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Visits to Canada: The Role of Canada's Immigrant Populations

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Abstract: This paper investigates the role of Canada's immigrant populations in determining the annual flow of visitors to Canada. A model of the decision to travel to Canada is developed. This model motivates the role of Canada's immigrant populations in an aggregate demand for visits to Canada and it implies testable hypotheses concerning how price and income elasticities differ by purpose of trip. Using time-series cross-section data, an empirical demand model of visits is estimated. Immigrant populations are found to have a strong influence in the annual flow of foreign visitors to Canada (measured by both arrivals and person-nights spent in Canada). The elasticity estimates imply that the present value of the stream of spending by foreign visitors to Canada that is attributable to an additional immigrant is approximately $4,500 in 1996 dollars.

Introduction

International Tourism and Arrivals in Canada

International tourism accounts for a significant proportion of GDP in many countries and has shown strong growth over the past decade and more. This sector employs approximately 10.6 percent of the global workforce and produces 10.2 percent of the world's GDP (Harris and Easton, 1977.) According to the World Tourism Organization (1999), international arrivals grew at an average annual rate of 4.3 percent between 1989 and 1998. In 1998, Canada was the ninth preferred destination country among 40 countries with 18.7 million arrivals out of a world total of 625,236 million (WTO 1999). While Canada's share of the world's total arrivals is a mere 3 percent, international tourism is nevertheless an important contributor to Canada's economy.

Table 1 provides additional information on Canada's international arrivals over the period 1988 to 1997. The USA is by far the largest origin country, accounting for 76 percent of the total in 1997, down from 82 percent in 1988. While arrivals from the USA grew by 5 percent over these 9 years, arrivals from other countries grew by 56 percent. After the USA, the four next most important source countries are the United Kingdom, Japan, France and Germany. However, in 1997 these 4 countries accounted for just about 50 percent of total overseas arrivals in Canada.

Table 1: Canada's International Arrivals, 1988-1997 (000s)

Year	USA	UK	Japan	France	Germany	Total Overseas	Total Arrivals
1988	12763	527	324	230	263	2722	15485
1989	12184	561	387	243	263	2927	15111
1990	12252	553	411	259	253	2958	15210
1991	12003	530	393	307	273	2909	14912
1992	11819	536	392	310	290	2922	14741
1993	12024	562	408	361	339	3081	15105
1994	12542	577	481	410	367	3429	15972
1995	13005	641	589	430	421	3927	16932
1996	12909	691	648	460	447	4377	17285
1997	13401	734	566	439	398	4234	17,636

U.S. arrivals accounted for 76% of the total in 1997, down from 82% in 1988
U.S. arrivals grew 5% between 1988-1996
Overseas arrivals grew 55% between 1988-1996

It is not surprising that a sector as important as tourism has attracted considerable attention amongst researchers. A brief survey of the literature on studies into the demand for tourism is presented below. That literature recognizes that international visits are made for a variety of reasons (for example to visit family and friends, to visit sites and events and for business purposes) and that the demand equations may well differ by purpose of trip. The objective of this study is investigate the demand for international visits to Canada paying particular attention to the role played by Canada's immigrant populations. Evidence already exists that immigrant populations have a significant effect on trade flows. Two Canadian studies are those of Head and Ries (1998) and Head, Ries and Wagner (1998). Since foreign tourism in Canada is a component of Canada's exports, these studies provide some motivation for the present investigation. The networking arguments that support the links between

immigrant populations and trade flows apply equally to visits to Canada for business purposes. For similar arguments, tourist flows may also be stimulated by immigrant populations. The strength of this connection may well vary by purpose of trip. For example, we would expect immigrant populations to have a particularly strong effect on the group who visit family and friends.

Immigration to Canada

Compared to other countries and in proportion to its population, Canada receives a large number of immigrants. Canada's 1996 Census showed that approximately 5 million Canadian residents were born outside Canada, implying that the foreign born (almost all of whom are immigrants) account for over 17 percent of Canada's population. In recent years the major source countries have shifted away from Europe and towards Asia and certain Pacific countries. Table 2 shows the immigrant flows from the top 10 source countries in 1996. Hong Kong was the top ranked source country in 1996 (and also in the two previous years), followed by India, China, Taiwan and the Philippines.

Table 2: Immigration - Top 10 Source Countries

	1994			1995			1996		
COUNTRY	Rank	No.	%	Rank	No.	%	Rank	No.	%
Hong Kong	1	44169	19.73	1	31746	14.94	1	29871	13.33
India	3	17225	7.69	2	16215	7.63	2	21166	9.45
China-mainland	4	12486	5.58	4	13290	6.25	3	17479	7.8
Taiwan	5	7411	3.31	6	7691	3.62	4	13165	5.88
Philippines	2	19097	8.53	3	15149	7.13	5	12923	5.77
Pakistan	14	3746	1.67	10	3996	1.88	6	7724	3.45
Sri Lanka	6	6671	2.98	5	8925	4.2	7	6117	2.73
United States	7	6234	2.78	9	5185	2.44	8	5789	2.58
Iran	20	2694	1.2	15	3683	1.73	9	5770	2.58
United Kingdom	9	5971	2.67	8	6160	2.9	10	5559	2.48
Bosnia-Herzegovina	10	4905	2.19	7	6270	2.95	11	5098	2.28
Vietnam Soc. Rep. Of	8	6230	2.78	11	3953	1.86	19	2476	1.11
Total for Top Ten only	-	130399	58.25	-	114627	53.94	-	125563	56.04
Total Other Countries	-	93476	41.75	-	97864	46.06	-	98487	43.96
Total		223875			212491			224050	

Table 3 shows how the shift in the immigrant source countries has affected the relative sizes of Canada's immigrant populations. The 1991 census revealed that 2.63 percent of the Canadian population was born in the United Kingdom (down from over 4 percent in the 1970s). Five years later that proportion fell to 2.27 percent. The second and third ranked countries (Italy and the USA) also showed declines over this interval, whereas the proportion of Canada's population born in Hong Kong grew from 0.56 percent to 0.84 percent.

