country from the Central Intelligence Agency, The World Factbook as well as the July 1995 estimated population by province from Statistics Canada.[2]

Great circle distances were computed using the longitude and latitude of provincial capitals and country capitals, which were obtained from the website http://www.indo.com/distance/ and are reported in miles. This is the same technique that was used in Anderson and Van Wincoop (2003) and has been commonly used in the literature. In sensitivity analysis, Anderson and Van Wincoop found that doubling and halving their measure of distance internal to states, provinces, and the other industrialized countries in their sample had little effect on their results.

The immigration wave data was collected from Statistics Canada for the following periods: before 1960, 1961-1970, 1971-1980, 1981-1990, 1991-2001, 1991-1995, and 1996-2001. These provincial immigration wave statistics were then divided by the population in the province at the beginning of the period (before 1961/first recorded

[2] GDP data were also obtained for each country and province from the above sources. The reported regression models were also estimated using GDP instead of population with similar results.

provincial population[3], (1961-1970)/1961, (1971-1980)/1971, (1981-1990)/1981, (1991-2001)/1991, (1991-1995)/1991, and (1996-2001)/1996). Provincial immigration waves as a percent of the base total provincial population provide a measure that is unbiased towards provincial population.[4] Whether or not English or French is a primary or secondary language was taken from the CIA website at http://www.cia.gov.

V. Results

Using the log-log specification in equation 1, both imports and exports are used separately as dependent variables. Variable definitions and sources are listed in Appendix 2. The model for imports is reported in columns 1-4 of Table 1. Columns 1 and 2 include population as an independent variable, whereas columns 3 and 4 include provincial and country dummy variables to account for fixed effects. The difference between the specifications in columns 1 and 3 versus 2 and 4 is that for columns 1 and 3, the last immigration wave is for 1991-2001, whereas in columns 2 and 4, the 1991-2001 immigration wave is separated into two waves: 1991-1995 and 1996-2001.

As expected, immigrants have a significant and positive impact on 2003/2004 imports to Canadian provinces, which is consistent with the first main hypothesis that immigrants increase trade. By including separate variables for immigration waves, one can ascertain the timing of these impacts. In column 1, 1961-1970 and 1971-1980 immigrant waves are significant at the 10% level, whereas the 1981-1990 immigrant

[3] The base years for each province are: 1851 for Ontario, 1951 for Newfoundland and Labrador, 1851 for Prince Edward Island, 1851 for Nova Scotia, 1851 for New Brunswick, 1851 for Quebec, 1871 for Manitoba, 1901 for Saskatchewan, 1901 for Alberta, and 1851 for British Columbia. The base year is the first year that population data is available for each province.

[4] Regressions using raw provincial immigration wave data (without dividing by base provincial population) yield results consistent with regressions using provincial immigration wave statistics divided by base

wave is significant at the 5% level. Interestingly, the 1991-2001 immigrant wave is not significant. This suggests that there is a time period of approximately 10-15 years, where immigrants need to establish themselves in a province before immigration actually impacts imports.

Column 2 provides a finer look at more recent immigration as it breaks the decade of the 1990s into two distinct immigration waves. As can be seen, results are similar in this model vis-à-vis column 1 except for the 1991-1995 immigration wave, which is significant at the 5% level. Thus, using column 2's results, it appears that the time period for immigrants to establish themselves before affecting imports from their home countries is somewhere between 5-10 years (versus 10-15 years in column 1). It is also interesting to note the magnitude of the effects of immigration waves on imports. For example, in column 1, the coefficient on each immigration wave steadily increases with time – the 1961-1970 wave has a coefficient of 0.086, the 1971-1980 wave has a coefficient of 0.092, and the 1981-1990 wave has a coefficient of 0.14 (similar results can be seen in column 2). This is depicted in the first graph in Table 3, which illustrates the lagged effect of immigration on 2003/2004 imports, which peaked in the 1980s. Since this is a log-log specification, the coefficients can be interpreted directly as elasticities. This means that in column 1 of Table 1, a 10% increase in 1981-1990 provincial immigrants (divided by a province's 1981 population) increases imports in that province by 1.4%.

