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Immigration and inbound air travel demand in Canada

Yap Yin Choo

British Columbia Institute of Technology, 3700 Willingdon Avenue, Burnaby, British Columbia, V5G 3H2, Canada

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ABSTRACT

This paper investigates the impact of immigration on inbound air transport demand in Canada. Air travelers to Canada from 68 countries were regressed against the number of Canadian residents born overseas from 1990 to 2015 with 5-year intervals. The regressions were controlled by population, GDP per capita of country of origin, geographical distance between the major airports and visa requirements. The panel data fixed and random effects models both support the hypothesis that immigration is a major determinant of inbound arrivals in Canada. This is especially true for new immigrants and immigrants from China.

1. Introduction

The world has become more interconnected and with the proliferation of international migration, it is impossible to identify nationality based solely on race, physical appearance or distinctive features. According to the estimate by the United Nations (2015), the number of people living in a country other than where they were born reached 244 million in 2015, which accounted for 3.3 percent of the world population in that year.

Given that immigration is a prominent feature in the economic, social, and political landscape of many countries, there has been a plethora of research on the economic impacts of immigration.¹ Immigration can influence air travel demand as it encourages family members, friends and relatives of immigrants to travel to their new home country. Seetaram and Dwyer (2009) have identified several mechanisms through which immigration can influence inbound travel demand. For instance, immigrants promote their new adopted country of residence, provide free accommodation and enrich the local culture making it more interesting and cheaper for their visiting friends and relatives (VFRs) and people from their home country to visit their new homeland. Many immigrants retain business links with their former country which can influence inbound travel demand. For the stakeholders in the aviation industry, understanding and identifying the factors that affect air travel demand is important for long term planning in the areas of fleet management, airline route planning, and development of airside and landside facilities. For governments, considering factors that affect air travel demand is essential for formulating public policies to foster economic growth. However, empirical studies to establish the linkage between immigration and air travel demand are rather limited and most of them are focused on Australia and New

Zealand. Among the G8 countries, Canada had the highest foreign-born population. 20.6% of the total Canadian population (6,775,800 people) in 2011 were born overseas (Statistics Canada, 2013). However, no empirical study has been undertaken to determine this impact on air travel demand or to quantify the economic impact of migration-induced inbound travel demand. The trend of Canadian immigration has changed considerably in the past decades, from predominantly European immigrants to an increasing number of immigrants from Asia. Of particular interest is to what extent the immigrant stock from different countries stimulates the demand for inbound travel to Canada. Hence, the aim of this paper is to close this research gap using panel data models for 68 countries during the period 1990 to 2015.

The rest of the paper is as follows. Section two summarizes the literature review on the factors determining air travel demand notably immigration. Section three describes the empirical specification and methodology used for the estimation. Data description is presented in section four. Section five presents the estimation and econometric results. This is followed by concluding remarks in section six.

2. Literature review

Along with the phenomenal growth in the air travel industry, there has been a growing interest in the study of air travel demand in the last few decades. Wang and Song (2010) identified and summarized the main findings of one hundred and fifteen articles on air travel demand during the period of 1950–2008. A considerable number of the papers examined the determinants of air travel demand using different estimation models and methods. In general, the explanatory variables of air travel demand can be classified as geo-economic or service-related factors (Jorge-Calderón, 1997). Valdes (2015) categorized the

E-mail address: ychoo1@bcit.ca.

¹ Kerr and Kerr (2011) summarized the recent empirical studies on the economic impacts of immigration based on an extensive review of the literature.

Table 1
Descriptions and sources of variables used.

Variable	Definition	Source
<i>PAXNO</i>	Annual number of travelers entering Canada from source country <i>i</i> .	Statistics Canada
<i>IMMIG</i>	Number of Canadian residents born in foreign country <i>i</i>	United Nations, Department of Economic and Social Affairs
<i>DIST</i>	Average distance between the major airports in source country <i>i</i> and Toronto Pearson International Airport/ Vancouver International Airport.	https://www.world-airport-codes.com/distance
<i>GDP</i>	Per Capita GDP at constant 2005 prices in US Dollars	United Nations
<i>POP</i>	Population in source country <i>i</i> .	United Nations
<i>VISA</i>	Dummy variable if travel visa is required to enter Canada	Citizenship and Immigration Canada
<i>COMM</i>	Dummy variable for Commonwealth countries	http://thecommonwealth.org/member-countries

determinants as either outside or inside of the scope of airline control. Factors that are outside the scope of airline control include income, population, real exchange rate, consumer price index, distance, intra-modal and intermodal competition, tourism, foreign direct investment and liberalization. Factors within airline control include price, frequency of departures, load factor and aircraft size.

