Social Science & Medicine 132 (2015) 173–180

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Trends and structural shifts in health tourism: Evidence from seasonal time-series data on health-related travel spending by Canada during 1970–2010

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ARTICLE INFO

Article history:
Available online 17 March 2015

Keywords:
Canada
Health tourism
Health service trade
GATS
Structural break

ABSTRACT

There has been a growing interest in better understanding the trends and determinants of health tourism activities. While much of the expanding literature on health tourism offers theoretical or qualitative discussion, empirical evidences has been lacking. This study employs Canada's outbound health tourism activities as an example to examine the trends in health tourism and its association with changing domestic health care market characteristics. A time-series model that accounts for potential structural changes in the trend is employed to analyze the quarterly health-related travel spending series reported in the Balance of Payments Statistics (BOPS) during 1970–2010 (n = 156). We identified a structural shift point which marks the start of an accelerated growth of health tourism and a flattened seasonality in such activities. We found that the health tourism activities of Canadian consumers increase when the private investment in medical facilities declines or when the private MPI increases during the years following the structural-change. We discussed the possible linkage of the structural shift to the General Agreement on Trade in Services (GATS), which went into effect in January, 1995.

1. Introduction

Health tourism, embodying the activities of consumers traveling abroad for health services and medical procedures, is becoming an increasingly notable way of health care delivery around the globe. While capturing much attention from the popular media, (Kumar, 2009a; Kurlantzick, 2007; Rosenthal, 2013; Surowiecki, 2012; Yang and Liu, 2012) health tourism has also become an important topic in the public policy forum (Haley, 2011; Lunt et al., 2015; Pocock and Kai Hong, 2011; Reisman, 2010). For countries on the demand side of health services abroad (with outbound patients), health tourism provides a way to relieve the shortage of health services in the domestic market. The increasing volume of health tourism activities, however, often yields growing concerns about patient safety and legal issues related to malpractice, given that the legal responsibility has not always been clearly defined between patients, health insurance agencies, and foreign health service providers (Crooks and Snyder, 2011; Hanefeld et al., 2013; Mitka, 2009; Samir and Karim, 2011; Turner, 2010). International medical travel can also influence domestic political and social changes (Ormond, 2015). For destination countries (with inbound patients), health tourism gains popularity due to the revenue and the broader economic impact generated through such activities and the opportunity to bolster domestic medical care standards (NaRanong and NaRanong, 2011; Turner, 2010). However, a lucrative health tourism sector may also distort national health care system with a negative impact on the access to health care for domestic consumers (Whittaker et al., 2010).

Due to the widespread impact of health tourism, there has been a growing need from the health system planning and policy-making perspective to better understand the nature of the trend in these activities (Chen and Flood, 2013; Cohen, 2012; Crozier and Martin, 2012; McMahon and Thorsteinsdottir, 2010). It is important to have a better understanding of what the determinants of health tourism are and in what way they have shaped the trend. Unfortunately, the rapidly expanding literature of health tourism offers mostly theoretical or qualitative discussion regarding, but lacks the much needed empirical evidences due to the paucity of reliable data (Connell, 2013; Hanefeld et al., 2015).

In this study we explore the quarterly health-related travel spending series from 1970 to 2010 in the Balance of Payments Statistics (BOPS) maintained by the International Monetary Fund (IMF) as a measure for health tourism. Combined with data from

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http://dx.doi.org/10.1016/j.socscimed.2015.03.036
0277-9536/

other sources including World Development Indicators (WDI) and the OECD Health Data (OECD Health) as covariates, the health-related travel spending data are analyzed in time-series models to assess the association of a country's outbound health tourism activities with domestic health care market conditions, using Canada as an example. Our analysis accounts for potential structural changes in the trend in health tourism, a consideration motivated by the observation of the changes in the stereotypes of health tourists and the medical procedures sought abroad. The timing of the structural break is identified using a procedure suggested by Franses and Vogelsang (1998).

This study uses Canada for two reasons. First, Canada has a relatively long history of engagement in health tourism and has been in the lead in terms of the volume of health tourism activities. In the BOPS database, Canada has the longest stretch of seasonal data dating back to 1970. The long period of data coverage allows us to have a clearer view of the presence of any structural changes. Second, during the study period, Canada's national health care system went through frequent adjustments in capital investments in health care and variation in the medical price index (MPI) under the same national health insurance system (also known as Medicare). It makes the Canadian data more ideal for identifying the impact of changes in the domestic health care market conditions without the complexity of a large scale disruption in the system, which often leads to unstable estimates in an empirical analysis.

Our analysis identified a structural shift point which marks the start of an accelerated growth of health tourism and a flattened seasonality in such activities. We also found that the health tourism activities of Canadian consumers increased when the private investment in medical facilities declined or when the private MPI increased during the years following structural-change. We offered a possible explanation of these structural changes and discussed the contextual factors.

The rest of the paper is arranged as follows. Section 2 provides an overview of the global trends in health tourism, while Section 3 gives an overview of the domestic health care market in Canada and highlights the potential factors of demand for health tourism by Canadian consumers. The data and methodology are described in Sections 4 and 5. Section 6 and 7 present the results and conclusions.

2. Global trends in health tourism

Based on a growing number of popular press reports and existing industry or country case studies, many postulate that the rising trend in health tourism is a global phenomenon. A recent study, however, shows that the growth in health tourism in the last decade is not a universal phenomenon but rather uneven across countries with the volume of health tourism activities becoming more polarized between the high- and the low-usage countries (Loh, 2014). Consequently, a better understanding of what the determinants of health tourism are is needed.

The growth of health tourism can be linked to a number of factors. From the demand side, the unavailability or inaccessibility of health services in the domestic market is the major driving factor. Health tourism seems to have gone through a major change in recent decades in terms of the type of services sought and the demographics of consumers. Until recent decades, health tourism has been characterized by affluent patients from developing countries traveling abroad for health procedures that are unavailable or of lower quality in their countries of residence (Achouri and Achour, 2002; León, 2002; Widiatmoko and AGani, 2002). This type of medical tourism continues to grow, especially within the Global South (Crush and Chikanda, 2015). During recent decades, however, rising numbers of patients from developed economies seeking medical services abroad for cost-saving or avoidance of long wait lists appear to have shifted the average profile of medical tourists (Connell, 2015). These changes could be attributed to the rapidly worsening medical inflation (e.g., in the US, see Cebula (1998) and Riggs et al. (2012)) and the increasing wait time for major surgical and therapeutic treatments at home (e.g., in Canada, see Barua et al. (2010)). The new types of health tourists form a niche market, which foreign countries with cost advantages over home countries in producing these health services (e.g., Thailand, Malaysia, and India) can tap into (Bookman and Bookman, 2007a; MacReady, 2007).