Table 3: Canada's Foreign Born, 1991 & 1996 Census

Country	Number		Rank		% of FB		% of Total Pop.	
	1991	1996	1991	1996	1991	1996	1991	1996
United Kingdom	717,750	655,535	1	1	16.5	13.2	2.63	2.27
Italy	351,615	332,110	2	2	8.1	6.68	1.29	1.15
United States	249,075	244,695	3	3	5.74	4.92	0.91	0.85
Hong Kong	152,450	241,095	9	4	3.51	4.85	0.56	0.84
India	173,675	235,930	6	5	4.00	4.75	0.64	0.82
China (PRC)	157,405	231,055	8	6	3.62	4.65	0.58	0.80
Poland	184,695	193,375	4	7	4.25	3.89	0.68	0.67
Philippines	123,295	184,550	10	8	2.84	3.71	0.45	0.64
Germany	180,525	181,650	5	9	4.16	3.65	0.66	0.63
Portugal	161,180	158,815	7	10	3.71	3.19	0.59	0.55
Vietnam	113,595	139,325	12	11	2.62	2.80	0.42	0.48

Clearly, the composition of the Canadian population has been changing and in the wake of these shifts we might expect to see corresponding shifts in the origins of Canada's overseas visitors. As noted above, there has been rapid growth in visits to Canada from overseas. But this growth is far from evenly spread across countries. For example, arrivals from the UK grew approximately 122 percent over the 20 years between 1972 and 1992 but arrivals from Hong Kong grew by a factor of 12 over this period and from Japan by a factor of almost 10.

This study will attempt to explain the time series and cross sectional patterns in Canada's overseas tourist arrivals not only in terms of traditional economic variables (price and income effects) but also by quantifying the attraction effects of Canada's immigrant populations.

Studies of International Travel Demand

Crouch (1994) reviewed the literature on international tourism demand. He focuses chiefly on the roles of the economic variables, price and income but he also notes that "it is evident that noneconomic factors are also important" and cites studies that find highly significant non-economic influences and suggests that while price and income may determine aggregate demand for international travel, sociological variables may influence the selection of specific destinations. However, Crouch does not identify the specific sociological variables used in the studies he cites.

According to Crouch, the literature finds that income is the single most important explanatory variable. However elasticity estimates vary a great deal, but generally exceed unity and lie below 2.0 confirming that international travel is a luxury good. As for price effects, Crouch argues that "economic theory ensures that price must be included in any demand study, but in the study of tourism, the issue of price is particularly vexatious." The fundamental problem seems to be that "international travel" is a complex mix of goods and services for which no single price index is wholly adequate. Price includes the price of reaching the destination (including perhaps an opportunity cost for travel time, yet some may receive enjoyment from the travel itself), the cost of local goods and services adjusted for the exchange rate. Moreover, some trips involve multiple destinations.

Abstracting from these complexities, theory suggests that the real exchange rate should be an important factor in the demand for international travel. Many studies however have separated the nominal exchange rate effects from local price effects. This is the focus of work by Vilasuso and Menz (1998) who argue that when travellers are making travel plans they may be more aware of exchange rates than local prices in the destination country. Since the degree of uncertainty differs between the three components of the real exchange rate, Vilasuso and Menz argue that unequal weights are attached to these pieces of information. In a study of Canadian travellers in the United States they found the order of importance to be: the exchange rate, the domestic home price and finally the local (foreign) price.

On the question of transport costs, Crouch (1984) observes "among the studies that have modelled transport costs, no satisfactory estimate of its impact has been made. . . [and] . . . the effect on international tourism is poorly understood." An exception seems to be the more recent paper by Harris and Easton (1997) in which transport costs proved to be a significant factor in the demand for visits to Canada. Since the data and statistical methodology used by Harris and Easton forms the basis of this study it will be useful to review their work in more detail.

For our purposes the most relevant part of the Harris and Easton (1997) study, (referred to as H&E) is their investigation of the determinants of arrivals of visitors to Canada from 17 countries over the period 1972-1992. Apart from country dummy variables, H&E employ five continuous variables to explain the time series and cross section variations in arrivals. The real exchange rate is the ratio of the Canadian CPI to the foreign CPI adjusted for the exchange rate. Since the units differ across countries, H&E calculated real exchange rate indexes for each country, all being set to 100 in 1972. The expected sign is negative on the "own price" variable. Clearly, the real exchange rate index has only a time series dimension and cannot explain any of the cross section variation in arrivals. Similarly, H&E compute real exchange rate indexes between the United States and the 17 source countries, which acts as a relative price. Viewing the USA as an alternative destination, this variable is expected to have a negative sign.

As with the real exchange rates, there is a problem of units when real income for different countries are to be combined in a time series cross section study. H&E chose to compute real income indexes for each country, setting each index to 100 in 1972. Once again, this variable is limited to explaining time series variations in arrivals. Two variables that do have cross section variation are the population of the source country and travel costs. H&E measure the latter as the proportion of real income in a particular country that is needed to reach Canada.

All variables (except the country dummy variables) are measured in natural logarithms. All five of the continuous variables have coefficients of the expected sign and all are

statistically significantly different from zero. H&E estimate the following elasticities: income (0.7), own price (-0.95), cross price (0.58), travel cost (-0.52), population (1.75).

The present study extends the work of H&E in two principal ways. First, we explore the role that Canada's immigrant populations have on visits to Canada. This adds another variable that can help explain cross section variation in arrivals. In addition, we define a relative real income index which adds a cross section dimension to real income. This is achieved by setting the base year real income indexes in relation to GDP expressed in US dollars. With the addition of these two variables that have cross section variation we find that country dummy variables are redundant.

Our second principal extension is to use Statistics Canada's disaggregated data on tourist arrivals which are available for years since 1990. Canada's International Travel Survey measures not only arrivals by origin country but also person nights spent in Canada and these are both disaggregated by purpose of trip. In a separate statistical study based on OECD countries, we investigate the demand for travel to Canada by purpose of trip. According to Turner, Reisinger and Witt (1998) there has been relatively little work on demand for travel by specific purposes. T, R&W estimate structural equations for travel from the UK to 7 destinations for three categories of demand: holidays, business and visiting family and friends (VFR).

