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Back to the Roots: Borders and Trade in Canada, 1933-39*

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Abstract
Initial (and many of the subsequent) estimates of the effect of national borders on trade are based on data for Canadian provinces for which information on current intra- and international trade volumes are readily available. In this paper, I extend this research by providing evidence on the historical pattern of Canadian trade. More specifically, I exploit data on trade between British Columbia and other Canadian provinces and foreign countries from 1933 through 1939. Applying a gravity model to control for standard determinants of trade, I find that crossing the Canadian border reduces trade by about the same magnitude as in contemporary trade.

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I. Introduction

About a decade ago, John McCallum (1995) presented an interesting empirical puzzle. Analyzing a new (and apparently unique) data set on the trade pattern of Canadian provinces, he found that trade within Canada is much more intense than trade that crosses the national border. More specifically, McCallum found that, in 1988, Canadian provinces traded about twenty times more with each other than with U.S. states of comparable size and distance. Since the Canada-U.S. border is widely believed to represent only a minor barrier to commercial exchange, this result suggests that the level of international trade integration is surprisingly low.

Subsequent work has extended the analysis along several lines and basically confirmed McCallum's observation of a substantial home bias in trade (though the estimates generally turn out to be somewhat lower).[1] For one thing, several studies find that borders strongly reduce trade also for other (seemingly) highly integrated territories in the world. Keith Head and Thierry Mayer (2000) and Nitsch (2000), for instance, analyze the trade pattern in the European Union and find that domestic trade is on average ten times larger than cross-border trade, after accounting for the effects of size and distance.

In another extension, James Anderson and Eric van Wincoop (2003) critically review the empirical framework underlying McCallum's (and others's) estimation results. Based on a regression specification that is derived from a formal trade model, they show that the estimated border effect is affected by a country's alternative trading opportunities. As a result, Anderson and van Wincoop argue, for instance, that small countries tend to exhibit a relatively large border effect. Yet, their theoretically consistent estimate for Canadian trade in 1993 still suggests a home bias of about factor 10 which is not very different from John Helliwell's (1998) baseline estimate of 12.0 for that year.

Perhaps the most convincing piece of evidence for the existence of large border effects, however, is provided by findings that the estimated border coefficients appear to be related to actual border barriers to trade. Studies that analyze the evolution of the home bias over time typically report a decline in the estimated border effect, a result that is consistent with the hypothesis of growing trade integration (e.g., due to a reduction of tariff barriers or a fall in transportation costs). Helliwell (1998), for instance, extends McCallum's sample to 1996 and reports a decline in the estimated border coefficient from 16.7 (based on revised data for 1988) to 11.8; he attributes this result to the effect of the 1989 Canada-U.S. free trade

[1] Throughout the paper, I use the terms "border effect" and "home (country) bias" in trade interchangeably.

agreement. Similarly, Nitsch (2000) documents a gradual decline in the average home bias in the European Union. According to his estimates, the border effect has dropped by almost one-half between 1979 and 1990, possibly reflecting ongoing efforts to (further) liberalize trade within the European Union and to form a single market. Other studies, using sectoral data, often find considerable variation in the estimated border effect across product categories, with larger estimates for products that face larger barriers to trade. Helliwell (1998), for instance, reports larger home bias estimates for trade in services than for goods. Natalie Chen (2004) succeeds in relating the product-specific estimates to technical barriers to trade and information costs. Based on this evidence, Lionel Fontagné, Mayer and Soledad Zignago (2005) have recently applied a border effects approach to measure the level of international integration between the United States, Japan, and the European Union.

In this paper, I provide a new, historical perspective on the home country bias in trade. In particular, I examine the evolution of the estimated home bias in trade over a period of more than 70 years. I do so mainly by analyzing a previously unexplored data set on the trade pattern of the Canadian province of British Columbia for the period from 1933 through 1939. The use of historical trade data from Canada, one of the few countries in the world that also provide actual statistics on intra-national trade flows, allows comparing directly historical results to current patterns of trade.

Previewing the main results, I find no measurable change in the estimated home bias of British Columbia over time; the estimated border coefficients for the 1930s and the 1990s are remarkably similar. This result allows discriminating between some of the recently proposed explanations for the existence of large border effects. It strongly questions, for instance, the hypothesis that the observed home country bias in trade is mainly the result of border barriers. Since the level of international trade integration is widely believed to have risen over the past 70 years (and trade costs that reduce cross-border transactions have fallen sizably), border-related trade barriers generally fail to explain why the bias towards shipping goods domestically has remained stable over time. Explanations for disproportionately large volumes of intranational trade that are based on less time-variant factors (such as more efficient local networks), in contrast, seem to be consistent with the finding of an unchanged home bias.

The remainder of the paper is organized as follows. In the next section, I briefly review the relevant literature. Section 3 describes the data and the empirical methodology, followed by a presentation of the results. Section 5 provides a short conclusion.

II. Literature Review

Puzzled by McCallum's (1995) finding, a (by now) large literature has examined the home country bias in trade. Broadly, four lines of research can be distinguished. A first group of papers basically follows McCallum's original approach and explores data from Statistics Canada. Michael Anderson and Stephen Smith (1999) enlarge the sample of destination countries. Teresa Cyrus (1998) and Helliwell (1998) provide results derived from sectoral data; Helliwell (1998) extends the analyzed time period. Most recently, Canada's provincial trade data has been increasingly used to match it to other (e.g., industry) data, such as in Kei-Mu Yi (2003).

Another line of research was initiated by Shang-Jin Wei (1996). Lacking the necessary information on the pattern of trade within countries, he proposes ingenious methods to derive the missing data. However, Wei's ad hoc approach of estimating the countries' total volume of intranational trade and the average distance that is travelled often raises a number of problems; see, for instance, the discussion in Nitsch (2000).

A third set of papers successfully searched for new data sets on intra-national trade flows, allowing a replication of McCallum's analysis for other countries. Examples include Holger Wolf's (2000) analysis of the Commodity Flow Survey on trade between U.S. states or Pierre-Philippe Combes, Miren Lafourcade, and Mayer (2005) on trade between French departments. Some studies also examine intranational trade data that became available for only a short period of time, mainly due to political integration. Nitsch (2004), for example, examines intra-German trade after reunification; Nikolaus Wolf (2005) explores the trade pattern within Poland after the formation of the Polish nation state.

Finally, a growing number of papers aim to provide an explanation for the observed home bias in trade. While taking different routes, these papers generally seem to suggest that home bias estimates do not reflect artificial barriers to trade. Maurice Obstfeld and Kenneth Rogoff (2001) emphasize the role of trade costs. Russell Hillberry (2002), in an interesting study on industry-level border effects, notes the importance of aggregation bias. Carolyn Evans (2003) argues that part of the border effect can be explained by the large substitutability between domestic products and imports. Anderson and van Wincoop (2003) claim to have solved the "border puzzle" by providing a theory-grounded regression.