On the supply side, an increasing number of countries have been aggressively developing a health tourism sector to meet the needs of patients from targeted countries or regions. Many supplying countries carved their markets around a specialized subset of health services (such as cosmetic surgery, reproductive care, dental care, organ transplants, hip replacement, and even heart bypass surgery) while few others attempted to provide a one-stop shopping experience by offering a more balanced mix of services (Hamlin, 2012; Ramachandra, 2011; Schiano and Rhodes, 2010; Siva, 2011). In most of these countries, governments took an active role in promoting health tourism and creating financial incentives for health care providers to meet the international quality standard (Bookman and Bookman, 2007b; Kumar, 2009b; Reisman, 2010).

Another factor which may have influenced the increasing health tourism activities is trade liberalization. The most notable international service trade agreement in the recent decades is the General Agreement on Trade in Services (GATS), which went into effect on January 1, 1995. It was a major attempt of the World Trade Organization (WTO) to liberalize trade in services, with health services being one of the two specially targeted areas (the other being education services). In the GATS framework, the supply of services is categorized into four modes: cross-border delivery of services (Mode 1), consumption of services abroad (Mode 2), commercial presence of suppliers (Mode 3), and presence of suppliers as a natural person (Mode 4) (Chanda, 2002). Health tourism, which involves consumers crossing borders to obtain medical treatment, falls into Mode 2. Since the GATS commitment is legally binding, a country needs to be highly certain about the consequences and implications before committing the health service sector (Smith et al., 2009; Woodward, 2005). Full commitment consists of providing full market access and national treatment for the particular mode without any restriction. National treatment means that citizens of foreign countries are granted the same rights and privileges of national citizens. Around the time when GATS went into effect, 38 countries made full commitment to liberalize trade in medical and dental services, 21 countries committed to liberalize trade in midwife and nurse services, and 31 committed to liberalize trade in hospital services under Model 2 (Secretariat, 1998). By 2009, the number of countries that made full commitment to the above sectors rose to 49, 24, and 50, respectively (Adlung, 2010). The effect of GATS on the volume of health tourism activities is unclear due to the lack of empirical studies.

3. Health tourism by Canadians

Canadian patients have been actively involved in health tourism in the last few decades. Canada is among countries with the highest spending on health tourism. Table 1 summarizes the annual health-related travel spending and its share in personal travel spending in 2000, 2005, and 2009 for a selected list of countries. From 2000 to 2009, the health related travel spending by Canada rose from US$213 million to US$366 million dollars. With the health-related travel spending as a share of personal travel spending constantly above 1.5% for all years, Canadians also travel for health reasons

Table 1
Health related travel services spending by country.

Country	GDP per capita in 2005 (USD)	Annual health related travel services spending (in million USD)			Share of health related services share in total travel services spending		
		2000	2005	2009	2000	2005	2009
Canada	35,091	213.45	283.44	365.77	1.72%	1.57%	1.51%
Italy	30,337	87.61	82.95	266.73	0.56%	0.37%	0.96%
Greece	21,876	48.90	20.11	11.82	1.07%	0.66%	0.35%
Slovenia	17,873	3.70	13.70	0.96	0.72%	1.44%	0.07%
Croatia	10,094	13.59	22.19	38.16	2.39%	2.94%	3.77%
Mexico	8236	51.53	64.09	52.04	0.94%	0.84%	0.73%
Latvia	6972	0.30	0.90	2.80	0.12%	0.15%	0.35%
Panama	4787	1.20	1.70	2.00	0.64%	0.63%	0.59%
Brazil	4740	8.14	7.67	17.94	0.21%	0.16%	0.16%
Romania	4570	2.00	2.66	10.00	0.47%	0.29%	0.68%
Bulgaria	3735	1.71	4.98	41.47	0.32%	0.38%	2.36%
Fiji	3634	2.04	4.56	2.86	2.46%	4.30%	3.02%
Namibia	3617	1.74	2.46	1.83	2.38%	2.27%	1.68%
Cape Verde	2097	0.20	0.70	0.14	0.54%	1.04%	0.10%
Philippines	1157	10.00	6.00	10.00	0.61%	0.47%	0.37%
India	761	2.66	20.59	30.97	0.10%	0.33%	0.33%
Bangladesh	392	1.02	0.48	1.29	0.35%	0.35%	0.52%

Source: Balance of Payments Statistics, IMF. Table created by the author.

relatively more frequently compared to residents in most other countries.

Canadians' heavy consumption of health services abroad may be linked to the long-existing shortage of domestic services. The Canadian health care system, also known as Medicare, is a single payer, publicly funded system created in 1971 that aims to provide citizens with universal access to health services. Since only medically necessary services can be fully publicly funded in the system, patients are responsible, in part or in full, for the cost of the services not considered as medically necessary. However, due to government control of capital investment in hospitals, specialty mix of medical practitioners, and the investment in high-tech diagnostic and surgical equipment, many publicly funded services come with long wait lists (Barua et al., 2010; Crooks and Snyder, 2011; Eggertson, 2006; Ridic et al., 2012; Snyder et al., 2011).

According to annual surveys conducted by Fraser Institute, the median wait time is increasingly longer than what Canadian physicians regard as clinically reasonable (Esmail, 2009; Walker and Zelder, 1999). As shown in Table 2, in both 1999 and 2009 the median actual wait time was longer compared to the median clinically reasonable wait time in all specialties except medical oncology. In specialties such as neurosurgery and orthopedic surgery, the national median wait time is more than four weeks beyond what is regarded as clinically reasonable.

