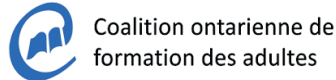
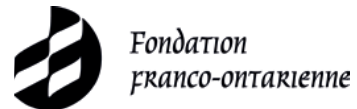


Ontario, Trade and the Advantages of English-French Bilingualism

The Conference Board of Canada – 2018
Prepared by:
Sam Goucher and Lois Mainville

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Le Conference Board
du Canada

The Conference Board
of Canada

255, chemin Smyth, Ottawa ON
K1H 8M7 Canada
Tél. 613-536-3280
Télééc. 613-526-4857
Ligne-info 1-866-711-2262
conferenceboard.ca

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Summary

French is one of the most widely spoken languages in the world. According to the Organisation mondiale de la Francophonie (OIF), at least 274 million people speak French¹. Currently, 39 countries, including Canada, count French among their official languages. By 2065, the number of people who speak French is expected to exceed 1 billion².

According to Statistics Canada's 2016 Census, the English-French bilingualism rate is currently at 17.9%, the highest it has ever been in the country's history. Close to 1.5 million Ontarians—11.2% of the province's population—can carry on a conversation in both official languages. This number is lower in the western provinces and Newfoundland and Labrador. Only Quebec and New Brunswick exceed the national average.

Research has shown that there are a number of personal advantages to being bilingual. Being multilingual is a definite asset³. Is Ontario making the most of its two official languages? In other words, are there economic advantages to being bilingual?

One of the advantages of bilingualism is the additional bilateral trade opportunities that it offers. According to one long-standing economic theory, countries that engage in trade are more prosperous than those that strive to be self-sufficient. At the same time, empirical research indicates that countries that share a common language tend to trade more with each other than with others. Thus, if sharing a common language facilitates trade, thereby making a country more prosperous, then a bilingual country should be able to engage in more trade and enhance its prosperity, as more languages mean more potential trading partners. It is for this reason that our study focuses on the link between trade and language, and uses an empirical analysis to confirm whether the presence of French speakers in Ontario has stimulated bilateral trade with Francophone countries.

Location quotients enable comparisons between one region and a reference region. In this study, the reference region is Canada excluding Quebec and New Brunswick. Location quotients will be used to determine whether Ontario trades more with Francophone countries than would otherwise be expected in view of its global share of bilateral trade activity.

Although Ontario tends to favour trade with the United States and other Anglophone countries, the location quotients indicate that Ontario's Francophonie has boosted trade with Francophone countries. **Based on the location quotients for the other provinces, we estimate that Ontario's exports to francophone countries would have been \$58 million less, and imports would have been \$1.4 billion less if Ontario had not traded as actively with Francophone countries.**

1. Organisation internationale de la francophonie, *La langue française dans le monde*, 2014, p. 5.

2. *Ibid.*, p. 34.

3. See Christofides and Swidinsky, *The Economic Returns to a Second Official Language*.

One instrument currently used to analyze international trade is the gravity model. The gravity model is based on the law of gravity, but by replacing physics variables with economic variables, we end up with estimates that perfectly match the data. In international trade research, the core concept of the gravity model is as follows: bilateral trade between two countries grows in relation to economic weight, but decreases as the distance between the countries increases. It is now common practice to include additional indicators in the gravity equation other than economic weight and distance. Common official languages and other language variables are now used as constants in gravity models⁴.

Empirical research has shown that English is a positive and statistically significant factor for Ontario and the less bilingual provinces in the study, which are defined as the rest of Canada excluding Quebec and New Brunswick.

The gravity equation, which treats English and French separately, indicates a clear correlation between English and trade given the higher coefficients. However, that correlation is more ambiguous for French. Trade with the United States dominates Ontario's international trade activity. Notwithstanding the control variables for free trade and for proximity with the United States, it is difficult to assess the trends with Francophone countries because they account for such a small proportion of Ontario's trade.

Although less common in empirical studies, gravity equations could also take into consideration the impact of a country being an OIF member without necessarily having French as its language. Given that Ontario only recently joined the OIF, the impact of being an OIF member is not reflected in the study. However, the gravity analysis suggests that including country members from the European Union, which is an OIF member, improves the statistical results of the study for Ontario. Thus, Ontario's participation in the OIF could increase its trade opportunities. It will certainly benefit under the recently ratified Canada-European Union Comprehensive Economic and Trade Agreement (CETA).

The study focuses on the exchange of goods. Because of the lack of data, it is difficult to apply the gravity model to assess the impact of bilingualism on the exchange of services. However, it is important to remember that services, including supply chains and products sold through foreign subsidiaries, represent half of Canada's exports, and that Ontario's service exports have grown steadily over the past few years⁵.

4. Fridmuc and Fridmuc, *Foreign Languages and Trade: What are you Sinking About?*, p. 4.

5. Palladini, *Spotlight on Services in Canada's Global Commerce*, p. ii.

The Conference Board of Canada has recently conducted several studies and identified strategies to develop trade in services. Those strategies include creating international networks and maintaining a local presence, as well as linguistic and cultural understanding⁶. Thus, Ontario's participation in the OIF could increase the province's trading opportunities.

6. Goldfarb and Palladini, *Becoming a Services Superpower: Tapping into the Global Appetite for High-Value Services*, p. 27.

1. Introduction

French is one of the most widely spoken languages in the world. According to the Organisation mondiale de la francophonie, at least 274 million people speak French⁷. Currently, 39 countries, including Canada, count French among their official languages.

Canada's other official language is English, making it an officially bilingual country. Many Ontarians speak both official languages, and in some parts of the province, approximately one third of the population is bilingual.

Empirical studies have demonstrated that speaking several languages is a personal asset⁸. But does the province as a whole benefit from having both languages? In other words, are there economic advantages associated with bilingualism? These are the questions that we will attempt to answer in our study.

The report consists of seven chapters. Chapter 1 presents the empirical studies focused on the correlation between the use of a common language and the volume of bilateral trade. Chapter 2 provides an overview of the gravity models and their applications to the analysis of international trade. Chapter 3 paints a linguistic portrait of Ontario compared to the rest of Canada and the world. Chapter 4 reviews Canada's trading patterns, particularly those that show how language influences the choice of trading partners. The results of the analysis based on our gravity model are reported in Chapter 5. These results help estimate the impact of an official language or a shared language on trade volume in Ontario. Chapter 6 outlines other reasons where Ontario's English-French bilingualism could be an asset. Chapter 7 contains some final observations and a conclusion.

7. L'Organisation internationale de la francophonie, op. cit., p. 5.

8. See Christofides and Swidinsky, The Economic Returns to a Second Official Language.

2. Literature review: gravity equations and their empirical results

Numerous studies have analyzed the correlation between language and bilateral trade. Every study reviewed uses a gravity model to explain the volume of trade between countries. Today, economists most often opt for gravity equations to review the volume of bilateral trade. Those equations are considered an integral part of the analysis of international trade⁹. They also form the basis of our own analysis, whose results are described in Chapter 4. Before summarizing the findings from the empirical literature, we will take a closer look at the gravity equation.

2.1 Brief history of the gravity equation

The gravity equation got its name from the law of gravity in physics. According to the law of gravity, the gravitational force between two objects is proportional to the product of their respective masses, and inversely proportional to the square of the distance between them. The mathematical formulation is as follows:

$$\text{force of gravity} = G * \frac{M_1 M_2}{\text{dist}_{12}^2} \quad (1)$$

In the above equation, M_1 is the mass of object 1, M_2 is the mass of object 2, dist_{12} is the distance between the two objects, and G is the gravitation constant.

Equation 1 works well when the above variables are replaced by economic data – the equation generally reduces a high R square value. The idea is to replace the force of gravity with the value of trade between two countries, and the masses by the Gross Domestic Product (GDP) of the trading partners. In this equation, the distance between the two countries is in kilometres. Thus, gravity equations can be used to model bilateral interactions in terms of economic weight and distance.