This paper provides a completely different approach. I exploit a previously unexplored historical data set on intranational trade that allows examining the evolution of the home country bias in trade over a long period of time. The data set that is employed has at least two advantages. First, it provides direct information on trade flows within a country so that it

avoids the shortcomings of other approaches that apply indirect methods to compile the volume of intranational trade. Second, since the data set covers trade of British Columbia with other Canadian provinces, the data set effectively covers a subset of McCallum's (1995) original country sample, allowing a direct comparison of historical estimates to results derived from contemporary trade.

III. Methodology and Data

To identify the border effect on trade, McCallum (1995) applies a very simple version of the gravity model. In particular, he estimates a cross-country equation of the form:

$$(1) \qquad \ln(X_{ij}) = \alpha + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(Dist_{ij}) + \gamma \, Border + \varepsilon_{ij}$$

where X_{ij} denotes exports from i to j, Y denotes GDP, Dist is bilateral distance, and Border is a binary dummy variable that takes the value of one if i and j are located in the same country (that is, Canada). The coefficient of interest is γ; this coefficient captures the extent to which trade between Canadian provinces deviates from trade that crosses the national border.
As convincingly argued by Anderson and van Wincoop (2003), this simple specification of the gravity model may give biased (or, more precisely, exaggerated) results. In particular, Anderson and van Wincoop emphasize that in assessing a country pair's bilateral trade relationship the countries' alternative trading opportunities have to be taken into account. Taking gravity theory seriously, they implicitly solve for price differences across countries and show that the resulting theory-consistent border effect estimate is considerably smaller (though still not negligible).

For my purposes, however, McCallum's gravity framework may still provide a useful benchmark specification. For one thing, features in the design and the construction of the historical data set at hand do not allow the use of other estimation strategies (such as fixed effects).[2] With only one source territory, British Columbia, destination fixed effects would soak up all destination-specific variation in trade, including the effect of the Canadian border on trade. Fortunately, the omission of Anderson and van Wincoop's price terms should also not provide a serious problem, since I am not (mainly) interested in the absolute magnitude of the estimated border effect, but rather its evolution over time. To the extent that the estimated

[2] Robert Feenstra (2004) argues that a fixed-effects approach is a useful alternative to Anderson and van Wincoop's (2003) approach. While computationally much less demanding, the fixed-effects method provides unbiased estimates of the average border effect.

border effect for British Columbia is affected by (omitted) time-invariant relative prices, this effect is constant over time.

The key contribution of this paper then is the use of a previously unexplored data set of intra- and international goods shipments. In particular, I make use of historical trade data for the Canadian province of British Columbia. This data was first compiled for the year 1934 by the Economic Council of British Columbia; it was published in the Council's 1936 report on The Trade of British Columbia with other Canadian Provinces and with Foreign Countries, a report that was then published on an almost yearly basis until 1940. Since each of these reports contains data for a single year as well as (revised) figures for the previous year, the first yearbook also contains some (incomplete) benchmark figures for 1933. In total, there are six reports, covering the period from 1933 through 1939.[3]

The reports provide detailed information on the exports and imports of British Columbia by country and by commodity. The unit of measurement is typically the value of the shipments in current Canadian dollars; for some commodities also quantities are given (such as tons or numbers). In the empirical analysis, I use exclusively trade values.

All shipments are listed at a highly disaggregated product level. For instance, the list of British Columbia's imports from the United States in 1939 consists of about 1,500 separate product lines. However, making use of this massive amount of (raw) data seems an insurmountable task. Therefore, I analyze two subsets of the available aggregate trade data, provided in the summary tables of each yearbook. In a first exercise, I follow conventional practice and examine total (aggregate) shipments by destination; this sample covers all countries. In another exercise, I aim to make use of trade data at product level and examine trade in various product groups (industries) for a few of British Columbia's major trading partners.

[3] More years of data or data from other sources do not seem to be available. The preface to the first issue (1936, p. i) states: "At the present time detailed external trade statistics in Canada are available only for the Dominion as a whole, and internal trade statistics are in the main not available. In consequence, relatively little information exists about the foreign trade of the individual provinces or about the trade between provinces. In an endeavour to meet the absence of statistics on these points, this report attempts to provide a comprehensive statement of the external and inter-provincial trade of the Province of British Columbia in the year 1934." The 1939 issue notes: "In this report the Bureau of Economics and Statistics presents a final estimate of the trade of British Columbia with other Provinces and with Foreign Countries during the calendar year 1939."

The most notable feature of this data set, however, is that it contains information on British Columbia's trade with the rest of Canada.[4] Shipments to other Canadian provinces are typically reported as an aggregate to Eastern Canada (comprising the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario) and the Prairie provinces (Alberta, Saskatchewan, Manitoba).[5] Separate data are available for Newfoundland, which was not a part of Canada until 1949. Figure 1 provides a map of Canada in 1927.

While regional aggregates (instead of provincial figures) reduce the number of available observations, this lack of detail is of minor importance; it is easily possible to perform an identical aggregation for current (provincial) data. I follow a similar strategy in the case of the United States for which, again in contrast to McCallum's original set-up, only a single national trade figure (instead of trade data for individual U.S. states) is available.[6] In constructing the regional aggregates, I deal with the problem of computing the average trade distance from and to British Columbia by compiling the population-weighted midpoint of the territory in question based on provincial or state population data and the geographic location of provincial or state capitals.[7]

Other data are compiled from a number of different (standard) sources. Current trade data are obtained from Industry Canada and BC Stats, the central statistical agency of the Province of British Columbia. GDP and population data are taken from Angus Maddison's (2003) The World Economy: Historical Statistics. Distance is calculated as the great circle distance between Vancouver and the geographic center of the territory as reported in the CIA's World Factbook. A data appendix describes in detail the sources and the list of the variables used.

IV. Results

4.1 Descriptive statistics

Tables 1 and 2 describe the historical trade data in more detail. Table 1 lists British Columbia's main trading partners (separately for exports and imports) for three different years: 1933, 1936, and 1939. As shown, British Columbia's external shipments at that time

[4] The shipments data do not include transit shipments, i.e. exports or imports of other Canadian provinces through (the ports of) British Columbia.
[5] For some years, also shipments to Yukon Territory are available.
[6] Separate data are available for the trade of British Columbia with Alaska and Hawaii.
[7] For an illustration of the center of population in the United States by decade, see Figure 1.1 of the U.S. Census Bureau's 2008 Statistical Abstract (available at http://www.census.gov/prod/2007pubs/08abstract/pop.pdf).

are split almost equally between three markets, the United Kingdom, the rest of Canada, and the United States. Each of these markets absorbs about one-quarter of British Columbia's exports. Other major export destinations are Japan, Australia and China. For imports, British Columbia heavily relies on shipments from other Canadian provinces, though the importance of the United States as a supplier increases rapidly. The share of British Columbia's imports from the rest of Canada declines from about 70 percent in 1933 to about 55 percent in 1939, while the share of the U.S. almost doubles to about 28 percent.[8] Figure 2 illustrates that, in the 1930s, British Columbia had a trade deficit with the rest of Canada and a trade surplus vis-à-vis foreign countries.