The long queues have likely generated a persistent demand for health tourism. Indeed, long wait times for treatment is the most heavily cited reason for Canadians engaging in health tourism (Snyder et al., 2011). It has also been recommended that the Canadian government should take advantage of medical tourism as a way of improving the wait time and access to health care (Purdy and Fam, 2011).

The private sector in Canada makes up for a significant portion of services uncovered or of shortages in the public system. The private share of the Canada's total health expenditure was approximately 24% in 1975 and rose slightly to 30% in 2005. However, the utilization of private health care in Canada depends on the relative price of health care and per capita income (Matteod, 2009). As a result, health tourism may also respond to the private sector health care price.

Canadian health tourism may also be motivated by increased treatment options abroad (e.g., alternative medicine and new

Table 2
Median Wait Time between Receiving Treatment and Appointment with Specialist in Canada, National Average (in weeks).

Specialty	1999[1]		2009[2]	
	Actual wait time (weeks)	Clinically reasonable wait Time[a] (weeks)	Actual wait time (weeks)	Clinically reasonable wait Time[a] (weeks)
Plastic surgery	10.7	8.5	16.3	10.9
Gynecology	7.8	5.1	7.2	6
Ophthalmology	8.3	4.3	8.8	7.9
Otolaryngology	9.3	5.6	10.2	7.1
General surgery	4.5	3.1	6	4.5
Neurosurgery	8.2	4	10.1	6
Orthopedic surgery	16.6	7.8	16.6	10.8
Cardiovascular surgery (urgent)	1.3	1	1	0.8
Cardiovascular surgery (elective)	10.5	5.5	5	4.2
Urology	5.5	3.4	5.1	3.8
Internal medicine	4.8	2	7.7	3.5
Radiation oncology	6.1	3.2	3	2.8
Medical oncology	2	2	2.1	2.4
Weighted median	8.4	4.1	8	5.8

[a] Based on surveys of specialists regarding what they believe as clinically reasonable.
Source: [1]Walker and Zelder (1999). Waiting Your Turn: Hospital Waiting Lists in Canada (9th edition). Fraser Institute. [2]Esmail (2009). Waiting Your Turn: Hospital Waiting Lists in Canada (19th edition). Fraser Institute.

medical procedures such as stem cell injections) and the proximity to foreign health care providers (Snyder et al., 2011). These supply-side factors may be strengthened by the growing openness of the international health care market. Although Canada has made no commitment under GATS to open up its health care sectors (with the exception of the health insurance market), the country can still benefit from the liberalization of health service sectors in all other committing countries due to the GATS' principle of most-favored nation treatment for all WTO members.

While many perceive that Canadian health tourism consists mainly of cross-border consumption in the US, some suggest that this is not likely the case based on data collected during 1994–1998 (Katz et al., 2002). In fact, other than the United States, more than twenty countries from multiple continents have been cited as popular destinations for Canadian health tourists (Turner, 2007, 2012a, 2012b).

4. Data

The data used in this study comes from the Balance of Payments Statistics (BOPS), a database maintained by the International Monetary Fund (IMF). The BOPS dataset contains annual aggregate and detailed time series related to the balance of payments and international investment position of individual countries, regions, and the world. In the dataset, the variable of interest is provided under the series labeled "Health-Related Travel". The debit series measuring the import of goods and services captures the consumption of goods and services by health travelers. The credit series, which measures the export of goods and services, reflects a country's sale of health services and other goods and services to foreign patients during health-related travel to the country.

According to the BOPS manual, "*Travel covers goods and services – including those related to health and education – acquired from an economy by nonresident travelers (including excursionists) for business and personal purposes during their visits in that economy … Travel excludes international passenger services, which are included in transportation. Students and medical patients are treated as travelers, regardless of the length of stay*" (International Monetary Fund,

2005). Thus, the "Health-Related Travel" variable contains expenditure on goods and services a patient acquires during his/her health-related trip. This measure likely includes health services and pharmaceutical products as well as accommodation and tourism activities during the trip. It thus includes most major expenses related to health tourism, except for the cross-country transportation.

We examined two variables that measure the import of health tourism as dependent variables: (1) Health-Related Travel Spending (HRT; in million USD), which represents the total quarterly spending by a country's health travelers on the aforementioned goods and services abroad, and (2) Health-Related Travel as a share of personal travel spending (HRT Share), which is HRT divided by the total personal travel spending in the quarter.

We consider several covariates of health tourism, including per capita GDP, medical price index for private expenditure on health (or private MPI henceforth), private investment in medical facilities as a percentage of the total expenditure in health, public investment in medical facilities as a percentage of total expenditure in health. The data on per capita GDP come from the World Development Indicators of the World Bank. The other variables come from the OECD Health Data. Fig. 1 illustrates the trends in all variables for Canada from 1970 to 2010.

5. Methodology

We consider that there exists a structural break point in health tourism when the changes in the service types and demographics of health tourists start. Since it is unknown *a priori* when such structural changes may have occurred, it will be improper to arbitrarily assign a date to a pre-post analysis based on the observed shifts in the data. To overcome this difficulty, we followed the approach in Franses and Vogelsang (1998) to identify the timing of the structural break. The timing identified in the data can also shed some light on the potential factors contributing to the structural changes in history.

Franses and Vogelsang demonstrated that seasonal unit-root tests could be biased toward finding too many unit roots when a structural shift exists but not considered in the model. Thus, a procedure can be developed to identify the structural break based on the tendency to fail to reject the null hypothesis in seasonal unit-root tests. We first tested for unit roots in the seasonal time series using the seasonal unit-root test proposed by Hylleberg (1990) on each dependent variable. As shown in the next section, our test results later confirmed that the necessary condition for applying Franses and Vogelsang's approach is met.