It has become common practice to include indicators other than the economic weight and distance in the gravity equation in the form of nominal variables that are assumed to influence bilateral trade. A nominal variable is a binary variable that only takes two values: 0 or 1, to indicate the absence or presence of a particular element (e.g. male or female) that could influence the regression result. The most frequent nominal variables in gravity analyses include border countries, countries without shorelines and a common

9. Head and Mayer, Gravity Equations, p.5.

official language – the main object of our study. Having a shared official language, as well as the use of other language variables¹⁰, has become a constant in every gravity model. Those models clearly indicate that the use of a common language has a significant impact on bilateral trade¹¹.

In their modern version, gravity equations integrate different measurements of the material and cultural costs of trade between countries. The exchange of goods between two countries implies both material and cultural costs, which is expressed as follows:

$$ptot = p + phy + cul \quad (2)$$

Equation 2 indicates that the total price of a traded good (*ptot*) corresponds to the price of the good (*p*), the material cost, plus the transportation cost of the good (*phy*) and any cultural or linguistic cost (*cul*). In the gravity equation, material costs are represented by distance. Cultural costs are normally represented by a linguistic nominal variable, but other nominal variables may be used, such as a common religion or a common legal system. As suggested by equation 2, if two countries share a same culture and language, the variable is left out of the equation, and the cost of trading a good decreases. However, if two countries have no common language or cultural institutions, it costs more to trade a good. Two countries with a common language and culture should logically trade more between themselves than two countries with different languages and cultures, simply because it is cheaper to do so.

In other words, in a gravity model, the difficulty involved in exchanging goods between trading partners has a negative impact on the potential volume of exchanges, which would enable them to achieve their economic weight in a hypothetical “friction-free” world¹². Other than distance, a language barrier is one of the biggest obstacles to trade.

10. Fridmuc and Fridmuc, op. cit., p. 4.

11. Mélitz, Language and Foreign Trade, p.2.

12. Hutchinson, Does Ease of Communication Increase Trade, p.545.

2.2 Empirical results

Variables other than distance should be taken into consideration in modern gravity equations that address obstacles to trade: empirical research shows clearly that countries trade far less internationally than domestically, even when geographic distance is not a factor¹³. This suggests that there are costs related to international trade other than material ones. In fact, the literature is nearly unanimous: one of the biggest obstacles to trade involves communication issues. Helliwell (1997) found that trade between OECD countries is much less prevalent than within those countries themselves, hence national borders are significant¹⁴. Adding a common language to the gravity equation explains much of that difference. In the same vein, Anderson and Van Wincoop (2004) add up all of the trade-related costs incurred by those industrialized countries¹⁵. If they were counted as a tax, their value would amount to 170%. According to Anderson and Van Wincoop, the language barrier accounts for seven percentage points.

Several other authors have studied the correlation between language and trade. Frankel, Stein and Wei (1995), for instance, discovered that two countries that share linguistic or colonial connections tend to trade more—approximately 65% more in fact—than if they did not¹⁶.

Hutchinson (2001) uses an index that measures the difficulty that a native English speaker would have in learning a foreign language¹⁷—such as Japanese—that is more difficult than French. He reports that US international trade from 1970 to 1986 was lower with countries whose dominant language was relatively more difficult for an Anglophone to learn.

Similarly, Lohmann (2010) has built an index to measure the language barrier between two countries¹⁸. Even if the language is not the same, similarities in languages between two countries would facilitate trade because of the lower cost of communication. Lohman highlights a negative correlation between linguistic obstacles and international trade. The results of his analysis demonstrate that a 0.10 point increase in the language barrier index—which corresponds to a 10% reduction in common linguistic characteristics—will reduce trade by approximately 6.8 to 9.8%.

Hutchinson (2002) uses a different database to estimate the impact of the proportion of a national population with English as a mother tongue or second language on bilateral trade with the United States¹⁹. According to the study, the fact that a certain proportion of the population speaks English as its mother tongue or second language has a positive impact

13. Konya, *Modeling Cultural Barriers in International Trade*, p. 495

14. Helliwell, *National Borders, Migration and Trade*, p. 165.

15. Anderson and van Wincoop, *Trade Costs*, p. 693.

16. Frankel, Stein and Wei, *Trading Blocs and the Americas*, p. 73.

17. Hutchinson, *Linguistic distance as a determinant of U.S. Bilateral Trade*.

18. Lohmann, *Do language barriers affect trade?*, p.160.

19. Hutchinson, *op. cit.*, "2002

on a country's imports and exports. For example a country where English is the mother tongue of 10% or more of the population will have 1.3% more imports from the United States, and 1.3% more exports to the US. The impact would be even higher when English is the second language: a country where 10% or more of the population uses English as a second language, imports from the US would increase by 1.7%, and exports to the US would increase by 2.3%.

Hutchinson attributes the stronger impact of English as a second language than as a mother tongue to the fact that many people who decide to learn English do so precisely in order to conduct business with the US or other English-speaking countries²⁰.

Other empirical research has focused on the impact of the language used on the nature of the goods and services traded. One such study by Sauter (2008) demonstrates that the language barrier is far greater when it comes to services than goods, because the tertiary sector tends to be much more sensitive to the language dimension than the manufacturing sector²¹. Sauter also notes that in Canada, industries in which communication holds a significant place do more business in provinces where they speak the same language, compared to industries that have less of a need to communicate with commercial partner. In other words, trade involving industries that require direct communication with a commercial partner is more likely to occur if the business partner is in a provincial linguistic majority. The correlation observed between the use of a common language and direct—(oral)—communication is 5%, which is statistically significant. However, there is less conclusive data in support of such interaction in indirect—(written)—communication. Language will likely remain one of the main obstacles to trade in services and in complex goods where direct communication with the foreign importer. Sauter proposes that language is a comparative advantage and language acquisition could be prioritized in order to facilitate trade in more complex goods and services.

Melitz (2011) finds that all of the linguistic variables integrated into the gravity equation, (including a common language, linguistic diversity and literacy), are associated with significant positive results²². The ability to speak the same language is not the only factor conducive to foreign trade: literacy also counts. A population that can read and write in its own language will be better able to deal with any communication issues that will arise in a foreign language.

Greater linguistic diversity can also stimulate foreign trade. Multilingual countries tend to trade more with other countries. Melitz believes that sharing a language with a foreign partner is at least as important as a country's linguistic diversity when it comes to promoting

20. Hutchinson, 2002, op. cit., p. 549

21. Sauter, Talking Trade, p. 1.

22. Mélitz, op. cit., p. 16.

foreign trade. One of his conclusions is that having a common language encourages trade with a foreign partner because it is easier to communicate, whereas a country's linguistic diversity encourages trade with all foreign partners, with no distinction.

Melitz and Toubal (2012) maintain that the majority (at least two-thirds) of the influence of language on bilateral trade has nothing to do with ethnic links or mutual trust. It stems from ease of communication.²³ The influence of ethnicity on bilateral trade is mainly attributable to the presence of cross-border migrants. According to the authors, all linguistic variables—official languages, common spoken languages, common mother tongue and linguistic proximity—are positive and highly correlated with bilateral trade. Their analysis also shows that English has no particular importance when it comes to explaining those exchanges. There is no reason why English or any other major language would be prioritized. What really counts is having a common language, regardless of what that language might be.

Based on data broken down by business category, Mayer and Ottaviano (2007) demonstrate that in France, the proportion of businesses that export to other Francophone regions around the world is exceptionally high²⁴. In addition, businesses that exploit this linguistic advantage have lower average productivity than other French exporting businesses. This makes sense given that the benefits from speaking the same language offset slightly higher costs of production, thereby making it possible for less productive businesses to export.

In view of all of the above, Egger and Lassmann (2011) conducted a meta-analysis of empirical studies in order to measure the impact of language on international trade²⁵. They found that the weighted average of the observed impact of language suggests a direct impact on bilateral trade of 44%.

As the empirical data indicate, a common language is a key determinant for the volume of bilateral trade. The Conference Board of Canada (2013) conducted an empirical study to confirm whether this also applies to Canada, not only globally, but also in its more and less bilingual components. Using location quotients and gravity analysis, the study produced an estimate of the degree to which knowledge of French in bilingual Canada stimulates trade with Francophone countries. The results of the gravity analysis indicate that bilingual Canada's trade with Francophone countries is 65% greater than with non Francophone countries²⁶.