Before discussing our empirical results we first consider a model of the demand for visits to Canada that yields a number of testable hypotheses, some of which have been noted in the literature. For example, Crouch (1994) argues that price elasticities will differ by purpose of trip (business travel is less price elastic than pleasure travel). Seaton (1997) summarizes the literature on the VFR class and observes that such travellers are attracted by immigrant communities and implies that VFR travel may be less price and income elastic than holiday travel.

A Model of Travel Demand

In this section we develop a model of the demand for visits to Canada which has a number of implications that are tested empirically in the following sections. In order to incorporate the effect of immigrant populations on the demand for visits to Canada we introduce a taste parameter that varies across foreign residents according to strength of their personal ties to Canada. In the empirical applications, the role of the taste parameter is proxied by the size of Canada's immigrant populations.

The empirical interpretation of the model can be represented by:

Visits = F (Price, Income, Travel cost, Population, immigrant Population)

where:

Visits represents a measure of demand for travel such as arrivals or total person nights spent in Canada by visitors from country *i*

Price is the real exchange rate between Canada and country *i*

Income is the level of real income in country *i*

Travel cost is the cost of reaching Canada from country *i* (and does not include the cost of staying in Canada)

Population is the population of country *i*

Migrant population is the proportion of Canada's population born in country *i*

These variables are discussed in more detail in the data section. For now, we note that measuring visits by arrivals simply counts the incidence of visits whereas total person nights clearly incorporates the duration of the visit.

Consumers in foreign countries are assumed to choose between a composite domestic good X and tourism services in Canada T. The relative price of T in terms of X is P. In addition, we assume that for a given foreign country there is a fixed transportation cost of getting to Canada, t. Let Y denote real income in terms of the composite commodity X. The budget constraint facing the individual foreign resident is therefore:

$Y = X + P*T + t$ for $T > 0$

$Y = X$ for $T = 0$

This discontinuous budget constraint consists of a downward sloping line segment and a single point on the X axis - see Figure 1.

While we assume utility is increasing in both X and T, it is an obvious fact that in any given period of time the majority of foreigners do not visit Canada. Hence for most foreign consumers, the optimal point in Figure 1 is at Y = X (T = 0). To model this possibility we use a variant of the Stone-Geary utility function:

$$U = (T - \gamma_1)^{\beta} (X - \gamma_2)^{(1-\beta)} \qquad [1]$$

In equation [1] the parameters γ_1 and γ_2 are thought of as minimum quantities of say food and shelter that the individual must consume in order to survive. In the present context we can dispense with the notion of a minimum required consumption of X (set $\gamma_2 = 0$) while switching the sign on γ_1 to recognize that consumers can "do without" international travel, commodity T. The modified Stone-Geary utility function is shown in equation [2]. The degree of indifference to consuming T is assumed to depend to the strength of an individual's ties to Canada through friendship and or family connections. In the aggregate, our empirical measure of the strength of these ties for each sending country is the size of Canada's immigrant populations. At the individual level the weaker are these ties, the less is the taste for T which will be reflected in flatter indifference curves (a higher value of γ in equation [2])

The indifference map is illustrated in Figure 2. Note that as γ increases the indifference map

$$U = (T + \gamma)^{\beta} X^{(1-\beta)} \qquad [2]$$

shifts left relative to the axes reducing the willingness to consume T. High values of γ are associated with a weak immigrant link between Canada and the foreign country. Figure 3 illustrates an equilibrium in which the foreign consumer is indifferent between travelling to Canada to consume T (point B) and remaining at home to consume only X (point A).

The maximization of the utility function [2] subject to the budget constraint leads to the following demand equations for X and T.[1]

$$T = \beta \frac{(Y-t)}{P} - \gamma(1-\beta) \quad \textit{demand for } T$$

$$X = \frac{(1-\beta)}{\beta}(Y - t + \gamma P) \qquad \textit{demand for } X$$

Notice as γ increases and the immigrant link weakens the demand for T declines and the demand for X increases. Using this demand model we now derive three propositions which have empirical implications that are examined below.

Proposition 1: The price elasticity of demand for visits is an increasing function of γ.

$$\varepsilon_p = \frac{\partial T}{\partial P}\frac{P}{T} = \frac{-\beta(Y-t)}{\beta(Y-t) - (1-\beta)\gamma P}$$

$$= \frac{-\beta(Y-t)}{PT} \prec 0$$

$$\frac{\partial |\varepsilon_p|}{\partial \gamma} = \frac{(1-\beta)\beta P(Y-t)}{[\beta(Y-t) - (1-\beta)\gamma P]^2} \succ 0$$

An empirical implication of Proposition 1 is that the demand for travel by family and friends will be less price elastic than the demand by tourists, who we assume have a higher γ.

[1] These demand equations assume T > 0. The price and income elasticities derived below apply only to the demand of those who are travelling and ignore the effect on those who switch from T = 0 to T > 0 and vice versa.

Proposition 2: The income elasticity of demand for visits is an increasing function of γ.

$$\varepsilon_Y = \frac{\partial T}{\partial Y}\frac{Y}{T} = \frac{\beta Y}{PT}$$

$$= \frac{\beta Y}{\beta(Y-t) - (1-\beta)\gamma P}$$

$$Hence \quad \frac{\partial \varepsilon_Y}{\partial \gamma} \succ 0$$

$$Also \ when \ \gamma = 0, \ \varepsilon_Y = \frac{Y}{Y-t} \succ 1$$

An empirical implication of Proposition 2 is that the demand for travel by family and friends will be less income elastic than the demand by tourists, who we assume have a higher γ.

Proposition 3: The travel cost elasticity of demand is an increasing function of γ

$$\varepsilon_t = -\frac{\beta t}{PT} \prec 0 \quad and \quad \frac{\partial \mid \varepsilon_t \mid}{\partial \gamma} \succ 0$$

Proposition 3 implies that travel by the family and friends class will be less sensitive to travel costs than is travel by tourists.

Proposition 4: The threshold level of income Y^* at which there is indifference between travel and no travel (see Figure 3) is an increasing function of γ.

For any given value of γ there is a threshold income level $Y^*(\gamma)$ at which the individual is indifferent between T = 0 and T > 0. It can be shown that

$$\frac{\partial Y^*}{\partial \gamma} = \frac{YPT}{\gamma(TP + t)} \succ 0$$

which means that as the immigrant link weakens, the threshold income level increases. Consider two countries that are identical in all respects except for γ. The threshold income level defines what proportion of the country's residents will travel to Canada. The country with the lower γ (which empirically means a larger immigrant population in Canada) will have a low threshold income level, implying that a larger proportion of its residents will visit Canada. Proposition 4 implies that the demand for travel to Canada by country *i* will depend positively on the number of immigrants in Canada from country *i*.