The procedure to identify the structural break involves the following steps. First, we removed the deterministic components consisting of available covariates in the vector $\boldsymbol{X}$, which includes the per-capita GDP, medical price index for private health expenditure, and public and private investment in health facilities as proportions of the total health expenditure, as well as shifts in seasonal means at an assumed date of the structural break (T_b). The shifts are captured using variables $DU_{s,t} = 1(t > T_b)*D_{s,t}$, where $1(\cdot)$ is the indicator function and $D_{s,t}$ are seasonal dummy variables (s = 1, 2, 3, and 4 representing the four quarters in a year) at time t. We collected the residuals $\tilde{y}_t$ from the regression

$$y_t = \boldsymbol{X}_t'\widehat{\boldsymbol{\beta}} + \sum_{s=1}^{4} \widehat{\delta}_s DU_{s,t} + \tilde{y}_t \tag{1}$$

and estimated an auxiliary regression on the residual $\tilde{y}_t$, which is specified as

$$\Delta_4\tilde{y}_t = \widehat{\pi}_1\tilde{y}_{1,t-1} + \widehat{\pi}_2\tilde{y}_{2,t-1} + \widehat{\pi}_3\tilde{y}_{3,t-2} + \widehat{\pi}_4\tilde{y}_{3,t-1} + \sum_{j=1}^{k} \widehat{c}_j\Delta_4\tilde{y}_{t-j} + \sum_{s=1}^{4} \widehat{\vartheta}_s D(T_b)_{s,t} + \sum_{i=1}^{4} \widehat{\theta}_s D(T_b)_{4,t-i} + e_t \tag{2}$$

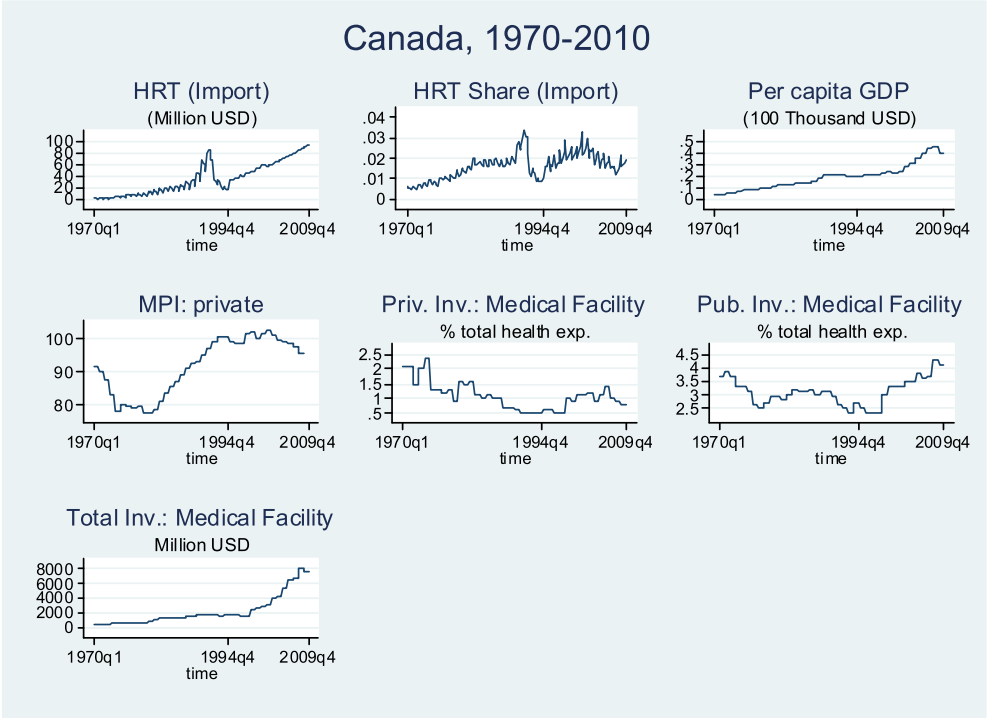

Fig. 1. Trends in selected time series of Canada, 1970–2010.

where

$$\tilde{y}_{1t} = \left(1 + B + B^2 + B^3\right)\tilde{y}_t$$
$$\tilde{y}_{2t} = -\left(1 - B + B^2 - B^3\right)\tilde{y}_t$$
$$\tilde{y}_{3t} = -\left(1 - B^2\right)\tilde{y}_t$$
$$D(T_b)_{s,t} = \Delta_4 DU_{s,t}$$

The differencing filter applied in the equation above is defined as $\Delta_k \tilde{y}_t \equiv (1 - B^k)\tilde{y}_t \equiv \tilde{y}_t - \tilde{y}_{t-k}$. The polynomial filters are based on a few possible combinations of potential seasonal unit roots. Note that the date of the structural break T_b^* is unknown *a priori* and needs to be searched over the range of all possible dates. We followed the criteria suggested by Vogelsang and Perron (1998) by choosing the date maximizing the statistic of the joint F test of $\pi_3 = \pi_4 = 0$. The truncation lag k is selected using the data-dependent method suggested in the same study.

Once the break date (T_b^*) was determined through the procedure, we examined the dependent variables in an Autoregressive-Moving-Average model with exogenous inputs (ARMAX), which is specified as

$$(1 - \phi_1 L - \ldots - \phi_p L^p)(y_t - \boldsymbol{Z}_t'\widehat{\boldsymbol{\gamma}}) = (1 + \theta_1 L + \ldots + \theta_q L^q)e_t \quad (3)$$

where p and q, the orders of the autoregressive and moving-average terms, are determined using the autocorrelation and partial autocorrelation functions as well as the Bayesian Information Criterion (BIC). The exogenous covariate vector $\boldsymbol{Z}$ includes the per-capita GDP, medical price index for private health expenditure, public and private investment in health facilities as proportions of the total health expenditure, as well as indicators of quarters and their interactions with the post-break indicator $1(t > T_b^*)$. The interaction terms allow us to examine the structural differences in terms of the association of the dependent variables with domestic health care market characteristics and the seasonality between the pre- and post-break periods.

6. Results

Our initial tests for seasonal stationarity, shown in Table 3, failed to reject the seasonal unit-root at all frequencies for either dependent variable. The test results verified the necessary condition for applying Franses and Vogelsang's procedure to identify a potential structural break.

Following Franses and Volgelsang's procedure, we identified the most likely structural break dates in HRT and HRT Share. The structural break dates in both series were consistently found for the fourth quarter of 1994. Interestingly, the timing of the structural break coincides with the inception of the GATS inception on January 1, 1995. The timing coincidence alone is not sufficient to assign the cause of the structural changes to GATS, but we will consider GATS as an important contextual factor in the remaining discussion. In order to better understand the nature of the structural break, a closer examination of the structural difference across the identified structural break date is carried out.