23. Mélitz and Toubal, Native language, spoken language, translation and trade, p. 3.

24. Mayer and Ottaviano, The happy few.

25. Egger and Lassmann, The Language Effect in International Trade, p.2.

26. Arcand, Le Canada, le bilinguisme et le commerce.

In this study, we conduct an empirical analysis to confirm whether that observation applies to Ontario. We attempt to answer the following question: compared to the provinces that have fewer Francophone communities, does Ontario have an advantage in terms of foreign trade due to a higher prevalence of French? However, before we proceed, it is important to analyse the linguistic landscape of Ontario, Canada and the rest of the world.

3. The linguistic landscapes of Ontario, Canada and the rest of the world

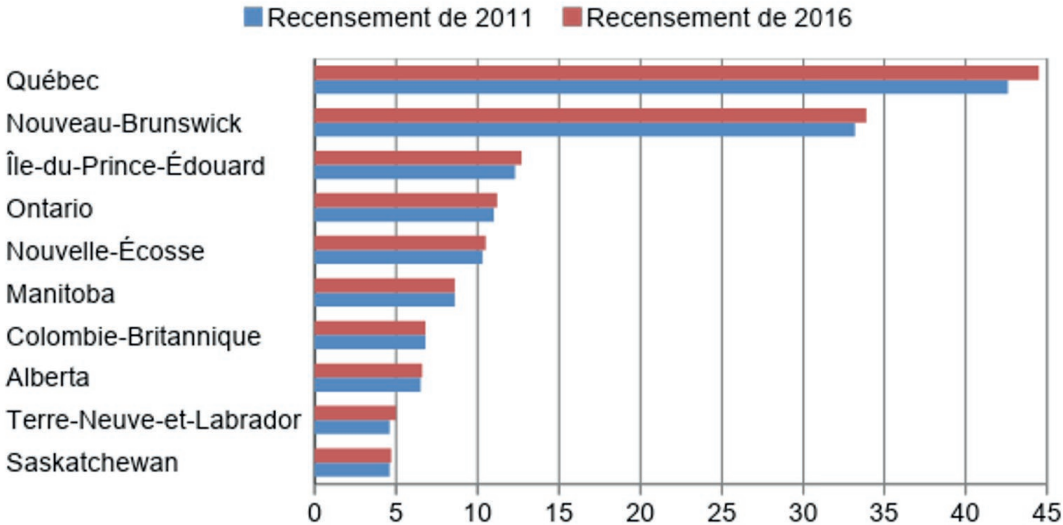
In this chapter we will review the linguistic landscapes of Ontario, Canada and the rest of the world.

3.1 Canada and Ontario

Canada’s official languages are English and French, making it an officially bilingual country. However, many more Canadians understand English than French. Nonetheless, according to Statistics Canada’s 2016 Census, the bilingualism rate is at its highest level ever in the country’s history. A total of 17.9% of Canada’s population knows both official languages.

Of course, English-French bilingualism rates vary from region to region, as illustrated in Chart 1. According to 2016 data, 11% of Ontario’s population can hold a conversation in both official languages. The western provinces and Newfoundland and Labrador are less bilingual than Ontario. The only provinces that surpass the Canadian average are Quebec and New Brunswick.

Chart 1
Proportion of the population with a knowledge of French and English (%)

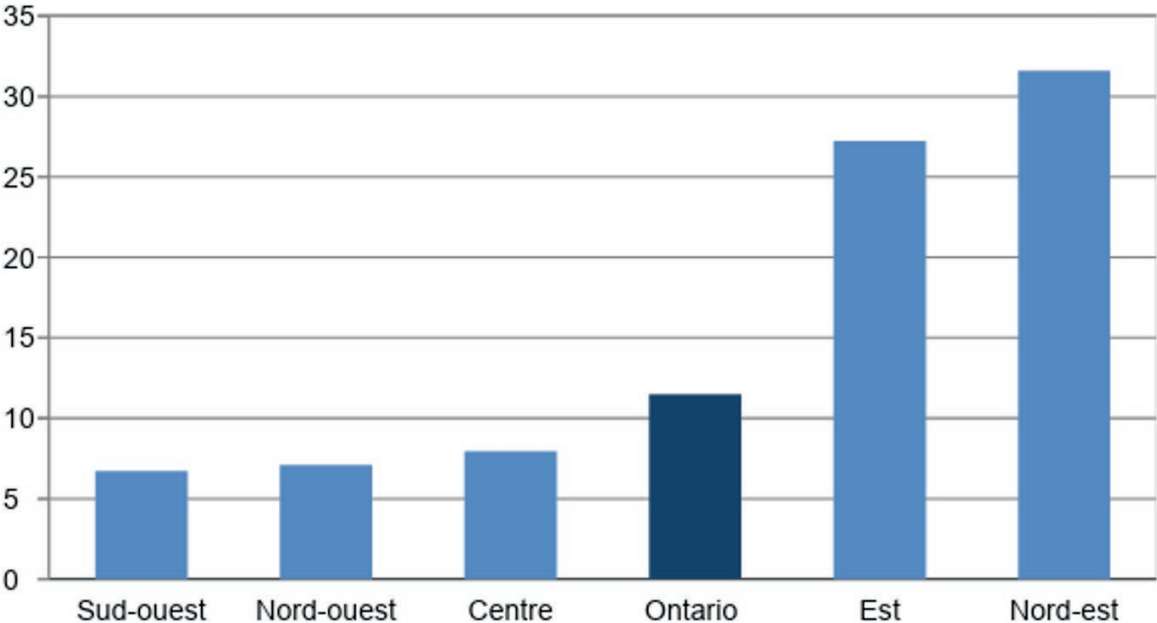


Sources: The Conference Board of Canada, Statistics Canada.

Over the past five years, the English-French bilingualism rate in Ontario has risen at a rate similar to that at the national level. To a large extent, the increase in the number of people who know both official languages comes from Quebec. English-French bilingualism in Western Canada has not changed since the 2011 Census.

Although most Ontarians report speaking only English, the ability to use French varies across the province, as illustrated in Chart 2. It is more common in the eastern and northeastern parts of the province, where close to one-third of the population can maintain a conversation in French. It is important to note that the population that can use French is highly bilingual in Ontario. A mere 0.3% of Ontario's population speaks only French.

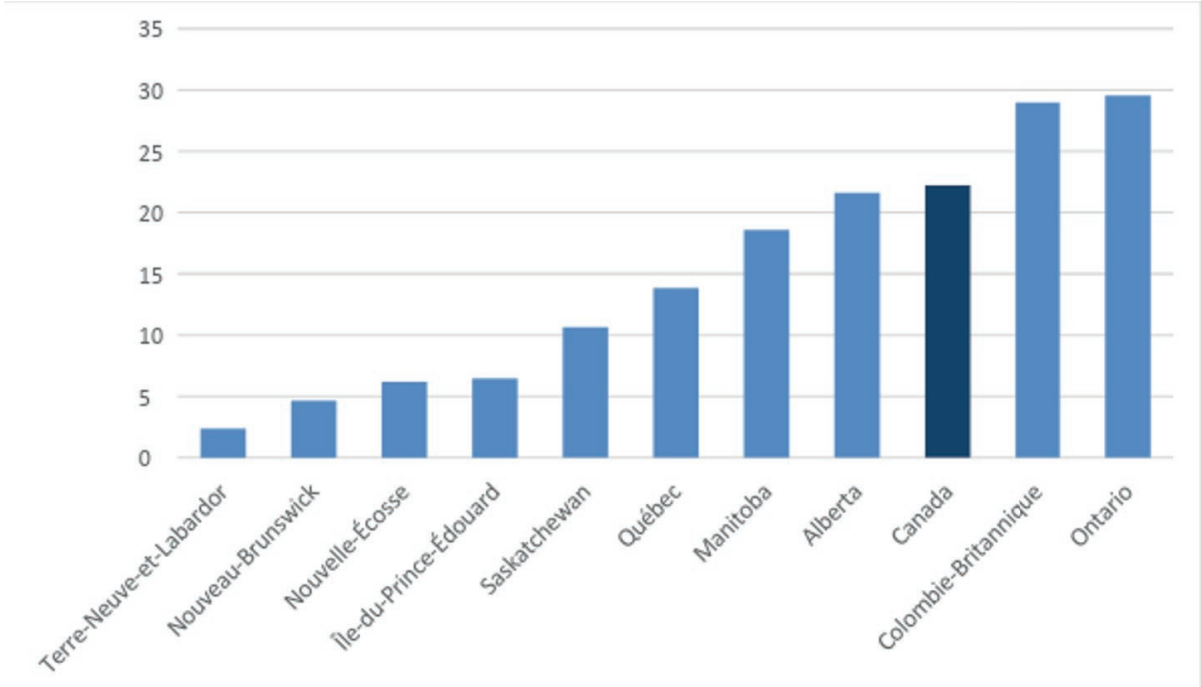
Chart 2
Proportion of the population that can use French in Ontario, by region (%)



Sources: The Conference Board of Canada, Statistics Canada.