Proposition 5. The threshold travel cost t^* at which there is indifference between travel and no travel (see Figure 3) is an decreasing function of γ.

For any given value of γ there is a threshold travel cost $t^*(\gamma)$ at which the individual is indifferent between T = 0 and T > 0. It can be shown that:

$$\frac{\partial t^*}{\partial \gamma} = \frac{-PT}{\gamma} \prec 0$$

which means that as the immigrant link weakens, the cost of reaching Canada must decline to maintain indifference between travelling and not. Alternatively, if two countries are identical in all respects except for γ, the difference (t* - t) > 0, where t is the actual travel cost will be greater for the country with a strong immigrant links. Since the maximum travel cost consistent with travelling is much greater than the actual cost for the country with strong immigrant links this country will send more visitors. Proposition 5 reinforces Proposition 4's implication that the size of the immigrant population has a positive effect on the demand for travel to Canada.

Proposition 6. The threshold level of income Y*, below which income is too low for travel to take place, is an increasing function of travel cost t.

$$\frac{\partial Y^*}{\partial t} = \frac{Y}{PT + t} \succ 0$$

Proposition 6 implies that for two countries that are identical in all respects except for travel costs, the country with the higher travel costs will have a higher threshold income level.

In a cross section time series study of arrivals data, this result suggests that an interaction term between travel cost and the size of the immigrant population in Canada would have a negative coefficient. In separate demand equations by class of visitor, we would expect the cost of travel to have a weaker effect on the demand for travel by family and friends than say by tourists.

Empirical Results: Study A

The regression results reported in Table A3 (see Appendix) are based on the time series cross section data set on 22 countries over the period 1972 to 1992. The countries included in this sample are listed in Table 4 below. The dependent variable is the natural logarithm of annual arrivals in Canada of visitors from the 22 countries. (The precise variable definitions are given at the end of this paper.) The four economic variables included in this model are income, own price, a cross price and a proxy for travel cost to Canada (measured by distance). All of these variables have the expected sign. Although two are not statistically significant at the 5 percent level (distance and the real exchange rate with the USA.) As in the H&E study, the original country's population is a highly significant variable but we find a considerably lower elasticity (0.35 compared to H&E's 1.7). This may be explained by our inclusion of India, which H&E did not include. India obviously has a large population but sends relatively few visitors to Canada.

Table 4: List of Countries

	Study A: 1972-1992	Study B: 1990-1996
1	Australia (AUS)	Australia
2	Belgium (BEL)	Austria
3	Brazil (BRA)	Belgium
4	Denmark (DNK)	Denmark
5	France (FRA)	Finland
6	Germany (DEU)	France
7	Greece (GRC)	Germany
8	Hong Kong (HOK)	Iceland
9	India (IND)	Ireland
10	Israel (ISR)	Italy
11	Italy (ITA)	Japan
12	Jamaica (JAM)	Korea
13	Japan (JAP)	Mexico
14	Mexico (MEX)	Netherlands
15	New Zealand (NZL)	New Zealand
16	Netherlands (NLD)	Norway
17	Portugal (PRT)	Portugal
18	Spain (ESP)	Spain
19	Sweden (SWE)	Sweden
20	Switzerland (CHE)	Switzerland
21	Trinidad and Tobago	Turkey
22	United Kingdom	United Kingdom

Our primary focus is on the immigrant variable LFB, which is the natural logarithm of Canada's immigrant population from each of the 22 countries in the sample. The estimated elasticity of 0.28 is highly significant statistically (having a t-value exceeding 10).

The second set of results in Table A3 exclude three countries that experienced extreme rates of inflation over the sample period. Between 1972 and 1992 the CPIs of Brazil, Israel and Mexico grew by factors of 2,169 million, 2.2 million and 900 respectively. The deletion of these countries has relatively little effect on the estimated elasticities but does remove some of the heteroskedasticity that is detected by the LM test. The prob value of the null hypothesis of no heteroskedasticity rises from .187 to 0.84.

Table A4 reports two additional regressions fitted to the sample of 19 countries. In equation A3 the logarithm of the real income index (which is the variable used by H&E) replaces the log of the relative real income index. The most notable effects are that the LM test detects significant heteroskedasticity and the goodness of fit drops considerably. There seems then to be considerable benefit to creating an income variable that has cross section variation. Equation A4 (also in Table A4) restores the relative real income index, but drops the statistically insignificant cross price effect. In addition, Eq. A4 splits the real exchanges rate into two components: the nominal exchange rate and the relative prices index. Some studies have found that the nominal exchange rate has a larger impact than the relative price level - see for example Vilasuso and Menz (1998). However, Eq. A4 finds the opposite result, although the two coefficients are close in size. (When all 22 countries are included in the sample these coefficients are identical to two significant digits - not reported for reasons of space.)

Table A5 reports 3 regressions, each of which introduces new interaction terms. Again the reported results are confined to the smaller sample of 19 countries although the results are essentially the same for the larger sample. Eq. A5 includes the product of the relative real income index and the foreign born variable. According to the theory developed earlier the coefficient should be negative, indicating that for countries which have a strong immigrant link to Canada the income elasticity of demand is lower. The expected sign does materialize, but the coefficient has an associated t-statistic just over unity in absolute value.

Eq. A6 introduces the interaction between the foreign born and the real exchange rate index, which is expected to have a positive sign, lowering the absolute value of the own price elasticity for countries with a strong immigrant link with Canada. The sign is in fact negative and the coefficient is not statistically significantly different from zero.

Finally, Eq. 7 includes the product of distance and foreign born. While we expect the number of foreign born in Canada to have an effect on arrivals, this effect may diminish with distance. The negative coefficient on the interaction term is consistent with this view. Note that the switch in sign of the coefficient on distance is not problematic. In this specification the marginal effect of distance on arrivals depends on the number of foreign born. At the sample mean, the marginal effect of distance is negative as we would expect.