Table 2 presents the commodity structure of exports from British Columbia. Trade shares are reported separately for shipments to Canadian provinces and to foreign countries. In general, the export structure does not vary dramatically across national and international destinations. Main export products of British Columbia are forestry products and minerals; these two product groups comprise about 70 percent of British Columbia's total exports.[9] At a more disaggregated level, however, there are some striking differences in the commodity composition of trade. Most notably, the largest single export commodity to other Canadian provinces is gold, making up, for instance, about one-half of British Columbia's shipments to Eastern Canada. In the empirical analysis, I deal with these differences in the commodity structure of trade in a variety of ways, ranging from the exclusion of gold to industry-specific regressions and the inclusion of commodity fixed effects.[10]

4.2 Benchmark results

I next compare intra-Canadian trade to international trade, after controlling for other determinants of bilateral trade. In particular, I follow McCallum's (1995) gravity approach and estimate (an augmented version of) equation (1).[11]

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[8] Appendix Table 1 describes the geographical pattern of British Columbia's international trade in comparison to Canadian external trade. Appendix Table 2 provides analogues for the sectoral composition of trade, showing that British Columbia's exports continue to be dominated by primary commodities.

[9] Not surprisingly, (perishable) agricultural products make up a considerably larger share of shipments to the rest of Canada than to the rest of the world.

[10] In 1939, for instance, exports of gold to foreign countries are unreported due to the War Time Measures Act.

[11] In contrast to McCallum's set-up, my sample comprises countries (not U.S. states) as export destinations. Therefore, I include, in addition to McCallum's set of regressors, controls for per capita income and common language (as is standard in empirical applications of the gravity model); see, for instance, Eichengreen and Irwin (1995). However, none of these extensions has a measurable effect on the key findings.

The benchmark regression results are reported in Table 3. The table presents the coefficient estimates derived from year-specific OLS regressions for the period from 1933 through 1939. As is standard in the literature, the gravity model fits the data well, explaining about 60 percent of the variation in (the log of) exports. The coefficients for the traditional gravity determinants have the expected sign and are often statistically highly significant, except for distance which is negative (as usual) but insignificant. This result implies that British Columbia's exports appear to be quite insensitive to distance; a result that invites further analysis.[12]

Turning to the variable of interest, the border dummy is positive and in most cases statistically significant. While the magnitude of the coefficient varies sizably across individual years, the average value of about 4.0 indicates that British Columbia's shipments to other Canadian provinces exceed trade with foreign countries by about factor 55, holding other things constant. A similar result is obtained from a pooled OLS regression; estimation results are tabulated in Table 4. In the following, I use this (period average) estimate as benchmark for various checks.

While the estimated border effect of about factor 55 for British Columbia in the 1930s is an interesting finding in itself, I am not mainly interested in the absolute magnitude of the effect of the Canadian border on British Columbia's trade but rather its change over time. Therefore, to explore the evolution of the home bias over a period of 70 years, Tables 5 and 6 present (exactly) analogous estimates for the contemporary time.[13] Since the number of countries in the world has increased and more data for the control variables (especially on GDP) have become available, the sample size is larger (comprising more than 100 destinations instead of about 30 for the 1930s).[14] Also, the fit of the regression has improved.

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[12] It is reassuring to note that Cletus Coughlin (2004) reports similar findings for U.S. states. Analyzing the geographical pattern of U.S. trade, he finds a positive distance coefficient for six of the 51 U.S. states, including the three states located close to British Columbia: Alaska, Oregon and Washington. (The other states are Hawaii, Louisiana and New Mexico.)

[13] In this respect, McCallum (1995) may only provide a useful benchmark estimate. A direct comparison of the estimated coefficients is not feasible since McCallum's estimates refer to Canada-U.S. trade only; are drawn from trade on a finer geographical grid (that is, trade between provinces and states); and refer to the Canadian average, while other results suggest that there are sizable differences in the home bias across individual Canadian provinces. According to Helliwell's (1998) estimates, for instance, the provincial border effects range from factor 7.5 for Newfoundland to 28.0 for Nova Scotia (all results for 1988). With an estimate of 9.3, British Columbia is on the low end of the spectrum, being somewhat less focused on the Canadian market than the rest of Canada.

[14] Already in the 1930s, British Columbia was shipping to all parts of the world. Trade data is reported on average to about 55 territories. Still, the increase in the number of trade

Still, the coefficient on (the log of) distance is insignificantly different from zero (in single-year regressions). Most importantly, however, the coefficient on the border dummy appears to be only moderately smaller than the estimate for the 1930s. With an average value of about 3.6 (partly resulting from particularly low values of the estimated coefficient in the last two years of the sample period), the coefficient indicates a home bias of about factor 36. Without taking these baseline estimates too literally, it seems clear that the decline in the home bias (by less than one-half) is surprisingly small, given the dramatic fall in trade barriers and transportation costs over this period of more than six decades. For comparison, the estimates in Helliwell (1998, Tables 2-1 and 2-2) suggest a decline in the border effect (for Canadian provinces) from factor 20.7 in 1988 to 11.4 in 1994, a reduction by 45 percent after a period of only six years.

4.3 Sensitivity analysis

In a next step, I check the sensitivity of the results to a number of perturbations. These checks aim to confirm that the key results do not depend on the exact way the gravity equation is specified or estimated. Table 7 explores the robustness of the results for the 1930s; Table 8 repeats most of these checks for the 1990s. Again, I use the pooled data sets for individual periods (with year controls). To economize on space, the tables report only the coefficient of interest.

I begin by examining the sub-sample stability of the estimated coefficients. As shown, splitting the sample over time has little effect on the results. There is (if anything) a minor decline in the estimated border effect in both periods, confirming the results from regressions for individual years. Also, using a constant country sample leaves the coefficient estimates basically unaffected. For instance, I merge country data into eleven regional groupings to correct for the growth over time in the number of countries trading with British Columbia, without much effect.[15]

Next, I modify the regression specification. When I drop per capita income, which is an atheoretic (but frequently used) control variable in gravity regressions, the difference between the estimated border effects in the 1930s and 1990s is slightly widened. Still, the estimated coefficients turn out to be broadly robust. In contrast, results change sizably when

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destinations can be interpreted as growth in trade along the extensive margin, providing some evidence of falling international trade costs.

[15] The groupings are: Canada-Prairie; Canada-Eastern; United States; Central America & Caribbean; South America; United Kingdom; Other Europe; North Africa & Mediterranean; Africa; Asia; Australia & Oceania.

