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Article abstract

A classical interpretation of the historical evolution of the Canadian policy has been to see the country as the result of tensions between two fields of spatial interaction, one East-West, the other South-North. Since the middle of the 19th Century, prevailing global geopolitical conditions have favoured one or the other. Currently, these conditions are overwhelmingly to the advantage of South-North interaction. This paper examines three types of spatial interaction between Canada and the United States in light of this broad hypothesis. The recent evolution of commodity flows, air travel and television signals indicates that a putative process of North American continental integration may be underway but that this process is chaotic and multiform, with unforeseeable consequences for the relations between Canada and Quebec.

CANADA, QUÉBEC, AND NORTH AMERICAN CONTINENTAL INTEGRATION*

Paul VILLENEUVE

Une façon, maintenant classique, d'étudier l'évolution de la formation sociale canadienne consiste à voir celle-ci comme résultant de tensions entre deux champs d'interaction, l'un est-ouest, l'autre sud-nord. Depuis le milieu du XIX^e siècle, la conjoncture géopolitique mondiale favorisa tantôt un champ, tantôt l'autre. Présentement, elle avantagerait surtout le développement des rapports sud-nord. Trois types d'interaction spatiale entre le Canada et les États-Unis sont considérés à la lumière de cette hypothèse générale. L'analyse de l'évolution des flux de marchandises, de passagers aériens et d'images télévisuelles permet de préciser certains aspects du processus d'intégration continentale qui a cours présentement en Amérique du Nord. Ce processus chaotique et multiforme peut avoir des effets imprévus sur les liens entre le Canada et le Québec.

A classical interpretation of the historical evolution of the Canadian polity has been to see the country as the result of tensions between two fields of spatial interaction, one East-West, the other South-North. Since the middle of the 19th Century, prevailing global geopolitical conditions have favoured one or the other. Currently, these conditions are overwhelmingly to the advantage of South-North interaction. This paper examines three types of spatial interaction between Canada and the United States in light of this broad hypothesis. The recent evolution of commodity flows, air travel and television signals indicates that a putative process of North American continental integration may be underway but that this process is chaotic and multiform, with unforeseeable consequences for the relations between Canada and Québec.

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Three international geopolitical events, of indirect but possibly crucial and lasting significance for the future of Canada and Québec, have recently occurred : the fall of the Berlin Wall, NAFTA and the Maastricht Agreement. These events reveal deep restructuring tendencies within the world system. They underline, in particular, the emergence of continental trading blocs, with Europe steadily turning to the East, the Americas gradually forming a more unified market, and parts of Asia coming together through such institutions as ASEAN. Although these blocs are seen by most analysts as mere stepping stones in the process of world economic integration (NYAHOHO, 1996), their formation may have considerable consequences for the internal economic, political and cultural configurations of the countries involved. This is especially the case of a country such as Canada where certain forms of continental integration are already the rule¹. In particular, we may ask whether the internal cohesion of Canada will resist the new centrifugal pressures added by NAFTA to the existing contentious relations between Québec and the rest of Canada.

In the case of NAFTA, the profound differences among the three participating countries have been noted repeatedly, particularly the large difference in population size between Canada and the United States. Of more interest however is the geographical configuration of both countries and the history of their growing autonomy from Europe and of their occupation of the continent (BAILLY *et al.*, 1992). The fact that there are two countries instead of one in North America is, largely, a product of European geopolitics. According to Lipset, who emphasizes the cultural differences between the two countries, the formative events associated with the American Revolution left lasting marks on the two countries : the United States was the country of the revolution, Canada of the counterrevolution (LIPSET, 1990).

Both the United States and Canada have penetrated the continent from East to West, though differently. In the United States, the « Yankee » culture of the North-East, and the Southern culture, rooted in slavery, have respectively spread westward, as a gradual diffusion process involving both immigrants from Europe and migrants from the previously settled lands of the Atlantic Coast (SALE, 1976). The territorial occupation of what is now Canada proceeded quite differently. Societies were formed sporadically in islets by immigrants, most of whom arrived directly from Europe. The Canadian patterns of settlement were highly discontinuous compared to the American (COLE HARRIS, 1987).

1. Among the numerous forms of continental integration, direct investments of American firms in Canada (CLEMENT, 1977) and, more recently, of Canadian firms in the United States (LIPSET, 1990) have reached such a high level that, as a consequence, as much as 60 % of the total trade between the two countries takes the form of intra-firm trade (MOREAU, 1988). In discussions of long term processes of economic and cultural integration between countries, special attention has to be given to the interplay between trade, direct investment and portfolio investment (LEVITT, 1970).

The lasting reality of Canada as a fragmented country has its roots, then, in the initial settlement of the land. As long as the isolated colonies that constituted British North America – including Québec as the second largest – were part of the Empire and, more recently, of the Commonwealth, this loose assemblage could be held together by these larger structures. But the Empire is no more, the Commonwealth wavers, and, by most accounts, the provinces have steadily gained political strength at the expense of the federal state and in spite of a well-developed urban network which forms the backbone of the Canadian space-economy (VILLENEUVE, 1990).

In the recent debates surrounding free trade, English Canadian intellectuals thought Québécois were naive not to oppose FTA and, later on, NAFTA. In response, Daniel LATOUCHE (1995) noted an important new element growing out of this episode in Canada-Québec relations. That outcome occurred simultaneously with and resulted perhaps from the rejection by English Canada of the Meech Lake Accord and the passage, by the Québec National Assembly, of a bill banning English-language signs. According to LATOUCHE, the debates have accelerated the consolidation of a form of English Canadian nationalism, constructed not only against the United States, which marked previous pan-Canadian nationalism, lamented by GRANT (1994), but also against Québec nationalism. Prior to these debates, the dominant tendency among English Canadian intellectuals was to promote a pan-Canadian nationalism inclusive of Québec. Thereafter, however, a small but growing number among them adopted attitudes such as this : « I would like to see a 'shell' federalism in which Québec has most of the attributes of an autonomous country, and where the remaining nine provinces have a highly centralized government capable of managing the evolution of a meaningful cultural nationalism in English Canada » (CONLOGUE, 1996, p. 155). Given the divergent nationalisms of Québec and Canada and the progression of North American continental integration, what new developments are possible ?