Given the identified break date, we estimated an ARMAX model using the specification in equation (3). The orders of the ARMA process of $p = 1$ and $q = 4$ were chosen based on our analysis of the autocorrelation and partial autocorrelation functions. Table 4 reports the estimation results of the ARMAX models.

We found a positive association between the HRT and the per-capita GDP but no association of the HRT Share with the per-capita GDP. This suggests that the health-related travel spending has been rising with per-capita income and that this increase is proportional to the increase in total personal travel spending associated with higher per-capita income. Table 5 compares the pre- and post-break association between the dependent variables and the covariates. The pre-break associations are direct estimates of the baseline coefficients. The post-break associations are calculated as the aggregation of the estimates of the baseline coefficient and their interactions with the post-break indicator. The p-values of the post-break associations are based on the tests of significance of the linear aggregations.

We found little association of either HRT or HRT Share with the domestic health care market covariates during the pre-break period. However, the association of HRT with the private MPI during the post-break period was statistically significant and positive, which is consistent with the prediction that the demand for health tourism increases when the private option becomes expensive, given that the public sector may fail to provide such services in a timely manner. Private MPI is an insignificant determinant of HRT Share during the post-break period. This suggests that the association of HRT with private MPI may have been exaggerated because of high correlation between private MPI and

Table 3
Seasonal unit roots tests on the residual of health related travel services.

	HRT (million USD)	HRT share (percent)	1% Critical value	5% Critical value
	Test statistic	Test statistic		
Z(t): 0 frequency	−3.683	−2.496	−4.05	−3.49
Z(t): 0.5 frequency	−2.742	−2.251	−3.52	−2.91
Z(t): L. annual	−3.21	−2.56	−4.04	−3.41
Z(t): annual	−3.43	−2.295	−2.65	−1.92
Joint annual	12.012	6.177	8.96	6.57
All seasons	11.562	6.097		5.89
All frequencies	12.056	6.064		6.38

The removed deterministic component consists of per capita GDP, MPI for private care, public and private spending on health administration and insurance, and public and private investment in health facilities.

Table 4
ARMAX estimations of health related travel services in Canada.

	HRT	HRT share
Per capita GDP	119.3** (47.712)	0.0234 (0.019)
MPI: private exp. on health (relative to GDP)	1.320 (1.151)	−0.000108 (0.000)
Private investment in medical facilities (% total expenditure in health)	2.388 (2.820)	0.000469 (0.001)
Public investment in medical facilities (% total expenditure in health)	−8.548 (6.831)	−0.00227 (0.002)
Post-break*MPI: private	0.130 (1.579)	0.000466 (0.001)
Post-break*Private Inv	−2.729 (4.060)	−0.00378** (0.001)
Post-break*Public Inv.	10.82* (5.999)	0.00226 (0.003)
Quarter 1	−88.70 (87.918)	0.0263 (0.020)
Quarter 2	−90.95 (87.576)	0.0261 (0.020)
Quarter 3	−91.90 (87.901)	0.0244 (0.020)
Quarter 4	−96.83 (88.061)	0.0243 (0.020)
Post-break*Quarter 1	−31.02 (153.272)	−0.0480 (0.058)
Post-break*Quarter 2	−28.90 (152.954)	−0.0454 (0.059)
Post-break*Quarter 3	−28.03 (153.101)	−0.0426 (0.059)
Post-break*Quarter 4	−23.02 (153.049)	−0.0384 (0.059)
ARMA parameters		
L.ar	0.904*** (0.104)	0.919*** (0.052)
L4.ma	0.267** (0.125)	0.197 (0.127)
Sigma		
Constant	4.198*** (0.873)	0.00178*** (0.000)
Observations	156	156

Standard errors in parentheses.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table 5
Pre- and post-break Comparison of estimated associations.

	HRT		HRT share	
	Coefficient or Combined coefficient	p-value	Coefficient or Combined coefficient	p-value
Pre-break period (Q1, 1970 – Q4, 1994)				
MPI: private exp. on health (relative to GDP)	1.320	0.251	−0.000108	0.668
Private investment in medical facilities (% total expenditure in health)	2.388	0.397	0.000469	0.601
Public investment in medical facilities (% total expenditure in health)	−8.548	0.211	−0.00227	0.305
Post-break period (Q1, 1995 – Q4, 2009)				
MPI: private exp. on health (relative to GDP)	1.45**	0.0422	0.000358	0.4138
Private investment in medical facilities (% total expenditure in health)	−0.341	0.9085	−0.003311**	0.0172
Public investment in medical facilities (% total expenditure in health)	2.272	0.4610	−0.00001	0.9931

Note: For Q1, 1970 – Q4, 1994, the coefficient estimates are directly from the estimation. For Q1, 1995 – Q4, 2009, the coefficients are based on the aggregation of coefficients for each variable and its interaction with the post-break indicator.

the general price level on which the personal travel spending depends. Since the HRT Share can actually be seen as HRT deflated by the Personal Travel Spending, it is not subject to the same bias due to general inflation.

The HRT Share during the post-break period seems to respond to the private investment in health facilities. HRT Share rises when private investment in health facilities, as a percentage in total health expenditure, decline. We found no evidence of the association of HRT or HRT Share with the public investment in health facilities during either the pre- or post-break period.

The structural shift in the long-term trend and seasonality is shown in Fig. 2 for HRT and Fig. 3 for HRT Share. In each figure, we present two series of forecasts based on the ARMAX estimation, each of which uses the one-step-ahead forecast for the pre-break period and a recursive forecast for the post-break period. The first series is based on the actual values in the data for both periods. The second series simulates the counterfactual scenario in which the break never took place, which is achieved by setting the post-break indicators and their interactions with other variables to zeros in the recursive forecast for the post-break period.

Fig. 2 shows that the seasonality in the actual HRT gradually disappeared after the fourth quarter of 1994. The factual forecast stays close to the actual HRT in trend and reflects such flattened seasonality. The counterfactual forecast, however, shows that the seasonality would have been much more prominent and the rise in HRT much slower had the structural break not taken place. The attenuation of seasonality implies that health tourism activities have gone from a seasonal tourism to an all-year round phenomenon.