Empirical Results: Study B

In this section we report the results of investigating a shorter time series (1990-1996), but one in which visits are disaggregated by purpose of trip. The source countries number 22 and are confined to the OECD. Using the ITS, the 10 distinct reasons for visiting Canada are aggregated into 4 classes:

Purpose of Trip Defined	
Definition of Aggregate (this paper)	ITS Definition (response code and description)
Work	01 - meetings
	02 - convention, conference, trade show, seminar
	03 - other work
Tourism	04 - holidays, vacation
	06 - visit second home, cottage, condo
	07 - attend events, attractions
Family and friends	05 - visit friends or relatives
Education	10 - education, study

Table B3 presents estimated demand equations for 22 OECD countries. Demand for travel to Canada is measured by person nights spent in Canada and by arrivals but is not disaggregated by purpose of trip. In the first two columns the specifications include the real exchange rate whereas in columns 3 and 4 the real exchange rate is split into its component parts: the nominal exchange rate and the relative price levels. In the first two columns, all coefficients have the expected signs and all except the coefficient on distance are statistically significant. The foreign born elasticity is strongly significant and similar in size to the estimates in study A where the dependent variable is arrivals. Here we have two alternative measures of demand and we find that the foreign born elasticity is larger for person nights than it is for arrivals. This implies that the foreign born have a positive impact both on the incidence of visits (arrivals) and on the duration of visits (person nights.) The dummy variables ENG and FR are positive and statistically significant. The coefficients imply that countries that have either English or French as an official language send over 3 times as many visitors to Canada as other countries. By and large, the results are similar regardless of whether we use person nights or arrivals as the dependent variable. However, compared to study A, the R-squared statistics are much higher. In general, in study B the R-squared coefficients are higher for the person-nights regressions than for arrivals.

In the second pair of columns in Table B3 the real exchange rate is replaced by its component parts. Both the nominal exchange rate and relative prices have the expected negative signs and, as in some other studies, the nominal exchange rate has a strong statistically significant effect. However, the relative price index is statistically insignificant. This is consistent with Vilasuso and Menz's observation that the readily observable exchange rate incorporates useful information while potential travellers likely have much less reliable information about foreign prices.

Tables B4 to B7 repeat the specifications in Table B3, but disaggregate person-nights and arrivals into four sub-categories. Of particular interest is the comparison between the classes: family & friends, and tourists which are by far the most important sub-categories. Regardless of whether the dependent variable is person-nights or arrivals or whether the real

exchange rate is entered directly or in component parts, we find that for both the income and own-price elasticities these are considerably smaller for the family & friends class than they are for tourists, which is precisely what the theory predicted. For example, compare the first two columns of Tables B4 and B5: the estimated income elasticties for the family & friends catgory are 0.61 (person nights) and 0.54 (arrivals) compared to 0.82 (person nights) and 1.02 (arrivals) for the tourism class. The differences in extimated price elastcities are more strking: approximately -0.8 for the family and friends class compared to approximately -3.0 for tourists. The coefficients on the language dummy variables are large and statistically significant for both classes but not surprisingly, knowledge of English or French is more important to the tourist class than to visitors of friends & relatives.

Table B6 examines the class of victors who come for work activities. Income and price effects are found to be relevant to this class of visitor. The foreign born elasticity is considerably smaller than it is for the family & friends and the tourist classes, but it is still highly significant in a statistical sense.

Only for the education class is the foreign born variable insignificant statistically speaking. While income, language and home population have the expected signs and are statistically significant, distance and the exchange rate are not. This may be due to the fact that graduate students are included in this class and for many, their level of funding is specified in Canadian dollars. We would also expect distance to play a smaller role when the length of stay is very long, perhaps measured in years rather than weeks. Note that person-nights equations have lower R-squared statistics than the arrivals regressions which we might expect for a class that includes students who have long and variable stays.

Finally, Table B8 estimates the models in Table B3 using Generalized Least Squares. The GLS adjustment takes into account possibly different error variances over countries. For those equations that include the real exchange rate the impact of using GLS instead of OLS is slight. The only major change is the switch in sign of the distance coefficient. A positive coefficient is difficult to rationalize. But, when the real exchange rate is split into its component parts the distance coefficient is either negative and statistically significant or

positive and insignificant. However, in these latter two cases, the relative price level variable has a perverse sign.

Impact of Immigration on Tourism

The work of Head and Ries has shown that Canada's immigrant populations have an effect on trade - both imports and exports are stimulated by immigrants. From a balance of payments point of view, the evidence shows that immigrants have effects on both sides of the accounts. Tourism is an important component of Canada's trade account and this study has confirmed that Canada's immigrant populations do attract visitors to Canada. To put the elasticity estimates into context it is interesting to quantify these effects in terms of the impact of immigrants on person nights spent in Canada and on expenditures by foreign visitors in Canada. It is beyond the scope of this paper to consider the effect of Canada's immigrants on Canadian tourism abroad and so the following calculations are necessarily one-sided.

Annual immigration into Canada has fluctuated a great over the past 45 years. In the mid-1980s annual flows were less than 100,000 per year. In 1993 Canada admitted 255,747 immigrants. For the purposes of this exercise we consider the impact on visits to Canada of a reduction in immigration by 50 percent over the 10 years 1989 to 1998. The 1996 census recorded Canada's population to be 28,846,761 persons, of which 4,971,070 were immigrants. Between 1989 and 1998 Canada admitted 2,197,811 immigrants which represents 44.2 percent of the immigrant population in 1996. If immigration had been cut in half during this 10 year period, Canada's immigrant population would have been approximately 22 percent lower than it was.

The estimated elasticity of person nights with respect to the stock of immigrants depends on the specification of the demand equation, but a mid-range estimate is around 0.32. This elasticity implies a reduction in person-nights of about 7 percent per year. Table B9 summarizes the results of the calculations based on spending and person-nights in 1996. Visitors in the Family & Friends class tend to stay longer but spend less than visitors in the Tourist class. This is reflected in the last row of Table B9, which suggests that a 50 percent reduction in immigration flows over a recent ten year period would have reduced annual

spending by about $44 million and $156 million for the Family & Friends class and the Tourist class respectively.