To be sure, the passage of Canada from the hinterland of England to that of the United States has been gradual and spread over much of this century. Recent free trade tendencies should accelerate the transition : the Canada - U.S. Free Trade Agreement (FTA) has strengthened North-South economic links while weakening Canada's own East-West links. According to SPICER (1995, p. 25), « NAFTA, too, is likely to make our old internal bargains less relevant ». Will they become so irrelevant as to offer no opposition to the fragmentation of Canada and the progression of Québec toward political independence ? That is the question underlying this paper. Will NAFTA, which is replacing the Commonwealth as the main international forum for Canada, exert a sufficiently strong centrifugal force on the country as to contribute to its demise ?

For a number of reasons, definitive answers to these questions are not possible. First, other factors besides international partnerships influence the evolution of the Canadian polity, especially the political will of enough Canadians to continue to

pursue, in America, social goals different from those of the United States (VILLENEUVE, 1993). Second, as was alluded to above, the formation of continental trading blocs, at this time in history, may only be a stage in the process of world system integration. Further stages may bring about new circumstances that will influence Canada's evolution in unforeseeable directions. Third, there remains the nagging question of the relationships between economic integration, political sovereignty and cultural homogenization. To what extent are these processes related? When are these processes convergent and when are they divergent?

The goal here is to bring empirical evidence in order to provide information about these themes and to give at least partial answers to the questions. The notion of « fields of spatial interaction » serves to organize the investigation. Following a brief discussion of this notion², various types of spatial interaction data are analyzed in order to gain some understanding of the respective positions of Canada and Québec in the present process of continental integration.

Continental Integration and Spatial Interaction

Historically, relations between Québec, the rest of Canada and the United States have often been interpreted as developing in the context of a changing balance between East-West interactions among the Canadian provinces and North-South interactions linking the provinces with the American states to the South. At least two broad ways of thinking about this issue can be identified.

The first one is best exemplified by a number of authors associated with the French School of Regional Geography who wrote, roughly, from the 1890's to the 1950's. For example, not long after the 1867 Confederation, RECLUS (1890, p. 258) held the opinion that the East-West political boundary drawn between Canada and the United States went against the South-North pattern of mountains, valleys and climates which formed the « grain of the continent ». In his view, Canada did not have sufficient geographical « unity ». He gave much credibility to the American belief that, eventually, Canada would be integrated into the United States : « ...l'opinion générale, aux États-Unis, est que le Canada finira par s'agréger à la grande république anglo-saxonne... » (RECLUS, 1890, p. 698). Forty-five years later, BAULIG (1935, p. 5) asserted that transcontinental railways and the East-West political boundary would never abolish the basic North-South architecture of the continent. SIEGFRIED (1937) had a more nuanced view of things. In an influential book that was reedited at least seven times between 1937 and 1956, he is careful enough to leave the future of Canada open. He sees the East-West-North-South tension as a struggle, in an international context, between history and geography. If the historical East-West links of Canada with Europe are maintained, Canada could survive

2. See VILLENEUVE (1997b) for a more detailed discussion of this concept.

as a different entity. If, on the other hand, the intensification of the North-South links contributes to further differentiate North America from Europe, then Canada could disappear. These authors do not give much thought to the possibility that forces internal to the country could alter these geographical and historical determinisms. A Canadian political economist, Harold INNIS (1956), trained into the institutional economics of Thorsten VEBLEN and Frank KNIGHT, and well aware of these French writings, developed at the time an interpretation in which history could clearly triumph over geography, under one condition: the Canadian polity had to move the country beyond the staple producing stage³.

INNIS had a considerable influence on the second stream of thought dealing with the East-West-North-South tension. Collected works by WARKENTIN (1968) and MCCANN (1987) illustrate the ideas and methods put forth. Authors, here, are less tempted to produce grand interpretations and more concerned with analyzing limited bodies of data pertaining to specific aspects of this tension. They also are much influenced by the methods proposed by authors such as STOUFFER (1940), ZIPP (1946) and STEWART (1948) for the analysis of movement and spatial interaction. They realize that credible interpretations of levels of integration, barrier effects and structuring processes in social systems have to be grounded into the systematic analysis of spatial interaction data⁴. Myriad single interactions occur continuously. These polymorphous and innumerable events form a space-time continuum that, if properly analyzed, can yield insights into processes of temporality and spatiality, taking us far beyond chronological time and Cartesian space. Days, weeks and years categorize time arbitrarily. Latitude and longitude do the same for space. Starting with the most disaggregated interaction data available, and gradually aggregating this information in space-time, according to categories allowed to emerge from the data themselves, should help to uncover the temporality and spatiality of processes, since interaction does not take place randomly. It is non-random patterns – direction biased and distance biased patterns – that can be called « fields of interaction ».

For a number of decades, Canada evolved as an East-West field of interaction, first under the guidance of British rule and, later on, in the context of MacDonald's National Policy. It is questionable whether this field of interaction ever produced a sufficiently integrated polity. The transportation landscape of the past, especially trans-Canadian railways, as well as an entire range of federal institutions, testify to the efforts made to turn Canada into a nation-state. A host of factors is now putting severe strain upon this attempt at nation building, not the least of which are Québec's desire for political autonomy, the crisis of public finances that tends to

3. See VILLENEUVE (1997a) for a detailed discussion of the writings of these authors.

4. See GIDDENS (1984), especially Chapter three, « Time, space and regionalization », for a detailed exposition of how « social systems are constituted *across* time-space » (p. 110, *italics mine*). See THOMPSON (1974) for a detailed assessment of spatial interaction data.

force state decentralization and, of course, continental integration. As GUNDERSON (1996, p. 2) has pointed out: « greater economic inter-dependence within the western hemisphere will test the viability of the East-West links ». Let us now examine a range of spatial interaction data pertaining to the recent past, in order to test the relative strength of East-West and North-South links.