The results in column 2 of Table 1 for 2003/2004 Canadian provincial imports from the 40 respective trading partners match very closely with Head and Ries' findings

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provincial population. The latter variable is used in the preferred models reported in the results section of the paper.

if one examines the cumulative impact of immigration. For example, the cumulative impact of immigration is 0.26 (0.13 + 0.13) at the 5% significance level and is 0.343 (0.13 + 0.13 + 0.083) at the 10% significance level (column 2, Table 1). These results illustrate that a 10 percent increase in all significant lagged provincial immigrant waves (as a percent of their base provincial populations) yields between a 2.60% and 3.43% increase in provincial imports. Head and Ries' results ascertain that a 10 percent increase in immigrants yielded a 3 percent increase in imports, using Canadian data for 136 trading partners from 1980-1992. The findings in columns 1 and 2 are similar to the results in columns 3 and 4, which account for provincial and country fixed effects. Thus, the immigration results are robust to alternate specifications.

The above import results demonstrate that there is a need for Provincial policymakers to incorporate the notion that immigrants help to promote imports into their provinces. This effect is nontrivial in that a 10 percent increase in all significant lagged provincial immigrant waves (as a percent of their base provincial populations) yields between a 2.60% and 3.43% increase in provincial imports. Also, today's immigration policy affects tomorrow's imports in that there is a lag of approximately 5-10 years before a wave of immigrants actually affects imports from their home country into their respective provinces.

The provincial population and the country population variables are significant at the 5% level and are positively related to imports for the specifications in both columns 1 and 2. This is consistent with previous studies that use a gravity model to predict levels of trade. Thus, country size and provincial size matter in terms of imports. This indicates that larger provinces (i.e. Ontario and Quebec) are more likely to have a higher

level of imports, *ceteris paribus*, than smaller provinces (i.e. Prince Edward Island, Newfoundland, and Saskatchewan).

Distance is negatively related to imports, but is not significant in column 1 and is only significant at the 10% level in column 2. This indicates that distance to home country from a province is not very important in predicting the level of provincial imports. It was presumed that geographical distance between new and old countries would negatively impact trade. Although the result has the expected negative sign (i.e. the greater the distance between two trading partners, the lower the amount of trade), perhaps distance is not an important factor because immigrants' preferences for imported goods from their home country overwhelm the distance effect.

Finally, whether or not the primary or secondary language spoken in a home country is French is significant at the 5% level and is negatively related to imports in both columns 1 and 2. It was proposed that common language in new and old countries will positively impact trade. The result that provinces are less likely to import from countries whose primary or secondary language is French in consistent with the proposition that common language matters. Although Canada is a bi-lingual country with French and English as its two official languages, this result may indicate that the preferred language for doing business between Canadian provinces on average and other countries is English.

The model for exports is reported in columns 1-4 of Table 2. As expected, immigrants have a significant and positive impact on 2003/2004 exports from Canadian provinces to other countries, which is consistent with the first main hypothesis that immigrants increase trade. The timing of these impacts can be seen by examining the

immigration wave variables in columns 1 and 2. In column 1, 1961-1970 and 1971-1980 immigrant waves are significant at the 10% level, whereas the 1981-1990 immigrant wave is significant at the 5% level. The 1991-2001 immigrant wave is not significant. This demonstrates that there is a time period of approximately 10-15 years where immigrants need to establish themselves in a province before immigration actually impacts exports. These findings coupled with the results for imports provide credence to the second main hypothesis which states that because of transactions costs, the effect on imports is more rapid than on exports.

Column 2 provides a finer look at more recent immigration as it breaks the decade of the 1990s into two distinct immigration waves. As can be seen, results are similar to those in column 1. The more recent immigrant wave of 1991-1995 does not affect exports (although it affects imports). As noted above, this implies that the time lag for immigrants to impact trade is greater for exports than for imports. However, the "life-cycle" of the effects of immigration waves on exports is similar to that for imports. This can be seen in graph 2 of Table 3, where the lagged effects of immigration on exports peak in the 1980s.