Poisson estimation (instead of OLS) is used, as suggested by Santos Silva and Tenreyro (2007). For both periods, the estimated border coefficient decreases in magnitude. However, the decline in coefficient size is much larger for the 1990s than for the 1930s. As a result, the estimates become of virtually identical magnitude, suggesting that the border effect is unchanged over time.

Similarly, there are other modifications in the regression set-up (apart from using alternative estimation methods) that have large effects on the estimation results. In a first experiment, I exclude gold from the regression due to its special commodity status (and possible distortions in gold trade due to trade restrictions). With this modification, the estimated border effect is reduced sizably. With a value of 3.46, the coefficient even falls below the pooled estimation result for the 1990s.

In another extension, I find that the estimated coefficients are highly sensitive to the treatment of Newfoundland which officially joined the Canadian Confederation only in 1949.[16] When Newfoundland is dropped from the sample or reclassified as part of Canada, the border coefficient for the earlier period falls considerably. In fact, with a value of about 3.55 (for the regression specification where Newfoundland is dropped from the sample), the coefficient is of about exactly the same magnitude for the 1930s as for the 1990s. Alternatively, when Newfoundland is added as a separate observation to the sample in the 1990s (in addition to the aggregates of Eastern Canada and the Prairie provinces), the border effects coefficient for this period jumps to 3.85, close to the baseline coefficient for the 1930s.[17]

A different set of results is obtained when I replace exports as the dependent variable. Instead of shipments from British Columbia, I also use imports and total trade (the sum of exports and imports) as regressand. In line with the descriptive analysis above, there is a notable discrepancy in the estimated import and export border effects. Initially, British Columbia appears to rely heavily on supplies from the rest of Canada; the home bias for

[16] As an island isolated from mainland Canada and closer in distance to Britain than to British Columbia, Newfoundland remained a British colony. After World War II, Newfoundlanders voted in a referendum on three geopolitical options: self-government, British dependence, or joining Canada. Newfoundland entered the Confederation as the tenth province on March 31, 1949. Malcolm Macleod (1994, p. 26), however, argues that "[c]onfederation when it came was […] no sudden, postwar phenomenon. Since the late 1800s Newfoundland has been going through a process whereby it accepted, and promoted, the pull of continental connections." There has been a long history of strong economic, political and social linkages, including the use of a common currency (after the bank crash of 1894).

[17] A possible explanation for this finding is the small economic size of Newfoundland, making trade of British Columbia with this territory highly unlikely. British Columbia's shipments to Newfoundland in the 1930s mainly comprised apples.

imports is much larger than for exports in the 1930s. This finding, however, disappears over time. For contemporary data, the estimated home bias for imports is smaller than for exports.[18, 19]

Finally, instead of modifying the baseline specification, I explore historical trade data disaggregated by industry. As noted earlier, the Council yearbooks also provide summary information on shipments by industry classification to a few major export destinations. The industry categories available are agricultural products, fishery products, forestry products, fibre and textile products (available for 1939 only), iron and its products (beginning in 1935), mineral products (splitted into non-ferrous metals and non-metallic minerals in 1939), and chemical products (beginning in 1936). The trading partners for which these disaggregated data are tabulated are the Prairie provinces and Eastern Canada for internal trade, and the United Kingdom, the United States, Australia, China, Japan, Belgium (1936-38), and British South Africa (1939) for external trade. As shown in Table 9, the industry-level results are even weaker than for aggregate trade. The estimated coefficient on the border dummy, while positive and economically still relevant ($\exp[1.1] \approx 3.0$), is statistically indifferent from zero. In unreported results, I also experiment with data for industry subgroups (such as dairy products, canned salmon, or logs); however, the gravity estimates vary wildly and are mostly unreliable.

In sum, comparing British Columbia's trade pattern in the 1930s and the 1990s, I find no measurable difference in the estimated home bias. The results suggest that the home bias has remained basically unchanged over the last 70 years.

4.4 Discussion

The finding that the effect of crossing the border on trade is largely identical for periods for which it is safe to assume that there have been large differences in international transaction costs offers some interesting insights about possible explanations for the large

[18] Helliwell (1998) reports also for current data that British Columbia has a significantly larger home bias for imports than for exports. As shown in Table 8, this result depends on the sample of trading partners. If I use McCallum's original sample of Canadian provinces and U.S. states, Helliwell's finding of a larger home bias for imports is confirmed.

[19] Taken at face value, the coefficient estimates suggest a sizable decline in home bias for imports. It should be noted, however, that imports data are much less reliable than data for exports. For historical data, the preface to the first issue of the yearbook (1936, p. i) states: "Considered as a whole, the report probably appears at its best in the treatment of exports to foreign countries, since in this respect the data is generally available. Exports to other Provinces are reasonably complete, but it is likely that exports to the Prairie Provinces are somewhat larger than recorded here. Imports, on the whole, are sufficient to show the characteristics of the trade, particularly with foreign countries." For contemporary data, no commodity detail of imports is available.

observed border effects. Provided that the estimated border effect is not an illusion due to misspecification (as argued by Anderson and van Wincoop [2003]) or measurement error (as argued by Hillberry and Hummels [2008]), a disproportionately large volume of domestic trade (relative to international trade) could, in principle, either reflect large cross-border trade costs that limit international transactions or factors that make trade within a country relatively more attractive such as preferences for national and local goods or more efficient distribution networks. Since one would expect that both of these factors have become weaker over time, the stability in the estimated home bias is generally striking.[20] Still, the (non-)result allows discriminating between various hypotheses explaining border effects in trade.

In principle, there are three (non-exclusive) sets of explanations for the identical degree of home bias across the two analyzed time periods. First, the estimated coefficients are mainly similar by coincidence, masking considerable variation in the border effect between the two periods. Second, the border effect has remained more or less stable, but the factors determining the border effect have varied over time, largely replacing each other. Third, the border effect arises from time-invariant factors. In the following, I briefly discuss each of these options and their implications.[21]

The simplest possible explanation for the identical degree of home bias across the two analyzed time periods is that the coefficients are mainly similar by coincidence. Perhaps, the factor(s) determining the home bias have not consistently fallen over time and initially worked in the opposite direction; that is, the home bias of British Columbia may have increased after the first period that is examined (with the gradual evolution of a Canadian national economy, making intra-national trade relatively more attractive) and then fallen back again (with external trade liberalization). In fact, one could question whether, in the 1930s, Canada already had a fully functioning national market. At that time, Canada was in existence

[20] Tariffs have been removed, and trade barriers were lowered. Similarly, consumption patterns have shifted towards international goods, and increasing activities of multinational firms should have reduced the (relative) attractiveness of intra-national trade.