Commodity Flows

The exchange of commodities often requires only limited contacts between individuals, the extreme historical case being the « deaf barter » between hunter-gatherers, exemplified by the Pygmies and farmers of Central Africa, who were otherwise hostile to each other⁵. As is proposed in trade theory, regions that are markedly different from each other generally have a greater incentive to trade goods since they tend to be more complementary than similar regions. Merchants act as intermediaries. During colonial times, Europe needed the natural resources from the Americas. In our century, mostly for strategic reasons, the United States has wanted to maintain easy access to the resources of the rest of the Americas. This geopolitical factor contributed to the ascent of the provinces in Canada during the Cold War, since the provinces own natural resources: « There were a number of reasons for the post-war strength of the provinces. First and foremost, the resource industries under provincial jurisdiction expanded enormously, mainly in response to American needs and with the aid of American direct investment. » (STEVENSON, 1977.) At the present time, it also partly explains why the U.S. did not oppose FTA more vigorously and why, in Canada, it is the Mulroney government, a less centralist government, who negotiated the agreement⁶. This, of course, does not contradict the fact that these agreements have also favoured the southbound movement of Canadian manufacturing goods. In this context it is possible to sketch the recent evolution of trade in goods between Canada and the United States.

Commodity flows can be documented by graphing, for the 1984-1994 period, the proportion of total annual exports from Canadian regions headed for the U.S. (Figure 1)⁷. One first notes the important regional differences in the levels of the

5. There is considerable debate among anthropologists on this form of trade which takes place without direct contact between the traders. Some suggest it never existed, and others infer its existence from indirect evidence. See SEITZ (1977, p. 174) for a discussion of this question.

6. Further evidence in support of the role played by Canadian resources in American policy formulation can be found in BRUNELLE (1978), CLARK-JONES (1987), CLEMENT (1977) and HAMEL (1987).

7. Exports statistics from Canadian provinces to countries of the world and imports by provinces from countries are published quarterly by Statistics Canada. Only exports on a yearly basis are analyzed here for a time period when data definitions were the same. It should be clear that modifications to the period observed would give different graphs.

share of total exports sold to the U.S., with Ontario reaching an extremely high level, followed by Québec, the Atlantic and the West. Second, the fluctuations from year to year are also quite different, revealing the size of the regional economies involved as well as the composition of exports, in terms of raw products (especially in the case of the West) versus finished products (especially in the case of Ontario). But of greater relevance for our discussion are the differences in the long-term tendencies by region.

To be sure, these time series incorporate an important economic cycle effect, with the export cycle preceding somewhat the growth cycle⁸. This cycle can blur the longer term tendency, which may be recovered by simply adjusting a linear function to each of the four time series. This exercise, not shown here, indicates that Québec has experienced the most significant long-term increase during the ten-year period. The standardized regression coefficient of the linear time trend extracted from the Québec series is strong, positive and statistically significant, while the Atlantic region shows a similar but less pronounced coefficient, and Ontario and the West exhibit non-significant coefficients. These last two results are largely due, in the case of Ontario, to the ceiling effect observed and, in the case of the West, to the large amplitude of the cycle. Also, the four regions experience an upward trend toward the end of the period. It is difficult, with the limited data at hand, to separate the effect on this trend of two possible factors: the FTA of 1989, and the moderate upturn in the economic cycle after 1991.

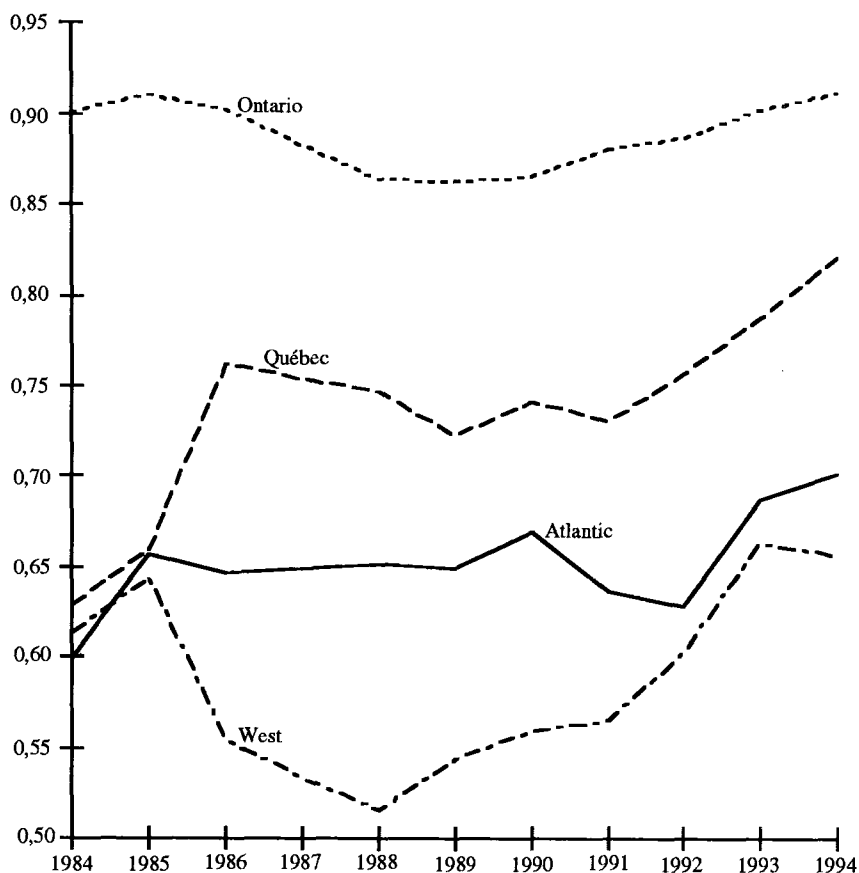
In conjunction with these data, it is important to refer to the evolution, during these years, of commodity flows *among* the regions of Canada. This allows a more complete test of a possible shift from an East-West axis to a North-South axis (or axes). The data on interprovincial flows are not as readily available as those on international flows⁹. Nevertheless, PROULX (1995) has been able to gather some evidence of a general decline in interprovincial trade relative to the growing U.S. – Canada trade. Also, FRÉCHETTE and VÉZINA (1990, p. 243), present data from the Bureau de la Statistique du Québec showing that, in 1989, for the first time in the postwar years, Québec exported a larger share of its manufactured goods to destinations outside Canada, overwhelmingly to the U.S., than it did to other Canadian provinces. More specific data on commodity flows can help document the relative strength of East-West versus North-South trade. For instance, Statistics