Again, these immigration results are comparable to Head and Ries (1998), which found that a 10 percent increase in immigrants yielded a 1 percent increase in exports. For instance, the cumulative impact of immigration is 0.12 at the 5% significance level (column 2, Table 2). These results exemplify that a 10 percent increase in 1981-1990 provincial immigrants (divided by 1981 provincial population) yields a 1.2% increase in provincial exports. Once more, this cumulative impact of immigration is consistent with

Head and Ries' results. Again, the findings in columns 1 and 2 are similar to the results in columns 3 and 4, which account for provincial and country fixed effects.

The above export related results again demonstrate the need for Provincial policymakers to understand the importance of immigrants' effect on exports to their home countries from their province. Consequently, policymakers need to be aware that their effective immigration policy will have ramifications on future exports with a 10-15 year time lag. Therefore, if Manitoba would like to increase its provincial exports to Asia for example, one channel to do this would be through a targeted immigration policy for immigrants from countries in that region.

In contrast to imports, provincial population is not significant for exports and country population is only significant at the 10% level. This indicates that provincial size does not affect exports, but has a significant impact on imports. This is an important result because it illustrates that immigrants have the same effect on exports for a large or a small province. This means that smaller provinces can look to a relatively bigger gain in exports from a targeted immigration policy.

In both columns 1 and 2 of Table 2, the distance variable is significant at the 5% level and is negatively related to exports. This is consistent with previous studies that use a gravity model to predict levels of trade as well as this paper's proposition that geographical distance between new and old countries will negatively impact trade. One would expect distance from home country to province to be negatively related to exports since greater distances increase the cost of doing business.

VI. Conclusion

The modified gravity model described above allows for the examination of how population, distance, lagged immigration waves, and common language affect trade flows between immigrants' destination country and their home countries. The results were consistent with previous studies, where immigrants increased both import and export trade flows. By adding the lagged provincial immigrant wave variable, it was also found that immigrants most strongly affect the importation of goods from their home countries to Canadian provinces after approximately 5-10 years, whereas immigrants most strongly affect the exportation of goods from Canadian provinces to their home countries after approximately 10-15 years. This indicates that there is a longer time lag for immigrants to affect exports than imports by province, which is not surprising given the greater complexity of exporting goods versus importing goods.

The provincial population and the country population are significant and are positively related to imports, but not exports. This suggests that there needs to be a critical mass of people to affect demand for incoming products into a province, but also exemplifies that there are opportunities for less populated provinces to engage in a targeted immigration policy to expand exports. The distance between the capital of a province and the capital of a foreign country is significant and negatively related to exports, but not imports. This indicates that the importation of products from immigrants' home countries is not impeded by distance, whereas exports are hindered by distance.

Finally, whether or not the primary or secondary language spoken in a home country is French is significant and negatively related to imports, but not exports. Consequently, provinces are less likely to import from countries whose primary or secondary language is French even though French is an official language of Canada along

with English. This may be due to the citizens of most provinces (except for Quebec and New Brunswick) conducting business almost solely in English.

The above results have implications for Canada's policymakers. For example, if provinces want to increase their international trade, is it reasonable for them to target certain groups of immigrants? If so, this could impact immigration policy in that certain countries' immigrants may be targeted over others based on their impact on trade. Also, the results of this study demonstrate that policymakers should be aware of the lagged effect of immigration on international trade flows. For instance, if policymakers would like to increase exports to certain countries via an immigration policy, there will be a time lag of approximately 10-15 years before exports actually increase. Finally, each province should find it beneficial to promote immigration since provincial exports and imports are positively influenced by immigration. An example of one such provincial program currently in place to increase immigration is SINP (Saskatchewan Immigrant Nominee Program).[5] In sum, more research into how immigration affects sub-national imports and exports should help to provide further insights into the linkages between immigration and trade flows by region.

[5] According to the Saskatchewan Government relations website for SINP, "Saskatchewan is looking for immigrants who can help us expand and diversify our growing economy".