The literature examining air travel demand in Canada is rather limited. [Qiu and Zhang \(1995\)](#) investigated the determinants of travel arrivals and expenditures of tourists to Canada from the United States, the United Kingdom, France, the former West Germany and Japan separately using both linear and log-linear functions. They concluded that the determinants of tourism demand vary across the countries. Among the explanatory variables included in the regression model, the travel price index and GNP were highly significant determinants while immigration was only statistically significant in some regression estimations. In a more recent study, [Gillen et al. \(2013\)](#) examined whether the recent Canadian's open skies agreements and air service agreements (ASA) increases international passengers to Canada. The statistical result revealed that those countries that Canada has an Open Sky ASA with have significantly more passenger flows.

Of the papers examining the determinants of air travel demand, only a handful of them considered immigration as an explanatory variable. Overall, these empirical studies concluded that the impact of immigration on travel demand is significant both statistically and economically regardless of the methodologies used or countries researched.

Using a double log format, [Dwyer et al. \(1993\)](#) regressed number of visiting friends and relatives (VFR) arrivals to Australia from 29 countries and found that an increase in immigration (number of migrant residents) by 10% leads to increase in VFR by 0.55%. [Seetaram and Dwyer \(2009\)](#) regressed tourism arrivals in Australia against the GDP per capita, real exchange rate, population of the origin country and the number of Australian residents born overseas, as a proxy for immigration. They found that for a 1% growth in the number of Australians born overseas, the short term arrivals of tourists from the origin countries can be expected to go up by 3.2%. In another paper, [Seetaram \(2012\)](#) employed a dynamic demand model to empirically establish the connection between immigration and inbound tourism in Australia. Seetaram estimated that the short run and long-run immigration elasticities are inelastic at 0.028 and 0.09 respectively, which is substantially different from the result in [Seetaram and Dwyer \(2009\)](#).²

[Leitao and Shahbaz \(2012\)](#) studied the relationship between immigration and Portuguese travel demand for the period 1995–2008 using a dynamic panel data approach and obtained an estimated immigration elasticity of 0.49. On the other hand, [Genç \(2013\)](#) used an augmented gravity model to explain the determinants of arrivals of tourists in New Zealand and suggested that a 10% increase in the stock

² The large difference in the elasticity could be attributed to the differences in the methodology and dataset used. [Seetaram and Dwyer \(2009\)](#) used a panel dataset from 1992 to 2006, consisting of nine countries, namely New Zealand, UK, USA, Japan, China, Hong Kong, Singapore, Malaysia and South Korea. On the other hand, [Seetaram \(2012\)](#) employed a dynamic demand model approach and the data consists of 15 main markets in Australia from 1980 to 2008 but with gaps (a total of 6-year data).

of immigrants from a particular country leads to a 2.1% increase in the number of tourists from that country, *ceteris paribus*.

3. Empirical specification and econometric methodology

The availability of panel data set allow us to employ panel data regression procedures in this research. The assumed model of air travel demand is modelled as the following specification:

$$y_{it} = \beta_0 + \beta_1 x_{it} + u_i + v_{it} \quad (1)$$

where the subscript *i* refers to the origin country, the subscript *t* refers to time and y_{it} is the number of passengers entering Canada from a source country *i* (*PAXNO*). x_{it} is the explanatory variable which comprises the following variables: *IMMIG*, *DIST*, *GDP*, *POP*, *VISA*, *COMM* and year dummy variables. Detailed descriptions and sources of all variables are reported in [Table 1](#). The logarithmic transformation was applied to all variables except for the dummy variables. u_i is the time-invariant country-specific fixed effect and v_{it} is the stochastic error term which is assumed to be uncorrelated over *i* and *t*.

The model can be estimated using either fixed effect or random effect. The crucial distinction between fixed and random effects lies in the assumption as to whether there is any correlation between the unobserved factors that affect the dependent variable and explanatory variables in the model. The random effect (RE) assumes that the unobserved individual effects are random variables that are distributed independently of the explanatory variables:

$$E(u_i | x_{it}) = 0 \quad (2)$$

On the other hand, the fixed effect (FE) treats the unobserved individual effects as random variables that are potentially correlated with the explanatory variables. The fixed effect eliminates time-invariant elements; hence, the coefficients of time invariant explanatory variables are not identified. If u_i is correlated to explanatory variables, a fixed effect technique is more superior. Because time-constant variables such as *DIST* and *VISA* cannot be estimated under the fixed effects model, the effects of these constant variables are gauged under the random effect model.

4. Data description

Our sample for this study consists of balanced panel dataset of 68 countries, from 1990 to 2015 but with 5-year intervals i.e. 1990, 1995, 2000, 2005, 2010, and 2015 ($t = 6$). [Appendix 1](#) shows the list of countries by region included in the study. These countries were selected from among the top 70 inbound countries of international travelers to Canada after the United States, as compiled by Statistics Canada. Taiwan, and Saint Pierre and Miquelon were excluded from the sample as we do not have the complete data for analysis purposes.

Because data for the number of air passengers entering Canada by country of origin is not publicly available, we used the number of non-resident travelers entering Canada as a proxy for inbound air travel demand. The shortfall of using this variable is that it includes travelers entering

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