8. Adjusting third-order polynomials to the time series shows a minimum in 1991 for the Atlantic, in 1990 for Québec, in 1989 for Ontario and in 1988 for the West. The worst year during the recession of the early 1990's was 1991 (Statistics Canada, 1996, p. 7 and 49). This pattern should be expected, given the pull exercised by the United States on the Canadian economy.

9. Statistics Canada published data (Catalog 31-530) on interprovincial flows of manufacturing goods only between 1979 and 1984. For more recent years, these can only be obtained through costly special orders.

FIGURE 1

Proportion of Exports from Canadian Regions Sold to the United States



Source: Statistics Canada, Catalog 65-003, vol. 41(4) to 51(4).

Canada annually publishes data on the tonnage shipped by truck between large Canadian and American regions. These data have been aggregated in order to obtain the percentage distribution, among three destinations, of shipments originating in each of five large Canadian regions for the years 1987 and 1994 (Table 1). The destinations are, simply : the region of origin, the rest of Canada and the United States. The most obvious change, observed for all five regions between the two years of reference, is a decrease in intraregional shipments and, conversely, an increase in shipments both to the rest of Canada and to the United States. Trucking appears to be a mode of transportation operating over longer and longer distances, notwithstanding the fact that the intraregional share of total tonnage shipped is still high in 1994. It is interesting to observe that Québec behaves somewhat differently compared to the other regions : at both dates, it has the lowest share of intraregional shipments and the highest share of shipments to the rest of Canada. Nevertheless, the hypothesis of an increase in the share of southbound shipments – measured as the absolute increase in the percentages between the two dates – compared to interprovincial shipments, is supported for every region, except the Prairies.

TABLE 1

Percentage Distribution of Tonnage Shipped by Trucks by Origin and Destination

Destination :	1987			1994		
	Same Region	ROC*	USA	Same Region	ROC	USA
Origin :						
Atlantic	85,5	7,1	7,4	80,4	9,2	10,4
Québec	75,6	15,6	8,9	63,0	21,6	15,4
Ontario	82,0	7,7	10,2	69,8	13,2	17,0
Prairie	88,0	8,9	3,1	78,4	15,1	6,5
British Col.	84,2	8,9	6,9	73,0	13,9	13,1

* Rest of Canada.

SOURCE : Statistics Canada, Annual Catalog 53-222.

Finally, it is worth mentioning that American imports by Canadian regions do not tend to increase as much as do Canadian exports to the U.S. As mentioned, FTA and NAFTA were, among other things, ways of making sure that the U.S. could continue to count on Canadian natural resources. The trade volume of raw products and intermediate goods partly explains the difference between imports and exports. This difference may, however, have a longer-term significance. According to NYAHOHO (1996), continental blocs will not keep member-countries from doing business with non-members. On the contrary, they will often provide access for non-members to the whole bloc through direct investments in one of the countries

of a bloc¹⁰. Blocs are not an alternative to multilateralism. They offer, rather, a smooth transition to a more fully multilateral world market. In other words, what we observe here is a complex interplay between commodity flows and capital flows in the form of direct investments or portfolio investments¹¹. Trade agreements such as NAFTA or MERCOSUR facilitate the exchange of commodities and capital between participating countries. Usually, and this is the case of NAFTA, non-participating countries are allowed, under conditions that may vary from country to country, to invest directly – that is build production facilities – in participating countries. The goods thus produced can then be exported to other participating countries as easily as other domestic goods. The added advantage for a European firm to build production facilities in Canada or Mexico in order to gain easier access to the United States market is readily seen. Finally, NAFTA also facilitates the supply of financial services, including portfolio investments and branch-banking, between participating countries.

As is well known, one of the rationales for NAFTA is to counter the flow of labour from Mexico to the United States by, so to say, bringing jobs to Mexico through easier direct investments and other mechanisms such as the maquiladoras. As for Canada, its net migration loss to the United States has been much less between 1970 and 1990 than during the two previous decades (BAILLY *et al.*, 1992, p. 336). Clearly, the evolution of migration and travel is also a key indicator of the various forms taken by continental integration. Leaving aside migration flows, for now, let us turn to an important form of travel, especially at the continental scale.

Air Travel

Air passenger traffic data offer perhaps the best source of information with which to document processes of continental integration¹². Air transportation is widely used for business and tourist purposes in North America. These data portray movements of persons between cities and help trace action spaces of individuals, which, when aggregated, can reflect interaction fields. By selecting a set of Canadian and American cities uniformly spread over the continent, the evolution

10. As the U.S. did, historically, by building branch plants in Canada to gain access to the Commonwealth market.

11. See footnote 2 above for a brief distinction between these forms of economic flows. A good presentation of NAFTA can be found in a brochure published by the Ministère des Affaires internationales du Québec (1993).