Ontario’s linguistic landscape is highly diverse, which reflects the high proportion of foreign-born residents. According to the 2016 Census, 29.5% of Ontario’s population was born outside Canada. As illustrated in Chart 3, this proportion is much higher than the Canadian average. The 2016 Census indicates that 22.7% of Ontario households speak a language other than English or French at home.

Chart 3
Proportion of foreign-born residents (%)



Source: The Conference Board of Canada, Statistics Canada

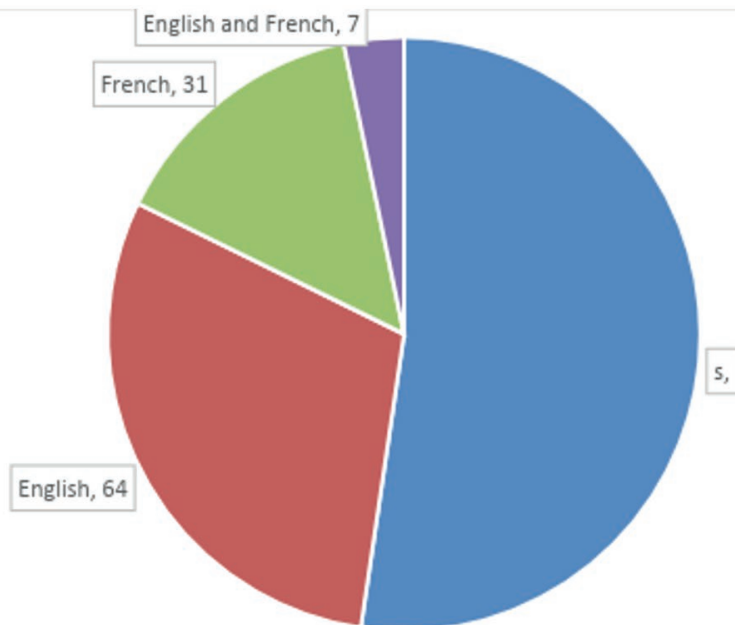
Ontario may have an advantage over other provinces in regard to trade with non-Anglophone or Francophone countries, but that possibility is beyond the scope of this study.

For the purposes of this study, we will compare Ontario to the provinces with lower English-French bilingualism rates. This means that Quebec and New Brunswick are not included in our analysis.

3.2 The world

Language data is available for 124 countries. Slightly less than half of those countries use English, French or both as their official languages, as illustrated in Chart 4²⁷. For our purposes, we consider that three additional countries use French as their official language, even though French was imposed through colonization and was abandoned after their independence. The countries that continue to use French in their administration and media are Algeria, Morocco and Tunisia.

Chart 4
Official languages around the world (Number of countries)



Sources: The Conference Board of Canada, CEPII, CIA World Factbook, Wikipedia.

There are 88 countries where at least 20% of the population speaks English, French or both, as illustrated in Chart 5²⁸.

27. Appendix 1 provides a list of countries that use English, French or both as their official languages.

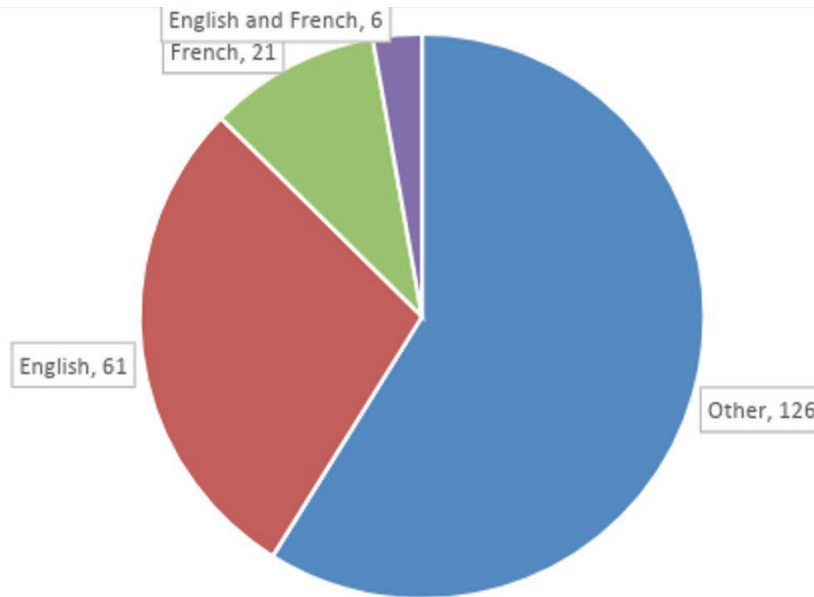
28. Appendix 1 provides a list of countries where at least 20% of the population speaks English, French or both.

An analysis of the differences between official and spoken languages reveals that 11 countries that have adopted English as their official language, have less than 20% of their populations use it: Ethiopia, Ghana, Mauritius, the Solomon Islands, Malawi, Papua New Guinea, Somalia, Sudan, Tanzania, Tonga and Uganda. On the other hand, 7 countries reach the 20% threshold of English-speakers, even though English is not an official language: Aruba, South Korea, Egypt, the Cocos Islands, Jordan, Kuwait and Lebanon.

At the same time, 11 countries have adopted French as their official language, but less than 20% of their populations use it: the Comoros, Djibouti, Dominica, Equatorial Guinea, Haiti, Mali, the Central African Republic, the Democratic Republic of the Congo, Rwanda and Tunisia. Israel is the only country in our dataset where at least 20% of the population speaks French even though it is not an official language of that country.

In total, 6 countries are considered English-French bilingual: Cameroon, Canada, Israel, Lebanon, the Seychelles and Vanuatu. Three countries are officially considered bilingual but are not included in the above group: Dominica, Mauritius and Rwanda.

Graph 5
Languages spoken around the world



Sources: The Conference Board of Canada, CEPII, CIA World Factbook, Wikipedia

The Organisation mondiale de la francophonie estimates that 274 million people around the world speak French. Among those, 212 million use French daily. They are spread throughout 102 countries²⁹, including countries where French may not be an official language commonly used. French may be used at home, in school, at work, in social or cultural circles or in the media. French is in fifth place, after Mandarin, English, Arabic and Hindi in terms of the number of users around the world³⁰. By 2065, it is expected that more than one billion people around the world will speak French³¹.

Chan (2016) classifies the influence and scope of different languages according to an index based on 20 indicators. According to that classification, French comes third, after English and Mandarin. French ranks high in that classification because it is spoken on three continents and is considered prestigious in international relations³².

29. Organisation mondiale de la francophonie, op. cit., p. 5.

30. Ibid, p. 7.

31. Ibid, p. 34.

32. Chan, Power Language Index: Which are the world's most influential languages?, p. 2

There are Francophone networks, one of which is the Organisation internationale de la francophonie (OIF). That institution consists of 84 member states and governments that share French and a number of values: promoting peace, democracy, human rights, access to education, cooperation and sustainable development. The OIF has been in existence since 1970, and is headquartered in Paris.