The HRT Share, as shown in Fig. 3, has a reversed seasonality with much more pronounced pattern of fluctuation after the break date. Our forecast for the counterfactual scenario suggests that the HRT Share would have maintained similar seasonal variation as before the break date, had there not been the structural break. Without the structural break, HRT Share would also have been

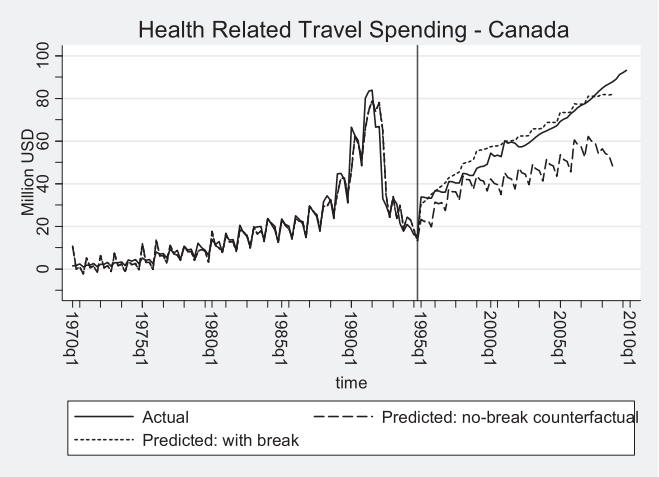

Fig. 2. Trend in and predictions for health related travel spending in Canada, 1970–2010.

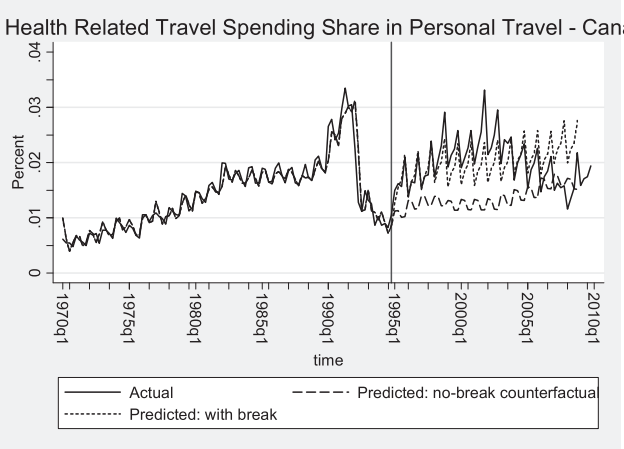

Fig. 3. Trend in and predictions for the health related travel spending as a share of the personal travel spending in Canada, 1970–2010.

lower and increasing at a slower rate. This provides some indication that the effect of the structural break is specific to health related travel spending and not a widespread influence on personal travel spending.

7. Discussion

Health tourism is expected to continue to attract attention not only because of its significant economic benefits, but also because of the potential implications it may have on health care systems and public policy. A better understanding of health tourism is of high priority for forward-looking policy makers. This study analyzes the seasonal health related travel spending by Canadian consumers from 1970 to 2010 using the BOPS data. The objectives are to better understand the trend of health tourism activities and to identify the role a country's domestic health care market characteristics play in shaping the trend. We also attempt to identify a structural break which may relate to the shift of the stereotypes of health tourists and the medical procedures sought abroad.

Borrowing from a method considered in Franses and Vogelsang, we identified the structural break point based on the likelihood of revealing multiple seasonal unit roots. The method revealed that the structural break started at the end of the fourth quarter of 1994.

This is approximately the same time when the GATS went into effect on January of 1995. While timing coincidence only lends a tenuous link, we argue that the GATS can be an important factor behind the structural break for several reasons. First, upon examination of available data, we observe notable structural changes around the same time in several other countries (e.g., Bahamas, Brazil, and Italy). It implies that there may be a common cause at the international scale. The GATS inception is, arguably, the most significant event that could have a long-term influence on health service trade around that time. In that case, our results would suggest that the effect of the GATS was rather immediate, which is not uncommon for trade agreements (Jackson, 2010). GATS negotiations and the WTO members' commitments (such as granting market access) were eight years in the making during the Uruguay Round (WTO, 2013). With considerable anticipation built up by the time of its inception, an immediate influence does not seem unreasonable.

The association with the GATS inception seems more plausible when the characteristics of the structural change are considered. We found that HRT is responsive to domestic market characteristics during the post-break period but not during the pre-break period. A possible explanation is that the options for health tourism expanded after the break point, so Canadian consumers, facing persistent wait lists under the public system, were more able to respond to the shortage and the rising cost of domestic private alternatives by seeking health services offered in foreign countries. This is consistent with the effect one believes GATS to have.

Meanwhile, gradually flattened seasonality after the structural break date is also consistent with the expansion of the supply side of the health tourism market in recent years. Until the most recent decade, health tourism services have included mainly wellness tourism (such as spa treatment and plastic surgery) and alternative medicine. The non-urgent nature of these types of care allows their consumption to be planned with vacations that tend to follow a regular seasonal pattern. However, the recent expansions of the health tourism sector in many countries, such as Thailand, India, Singapore, and Malaysia, added significant emphases on major medical procedures, such as hip replacement, organ transplant, coronary artery bypass surgery, and other invasive procedures. The demand for such medically necessary services is unlikely to follow seasonal patterns as the increasing number of hosting countries created a network of uninterrupted supply of services all year round to meet the continuing demand. The attenuation of seasonality can potentially be attributed to the increasing importance of medically necessary services in health tourism activities.

The findings of this study suggest that the investment in and the price of domestic private health care in Canada have implications for health tourism, particularly during the post-GATS decade. The Canadian health authority needs to plan for possible increases in health tourism when observing the tightening of the private health care market. For example, the Canadian legal system needs to be prepared to assist its citizens in a growing number of legal disputes related to malpractices. In addition, the medical tourism companies in Canada face a high failure rate (Turner, 2012b). The turbulent marketplace for medical tourism may increase the information cost for consumers seeking high-quality care abroad, thus making it essential for the government to monitor the trends in foreign health care options and provide guidelines and information for Canadian consumers to make informed decisions. Canada has a significant reliance on health tourism, as evidenced by considerable health-related travel spending among all countries. It seems especially crucial for the Canadian health authority to assume a more aggressive advisory role if health tourism is viewed as a part of the safety net by those whose medical needs cannot be met domestically.