An alternative way to represent the estimated impact of the immigration on tourism spending is to calculate the present value of the stream of spending by overseas visitors. Per immigrant, annual spending by overseas visitors is approximately $182 per year (1996 dollars). Using a 4% real interest rate, the present value of that annual stream is approximately $4,550 per migrant in 1996 dollars.

Summary and Conclusions

This paper uses Canadian travel data from Canada's International Travel Survey to estimate the effect of Canada's immigrant populations on overseas travel to Canada. A utility maximizing model of the travel decision is used to derive an aggregate demand equation in which price (the real exchange rate), real income, travel cost, Canada's immigrant populations and the sending country's total population are explanatory variables. In the empirical study additional variables are included: a cross price effect (capturing the possibility that travel to the USA is a substitute for travel to Canada) and language dummy variables (English and French). The model not only accounts for the role of Canada's immigrant populations in the travel demand equation but also predicts that price and income elasticities are likely to be smaller for visitors in the family and friends class than in the tourist class.

The model is estimated using two cross section time series data sets. The first data set is longer in the time series dimension and the dependent variable is annual overseas arrivals in Canada aggregated over all purposes of trip. The second data set makes use of Statistics Canada's more recent disaggregated travel data. This allows us to measure visits by person nights as well as arrivals and to distinguish visits by purpose of trip.

The empirical results find a strong link between Canada's immigrant populations and visits to Canada whether measured by arrivals or person nights.

Elasticity estimates vary across specifications but for the family and friends class and the tourist class a summary measure of this elasticity is approximately 0.3. To place this estimate in perspective, we calculated the effect on visits to Canada of a 50 percent reduction in immigration flows over 10 years and estimate that in 1996 expenditures by visitors in these two classes would have been about $200 million lower than otherwise. Alternatively, the present value of the stream of expenditures by overseas visitors in Canada that is attributed to an additional immigrant is approximately $4,550 in 1996 dollars.

The empirical results confirmed the model's prediction that price and income elasticities are lower for visitors in the family and friends class than in the tourist class. Also income elasticities tend to be greater for arrivals than for person nights. Countries in which English and French are official languages send more visitors to Canada, particularly tourists. The language effects are statistically significant for visitors of family and friends but not as strong as for tourists.

Finally, in common with much of the literature we find that when the real exchange rate is decomposed into its component parts, the nominal exchange rate is highly significant but the relative price level between Canada and the origin country is not.

Appendices

Table A1: Full Sample Statistics

	Mean	Std Dev	Minimum	Maximum
FB	102,106.23	184,471.38	0.00	928,232.00
RII	92.97	13.66	40.14	138.09
RRII	81.31	53.89	1.95	229.72
RERC	108.48	24.32	51.44	219.59
RERUS	100.77	23.34	51.41	188.48
POP	6.42769D+07	1.49719D+08	989,000.00	8.83570D+08
ERUS	27,625.75	537,335.63	0.02	1.15044D+07
ERC	30,459.58	589,733.68	0.02	1.26206D+07
RPIUS	8,518.74	46,998.17	0.00	416,328.34
RPI	7,598.22	41,546.98	0.00	362,109.06
DIST	4,413.36	1,538.93	1,775.00	7,912.00

Table A2: Sample Statistics Excluding Brazil, Israel and Mexico

	Mean	Std. Dev.	Minimum	Maximum
FB	116,953.15	194,398.01	0.00	928,232.00
RII	93.04	14.13	40.14	138.09
RRII	89.06	53.16	1.95	229.72
RERC	111.94	23.44	59.43	219.59
RERUS	103.92	22.36	51.74	188.48
POP	6.38484D+07	1.59822D+08	989,000.00	8.83570D+08
ERUS	94.86	42.39	13.98	418.44
ERC	107.67	49.41	18.72	459.04
RPIUS	131.80	75.20	30.52	577.82
RPI	122.98	65.13	30.34	502.57
DIST	4,458.47	1,528.63	1,775.00	7,912.00

Table A3: Dependent Variable: Log of Arrivals

	EQ. A1 FULL SAMPLE		EQ. A2 EXCLUDING BRAZIL, ISRAEL & MEXICO	
No. of observations	444		382	
Variables	Estimated Coefficient	Standard Error	Estimated Coefficient	Standard Error
C	5.086	0.948	5.476	1.274
LFB	0.284	0.022	0.284	0.029
LRRII	0.602	0.034	0.612	0.035
LRERC	-1.699	0.428	-1.637	0.461
LRERUS	0.741	0.412	0.588	0.449
LPOP	0.350	0.022	0.394	0.029
LDIST	-0.141	0.093	-0.235	0.120
R2	0 .608		0 .630	
Adjusted R2	0.602		0.624	
LM het. test	1.744 [.187]		0 .041 [.840]	

Table A4: Dependent Variable: Log of Arrivals

No. observations = 382

	EQ. A3		EQ. A4	
Variable	Estimated Coeff	Std Error	Estimated Coeff	Std Error
C	-3.960	0.948	14.602	1.982
LFB	0.218	0.037	0.294	0.027
LRII	1.254	0.294		
LRRII			0.561	0.035
LRERC	-0.536	0.628		
LERC			-1.170	0.172
LRERUS	0.651	0.605		
LRPI			-1.678	0.202
LPOP	0.284	0.037	0.369	0.028
LDIST	-0.173	0.167	-0.272	0.116
R2	0 .353		0 .656	
Adj. R2	0.343		0.650	
LM het. test	131.9 [.000]		0 .041 [.840]	

Table A5: Dependent Variable: Log of Arrivals

No. observations = 382

	EQ. A5		EQ. A6		EQ. A7	
Variable	Estimated Coeff	Std Error	Estimated Coeff	Std Error	Estimated Coeff	Std Error
C	3.130	2.542	-0.532	7.209	-70.02	9.334
LFB	0.521	0.224	0.837	0.654	7.267	0.857
LRRII	1.190	0.543	0.631	0.035	0.553	0.033
LRERC	-1.581	0.464	-0.374	1.562	-1.487	0.426
LRERUS	0.495	0.457	0.562	0.450	0.691	0.414
LPOP	0.388	0.029	0.391	0.028	0.429	0.027
LDIST	-0.243	0.120	-0.215	0.122	8.650	1.095
LFB*LRRII	-0.051	0.048				
LFB*LRERC			-0.117	0.138		
LFB*LDIST					-0.839	0.103
R2	0 .631		0 .630		0.685	
Adj. R2	0.624		0.623		0.680	
LM het. test	0.323 [.57]		0.32 [.57]		14.0 [.00]	