12. Passenger origin and destination statistics are collected from passenger coupons pertaining to unit toll transportation using a 10 % continuous systematic sample for Air Canada and Canadian and a 20 % sample for other carriers. They are published annually. Only initial origin and final destination are taken into account, thus excluding final destinations outside North America. Statistics Canada reports traffic among Canadian places (Catalog 51-204) and traffic between Canadian and American places (Catalog 51-205).

of both the direction and the intensity of interaction fields can be analyzed. Most authors discuss the relative rise of North-South linkages at the expense of East-West linkages, without taking into account the detailed orientation of the specific form of the interaction fields. The part of Canada which is densely populated represents such a narrow band that it is appropriate to consider a single East-West interaction field. As for North-South interaction, the situation is quite different.

In particular, one wonders whether each Canadian region interacts mostly with the states immediately across the border or within a corridor extending further South, or, perhaps, irrespective of direction and distance, with any of the American states. In other words, what are the factors which influence the size, intensity and orientation of interaction fields, and is the weight of these factors changing over time? Answers to such questions may have some bearing on future relationships between regions of Canada, particularly Québec. The integration of Canada to the continent could proceed through a number of specific and well-aligned North-South fields gradually replacing the East-West field. Or evolution could proceed quite differently if each province or region diversified part of its interaction on a continental scale rather than along any specific North-South axis, thus developing multiple levels of geographic identity. One could infer that the first path would put the unity of Canada more at risk than the second if, of course, it holds true that fields of spatial interaction are the basis for territorial identities and solidarities.

To explore these hypotheses fully, a much more complete documentation than the one at hand would be necessary. The multivariate analysis of air travel data presented here offers only a limited and preliminary view on the processes at work. A set of 20 American and 6 Canadian cities was selected and the number of air passengers from each of the Canadian cities to the 25 other cities was recorded for the years 1970 and 1995. The cities included in the analysis are listed in Table 2, which presents the data for Montréal. The purpose of the analysis is to account for the cross-sectional variation in passenger flow at each date and for the change during the 25 year period. As a first approximation, a standard gravity model can be helpful¹³. It simply states that the annual number of air passengers from a given Canadian city i to any city j among the 25 others in the set varies directly with the population of j and inversely with some function of the distance between i and j . As

13. The analysis of spatial interaction data with the aid of models inspired from physics, especially from the notions of gravity and entropy, is frequent in social science. While this approach can be useful for sorting out aggregate patterns, it does not allow very deep probing into such considerations as decision-making behaviour, human actions and intersubjectivity. For a wide range of views on these questions, see Fotheringham and O'Kelly (1989), MacMillan (1989) and Werlen (1993).

TABLE 2

*Annual Number of Air Passengers from Montréal
to a Selected Set of North American Cities*

City	1970	1995	95/70
Atlanta	6,630	63,910	9.64
Boston	89,125	116,490	1.31
Chicago	55,090	117,690	2.14
Cleveland	20,450	14,850	0.73
Dallas	4,390	42,920	9.78
Denver	3,700	16,510	4.46
Detroit	8,735	39,860	4.56
Honolulu	3,310	7,630	2.31
Houston	4,350	25,440	5.85
Los Angeles	35,095	114,920	3.27
Miami	79,565	132,680	1.67
Mineapolis	7,480	23,710	3.17
New York	381,490	346,740	0.91
Philadelphie	28,740	52,760	1.84
Pittsburgh	9,750	20,130	2.06
Portland	1,640	7,290	4.45
San Francisco	15,790	67,450	4.27
Seattle	3,340	15,940	4.77
Tampa	13,300	57,580	4.33
Washington	32,700	81,100	2.48
Calgary	32,150	103,480	3.22
Halifax	89,905	96,750	1.08
Regina	8,485	11,630	1.37
Toronto	674,765	1,082,320	1.60
Vancouver	78,045	185,920	2.38

SOURCE: Statistics Canada, Annual Catalogs 51-204 and 51-205.

in most applications of the gravity model, a power function is used¹⁴. Thus, for each Canadian city at each year, the logarithm of the passenger flow between *i* and *j* is re-

14. Detailed descriptive statistics of the variables have been obtained and scattergrams have been drawn in preparation for least squares multiple regression. When applying gravity formulations to air passenger data, one has to take into account the fact that air travel is a long distance mode. This can be done either by specifying a distance function describing increasing flows for shorter distances and decreasing flows for longer distances, or by selecting cities far enough from each other so that the air shadow effect will be minimized. The latter was done here.

gressed on the logarithm of the population of j and the logarithm of the distance between i and j . This procedure serves to account for the most obvious effects of size and distance in the variation of passenger flow among cities.

But how are we to assess the relative influence of the East-West and North-South orientations on the magnitude of the flows? One simple and efficient way, in the context of multiple regression analysis, is to construct categorical variables¹⁵. Here, two such variables are defined: « frontier » (Canadian cities = 1; American cities = 0) and « axis » (American cities on the North-South axis of a Canadian city = 1; other cities = 0). The regression coefficient of « frontier » measures the strength of the Canadian, or East-West, interaction field, while the coefficient of « axis » does the same for the North-South field of each Canadian city included in the analysis.

Twelve regression analyses are performed to explore the cross-sectional relations between the variables. In order to fully compare the effect of the variables, the standardized regression coefficients are reported (Table 3)¹⁶. Overall, the four-variable model performs relatively well. Except for the city of Regina, where smaller size could explain random variations of larger magnitude, the model accounts for at least two-thirds of the variance in passenger flows, with R squares, adjusted for the number of variables, exceeding 0,80 in four cases¹⁷. In all cases except one, the effect of population size is statistically significant, with coefficients systematically larger – indicating a clearer and stronger effect – in 1995 than in 1970. The signs of the coefficients of the variable « distance » are as expected (except in one case) and the magnitude of the coefficients is smaller in 1995 than in 1970, which can be interpreted as a decrease in the difficulty of overcoming distance, this being in itself an indication of overall continental integration. However, because the friction of distance does not exert a tremendous influence on air travel, many of the coefficients are not statistically significant.