The paucity of data has been a major reason for the lack of empirical studies related to health tourism. The health related travel-spending variable in the BOPS, which we use in this study, has not received much attention in the literature until recently. We found that the variable is useful in revealing plausible patterns in the long term trends, although it inevitably suffers from the common limitations of macro-level data in that it cannot be disaggregated by types of medical services. Before new data become available, the BOPS data should be further explored to advance the understanding in this area.

References

Achouri, H., Achour, N., 2002. Health services in Tunisia in the light of world trade organization agreements. In: Vieira, C. (Ed.), Trade in Health Services: Global, Regional, and Country Perspectives. PAHO, Washington DC, pp. 207–220.

Adlung, R., 2010. Trade in healthcare and health insurance services: WTO/GATS as a supporting actor(?). Intereconomics Rev. Eur. Econ. Policy 45 (4), 227–238.

Barua, B., Rovere, M.C., Skinner, B.J., 2010. Waiting Your Turn: Wait Times for Health Care in Canada 2010 Report.

Bookman, M.Z., Bookman, K.R., 2007a. Introduction to medical tourism. In: Medical Tourism in Developing Countries, First ed. Palgrave Macmillan, pp. 1–19.

Bookman, M.Z., Bookman, K.R., 2007b. Would you like a safari with your lasik surgery? The supply of medical tourism. In: Medical Tourism in Developing Countries. Palgrave Macmillan, pp. 65–94.

Cebula, R.J., 1998. Determinants of the inflation rate of the health care CPI in the US. Appl. Econ. Lett. 5 (1), 47–49. http://www.tandf.co.uk/journals/titles/13504851.asp.

Chanda, R., 2002. Trade in health services. Bull. World Health Organ. 80 (2), 158–158.

Chen, Y.Y.B., Flood, C.M., 2013. Medical Tourism's impact on health care equity and access in low- and middle-income countries: making the case for regulation (Article). J. Law Med. Ethics 41 (1), 286–300. http://dx.doi.org/10.1111/jlme.12019.

Cohen, I.G., 2012. How to regulate medical tourism (and why it matters for bioethics) (Article). Dev. World Bioeth. 12 (1), 9–20. http://dx.doi.org/10.1111/j.1471-8847.2012.00317.x.

Connell, J., 2013. Contemporary Medical Tourism: Conceptualisation, Culture and Commodification.

Connell, J., 2015. From medical tourism to transnational health care? An epilogue for the future. Soc. Sci. Med. 124, 398–401.

Crooks, V.A., Snyder, J., 2011. Medical tourism: what Canadian family physicians need to know. Can. Fam. Physician 57 (5), 527–529 e151–523.

Crozier, G.K.D., Martin, D., 2012. How to address the ethics of reproductive travel to developing countries: a comparison of national self-sufficiency and regulated market approaches (Article). Dev. World Bioeth. 12 (1), 45–54. http://dx.doi.org/10.1111/j.1471-8847.2012.00316.x.

Crush, J., Chikanda, A., 2015. South–South medical tourism and the quest for health in Southern Africa. Soc. Sci. Med. 124, 313–320.

Eggertson, L., 2006. Wait-list weary Canadians seek treatment abroad (Article). CMAJ Can. Med. Assoc. J. 174 (9). http://dx.doi.org/10.1503/cmaj.060219, 1247–1247.

Esmail, N., 2009. Waiting Your Turn: Hospital Waiting Lists in Canada: 2009 Report. Fraser Institute.

Franses, P.H., Vogelsang, T.J., 1998. On seasonal cycles, unit roots, and mean shifts. Rev. Econ. Stat. 80 (2), 231–240. http://www.mitpressjournals.org/loi/rest.

Haley, B., 2011. Public policy and medical tourism: ethical implications for the Egyptian health care system (Research Support, Non-U.S. Gov't). World Hosp. Health Serv. 47 (4), 13–15.

Hamlin, L., 2012. Patients without borders: the rise of surgical tourism. AORN J. 95 (4), 529–534. http://dx.doi.org/10.1016/j.aorn.2012.01.021.

Hanefeld, J., Horsfall, D., Lunt, N., Smith, R., 2013. Medical tourism: a cost or benefit to the NHS? (Article). PLoS One 8 (10), 1–8. http://dx.doi.org/10.1371/journal.pone.0070406.

Hanefeld, J., Lunt, N., Smith, R., Horsfall, D., 2015. Why do medical tourists travel to where they do? The role of networks in determining medical travel. Soc. Sci. Med. 124, 356–363.

Hylleberg, S., 1990. Seasonal integration and cointegration. J. Econ. 44 (1–2), 215–238. http://www.sciencedirect.com/science/journal/03044076.

International Monetary Fund, 2005. Balance of Payments Manual, fifth ed. International Monetary Fund.

Jackson, J.K., 2010. Trade Agreements: Impact on the US Economy. DIANE Publishing.

Katz, S.J., Cardiff, K., Pascali, M., Barer, M.L., Evans, R.G., 2002. Phantoms in the snow: Canadians' use of health care services in the United States. Health Aff. 21 (3), 19–31.

Kumar, R., 2009a. Global Trends in Health and Medical Tourism. SBS Publishers and Distributions, New Delhi.

Kumar, R., 2009b. Health and medical tourism in India: an overview. In: Global Trends in Health and Medical Tourism, 1 ed. SBS Publishers and Distributors, India, pp. 228–250.