Table 1: Regression Results: Imports as the Dependent Variable[a,b]
Log-Log Specification

Variable	Column 1	Column 2	Column 3	Column 4
Constant	-108.71 (2.20) **	-76.61 (1.51)	-117.49 (1.17)	-108.03 (1.081)
Pre-1961 Provincial Immigrant Base	0.014 (0.33)	-0.0015 (0.037)	0.011 (0.23)	-0.0038 (0.078)
1961-1970 Provincial Immigrant Wave	0.086 (1.75) *	0.083 (1.72) *	0.034 (0.67)	0.026 (0.52)
1971-1980 Provincial Immigrant Wave	0.092 (1.69) *	0.063 (1.13)	0.036 (0.65)	0.012 (0.21)
1981-1990 Provincial Immigrant Wave	0.14 (2.60) **	0.13 (2.42) **	0.11 (1.94) *	0.099 (1.80) *
1991-2001 Provincial Immigrant Wave	0.058 (1.04)		0.014 (0.23)	
1991-1995 Provincial Immigrant Wave		0.13 (2.51) **		0.12 (2.32) **
1996-2001 Provincial Immigrant Wave		0.027 (0.52)		0.037 (0.70)
Distance	-6.14 (1.43)	-7.058 (1.65) *	18.66 (1.51)	17.29 (1.41)
Provincial Population	7.11 (3.57) **	5.81 (2.86) **		
Country Population	4.35 (3.57) **	4.10 (3.38) **		
English	1.60 (0.36)	1.91 (0.43)		
French	-13.29 (2.52) **	-12.55 (2.41) **		
Provincial Fixed Effects	No	No	Yes	Yes
Country Fixed Effects	No	No	Yes	Yes
N	400	400	400	400
R^2	0.33	0.34	0.48	0.49

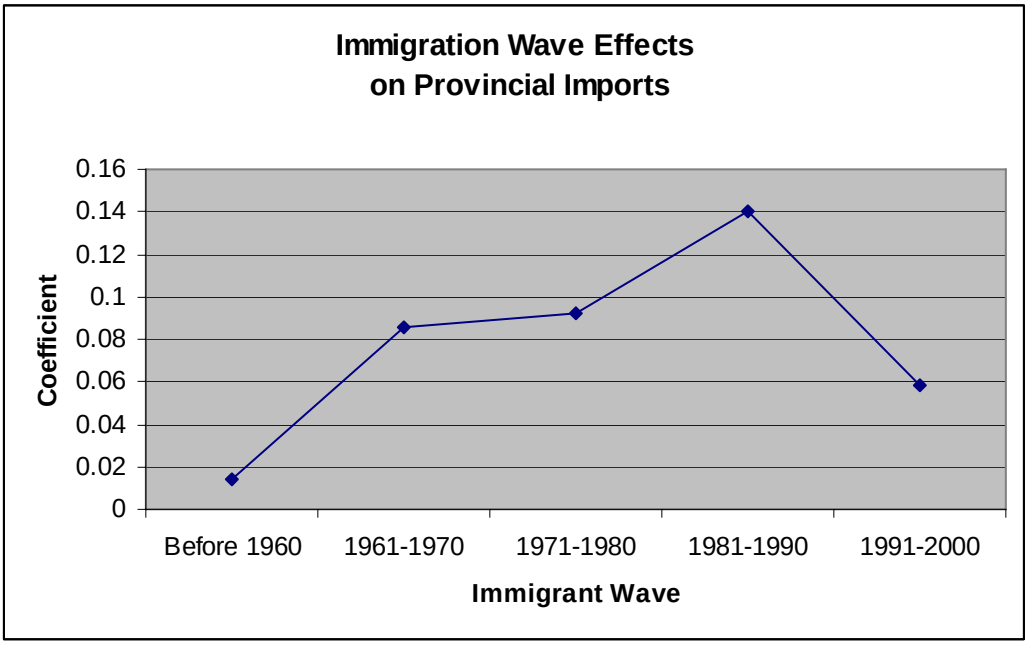
a: * indicates significance at the 10% level and ** indicates significance at the 5% level
b: The absolute values of the t-statistics are given in parentheses.