Unexpectedly, « frontier » systematically has the strongest coefficient among the four variables in the twelve models. The coefficients of this variable are everywhere significant and, most surprisingly, they are stronger in 1995 compared to 1970, which would tend to suggest, counter to most of the accounts found in the literature, a stronger Canadian field of interaction in 1995. Turning now to the coefficients of the variable « axis », they are significant in nine cases out of twelve.

15. For a detailed account of the procedures associated with this type of variables, also « unintelligently » known as « dummy » variables, see Hardy (1993).

16. These are obtained by multiplying the « raw » regression coefficient of an independent variable x by the ratio of the standard deviation (or standard error) of x over the standard deviation (or standard error) of y , y being the dependent variable.

17. Graphical analyses indicate that residuals are randomly distributed and that the model is well designed, with no important variable absent, with proper transformation of the variables included and with minimal multicollinearity.

TABLE 3

Modeling Air Passenger Flows : Standardized Regression Coefficients

City	Population	Distance	Frontier	Axis	Adj. R ²
Calgary					
1970	0,387	-0,365	0,852	0,274	0,688
1995	0,575	-0,177*	0,947	0,265	0,669
Halifax					
1970	0,533	-0,196	0,934	0,281	0,853
1995	0,538	-0,048*	1,030	0,223	0,812
Montréal					
1970	0,708	-0,176*	0,930	0,291	0,766
1995	0,900	-0,079*	0,965	0,258	0,816
Regina					
1970	0,166*	-0,113*	0,825	-0,087*	0,569
1995	0,371	0,145*	0,838	0,255	0,380
Toronto					
1970	0,744	-0,289	0,899	-0,182*	0,707
1995	0,927	-0,076*	1,026	-0,157*	0,755
Vancouver					
1970	0,484	-0,166*	0,984	0,618	0,806
1995	0,667	-0,116*	1,034	0,456	0,714

* Non-significant at 0,05 (n = 25 in each of the 12 regressions).

SOURCE: Computed by author with air passenger flow data from Statistics Canada Annual Catalogs 51-204 and 51-205.

They tend to be higher for easternmost and westernmost cities and lower (even negative) for cities located further « inland », such as Toronto and Regina, although a larger sample of cities would have to be assembled to further test this hypothesis. In the four cases where they are significant at both dates, they are weaker in 1995, indicating weaker North-South fields of interaction. So, in summary, the cross-sectional analyses reveal that East-West and North-South fields of interaction exist even for air travel, a mode of transportation less limited than others by distance and routing constraints. But the behaviour of the standardized coefficients of the variable representing the East-West field is unexpected and requires further investigation.

One way of examining this question further is to compare the growth of the traffic among the six cities to the Canadian and American destinations (Table 4). In all cases, save that of Halifax, average growth is stronger towards American cities. Montréal shows the lowest performance, probably reflecting the economic difficulties experienced by the city during the period considered here. In the case of Calgary, often considered the most American of Canadian cities, growth is almost double. These results seem to contradict the coefficients of the variable « frontier »

in the cross-sectional regressions. It must be remembered, however, that they are based on gross figures, which do not take into account population growth.

Defining a diachronic regression model, with change in passenger flow between 1970 and 1995 as the dependent variable and change in population as one of the independent variables, the other three remaining the same, takes the investigation a step further (Table 5). This time, the R squares are generally lower than they were for the cross-sectional regressions, the model for Regina being completely non-significant in statistical terms. Population growth is a significant explanatory factor of flow growth in three cases only : Calgary, Montréal and Toronto. Distance is not significant except for Calgary where it has a positive influence on flow growth, the fastest growth taking place at more distant locations, as would be expected in a general process of territorial integration. The variable « axis » shows only one case, Vancouver, where the coefficient is significant and negative, indicating that flow growth has been larger with non-West Coast cities than with West Coast cities.

The surprise, however, in this diachronic model, is to find in five cases statistically significant *negative* coefficients associated with the variable « frontier ». In reality, this finding supports the general hypothesis of a major rotation in North American interaction fields. It was, rather, the behaviour of this variable in the cross-sectional models which was surprising. Why do the growth model and the cross-sectional models appear to yield opposite results ? First, it is worth mentioning that a previous but slightly different analysis, conducted some years ago, on flows for the years 1970 and 1985, had produced positive *non-standardized* regression coefficients associated with the variable « frontier » at both dates, with the coefficients *lower* in 1985 than in 1970, thus supporting the rotation hypothesis (VILLENEUVE, 1992). This apparent contradiction can be explained as follows.

In the analysis presented here, standardized regression coefficients have been used in order to validly compare the coefficients. Recall that standardization is obtained by multiplying the raw coefficient by the ratio of the standard deviation of the variable « frontier » to the standard deviation of the variable « passenger flow » (cross-sectional model). The categorical variable « frontier » has the same definition in 1970 and 1995, and the same standard deviation, currently 0,408, for every Canadian city. The standard deviation of « log passenger flow », say for Montréal in 1970, is 0,662. As the raw coefficient of « frontier » is 1,507, the standardized coefficient becomes $1,507(0,408 / 0,662) = 0,930$. In 1995, the standard deviation of « passenger flow » has decreased to 0,522 and the raw coefficient of « frontier » is 1,233, that is lower than in 1970 as expected from the rotation hypothesis. The 1995 standardized coefficient thus becomes $1,233(0,408 / 0,522) = 0,965$, higher than in 1970. A check on the other variables indicates that « frontier » is the only one for which standardization produces a reversal in the coefficients between the two dates. There is a substantive reason why the standard deviation of « passenger flow » is

TABLE 4

Growth of Air Passenger Traffic between 1970 and 1995

From :	To 5 other Canadian Cities	To 20 American Cities
Halifax	2,31*	1,83
Montréal	1,68	1,70
Toronto	2,40	2,53
Regina	1,98	2,21
Calgary	3,12	5,94
Vancouver	3,23	3,51

* Number of passengers in 1995 divided by number of passengers in 1970. Canadian and American cities are those listed in Table 2.