Kurlantzick, J., 2007, May 20. Sometimes, Sightseeing Is a Look at Your X-rays. The New York Times. Retrieved from: http://www.nytimes.com/2007/05/20/travel.
León, F., 2002. The case of the Chilean health system, 1983–2000. In: Vieira, C. (Ed.), Trade in Health Services: Global, Regional, and Country Perspectives. PAHO, Washington DC, pp. 155–183.
Loh, C.-P.A., 2014. Health tourism on the rise? Evidence from the balance of payments statistics. Eur. J. Health Econ. 15 (7), 759–766. http://link.springer.com/journal/volumesAndIssues/10198.
Lunt, N., Exworthy, M., Hanefeld, J., Smith, R.D., 2015. International patients within the NHS: a case of public sector entrepreneurialism. Soc. Sci. Med. 124, 338–345.
MacReady, N., 2007. Developing countries court medical tourists (Article). Lancet 369 (9576), 1849–1850.
Matteo, L.d., 2009. Policy choice or economic fundamentals: what drives the public–private health expenditure balance in Canada? Health Econ. Policy Law 4 (01), 29–53.
McMahon, D., Thorsteinsdottir, H., 2010. Regulations are needed for stem cell Tourism: insights from China (Article). Am. J. Bioeth. 10 (5), 34–36. http://dx.doi.org/10.1080/15265161003754080.
Mitka, M., 2009. Surgical tourism: some us patients travel abroad for less costly surgery (Article). JAMA J. Am. Med. Assoc. 302 (14), 1519–1519.
NaRanong, A., NaRanong, V., 2011. The effects of medical tourism: Thailand's experience (Research Support, Non-U.S. Gov't). Bull. World Health Organ. 89 (5), 336–344.
Ormond, M., 2015. Solidarity by demand? Exit and voice in international medical travel – the case of Indonesia. Soc. Sci. Med. 124, 305–312.
Pocock, N.S., Kai Hong, P., 2011. Medical tourism and policy implications for health systems: a conceptual framework from a comparative study of Thailand, Singapore and Malaysia (Article). Glob. Health 7 (1), 12–23. http://dx.doi.org/10.1186/1744-8603-7-12.
Purdy, L., Fam, M., 2011. Evolving Medical Tourism in Canada: Exploring a New Frontier. Deloitte Center for Health Solutions.
Ramachandra, S.S., 2011. Dental implant tourism (Comment Letter). Aust. Dent. J. 56 (3), 344. http://dx.doi.org/10.1111/j.1834-7819.2011.01352.x. author reply 344–345.
Reisman, D., 2010. Health tourism and public policy. In: Health Tourism: Social Welfare through International Trade, 1 ed. Edward Elgar Publishing Limited, pp. 118–147.
Ridic, G., Gleason, S., Ridic, O., 2012. Comparisons of health care systems in the United States, Germany and Canada. Mater. Sociomed. 24 (2), 112–120. http://dx.doi.org/10.5455/msm.2012.24.112-120.
Riggs, J.E., Hobbs, J.C., Hobbs, G.R., Riggs, T.H., 2012. US national healthcare expenditures, 1960–2000: public and private cubic growth dynamics. Mod. Econ. 3 (2), 200–204. http://www.scirp.org/journal/me/.
Rosenthal, E., 2013, August 3. In Need of a New Hip, But Priced Out of the U.S. The New York Times. Retrieved from: http://www.nytimes.com/2013/08/04/health/for-medical-tourists-simple-math.html?_r=0.
Samir, N., Karim, S., 2011. An Insight: medical tourism, local and international perspective. Editorial Oman Med. J. 215–218. Retrieved from: http://ezproxy.auckland.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=65035964&site=ehost-live&scope=site.
Schiano, T.D., Rhodes, R., 2010. Transplant tourism (Review). Curr. Opin. Organ Transplant. 15 (2), 245–248.
Secretariat, W., 1998. Health and Social Services: Background Note by the Secretariat S: C.
Siva, N., 2011. Rise in assisted reproduction tourism in Asia threatens local medical services (Article). BMJ Br. Med. J. Overseas Retired Dr. Ed. 343 (7821), 443–443.
Smith, R.D., Chanda, R., Tangcharoensathien, V., 2009. Trade in health-related services. Lancet 373 (9663), 593–601. http://dx.doi.org/10.1016/S0140-6736(08)61778-X.
Snyder, J., Crooks, V.A., Johnston, R., Kingsbury, P., 2011. What do we know about Canadian involvement in medical tourism?: a scoping review (Research Support, Non-U.S. Gov't Review). Open Med. Peer-reviewed Indep. Open-access J. 5 (3), e139–148.
Surowiecki, J., 2012, April 16. Club Med, The New Yorker. Retrieved from: http://www.newyorker.com/talk/financial.
Turner, L., 2007. Medical tourism: family medicine and international health-related travel. Can. Fam. Physician 53 (10), 1639–1641, 1646–1638.
Turner, L., 2010. "Medical tourism" and the global marketplace in health services: U.S. patients, international hospitals, and the search for affordable health care. Int. J. Health Serv. 40 (3), 443–467.
Turner, L., 2012a. Beyond "medical tourism": Canadian companies marketing medical travel (Article). Glob. Health 8 (1), 16–26. http://dx.doi.org/10.1186/1744-8603-8-16.
Turner, L., 2012b. Canada's turbulent medical tourism industry. Can. Fam. Physician 58 (4), 371–373.
Vogelsang, T.J., Perron, P., 1998. Additional tests for a unit root allowing for a break in the trend function at an unknown time. Int. Econ. Rev. 39, 1073–1100.
Walker, M., Zelder, M., 1999. Waiting Your Turn: Hospital Waiting Lists in Canada. Fraser Institute.
Whittaker, A., Manderson, L., Cartwright, E., 2010. Patients without borders: understanding medical travel (Introductory). Med. Anthropol. 29 (4), 336–343.
Widiatmoko, D., AGani, A., 2002. International Relations within Indonesia's hospital sector. In: Vieira, C. (Ed.), Trade in Health Services: Global, Regional, and Country Perspectives. PAHO, Washington DC, pp. 107–117.
Woodward, D., 2005. The GATS and trade in health services: implications for health care in developing countries. Rev. Int. Polit. Econ. 12 (3), 511–534. http://www.tandf.co.uk/journals/titles/09692290.asp.
WTO, 2013. The General Agreement on Trade in Services (GATS): Objectives, Coverage and Disciplines. Retrieved June 22, 2013, from: http://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm#9.
Yang, W., Liu, Z., 2012, September 24. Health Rourism Can Be a Dose of Good Medicine. China Daily. Retrieved from: http://europe.chinadaily.com.cn/china.