[21] A potential issue is the use of trade data from the interwar period, shortly after the Great Depression and in the run-up to World War II. However, there appears to be little reason to question the results. The implosion of world trade in the early 1930s, if anything, should have increased the estimated home bias so that the finding of a similar border effect in the 1990s becomes even more striking. More importantly, Eichengreen and Irwin (1995) show that gravity models of interwar trade yield coefficients of standard magnitude, though the key determinants of bilateral trade flows (such as national incomes) have a slightly diminished influence in the 1930s. At a more detailed level, Canada's external trade at that time may have been affected by various policy initiatives, including the strengthening of tariff preferences within the British Commonwealth after the Ottawa Agreements of 1932, the introduction of the Smoot-Hawley Tariff of 1930 in the United States, and the subsequent reduction of import duties under the Reciprocal Trade Agreements Act of 1934.

for just about 65 years, having been formed as a federal union of British North American colonies in 1867. Moreover, participation in the union was not mainly driven by national identity. For instance, a first attempt for the union of Ontario and Quebec in 1840 had failed because of cultural differences between the French and the English. Also, when another attempt for unification was made in the mid-1860s, partly because of external threat from the United States[22], the British government had a strong influence on the decision of the Atlantic provinces, encouraging New Brunswick and forcing Nova Scotia to join; Prince Edward Island remained out until 1873. In any case, as each colony became a province of the newly-formed confederation, each province retained a large degree of autonomy. Moreover, the territory of interest, British Columbia, was not a founding member of the union, but joined Canada as sixth province in 1871.[23]

Despite the short history of the Dominion and the late entry of British Columbia, however, a number of arguments suggest that Canada was an already well-integrated economy in the 1930s.

For one thing, there is strong evidence of an existing national Canadian identity in the 1930s. The latest symbols of national pride erected at that time include the establishment of a national central bank, the Bank of Canada, in 1935; the founding of TransCanada airlines (the forerunner of Air Canada) in 1937; and the creation of the Canadian Broadcasting Corporation (CBC) in 1932. In addition, the 1931 Statute of Westminster established formal legislative independence of the self-governing dominions of the British Empire (including Canada) from Britain, thereby providing Canada a large degree of political independence. Michael Bordo and Angela Redish (2005, p. 4) conclude that "[t]he 1930s generally were a decade of assertive nationalism".

For another, the national expansion and unification of Canada was typically accompanied by various federal concessions and bargains (such as debt settlement arrangements and federal subsidies); these concessions often included federal support for the development of a national transportation infrastructure. Most notably, when British Columbia joined Canada in 1871, the federal government agreed to construct a transnational railroad within the next 10 years; the Canadian Pacific Railway (CPR) was finally completed in

[22] John Saywell (1999), for instance, notes that Charles Sumner, chairman of the U.S. Senate Foreign Relations Committee, was a prominent advocate of the annexation of British North America.

[23] For a more detailed description of the formation of Canada, see Donald Creighton (1999) and John Saywell (1999).

1885.[24] In sum, there is little reason to assume that national economic integration in Canada has led to a substantial increase in home country bias after the 1930s; technological innovations in transport and communication should have reduced both internal and external trade costs alike.[25]

If there is no clear indication of large (offsetting) changes in the border effect between the two analyzed periods, the factors from which the border effect arises could have varied over time. For instance, the fall in border-related trade costs has been widely documented; tariffs and non-tariff barriers have been reduced sizably over the 70-year period, a factor that should have lowered the national border effect. Still, the border effect could be identical for the two analyzed periods if the fading effect of trade barriers has been replaced by other factors that inhibit international trade such as a growing preference for domestic goods (e.g., due to a larger differentiation of goods). In this case, border barriers may have explained the border effect in the past, but have much less relevance for contemporary trade.

A third explanation for the finding of a stable home country bias in British Columbia's trade is that also the factors responsible for disproportionately large volumes of intranational trade have remained largely stable. An example of why local trade might still be important, even at a time when transaction costs have fallen, is provided by recent research on the role of networks in trade; the literature is summarized in James Rauch (2001). Most notably, empirical evidence appears to be particularly strong for networks based on a common ethnic background. An implication is that time-variant factors such as border barriers have generally little effect on the home bias in trade.

V. Conclusion

This paper adds to the (by now) large literature on the border effect in trade. Its main contribution is empirical. It applies standard (gravity) techniques to examine a previously unexplored data set on trade flows within a country; the data set covers shipments of British Columbia to other Canadian provinces and foreign countries in the 1930s. Yet the contribution of the paper goes much beyond adding some further evidence on the extent of the home bias in trade. By analyzing the trade pattern of a Canadian province in the 1930s, it allows a direct comparison of these trade relationships with contemporary patterns of trade.

[24] Paul Thomas (2001) provides a more detailed discussion of the history of British Columbia.
[25] It should be noted, however, that highways connecting large cities were just getting developed in the 1930s; the Trans-Canada highway was completed only in 1962. Since it is reasonable to assume that the highway system, which has greatly lowered the costs of trucking, has been more important for intra-Canadian trade than for international trade, this factor should have raised the border effect. I am grateful to the referees for making this point.

More specifically, it allows examining the evolution of the border effect in trade over a period of more than 70 years. Thereby, the paper offers a completely new, historical perspective on the effect of national borders on trade.

The evidence that I present provides little support for the hypothesis that the (surprisingly large) border effect in trade is mainly the result of border barriers. I find that in both examined periods, the 1930s and the 1990s, the observed border effect in British Columbia's trade is of about the same magnitude (of about factor 33). In view of the dramatic decline in international transaction costs in the post-war period, this stability in the estimated bias to ship goods domestically rather than internationally appears surprising. However, the unchanged home bias in trade can be plausibly explained by (ongoing) strong preferences for local goods or the existence of more efficient national distribution systems.

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Table 1: British Columbia's main trading partners, 1933-39

Exports

	1933		1936		1939	
Country	**%**	**Rank**	**%**	**Rank**	**%**	**Rank**
United Kingdom	24.1	1	26.6	1	28.9	1
Rest of Canada	21.8	2	24.6	3	25.9	2
Eastern Provinces	*12.4*		*15.8*		*17.1*	
Prairie Provinces	*9.4*		*8.8*		*8.7*	
United States	17.8	3	25.5	2	24.4	3
Japan	12.1	4	8.5	4	5.6	5
Australia	6.0	5	5.0	5	5.7	4
China	5.2	6	2.3	6	0.8	8
France	1.8	7	0.8	9		
Argentina	1.5	8				
South Africa	1.3	9	1.3	7	1.6	6
Hawaii	1.0	10	0.7	10	1.0	7
Belgium			0.8	8		
New Zealand					0.6	9
Germany					0.5	10
Total (in thousands of dollars)	**50,564**		**130,043**		**151,233**	

Imports

	1933		1936		1939	
Country	**%**	**Rank**	**%**	**Rank**	**%**	**Rank**
Rest of Canada	69.4	1	66.5	1	55.5	1
Eastern Provinces	*57.7*		*54.9*		*44.0*	
Prairie Provinces	*11.6*		*11.5*		*11.5*	
United States	14.0	2	11.2	2	27.6	2
United Kingdom	4.6	3	9.1	3	7.6	3
Fiji	3.0	4	2.4	4	2.2	4
India	2.6	5			1.2	5
Ceylon	1.3	6				
West Indies	0.9	7	0.9	8		
Australia	0.7	8	0.6	10	0.6	7
Japan	0.5	9	1.1	5	1.0	6
China	0.3	10	1.0	6	0.5	9
Argentina			0.9	7		
Philippines			0.8	9		
Hong Kong					0.5	8
Belgium					0.3	10
Total (in thousands of dollars)	**76,074**		**130,043**		**151,233**	

Notes: The table reports for the ten largest trading partners of British Columbia the share in British Columbia's total trade and the rank.