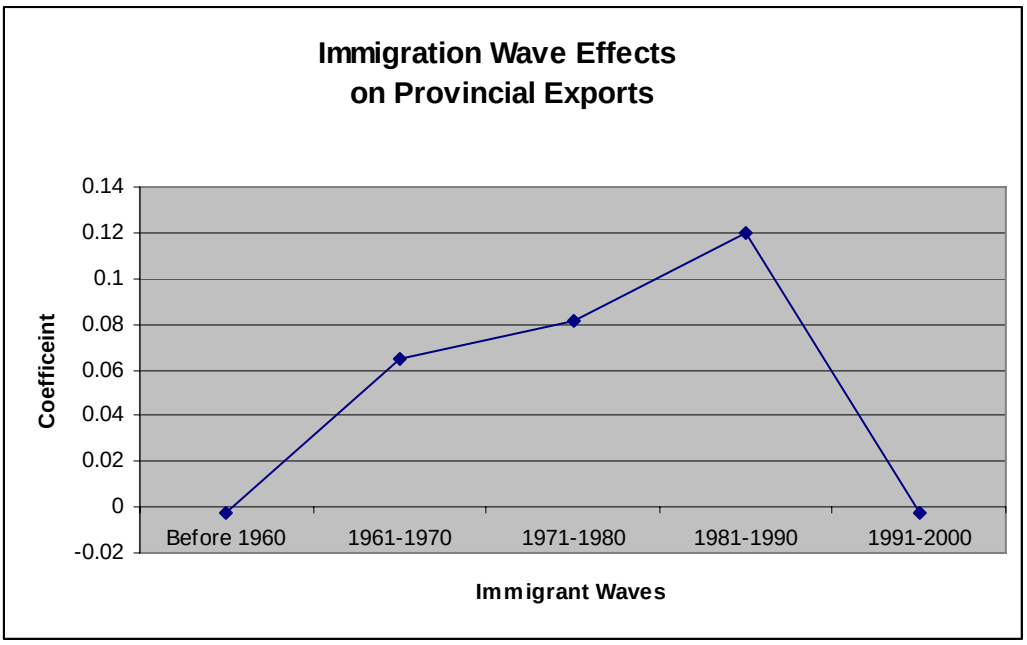
Table 2: Regression Results: Exports as the Dependent Variable[a,b]
Log-Log Specification

Variable	Column 1	Column 2	Column 3	Column 4
Constant	14.80 (0.38)	26.10 (0.64)	67.08 (0.84)	77.55 (0.97)
Pre-1961 Provincial Immigrant Base	-0.0023 (0.07)	-0.0073 (0.22)	-0.052 (1.37)	-0.060 (1.54)
1961-1970 Provincial Immigrant Wave	0.065 (1.67) *	0.064 (1.64)	0.023 (0.57)	0.019 (0.46)
1971-1980 Provincial Immigrant Wave	0.081 (1.86) *	0.069 (1.55)	0.058 (1.34)	0.048 (1.092)
1981-1990 Provincial Immigrant Wave	0.12 (2.85) **	0.12 (2.78) **	0.087 (1.97) **	0.087 (1.96) *
1991-2001 Provincial Immigrant Wave	-0.0022 (0.050)		-0.046 (0.96)	
1991-1995 Provincial Immigrant Wave		0.049 (1.21)		0.045 (1.069)
1996-2001 Provincial Immigrant Wave		-0.016 (0.38)		-.044 (1.045)
Distance	-7.30 (2.13) **	-7.64 (2.22) **	-4.95 (0.50)	-6.29 (0.64)
Provincial Population	2.46 (1.55)	1.99 (1.22)		
Country Population	1.73 (1.79) *	1.67 (1.71) *		
English	0.42 (0.12)	0.48 (0.13)		
French	0.20 (0.049)	0.65 (0.16)		
Provincial Fixed Effects	No	No	Yes	Yes
Country Fixed Effects	No	No	Yes	Yes
N	400	400	400	400
R^2	0.21	0.21	0.39	0.40

a: * indicates significance at the 10% level and ** indicates significance at the 5% level
b: The absolute values of the t-statistics are given in parentheses.