Canada plays a key role in the OIF. The federal government, Quebec and New Brunswick have been members since 1970, 1971 and 1977 respectively. Ontario joined in 2016 as an observer. Former Governor General of Canada and Chancellor of the University of Ottawa, the Right Honourable Michaëlle Jean, has been Secretary General of the OIF since 2015.

4. Trends in international trade

This chapter looks at the trends in international trade in Ontario and in those provinces that are less bilingual than Ontario. First, it provides a brief overview of the theory of trade and the gains stemming from it, followed by an analysis of it then looks at whether a common official language stimulates international trade.

4.1 Gains from trade

In 1817, David Ricardo clearly demonstrated in *On the Principles of Political Economy and Taxation*, that international trade benefits participating countries that engage in it. The argument is based on the principle of comparative advantage.

The following example provides a good illustration of that principle. Table 1 presents the unit labour requirements for two countries (A and B) to manufacture two products (X and Y).

Table 1
Illustration of comparative advantage

	Unit Labour Requirement	
	Product X	Product Y
Country A	1	2
Country B	6	3

Source: The Conference Board of Canada

In country A, it takes one unit of labour to manufacture product X and two units to manufacture product Y. In country B, it takes six units to manufacture product X and three units to manufacture product Y. Thus, country A is more efficient than country B at manufacturing both products. As a result, country A has an absolute advantage in the manufacture of products X ($1 < 6$) and Y ($2 < 3$).

However, whereas country A has a comparative advantage in the manufacture of product X, country B has a comparative advantage in the manufacture of product Y. Given that $1/2 < 6/3$, the cost of manufacturing product X, compared to product Y, is lower in country A. In other words, the unit cost of manufacturing product X in country A is half that of manufacturing of product Y. In country B, that cost comes to two units. Similarly, given that $3/6 < 2/1$,

the unit cost of manufacturing product Y in country B is half that of manufacturing product X. In country A, that cost comes to two units.

In an autarky, the two countries would be forced to manufacture products X and Y. Suppose that each country has 12 workers. Country A would be able to manufacture ten units of product X and one unit of product Y. Country B would be able to manufacture one unit of product X and two units of product Y. In total, in an autarky, the two countries would manufacture a maximum of 14 units.

In a free trade situation, countries A and B could specialize in manufacturing the products for which they have a comparative advantage: product X for country A and product Y for country B. Country A could manufacture 12 units of product X, and country B could manufacture 4 units of product Y. Thus, the two countries could manufacture 16 units, hence two more than in an autarky.

Trade promotes greater efficiency in the use of finite resources, resulting in greater well-being for producers and consumers. That greater social well-being stems from the advantages associated with specialization. Other benefits of trade include the exchange of new ideas, know-how, techniques and innovation among trading partners. The competitive pressures generated in a free-trade context lead to greater productivity.

4.2 Location quotients and trade

4.2.1 Methodology and data

Location quotients enable us to compare a region to a reference regions. In this study, we define the reference region as Canada excluding Quebec and New Brunswick. This technique enables us to determine whether Ontario trades more with Francophone countries than would be expected based on its overall share of international trade.

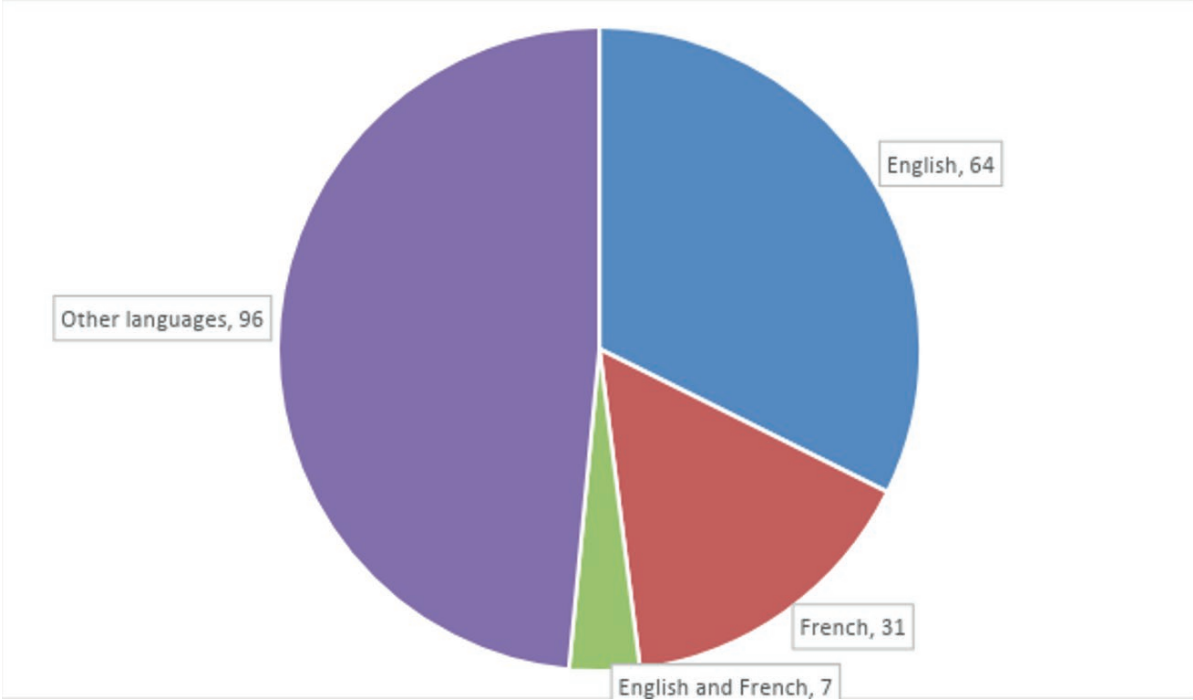
In mathematical terms, the location quotient we want to calculate is expressed as follows:

$$LQ_x = \frac{\frac{EXP_{x,ON}}{EXP_{ON}}}{\frac{EXP_{x,REF}}{EXP_{REF}}} \quad (3)$$

In this equation, the location quotient (LQ) for exports between Ontario and country X is defined as exports from Ontario to country X $EXP_{x,ON}$ divided by the total of exports from Ontario EXP_{ON} , which is itself divided by exports from the reference region to country X $EXP_{x,REF}$ divided by total exports from the reference region EXP_{REF} .

We also calculate the location quotients for all provinces that are less bilingual than Ontario, using trade data from Statistics Canada. Provinces that are less bilingual than Ontario are defined as all provinces excluding Ontario, Quebec and New Brunswick. Due to the availability of data, only 198 of the 214 countries identified in Chapter 3 were possible to sample. Chart 6 illustrates the language composition of that sample.

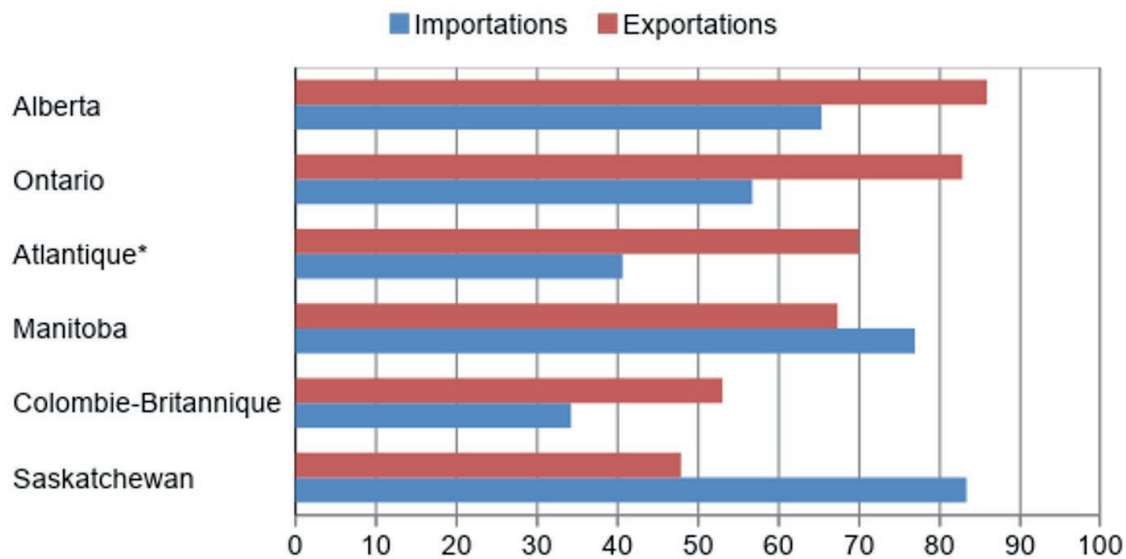
Chart 6
Language composition of sampled countries (Number of countries)



Sources: The Conference Board of Canada, CEPII, CIA World Factbook, Wikipedia.