SOURCE : Same as for Tables 2 and 3.

TABLE 5

Modeling Change in Air Passenger Flows : Standardized Regression Coefficients

City	Population	Distance	Frontier	Axis	Adj. R ²
Calgary	0,495	0,485	-0,401	-0,312*	0,452
Halifax	0,282*	0,423*	-0,412	-0,282*	0,561
Montréal	0,710	-0,036*	-0,693	-0,323*	0,572
Regina	0,074*	0,157*	0,047*	0,183*	0,003
Toronto	0,603	-,259*	-0,372	0,153*	0,523
Vancouver	0,232*	0,148*	-0,545	-0,566	0,417

* Non-significant at 0,05.

SOURCE : Computed by author with data from same source as for Tables 2, 3 and 4.

lower in 1995 than in 1970. Table 2 which presents this variable for the case of Montréal reveals that large northeastern cities such as New York and Boston and the Latin American hub of Miami had large flows in 1970 but moderate increases, if not losses, between 1970 and 1995. On the other hand, cities of the Sun Belt such as Atlanta, Dallas and Houston had low flows in 1970 but experienced fast growth during the period. This convergence translates into a lower standard deviation in 1995. Thus, at the continental scale, it is the rise of the crescent extending from Atlanta to Los Angeles to Calgary and Vancouver which explains the statistical results obtained. The implication is clear. North American integration will proceed to a lesser and lesser degree under the domination of the Northeast.

At least three substantive conclusions can be drawn from this analysis of air travel data¹⁸. First, the evidence, overall, points to a weakening of the Canadian interaction field. Second, North-South fields are also weakening, so that what seems to be emerging is less direction-biased and, also, less distance-biased air travel. Third, although Montréal has experienced economic stagnation and some restructuring during the quarter century observed here, it behaved much like the other Canadian cities with regard to the influence of direction and distance on the evolution of air travel in North America.

Television Signals

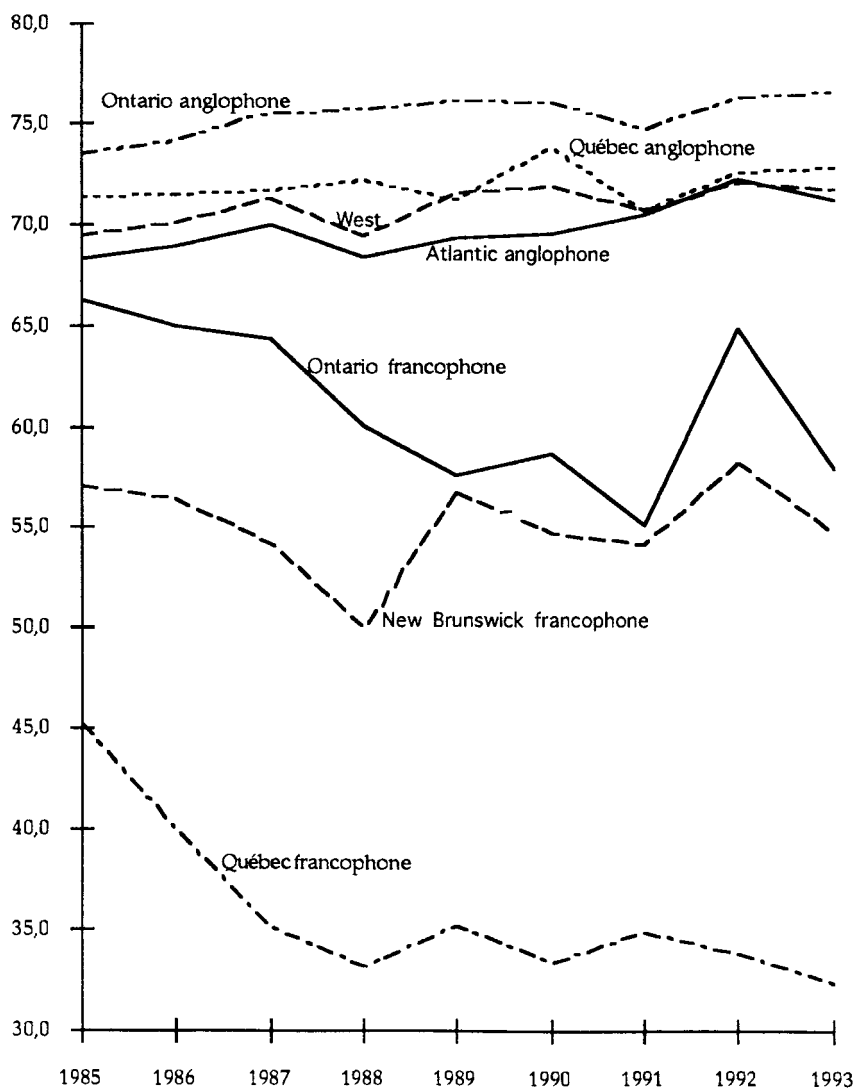
In addition to flows of goods and people, the transmission of messages constitutes a third type of spatial interaction, the analysis of which moves from the realm of transportation to that of communication. By most accounts, television is the key communication medium of the present technological epoch¹⁹. For instance, it obviously played a major role in the social and cultural transformations of the so-called Quiet Revolution in Québec (VILLENEUVE, 1975). A common culture, as well as group identity and group consciousness, are the result of shared memories and are more intensive within group transactions than within transactions conducted outside the group by its members. » Owing to language, Quebecers have long transacted much more among themselves than with others. This factor promoted early cultural homogeneity within a society, assuredly « distinct », but not large enough nor rich enough to generate much internal innovation. At the same time, however, it became sufficiently large to constitute a separate market for cultural goods borne by the electronic media.