Table 3: Immigration Wave Effects on Provincial Imports and Exports





Appendix 1: Provinces and Countries included in Study

Provinces	Countries			
Ontario	United States	Russia (Russian Federation)	Democratic Republic of Congo (former Zaire)	South Korea
Newfoundland and Labrador	United Kingdom	Iran	Morocco	Philippines
Prince Edward Island	France (including Monaco, French Antilles)	Iraq	Bangladesh	Taiwan
Nova Scotia	Germany	Lebanon	Sri Lanka	Vietnam
New Brunswick	Poland	Saudi Arabia	Hong Kong (Special Administrative Region)	Guyana
Quebec	Bosnia and Herzegovina	Somalia	India	Columbia
Manitoba	Romania	Egypt	Pakistan	Jamaica
Saskatchewan	Ukraine	Ghana	Afghanistan	Trinidad and Tobago
Alberta	Yugoslavia* (Serbia and Montenegro)	Republic of South Africa	People's Republic of China	Haiti
British Columbia	Croatia	Algeria	Japan	Mexico

* Lagged variables include Serbia and Montenegro only for consistency.

Appendix 2: Variable Definitions and Sources

Variable	Definition	Source
Imports	The 2003/2004 average of imports of goods in Canadian dollars to each of the 10 Canadian Provinces from each of the 40 countries.	Statistics Canada; U.S. Census Bureau, U.S. Department of Commerce
Exports	The 2003/2004 average of exports of goods in Canadian dollars from each of the 10 Canadian Provinces to each of the 40 countries.	Statistics Canada; U.S. Census Bureau, U.S. Department of Commerce
Pre-1961 Provincial Immigrant Base	(Provincial immigrants before 1961)/(Base Provincial population)[a,b]	Statistics Canada
1961-1970 Provincial Immigrant Wave	(1961-1970 Provincial immigrants)/(1961 Provincial population)[a]	Statistics Canada
1971-1980 Provincial Immigrant Wave	(1971-1980 Provincial immigrants)/(1971 Provincial population)[a]	Statistics Canada
1981-1990 Provincial Immigrant Wave	(1981-1990 Provincial immigrants)/(1981 Provincial population)[a]	Statistics Canada
1991-2001 Provincial Immigrant Wave	(1991-2001 Provincial immigrants)/(1991 Provincial population)[a]	Statistics Canada
1991-1995 Provincial Immigrant Wave	(1991-1995 Provincial immigrants)/(1991 Provincial population)[a]	Statistics Canada
1996-2001 Provincial Immigrant Wave	(1996-2001 Provincial immigrants)/(1996 Provincial population)[a]	Statistics Canada
Distance	Great Circle distances in miles between provincial capitals and country capitals	http://www.indo.com/distance/
Provincial Population	Provincial population estimates for July, 2005.	Statistics Canada
Country Population	Country population estimates for July, 2005	Central Intelligence Agency, The World Factbook
English	A dummy variable for whether or not English is a primary or secondary language spoken in a given country, where English equals 1 if it is a primary or secondary language spoken and equals 0 if it is not.	Central Intelligence Agency, The World Factbook
French	A dummy variable for whether or not French is a primary or secondary language spoken in a given country, where French equals 1 if it is a primary or secondary language spoken and equals 0 if it is not.	Central Intelligence Agency, The World Factbook

[a] For consistency, provincial immigrants are from the same 40 countries that comprised the most recent immigrant wave from 1996-May 15, 2001.

[b] The base years for each province are: 1851 for Ontario, 1951 for Newfoundland and Labrador, 1851 for Prince Edward Island, 1851 for Nova Scotia, 1851 for New Brunswick, 1851 for Quebec, 1871 for Manitoba, 1901 for Saskatchewan, 1901 for Alberta, and 1851 for British Columbia.

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