As summarized in Chart 7, the United States is a key trading partner for every province in our sample. In order to isolate the impact of language on international trade, we exclude the United States from the calculation of the location quotient.

Chart 7
Share of exports and imports with the United States (2016) (%)



*Newfoundland and Labrador, Prince Edward Island and Nova Scotia
Sources: The Conference Board du Canada, Statistics Canada and the US Census Bureau

4.2 Results

Table 2 shows the location quotients for exports from and imports to Ontario and the less bilingual provinces to and from countries where French, English or both are the official languages or that have a completely different language.

In order to interpret the results, we compare the location quotients for Ontario to those of the less bilingual provinces. As illustrated in Chart 9, in regard to trade with Francophone countries, Ontario's import and export location quotients are significantly higher for exports and for imports than for the less bilingual provinces. Ontario has a slightly greater propensity to trade with Francophone countries than the reference region because the location quotients are significantly higher than 1. However, Ontario does not trade much with Francophone countries, as only 1.1% of Ontario exports are to Francophone countries.

The same observation applies to trade with Anglophone countries: the location quotients are higher than 1, and are to Ontario's advantage. It is worth noting that the location quotient for exports from Ontario to Anglophone countries is much higher than to Francophone countries. As for trade with other countries—(Francophone, Anglophone or bilingual)—the location quotients are higher than for the provinces that are less bilingual than Ontario.

Table 2
Location quotients (1997-2016)

	Exports	Imports
Francophone countries		
Ontario	1.01	1.09
Less bilingual provinces	0.98	0.80
Bilingual countries		
Ontario	0.76	0.97
Less bilingual provinces	1.16	1.06
Anglophone countries		
Ontario	1.55	1.02
Less bilingual provinces	0.65	0.96
Other countries		
Ontario	0.80	0.99
Less bilingual provinces	1.13	1.02

Source: The Conference Board of Canada

Table 3
Share of exports and imports, 2016 (%)

Countries	Exports		Imports	
	Ontario	Less bilingual provinces	Ontario	Less bilingual provinces
Francophone countries	1.1	2.2	2.2	1.6
Bilingual countries	0.0	0.0	0.0	0.0
United States	82.8	68.6	56.7	52.4
Other Anglophone countries	7.6	5.2	3.2	5.4
Other languages	8.6	24.0	36.6	39.1

Sources: The Conference Board of Canada; Statistics Canada; US Census Bureau.

Even though Ontario shows a clear preference for trading with the United States and Anglophone countries, the location quotients demonstrate that Ontario's Francophonie has encouraged trade with Francophone countries. Based on the location quotients of the other provinces, we estimate that Ontario exports to Francophone countries would have been \$58 million less, and imports would have been \$1.4 billion less. The difference between imports and exports is attributed to the import of pharmaceuticals from Switzerland. In 2017, close to 96% of those products were destined for Ontario.

5. Gravity model

This chapter presents the results of the analysis based on the application of the gravity model to trade in Ontario and the less bilingual provinces. The location quotients indicate that Ontario trades more with Francophone and Anglophone countries as a proportion of their total trade. With the gravity model, we will see whether language plays a statistically significant role in Ontario's international trade relations. But first, we will focus on the two key characteristics of gravity equations—the volume of international trade increases with economic size and decreases with distance—to show that they also apply to trade relations in the rest of Canada.

5.1 Gravity model and trade

Trade data are consistent with the principle of gravity in a number of ways. First, exports increase in proportion to the economic size of the destination country, and imports in proportion to the size of the country of origin.

5.2 Data and hypotheses

Our chronological series goes from 1997 to 2016.

The trade data come from the Innovation, Science and Economic Development Canada Trade Data Online portal. The World Bank database on worldwide development indicators is our source of information for GDP. We have recent actual GDP data for 199 countries.

Distance, expressed in kilometres, is calculated for the orthodromic distance between the two largest cities in each region. For Ontario, that is Toronto, and for the less bilingual provinces, it is Vancouver.

Information about official and spoken languages is taken from different sources, namely CEPII's GeoDist database, the Central Intelligence Agency's World Factbook, Ethnologue and Wikipedia. The following are the dummy variables:

- Official language (French or English): Countries that use English or French as their official language are assigned a 1, and all others are assigned a 0.
- Official language (English): Countries that use English as their official language are assigned a 1, and all others are assigned a 0.
- Official language (French): Countries that use French as their official language are assigned a 1, and all others are assigned a 0.
- Language spoken (English or French): Countries where at least 20% of the population speaks English or French are assigned a 1, and all others are assigned a 0.
- Language spoken (English): Countries where at least 20% of the population speaks English are assigned a 1, and all others are assigned a 0.
- Language spoken (French): Countries where at least 20% of the population speaks French are assigned a 1, and all others are assigned a 0.

Given the importance of the automobile manufacturing supply chain in Ontario, we included Mexico. A dummy variable was created with an assigned value of 1 for the United States and Mexico, and 0 for all other countries. We also used dummy variables for colonial heritage (1 for the United Kingdom and France, 0 for all other countries), and free-trade agreements (1 for countries that have a free-trade agreement with Canada, 0 for all other countries).

The other terms in the equation are controls essential for identifying the impact of linguistic links on international trade. Countries that share a border often share the same language. Colonial links are also important³³. We expect Canada to do more trade with countries with which it has a free trade agreement. Finally, we believe that there is less trade with countries that do not have access to the sea, regardless of their language.

Thus, we established the following gravity equation:

$$\log(t_{ij}) = a + \beta_1 \log(GDP_i GDP_j) - \beta_2 \log(Dist_{ij}) + B_3 \log(Dum_{ij}) \quad (5)$$

33. Mélitz and Toubal, op. cit., p.17.

In other words, a regression of average actual international trade volumes is done between countries *i* and *j* on the product of their GDP, the distance between them in kilometres, and other indicators, using dummy variables that are believed to influence international trade.

5.3 Results

For Ontario, for the less bilingual provinces, and for all provinces, we have three gravity equations to assess:

- the impact of having English or French as the official language and/or common language;
- the impact of having English as the official language and/or common language; and
- the impact of having English as the official language and/or common language.

Table 4 shows the results of GDP, distance and dummy variables from our gravity equations estimating the impact of having either English or French as a common language. Table 4 shows positive coefficients for the GDP variable and a negative correlation between distance and the volume of international trade. There is a positive correlation between the volume of trade and contiguity, colonial links and free-trade agreements for all three gravity equations.

All of these variables are statistically significant because their T-tests, which appear in parentheses, are all well above 2 (for a positive coefficient) or below -2 (for a negative coefficient).

Table 4
Results of the gravity equation: Real trade (French or English as a common language)

Variable	Ontario	Less bilingual provinces	Ontario and less bilingual provinces
GDP	0.196 (17.423)*	0.156 (12.111)*	0.040 (4.378)*
Distance	-1.013 (-7.856)*	-0.182 (-1.178)*	-0.435 (-3.689)*
Contiguity	1.487 (2.054)*	0.804 (3.202)*	1.912 (2.878)*
Colonial connection	2.474 (4.092)*	0.694 (3.732)*	2.307 (4.157)*
Free-trade agreement	1.668 (4.528)*	0.424 (4.852)*	1.923 (4.378)*

*T-test (to determine the significance)

Source: The Conference Board of Canada

Table 5 illustrates the results of language from our gravity equations. The empirical analysis shows that a common official language is a positive and statistically significant factor for Ontario and the less bilingual provinces. The coefficient is higher for Ontario than for the less bilingual provinces.