Table 2: Commodity structure of British Columbia's trade, 1934-39

Exports

	1934		1936		1939	
Commodity	**Rest of World**	**Rest of Canada**	**Rest of World**	**Rest of Canada**	**Rest of World**	**Rest of Canada**
Agricultural products	5.0	19.0	4.5	21.9	7.1	18.8
Apples	*3.8*	*5.4*	*2.5*	*4.7*	*2.8*	*3.6*
Fishery products	13.0	9.7	9.7	14.6	11.8	11.8
Canned salmon	*9.9*	*9.6*	*7.0*	*14.5*	*7.6*	*10.9*
Fibre and textile products					0.3	0.0
Forestry products	46.4	30.0	51.0	27.1	51.7	26.8
Lumber	*20.3*	*23.6*	*22.7*	*18.0*		
Pulp and paper	*17.3*	*4.4*	*13.9*	*3.5*		
Planks and boards					*23.9*	*18.2*
Iron and its products			0.5	0.0	0.4	0.0
Mineral products	35.5	27.2	32.3	35.5	24.8	41.1
Gold	*0.0*	*25.9*	*7.4*	*34.7*	*0.0*	*40.5*
Lead and zinc	*18.1*	*0.0*	*18.5*	*0.0*	*14.5*	*0.0*
Chemical products			2.0	0.9	3.6	1.5

Imports

Aggregated product line data not available.

Notes: The table reports for each of the two territories (external and internal trade) the share of the industry in British Columbia's trade.

Table 3: Benchmark results, 1933-39

Year	**1933**	**1934**	**1935**	**1936**	**1937**	**1938**	**1939**
Border dummy	4.531* (1.996)	3.896# (2.136)	3.549# (2.000)	3.523# (1.929)	3.915# (1.996)	5.592** (1.788)	3.361# (1.924)
Distance	0.184 (0.999)	-0.180 (1.088)	-0.356 (1.030)	-0.109 (0.997)	-0.184 (1.022)	0.909 (0.905)	0.223 (0.947)
GDP	1.438** (0.231)	1.399** (0.252)	1.294** (0.209)	1.109** (0.196)	1.290** (0.203)	1.322** (0.183)	1.078** (0.195)
GDP per capita	1.158* (0.551)	0.372 (0.569)	0.611 (0.530)	0.327 (0.513)	0.637 (0.510)	1.029* (0.461)	0.906# (0.518)
Common language	1.751* (0.747)	2.714** (0.801)	2.595** (0.764)	2.627** (0.738)	1.597* (0.752)	1.286# (0.687)	2.624** (0.726)
# obs.	29	30	30	33	31	32	40
Adj. R^2	0.65	0.61	0.61	0.57	0.58	0.66	0.62

Notes: OLS estimation. Dependent variable is the log of exports. Standard errors are in parentheses. **, *, and # denote significant at the 1, 5, and 10 percent level, respectively.

Table 4: Pooled results, 1933-39

Period	**1933-39**
Border dummy	3.967** (0.701)
Distance	-0.012 (0.355)
GDP	1.262** (0.073)
GDP per capita	0.690** (0.184)
Common language	2.177** (0.268)
Year effects?	Yes
# obs.	225
R^2	0.65

Notes: OLS estimation. Dependent variable is the log of exports. Standard errors are in parentheses. **, *, and # denote significant at the 1, 5, and 10 percent level, respectively.

Table 5: Benchmark results, 1992-2001

Year	1992	1993	1994	1995	1996	1997	1998
Border dummy	3.494* (1.402)	3.232# (1.694)	4.368** (1.629)	3.579* (1.669)	3.989** (1.428)	3.960** (1.415)	3.806** (1.410)
Distance	-0.604 (0.515)	-0.958 (0.609)	-0.082 (0.581)	-0.256 (0.590)	-0.347 (0.499)	-0.498 (0.510)	-0.706 (0.500)
GDP	1.053** (0.097)	1.057** (0.121)	1.294** (0.118)	1.144** (0.112)	1.231** (0.102)	1.235** (0.101)	1.233** (0.094)
GDP per capita	0.911** (0.165)	0.916** (0.199)	0.784** (0.190)	0.839** (0.191)	0.531** (0.168)	0.571** (0.163)	0.687** (0.158)
Common language	0.580 (0.354)	0.652 (0.437)	0.589 (0.408)	1.044* (0.429)	0.861* (0.358)	0.445 (0.357)	0.407 (0.348)
# obs.	117	120	126	126	130	132	135
Adj. R^2	0.78	0.68	0.73	0.69	0.73	0.76	0.77

Year	1999	2000	2001
Border dummy	3.787* (1.507)	2.795 (1.781)	2.472 (1.522)
Distance	-0.629 (0.535)	-1.274* (0.614)	-1.379** (0.524)
GDP	1.278** (0.105)	1.341** (0.116)	1.198** (0.099)
GDP per capita	0.532** (0.176)	0.614** (0.191)	0.778** (0.165)
Common language	0.891* (0.388)	0.888* (0.447)	0.944* (0.369)
# obs.	129	140	141
Adj. R^2	0.74	0.71	0.76

Notes: OLS estimation. Dependent variable is the log of exports. Standard errors are in parentheses. **, *, and # denote significant at the 1, 5, and 10 percent level, respectively.

Table 6: Pooled results, 1992-2001

Period	**1992-2001**
Border dummy	3.559** (0.486)
Distance	-0.671** (0.172)
GDP	1.208** (0.033)
GDP per capita	0.714** (0.055)
Common language	0.726** (0.122)
Year effects?	Yes
# obs.	1,296
R^2	0.74

Notes: OLS estimation. Dependent variable is the log of exports. Standard errors are in parentheses. **, *, and # denote significant at the 1, 5, and 10 percent level, respectively.