The combination of two communication factors, language and electronic mass media, may have accelerated social change in Québec, during the 1950's and 1960's, by facilitating group consciousness, and also the diffusion of innovations within the group. A high proportion of Quebecers view the same television programmes, shows usually depicting their own way of living. Also, cultural homogeneity accounts for the fact that when a new product or a new idea is either produced locally or introduced into Québec's territory, it very often spreads much more rapidly than in other regions of Canada. How else could one interpret the dramatic reversal in birth control and contraceptive behaviour which brought Québec, in a short period of 15 years, from one of the highest to one of the lowest fertility rates among developed countries ? (CALDWELL, 1990.)

18. There is also a methodological conclusion : beware of standardized regression coefficients in diachronic analyses and interpret them only in the light of the standard deviations of the variables involved !

19. It is worth recalling here Harold Innis' work on communication techniques as a factor in cultural and political change, especially the relative efficiency of certain media to transfer information through time and space (Innis, 1950, 1954).

FIGURE 2

Percentage of Television Viewing Time of Foreign Programmes

Source: Statistics Canada, Culture Statistics, Television Viewing Time in Canada, Annual Catalog No. 87-208.

For innovations to spread across Québec's society, they first have to be introduced into the Province. Even though Québec lies within close proximity to the United States where newness – perhaps more than progress – is a prominent social value, the language barrier offers an obstacle much more formidable than the political frontier. There must be a sufficiently large number of bilingual individuals in the population to operate the intercultural transfer of innovations. This condition is met in Québec where the proportion of persons speaking both French and English has grown roughly from 25 to 35 % during the last half of this century, and where the dominant urban center, Montréal, is, virtually, a bilingual city²⁰.

One could argue that the continued development in Québec of a strong culture, which has something specific and original to contribute to the world²¹, depends to a great extent on Québec's capacity to interact sufficiently with the rest of America while maintaining a distinct cultural space, protected, if necessary, by appropriate legislation to facilitate growth in the number of French speakers and to provide support for endogenous cultural productions. Indications of the capacity to maintain a distinct cultural space in Québec can be gleaned from data on television viewing time. Figure 2 illustrates the evolution of the percentage of television viewing time of foreign – overwhelmingly American – programmes from 1985 to 1993. The effect of language is so clear that Statistics Canada reports the data separately, not only for Québec but also for Ontario and New Brunswick, where there are substantial French-speaking minorities. Not only do francophone Quebecers devote a much lower proportion of their television viewing time to American programmes, but this proportion decreased significantly between 1985 and 1993. Meanwhile, it has steadily increased in most parts of anglophone Canada, and has fluctuated a great deal in francophone Ontario and New Brunswick, as well as in anglophone Québec, probably reflecting both the smaller sizes of the samples for these three subgroups and the more ambivalent attitudes associated with minority status.

*

* *

20. Referring to Redfield and Singer's (1954) hypothesis about the cultural role of cities, I have attempted elsewhere an interpretation of the territorial dynamics of cultural change in Québec, in which Montréal, the international metropolis, engages in a dialectical relation with Quebec City, the « heritage city » (Villeneuve, 1981). Dean Louder (1996, pp. 31-46) has examined this same relationship in a comparative study of Salt Lake City and Quebec City.

21. A position which justifies the need for Québec's greater political autonomy on the basis of the contribution Québec's culture can make to global cultural diversity expresses a kind of nationalism quite different from the type of aggressive nationalism which can too easily degenerate into facism. See the discussion in CONLOGUE (1996).

At a time when much territorial turbulence is observed in the world, it is appropriate to monitor the various forms evidenced by the process of continental integration on going in North America. In particular, the relations between Québec and Canada are part and parcel of the integration process although much of the general attention is focused upon the relations between Canada as a whole, the United States, and now Mexico. The notion of spatial interaction is used above as a conceptual framework to think about these questions. The putative existence of direction-biased spatial interaction in North America, in the form of East-West and North-South fields, constitutes the historical background from which to consider recent tendencies. A limited empirical analysis of interaction trends indicates different tendencies depending on the substantive type of interaction considered. Surely, the analysis presented is too limited to help sort out answers to the question of the relationships between economic integration, political sovereignty and cultural homogenization. At most, the analysis suggests these few speculative comments.

With regard to commodity flows, exports from Québec to the United States are increasing somewhat faster than those from other regions of Canada, while those from Québec to the other provinces are diminishing in relative terms. This analysis, however, says nothing about the more specific geographical forms assumed by the expanding North-South trade. To more fully assess the spatial structuring taken by continental integration, especially with regard to directional interaction, it is necessary to document flows between *places* in Canada and *places* in the United States. This is possible with another type of interaction data, air passenger travel. The analysis of these data indicates a relative weakening of the Canadian East-West field between 1970 and 1995, accompanied by an increase in multidirectional, rather than specifically North-South, traffic between Canadian and American cities. Although one must not overinterpret such results, they may be indicative of a diffused form of continental integration, one in which travel shows little directional bias, one which could express a limited identification with the continent coexisting with relatively strong regional identities. A third set of interaction data, television viewing time of American programmes in regions of Canada, reinforces, at least in the case of Québec, the possibility of these coexisting identities, insofar as language can continue to guarantee Québec's distinctiveness. Of course, if the cultural integration of the rest of Canada with the United States continues apace, this could mean that the pressure on Québec to conform to anglophone North American cultural norms would augment. It is plausible that a more politically autonomous Québec would face that pressure better than a Québec still remaining an integral part of Canada. Why? Because Québec would be culturally more isolated within an Americanizing Canada, as it would also be within a Canada where anglophone cultural nationalism would become more assertive.

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