However, the coefficients are negative for language spoken. This indicates a negative correlation between trade and having English or French as a common language.

As indicated in Chapter 3, immigration was relatively higher in Ontario and British Columbia. Hence, the proportion of the population that speaks more than one non-official language in Canada is rising. This represents an advantage in trade with non-Anglophone and non-Francophone countries. In addition, technological advances, such as mobile applications, can reduce certain language barriers. The impact of non-official languages and technological advances compared to trade volumes is beyond the scope of this study.

Table 5
Results of the gravity equation: Real trade

Language	Ontario	Less bilingual provinces
English or French – Official language	0.803 (4.220)*	0.579 (2.679)*
English or French – Language spoken	-0.818 (-4.221)*	-0.620 (-2.816)*
English – Official language	0.902 (4.404)*	0.817 (3.23)*
English – Language spoken	-0.675 (-2.965)*	-0.505 (-1.962)*
French – Official language	0.172 (0.676)	-0.322 (-1.114)
French – Language spoken	-0.917 (-3.314)*	-0.803 (-2.55)*

*T-test (to determine the significance)

Source: The Conference Board of Canada

Gravity equations that treat English and French separately are used to check how each language influences the volume of international trade in Ontario and the less bilingual provinces. The correlation between English and trade is demonstrated by the higher coefficients in Ontario. However, contrary to what the literature suggests, the correlation between French and trade is ambiguous for Ontario. Although there is a positive coefficient between French as an official language and trade, it is not statistically significant.

As indicated above, Ontario's international trade is dominated by the United States. In total, 82.8% of Ontario exports in 2016 went to the United States. Ontario's second trade partner, the United Kingdom, represented only 6% of total exports.

Despite the control variable for free-trade agreements and contiguity, it is difficult to assess trends with groups of Francophone countries because such trade only represents such a small share of Ontario's international trade.

6. Other opportunities

This chapter explores the study's limitations, and proposes ways in which Ontario could use its bilingualism to its advantage. The location quotients revealed that Ontario trades more with Francophone and Anglophone countries proportionally than the less bilingual provinces. However, the gravity equations indicate that only English plays a statistically significant role in Ontario's international trade relations.

6.1 Being a member of the Organisation internationale de la Francophonie

Gravity equations could also calculate the effect of being an OIF member even if the member country does not use French as its language. Table 6 presents the results of gravity equations where the dummy variables concerning language are replaced by a dummy variable with a value of 1 if the country is a member of OIF and 0 if it is not. Including OIF countries greatly broadens the sample, and may produce more conclusive results.

Table 6
Results of the gravity equation: Real trade

Variable	Ontario	Less bilingual provinces
GDP	0.039 (4.541)*	0.152 (12.214)*
Distance	-0.100 (-0.880)	-0.280 (-1.915)*
Contiguity	4.481 (6.074)*	4.626 (4.576)*
Colonial connection	3.174 (6.042)*	3.680 (5.620)*
Free-trade agreement	1.800 (6.074)*	1.691 (4.536)*
OIF	-1.359 (-11.798)*	-2.219 (-15.315)*
European Union	2.788 (16.256)*	2.960 (13.668)*

*T-test (to determine the significance)

Source: The Conference Board of Canada

This new gravity analysis also reveals a negative international trade relationship with OIF member countries. However, this relationship is much less negative in Ontario than in the more bilingual provinces. Because the gravity analysis controls for temporal effects, it is difficult to demonstrate the relationships between OIF member countries given that Ontario only became a member in 2016, this method can only account for one year of a 20-year analysis period. In addition, several Francophile countries, including South Korea and Latin American countries, are also new OIF members.

Some European countries also participate in the OIF. To account for the political and economic ties between EU members, we add a dummy variable of 1 if the country is a member of the European Union. For example, France would have a value of 1 for the OIF variable and for the European Union variable, whereas Germany would have a value of 0 for the OIF and a value of 1 for the European Union variable. As demonstrated in Table 6, the correlation between the European Union and trade with Ontario is statistically significant. The gravity analysis shows that the European Union is an important factor for Ontario.

As well, the Comprehensive Economic and Trade Agreement (CETA) has no effect on the analysis because the agreement only came into effect in September 2017.

Nonetheless, that agreement will greatly benefit Canada. The Conference Board of Canada estimates that the elimination of tariffs with Europe will increase Canadian product exports by \$1.4 billion by 2022³⁴.

6.2 Trade in services

The gravity model is used to analyze trade in goods, but what about services? Given the lack of data, it is difficult to apply the model to assess the impact of bilingualism on trade in services. However, it is important to note that services, including supply chains and products sold through foreign subsidiaries, represent half of Canadian exports, and have been on the rise in Ontario for several years³⁵.

Among other things, CETA aims to increase the flow of Canadian services (namely information technology and professional, scientific, and technical, information technology, and environmental services) to Europe. The Agreement contains provisions to improve transparency in the services markets, to reduce restrictions applied to foreign suppliers and investors, and to establish a base to recognize foreign professional qualifications³⁶.

There is also tremendous potential in the emerging markets of Africa and Latin America. For example, direct foreign investment in Africa quadrupled between 2001 and 2012. As well, demand for financial, insurance and intellectual property services is rapidly increasing³⁷. The fastest-growing segment in international trade and investment is financial services, and Toronto is highly rated relative to other international financial centres³⁸.

One of the sectors with potential in Africa and Latin America is professional, scientific and technical services such as architecture, engineering, and support activities for mining and oil and gas extraction³⁹. According to the World Bank and the International Monetary Fund, African economies will experience significant growth by 2050. This presents many opportunities for services from Ontario. For example, the mining sector, in which Canada and Ontario are world leaders, invests heavily in African countries and creates jobs in Ontario

34. Chu and Goldfarb, *Stronger Ties: CETA Tariff Elimination and the Impact on Canadian Exports*, p. 3.

35. Palladini, *op. cit.*, p. ii.

36. Chu and Goldfarb, *op. cit.*, p.21.

37. Goldfarb and Palladini, *op. cit.*, p.22.

38. Burt and Forbes Partners in Growth: 2017 Report Card on Canada and Toronto's Financial Services Sector, p. ii.

39. Goldfarb and Palladini, *op. cit.*, p. 23.

and abroad⁴⁰. Key industries listed on the Toronto Stock Exchange include the energy, mining and technology sector⁴¹. Canada is also very active in international development, and has a strong presence in Francophone countries in Africa⁴².

The Conference Board of Canada has done several studies in the past few years, and has identified strategies to develop trade in services. These strategies include creating international networks internationally, having a local presence, and maintaining linguistic and cultural awareness⁴³. Thus, Ontario's participation in the OIF could increase the provinces's opportunities.

40. Attali, *La francophonie et la francophilie, moteurs de croissance durable*, op. cit., p. 44.

41. Burt and Forbes, op. cit., p.11

42. Attali, op. cit., p. 44.

43. Goldfarb and Palladini, op. cit., p. 27

7. Conclusion

This study has shown that Ontario trades proportionally more with Francophone and Anglophone countries than Canada's less bilingual provinces. Even though Ontario leans more towards trade with the United States and other Anglophone countries, this study has shown that Ontario's Francophonie has also encouraged trade with Francophone countries.

We used a gravity model to determine whether language plays a statistically significant role in Ontario's international trade relations. The empirical analysis demonstrated that a common official language is a positive and statistically significant factor.

There is a clear correlation between English and trade. However, contrary to what most studies on the subject would indicate, the correlation between French and trade is somewhat ambiguous for Ontario. Despite a positive coefficient, the correlation for French as an official language is not statistically significant. The United States dominates international trade in Ontario. Even with the controls for free-trade agreements and the proximity of trading partners, it is difficult to assess the trends with groups of Francophone countries because trade with that subset of countries only makes up a small portion of Ontario's international trade.