Table B3: Purpose of Trip: All reasons - OLS Estimates

	Dependent Variable			
	Person Nights	Arrivals	Person Nights	Arrivals
ln FB	0.373 (0.051)	0.240 (0.055)	0.232 (0.033)	0.083 (0.033)
ln RRII	0.720 (0.117)	0.728 (0.126)	0.948 (0.074)	0.982 (0.074)
ENG	1.379 (0.179)	1.295 (0.192)	1.355 (0.110)	1.268 (0.111)
FR	1.131 (0.172)	0.802 (0.185)	0.852 (0.107)	0.491 (0.108)
ln POP	0.613 (0.057)	0.666 (0.061)	0.813 (0.037)	0.889 (0.038)
ln DIST	-0.152 (0.247)	-0.301 (0.266)	-0.296 (0.152)	-0.461 (0.154)
ln RERC	-1.597 (0.429)	-1.687 (0.462)		
ln ERC			-1.501 (0.263)	-1.580 (0.266)
ln RPI			-0.114 (0.280)	-0.034 (0.283)
Constant	3.732 (2.693)	3.690 (2.901)	2.258 (2.697)	1.614 (2.728)
R2	0.811	0.740	0.929	0.918
No. of observations	154	154	154	154

Table B4: Purpose of Trip: Family and Friends - OLS Estimates

	Dependent Variable			
	Person Nights	Arrivals	Person Nights	Arrivals
ln FB	0.430 (0.045)	0.310 (0.043)	0.315 (0.031)	0.200 (0.031)
ln RRII	0.607 (0.102)	0.536 (0.099)	0.792 (0.070)	0.715 (0.069)
ENG	1.467 (0.156)	1.334 (0.151)	1.447 (0.105)	1.315 (0.102)
FR	0.913 (0.150)	0.750 (0.145)	0.685 (0.103)	0.531 (0.100)
ln POP	0.451 (0.050)	0.444 (0.048)	0.613 (0.036)	0.601 (0.035)
ln DIST	-0.212 (0.215)	-0.222 (0.209)	-0.330 (0.146)	-0.335 (0.142)
ln RERC	-0.880 (0.373)	-0.860 (0.362)		
ln ERC			-0.802 (0.252)	-0.785 (0.246)
ln RPI			0.327 (0.268)	0.306 (0.261)
Constant	2.715 (2.345)	1.947 (2.274)	-0.420 (2.584)	-1.035 (2.519)
R2	0.821	0.781	0.919	0.900
No. of observations	154	154	154	154

Table B5: Purpose of Trip: Tourism - OLS Estimates

	Dependent Variable			
	Person Nights	Arrivals	Person Nights	Arrivals
ln FB	0.544 (0.093)	0.347 (0.085)	0.321 (0.070)	0.131 (0.061)
ln RRII	0.816 (0.224)	1.018 (0.196)	1.168 (0.165)	1.368 (0.138)
ENG	1.742 (0.325)	1.743 (0.298)	1.699 (0.235)	1.706 (0.205)
FR	1.737 (0.312)	1.131 (0.287)	1.297 (0.228)	0.703 (0.201)
ln POP	0.772 (0.103)	0.812 (0.095)	1.088 (0.079)	1.119 (0.070)
ln DIST	0.127 (0.453)	-0.400 (0.413)	-0.093 (0.327)	-0.621 (0.285)
ln RERC	-3.144 (0.776)	-2.946 (0.715)		
ln ERC			-2.988 (0.561)	-2.799 (0.493)
ln RPI			-0.795 (0.596)	-0.671 (0.524)
Constant	2.318 (4.882)	4.229 (4.494)	2.771 (5.754)	4.248 (5.050)
R2	0.713	0.685	0.852	.851897
No. of observations	154	154	154	154

Table B6: Purpose of Trip: Work - OLS Estimates

	Dependent Variable			
	Person Nights	Arrivals	Person Nights	Arrivals
ln FB	0.149 (0.052)	0.169 (0.054)	0.018 (0.037)	0.023 (0.035)
ln RRII	0.861 (0.118)	0.785 (0.123)	1.073 (0.083)	1.021 (0.079)
ENG	0.690 (0.180)	0.614 (0.187)	0.667 (0.124)	0.589 (0.118)
FR	0.579 (0.174)	0.487 (0.181)	0.319 (0.121)	0.198 (0.115)
ln POP	0.712 (0.057)	0.701 (0.060)	0.898 (0.042)	0.908 (0.040)
ln DIST	0.082 (0.250)	-0.087 (0.260)	-0.052 (0.172)	-0.236 (0.163)
ln RERC	-0.844 (0.433)	-1.092 (0.450)		
ln ERC			-0.755 (0.297)	-0.993 (0.282)
ln RPI			0.536 (0.316)	0.444 (0.300)
Constant	-3.637 (2.717)	-2.513 (2.826)	-7.967 (3.043)	-6.628 (2.892)
R2	0.751	0.732	0.883	0.895
No. of observations	154	154	154	154

Table B7: Purpose of Trip: Education - OLS Estimates

	Dependent Variable			
	Person Nights	Arrivals	Person Nights	Arrivals
ln FB	-0.002 (0.138)	-0.035 (0.102)	-0.123 (0.134)	-0.137 (0.097)
ln RRII	0.706 (0.371)	0.605 (0.274)	0.663 (0.351)	0.571 (0.254)
ENG	0.168 (0.472)	0.053 (0.349)	0.187 (0.446)	0.070 (0.323)
FR	0.850 (0.375)	0.438 (0.273)	0.691 (0.357)	0.312 (0.254)
ln POP	0.916 (0.152)	0.868 (0.112)	1.028 (0.147)	0.962 (0.106)
ln DIST	-0.516 (0.679)	0.373 (0.502)	-0.923 (0.650)	0.026 (0.471)
ln RERC	-0.060 (0.991)	-1.275 (0.724)		
ln ERC			0.304 (0.941)	-0.989 (0.672)
ln RPI			2.271 (1.137)	0.680 (0.813)
Constant	-5.340 (7.022)	-8.399 (5.158)	-14.346 (10.127)	-10.172 (7.242)
R2	0.409	0.496	0.436	0.574
No. of observations	106	107	106	107