Table 7: Robustness checks, 1933-39

	Border dummy
Benchmark	3.967** (0.701)
Period: 1933-35	4.005** (1.123)
Period: 1936-39	3.982** (0.914)
1933 country sample	4.028** (0.659)
Group World into 11 regions	4.111** (0.535)
Drop GDP per capita	4.150** (0.721)
Poisson estimation	2.125** (0.177)
Exclude gold	3.461** (0.763)
Drop Newfoundland	3.546** (0.763)
Drop Yukon Territory	3.928** (0.722)
Reclassify Newfoundland as part of Canada	1.473* (0.696)
Dependent variable: imports	4.537** (0.673)
Dependent variable: total trade	4.784** (0.663)

Notes: Results from a pooled OLS regression for the period 1933-39 (unless otherwise shown). Controls included in the regression, but not recorded: log Distance, log GDP, log GDP per capita, common language. Standard errors are in parentheses. **, *, and # denote significant at the 1, 5, and 10 percent level, respectively.

Table 8: Robustness checks, 1992-2001

	Border dummy
Benchmark	3.559** (0.486)
Period: 1992-1996	3.745** (0.695)
Period: 1997-2001	3.368** (0.681)
1992 country sample	3.872** (0.330)
Group World into 11 regions	3.612** (0.287)
Drop GDP per capita	3.468** (0.517)
Poisson estimation	2.168** (0.182)
Add Newfoundland as separate observation	3.844** (0.402)
Add Yukon Territory as separate observation	5.842** (0.482)
Add Newfoundland and Yukon Territory together	5.131** (0.416)
Reclassify Newfoundland as separate country (not part of Canada)	2.950** (0.487)
Sample of Canadian provinces and U.S. states	2.457** (0.086)
Sample of Canadian provinces and U.S. states (depend. var.: imports)	3.102** (0.089)
Dependent variable: imports	2.536** (0.750)
Dependent variable: total trade	3.096** (0.598)

Notes: Results from a pooled OLS regression for the period 1992-2001 (unless otherwise shown). Controls included in the regression, but not recorded: log Distance, log GDP, log GDP per capita, common language. Standard errors are in parentheses. **, *, and # denote significant at the 1, 5, and 10 percent level, respectively.

Table 9: Trade with major partners by industry, 1934-39

Period	**1934-39**	**1934-39**
Level of disaggregation	**Industry total**	**Industry total**
Border dummy	1.566 (1.173)	1.095 (0.862)
Distance	-0.982# (0.502)	-1.187** (0.370)
GDP	0.504* (0.245)	0.585** (0.180)
GDP per capita	0.444 (0.469)	0.203 (0.345)
Common language	-0.441 (0.793)	0.009 (0.584)
Year effects?	Yes	Yes
Industry effects?	No	Yes
# obs.	228	228
Adj. R^2	0.08	0.51

Notes: Dependent variable is the log of exports. Standard errors are in parentheses. **, *, and # denote significant at the 1, 5, and 10 percent level, respectively.

Data appendix

Bilateral trade

1933-39: Trade data in nominal Canadian dollars are obtained from various issues of The Trade of British Columbia with other Canadian Provinces and with Foreign Countries, published by the Economic Council of British Columbia.
1992-2001: External trade data in nominal Canadian dollars are taken from Industry Canada. The data are available online at http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html. British Columbia's trade with other Canadian provinces in nominal Canadian dollars are from http://www.bcstats.gov.bc.ca/data/bus_stat/trade.asp.

Bilateral distance

Bilateral distance is calculated as the great circle distance between Vancouver and the geographic center of the territory as reported in CIA's World Factbook. The distance for Canadian regional aggregates (Eastern Canada, Prairie Provinces) is calculated as the population-weighted distance between Vancouver and the provincial capitals. The national aggregate for the United States is calculated as the population-weighted distance between Vancouver and the capitals of U.S. states.

GDP

GDP figures (in 1990 international dollars) are taken from Angus Maddison The World Economy: Historical Statistics. I also experimented with nominal GDP in current national currencies, taken from various issues of Brian Mitchell's International Historical Statistics, and in Canadian dollars, using bilateral exchange rates.

GDP per capita

Per capita GDP (in 1990 international dollars) is taken from Angus Maddison The World Economy: Historical Statistics. I also experimented with population data from Brian Mitchell's International Historical Statistics.

Common language

Common language is a binary dummy variable that takes the value of one if the official language of the trading partner is English.

Appendix Table 1: Is British Columbia Different? Main Trading Partners

Exports (% of total)

	1936	1936			1996	1996	
	Canada	**BC**	**%**		**Canada**	**BC**	**%**
United Kingdom	42.2	35.3	8.8	United States	80.9	54.6	6.5
United States	35.6	33.8	9.9	Japan	4.1	24.4	57.8
Australia	2.8	6.6	24.7	United Kingdom	1.5	1.4	9.1
Belgium	2.4	1.1	4.7	Germany	1.2	1.6	12.4
Japan	2.1	11.3	56.1	China	1.1	1.9	17.2
South Africa	1.6	1.7	11.5	South Korea	1.0	3.3	31.1
New Zealand	1.3	0.9	6.7	France	0.6	0.7	10.5
Netherlands	1.3	0.1	0.7	Netherlands	0.6	0.6	10.1
France	1.2	1.0	9.4	Belgium	0.6	1.2	20.6
Newfoundland	0.8	0.0	0.0	Brazil	0.5	0.5	9.4
Total			10.5	Total			9.6

Imports (% of total)

	1936	1936			1996	1996	
	Canada	**BC**	**%**		**Canada**	**BC**	**%**
United States	58.1	33.4	3.2	United States	67.5	53.8	6.7
United Kingdom	19.4	27.1	7.9	Japan	4.5	15.0	27.8
Germany	1.8	0.4	1.4	Mexico	2.6	1.4	4.6
Argentina	1.7	2.7	9.1	United Kingdom	2.5	1.1	3.6
Straits Settlem.	1.6	0.8	2.8	China	2.1	5.6	22.0
Australia	1.4	1.9	7.6	Germany	2.1	1.2	4.9
India	1.3	1.4	6.3	France	1.5	1.1	6.0
France	1.0	0.7	3.8	Taiwan	1.2	2.5	17.3
Belgium	1.0	1.0	5.9	Norway	1.2	0.1	0.7
Peru	0.9	1.5	10.1	South Korea	1.2	2.8	20.1
Total			5.7	Total			8.3

Notes: Countries are arranged in order of importance for exports and imports of Canada. Columns labelled "%" give the percentage of British Columbia's trade in terms of Canada's total trade with that territory.