Given that Ontario is a new member of the OIF, the impact of that membership is not yet clear. Ontario's participation in the OIF could increase the province's trade opportunities.

This study is to some extent limited by the availability of data. It starts by assessing the impact of language for the province as a whole. However, bilingualism rates vary greatly from region to region. As well, Ottawa shares a border with Quebec, and is the nation's capital. The University of Ottawa is the largest bilingual university in the world. Thus, regional differences warrant a closer look in a subsequent study using other analytical tools.

In addition, the study did not take interprovincial trade into account in any significant way. Nonetheless, a summary analysis based on data from 2010 to 2014 suggests a positive and statistically significant correlation between the bilingualism rate and interprovincial trade in goods and services in Canada, including Quebec and New Brunswick. The impact of bilingualism and economic relations between provinces warrants a more in-depth analysis with a larger sample size.

Bibliography

Anderson, James E. and Eric Van Wincoop. "Trade Costs". *Journal of Economic Literature*, vol. 42, n° 3, p. 691-751.

Attali, Jacques. *La francophonie et la francophilie, moteurs de croissance durable. Rapport à François Hollande, Président de la République française*: 2014.

Burt, Michael and Richard Forbes. *Partners in Growth: 2017 Report Card on Toronto's Financial Services Sector*. Ottawa: The Conference Board of Canada, 2017.

Christofides, Louis N. and Robert Swidinsky. *The Economic Returns to a Second Official Language: English in Quebec and French in the Rest-of-Canada*, 2008, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1150720

Chan, Kai L., *Power Language Index: What are the world's most influential languages?*, 2016, http://www.kailchan.ca/wp-content/uploads/2016/06/KC_Power-Language-Index_May-2016.pdf

Chu, Doris and Danielle Goldfarb. *Stronger Ties: CETA Tarriff Elimination and the Impact of Canadian Exports*. Ottawa: The Conference Board of Canada, 2015.

Egger, Peter H. and Andrea Lassmann. "The Language Effect in International Trade: A Meta-Analysis". *Economics Letters*, 2012.

Frankel, Jeffrey, Ernest Stein and Shang-Jin Wei. "The Trading Blocks and the Americas: The Natural, the Unnatural and the Super-natural". *Journal of Development Economics*, vol. 47, n° 1, 1995, p. 61-95.

Fridmuc, Jarko and Jan Fridmuc. *Foreign Languages and Trade: What are You Sinking About?*. 2008, https://www.fiw.ac.at/fileadmin/Documents/FOKO_II/FidrmucFidrmucpdf.pdf

Goldfarb, Danielle and Jacqueline Palladini. *Becoming a Services Superpower: Tapping into the Global Appetite for High-Value Services*. Ottawa: The Conference Board of Canada, 2015.

Head, Keith and Thierry Mayer. "Gravity Equations: Workhorse, Toolkit and Cookbook". *Handbook of International Economics Vol. 4*, under the direction of Gopinath, Helpman and Rogoff, Elsevier, 2003.

Helliwell, John F. "National borders, trade and migration". *Pacific Economic Review*, 1997, vol. 2, n°3. P. 165-185.

Hutchinson, William K. "Does Ease of Communication Increase Trade? Commonality of Language and Bilateral Trade". *Scottish Journal of Political Economy*, 2002, vol. 49, n° 5, p.544-556.

Hutchinson, William K. "Linguistic Determinant of Bilateral Trade". *Southern Economic Journal*. 2005, p. 1-15.

Konya, Istvan, "Modeling Cultural Barriers in International Trade". *Review of International Economics*, 2006, vol. 14, n° 3, p. 494-507.

Lohmann, Johannes, "Do Language Barriers Affect Trade?". *Economics Letters*, 2011, vol. 110, n° 2, p. 159-162.

Mayer, Thierry and Gianmarco I.P. Ottaviano, "The Happy Few: the Internationalisation of European Firms". *Bruegel blueprint series*, 2007, n° 3, p. 1-81.

Méltiz, Jacques. "Language and Foreign Trade". *European Economic Review*, 2008, vol. 52, n° 4, p. 667-699.

Méltiz, Jacques and Farid Toubal, *Native Language, Spoken Language, Translation and Trade*, CEPII working document, 2012, n° 2012-10.

Organisation internationale de la francophonie. *La langue française dans le monde*, 2014. Paris: Éditions Nathan, 2014.

Palladini, Jacqueline. *Spotlight on Services in Canada's Global Commerce*. Ottawa: The Conference Board of Canada, 2015.

Sauter, Nicolas, "Talking Trade: Language Barriers in Intra-Canadian Trade". *Empirical Economics*, 2012, p. 1-23.

Appendix 1

Use of French, English or both around the world

	English		French	
Territory	Official	Spoken	Official	Spoken
Algeria			X	X
Anguilla	X	X		
Antigua and Barbuda	X	X		
Aruba		X		
Australia	X	X		
Bahamas	X	X		
Barbados	X	X		
Belgium			X	X
Bélize	X	X		
Benin			X	X
Bermuda	X	X		
Botswana	X	X		
British Virgin Islands	X	X		
Burkina Faso			X	X
Burundi			X	X
Cameroon	X	X	X	X
Canada	X	X	X	X
Cayman Islands	X	X		
Central African Republic			X	
Chad			X	
Christmas Island	X	X		
Cocos Island		X		
Cook Islands	X	X		
Comores			X	
Congo (Democratic Republic of the)			X	
Congo (Republic of)			X	X

	English		French	
	Official	Spoken	Official	Spoken
Côte d'Ivoire			X	X
Djibouti			X	
Dominica	X	X	X	
Egypt		X		
Equatorial guinea			X	
Eritrea	X	X		
Ethiopia	X			
Falkland Islands	X	X		
Fiji	X	X		
France			X	X
French Polynesia			X	X
Gabon			X	X
Gambia	X	X		
Ghana	X			
Gibraltar	X	X		
Grenada	X	X		
Guinea			X	X
Guyana	X	X		
Haiti			X	
Hong Kong	X	X		
India	X	X		
Ireland	X	X		
Israel	X	X		X
Jamaica	X	X		
Jordan		X		
Kenya	X	X		
Kiribati	X	X		
Kuwait		X		

	English		French	
	Official	Spoken	Official	Spoken
Lesotho	X	X		
Lebanon		X	X	X
Liberia	X	X		
Luxembourg			X	X
Madagascar			X	X
Malawi	X			
Mali			X	
Malta	X	X		
Mauritius	X		X	X
Morocco			X	X
Montserrat	X	X		
Namibia	X	X		
Nauru	X	X		
Niger			X	X
Nigeria	X	X		
Niue	X	X		
New Caledonia			X	X
New Zealand	X	X		
Norfolk Island	X	X		
Pakistan	X	X		
Papua New Guinea	X			
Philippines	X	X		
Pitcairn	X	X		
Rwanda	X	X	X	
Saint Lucia	X	X		
Saint Helena	X	X		
Saint-Pierre-et-Miquelon			X	X
Saint Vincent and the Grenadines	X	X		

	English		French	
	Official	Spoken	Official	Spoken
Samoa	X	X		
Seychelles	X	X	X	X
Senegal			X	X
Sierra Leone	X	X		
Singapore	X	X		
Solomon Islands	X			
Somalia	X			
South Africa	X	X		
South Korea		X		
St Kitts and Nevis	X	X		
Sudan	X			
Swaziland	X			
Switzerland			X	X
Tanzania	X			
Togo			X	X
Tonga	X			
Trinidad and Tobago	X	X		
Tunisia			X	
Turks and Caicos Islands	X	X		
Uganda	X			
United Kingdom	X	X		
United States	X	X		
Vanuatu	X		X	
Wallis and Futuna			X	X
Zambia	X	X		
Zimbabwe	X	X		



L'ASSEMBLÉE DE LA FRANCOPHONIE DE L'ONTARIO

Tél: (613) 744-6649 Sans frais: 1-866-596-4692 Téléc. : (613) 744-8861
1490, chemin Star Top, Ottawa (Ontario) K1B 3W6