Table B8: Purpose of Trip: All reasons - GLS Estimates

	Dependent Variable			
	Person Nights	Arrivals	Person Nights	Arrivals
ln FB	0.392 (0.035)	0.311 (0.029)	0.250 (0.032)	0.108 (0.026)
ln RRII	0.965 (0.121)	1.072 (0.097)	0.876 (0.095)	0.904 (0.079)
ENG	0.866 (0.102)	1.021 (0.100)	1.209 (0.086)	1.348 (0.073)
FR	0.837 (0.081)	0.707 (0.075)	0.934 (0.078)	0.685 (0.074)
ln POP	0.728 (0.038)	0.767 (0.035)	0.788 (0.038)	0.875 (0.034)
ln DIST	0.656 (0.196)	0.533 (0.166)	-0.005 (0.163)	-0.329 (0.141)
ln RERC	-1.291 (0.259)	-1.314 (0.252)		
ln ERC			-1.637 (0.249)	-1.585 (0.214)
ln RPI			1.388 (0.193)	1.358 (0.213)
Constant	-7.344 (2.076)	-8.922 (1.872)	-5.963 (1.814)	-5.656 (1.488)
R2	0.998	0.997	0.997	0.997
No. of observations	154	154	154	154

Table B9: Impact of 50% Reduction in Immigration, 1989-1998

Imm. Population 1996 (A)	New immigrants 1989-98 (B)	50% of B as proportion of A
4,971,070	2,197,811	22%

	Family Class		Tourist Class	
Elasticity	0.32		0.32	
Person-Nights	-7%		-7%	
	Total Spending	Person Nights	Total Spending	Person-Nights
1996 Actual	$616 m	10.5 m	$2,080 m	18.2 m
1996 Change	$43.8 m	0.75 m	$156 m	1.36 m

Variable Definitions

1. Dependent Variables

1.1 Data set A: In Tables A1 to A5, the dependent variable is the natural log of arrivals. Arrivals data (annual, 1972 - 1992) on overseas visitors are produced through Statistics Canada's International Travel Survey. Observations on 22 countries over 21 years give a potential sample size of 462. The actual sample size is reduced since for 18 countries the 1971 census records zero values for the foreign born (all variables are measured in logarithmic form.)

1.2 Data set B: In Tables B1 to B8, the dependent variable is measured by (a) arrivals and (b) person nights spent in Canada. These variables are also available (1990-1996) by purpose of trip for 22 OECD countries. Note these disaggregated measures of visits to Canada are not available prior to 1996.

2. Explanatory Variables

2.1 Real Income Index (RII)

For data set A, base year is 1987 and t = 1, 2, ...21. For set B the base year is 1990, t= 1,2,.. 7. Index *i* designates country *i*.

$$RII_{i,t} = 100\frac{GDP_{i,t}}{GDP_{i,base}}$$

2.2 Relative Real Income Index (RRII)

$$RII_{i,t} = 100 \frac{GDP_{i,t}}{GDP_{i,base}} \frac{GDP^{us}_{i,base}}{GDP_{i,base}}$$

In the base year, the RRII expresses $US per capita real income in country *i* relative to that of the UK. The time series dimension of RRII shows real income growth in country *i*. The cross section dimension in the base year measures income ratios across countries having expressed each country's income in $US.

2.3 The nominal exchange rate between USA and the source country *i* at time *t* is the local currency cost of $US ($ERUS_{i,t}$)

These data are directly available from the World Bank (set A) and the OECD (set B).

2.4 The nominal exchange rate between Canada and the source country (ERC) is the local currency cost of $Cdn

$$ERC_{i,t} = \frac{ERUS_{i,t}}{ERUS_{Can,t}}$$

To pool countries, the nominal exchange rate is expressed as an index that is 100 in the base year:

$$ERC_{i,t} = 100 \frac{ERUS_{i,t}}{ERUS_{Can,t}} \frac{ERUS_{Can,base}}{ERUS_{i,base}}$$

2.5 The real exchange rate between Canada and the source country *i* at time *t* (RERC)

$$RERC_{i,t} = \frac{CPI_{Can,t}}{CPI_{i,t}} \frac{ERUS_{i,t}}{ERUS_{Can,t}}$$

This is the ratio of Canada's CPI to that of source country *i* having adjusted for the exchange rate. An increase in RERC means an increase in the cost of travel in Canada for a resident of *i*. To pool countries, the real exchange rate is expressed as an index that is 100 in the base year:

$$RERC_{i,t} = 100 \frac{CPI_{Can,t}}{CPI_{i,t}} \frac{ERUS_{i,t}}{ERUS_{Can,t}} \frac{ERUS_{Can,base}}{ERUS_{i,base}}$$

2.6 The relative price index between Canada and country *i* (RPI)

where all CPIs are set to 100 in the same base year.

$$RPI_{i,t} = 100\frac{CPI_{Can,t}}{CPI_{i,t}}$$

2.7 The real exchange rate between USA and the source country *i* at time *t* (RERUS)

$$RERUS_{i,t} = \frac{CPI_{US,t}}{CPI_{i,t}} ERUS_{i,t}$$

This is the ratio of USA's CPI to that of source country *i* having adjusted for the exchange rate. An increase in RERUS means an increase in the cost of travel in the USA for a resident of *i*. To the extent travel in the USA and Canada are substitutes, RERUS should have a positive effect on the demand for travel in Canada. In the empirical work, RERUS is also expressed as an index set to 100 in the base year.

2.8 The number of immigrants from country *i* in Canada (FB.) Calculated from Canada's 5 year censuses and interpolated linearly between census years. In some years the census does not distinguish between foreign born and immigrants so further interpolation was required to make a consistent series for immigrant populations in Canada.

2.9 The population of source country *i* (POP)

2.10 Dummy variable to indicate that either English or French is an official language of source country *i* (ENG and FR).

2.11 Distance (DIST) is a proxy for travel cost and is measured as the shorter of the two distances between the source country's capital city and Vancouver and Toronto.

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