Appendix Table 2: Commodity structure of British Columbia's international trade

Exports

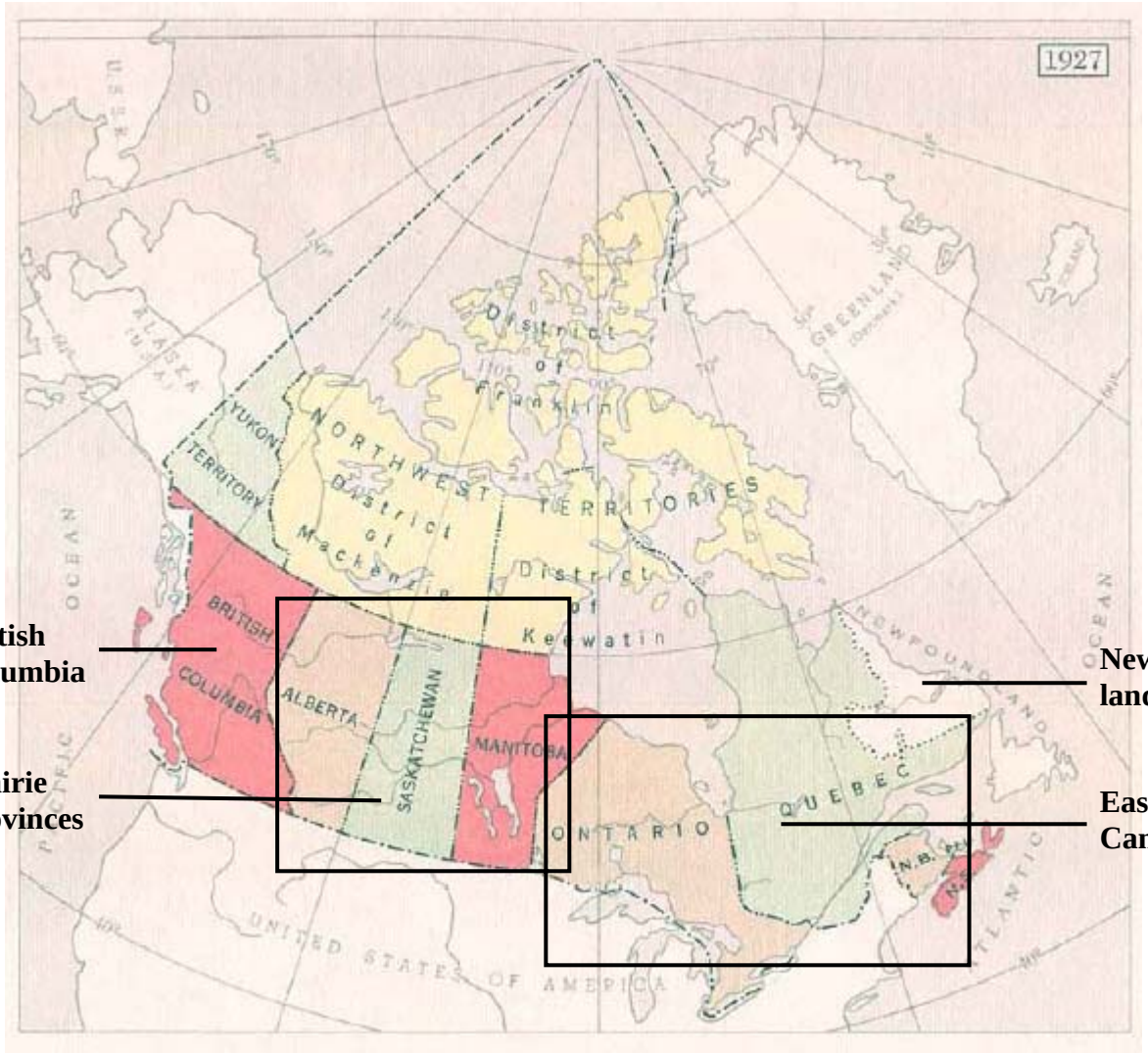
Commodity	**1936**	**1998**
Agricultural products	4.5	4.2
Fishery products	9.7	3.1
Fibre and textile products	0.0	0.9
Forestry products	51.0	51.9
Iron and its products	0.5	14.1
Mineral products	32.3	18.5
Chemical products	2.0	3.0
Other		4.3

Imports

Aggregated product line data not available.

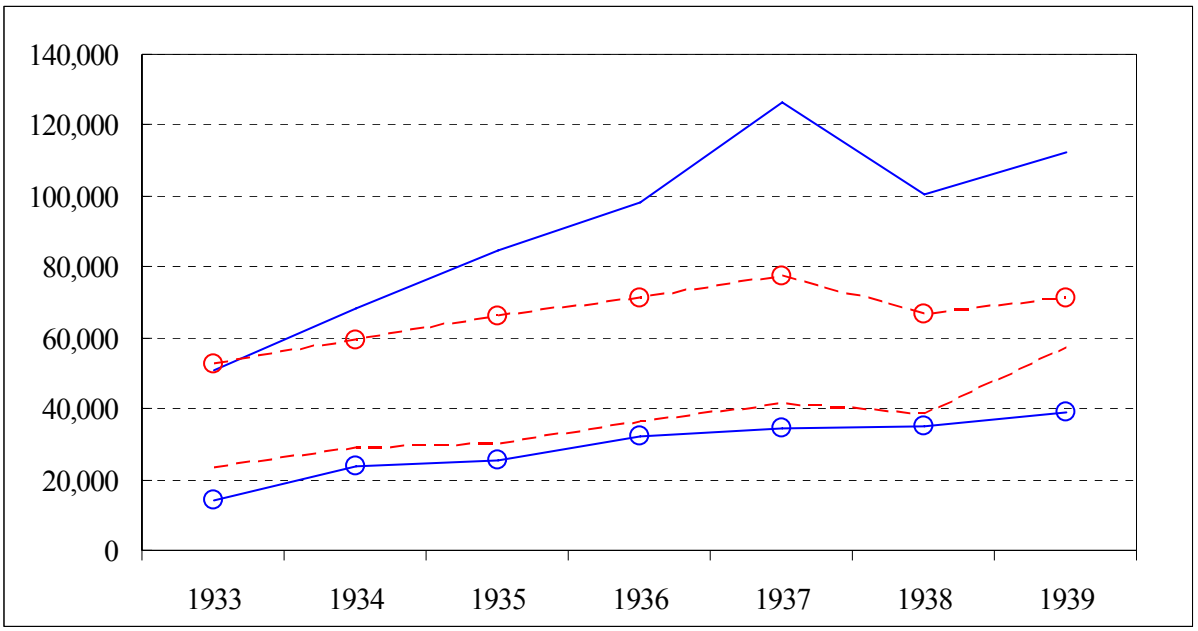
Notes: The table reports the share of the product group in British Columbia's international trade (in %).

Figure 1: Map of Canada, 1927



Source: The Atlas of Canada, 3rd edition (1957), available online at http://atlas.gc.ca/site/english/maps/archives/3rdedition/historical/109

Figure 2: Evolution of British Columbia's trade, 1933-39



Notes: Solid (dotted) lines are exports (imports) in thousands of current Canadian dollars. Circles mark trade with other Canadian provinces.