Ministry of Finance

Research and Policy Unit

An Investigation of the Determinants of Tourism Demand to Saint Lucia

Marvin Lionel HUTCHINSON

Ministry of Finance

Research and Policy Unit

Abstract

Tourism is the largest source of foreign exchange to Saint Lucia and has a substantial direct and indirect impact on economic activity. Consequently, identifying what drives the demand for the Saint Lucian product is crucial in assessing future sector performance. More specifically, a robust understanding of the determinants of tourism demand to St. Lucia can ensure consistency with marketing regimes and provide avenues for industry stakeholders to remain competitive and achieve a sustainable sector. This piece therefore intends to model tourist arrivals, by main source market, in an econometric VAR. The VAR estimated results generated indicated that the income variables explained more of the variation in US stay-over arrivals, whereas the price variables were found to better explain the disparity in the levels of UK and Canadian stay-over arrivals to Saint Lucia.

Keywords: tourism demand, determinants, VAR modelling

Contents

List of Figures

List of Tables

Introduction

Craigwell (2007) posits that tourism in small island economies is traditionally the leading segment of the services industry, with the potential to create significant value for the sector and indirect value for ancillary sectors. The Tourism sector plays a significant role in Saint Lucia's economy. Tourism in Saint Lucia has developed into one of the leading sectors that generate a large portion of economic activity in the country. The amplitude of the tourism sector contributes to employment and foreign exchange, and with its linkages to the other sectors, also generates additional economic activity within related sectors in the economy; such as agriculture and transport sectors. With such a connection, the key elements that drive tourist arrivals to Saint Lucia underscore the need for proper analysis in order to gain a better understanding of the behaviour of the sector and its economic impact on the economy.

Song and Witt (2000) define tourism demand as the quantity of tourism product that consumers are willing to purchase during a specific period under a given set of conditions. Tourism products in Saint Lucia and regional counterparts are close substitutes with differences residing in the manner in which the product is packaged and offered to the market. Markedly, tourism to small developing islands is the engine of growth (Tsounta, 2008; Craigwell, 2007; Botti et al., 2007) as tourism receipts account for a third to half of their GDP (Dixon, et al., 2001). Tax receipts from hotel accommodation, restaurants, visitor purchase and departure tax payments, all contribute to public finance and gross domestic product (GDP). Furthermore, the tourism revenue can be used to engage in further tourism related investments; marketing and promotion, airport services, security and transportation.

Knowledge on the determinants of tourism demand has significant value for policy makers and managers. Johnson and Thomas (*as cited in Uysal, 1998: see The Economic Geography of the Tourism Industry: A Supply-Side Analysis*) posit that the measure of tourism demand is critical in assisting policymakers to quantify its contribution to the economic welfare of the local economy and to provide indicators for the efficient allocation of scarce resources. Additionally, a measure of tourism demand equips policy makers with the data to forecast and understand market behaviour in the short, medium and long-term. Tourism forecasting is essential to enact appropriate policy responses from other exotic destination and declining sectoral performance, as well as investing in destination infrastructure; airports, road works, marinas and security (Song and Witt, 2006). From a management perspective, strong knowledge of tourism demand is essential for marketing and promotion of the tourist destination and provides avenues for industry stakeholders to enhance their deliverables to the visitors; remaining competitive and achieving a more economically active sector.

The World Tourism Organisation (UNWTO) reports that international tourist arrivals were up 4% and reached a record 1.2 billion in 2015. The Majority of travelers originated from the major international sourced markets such as the Americas, Europe, Canada, and Asia. The Caribbean Tourism Organisation (CTO) reports that in 2015, tourism arrivals to the Caribbean grew faster than the global growth rate of international trips (28.7 million). Notably, the American market accounted for 50.0 percent of total arrivals, with the Canadian

and European markets also performing well. Furthermore, the average annual growth rate over the last 5 years far exceeded the average annual global growth rate of international trips.

These performances are reflected in Saint Lucia's tourism performance as the country registered an estimated 2% growth in stay-over arrivals for 2015 with positive growth recorded from the US and Caribbean markets. Though, further assessment of the data over the past three years shows that growth in stay-over arrivals has slowed for the island. The high dependency of Saint Lucia on tourism makes the sector highly susceptible to exogenous shocks (price and income) to its main source markets. Tsounta (2008) argued that the tourism sector in the respective ECCU states is particularly vulnerable in the event of an economic downturn in its main source markets. As such, it is imperative to analyze and understand the key determinants of tourism demand to Saint Lucia.

With the aforementioned motivations, this study intends to identify what drives tourist demand to St. Lucia from the four main source markets (US, UK, Canada & EU) for sample period 1987-2014. First, the elasticities of the variables will be examining and evaluating to identify the key determinants of tourism demand by employing a simple linear regression equation. Following this, similar to Song et al., (2004, 2006) in forecasting tourism demand, the paper utilises the VAR methodology with a log-linear regression equation to model and forecast tourism demand**.** The major contribution to the literature in this paper is the modeling of tourism demand to Saint Lucia or any Caribbean country via the BVAR technique. Additionally, the study intends to identify and analyse the significance of determining factors of tourism demand by treating each source market independently.

The paper seeks to answer the following research objectives: (1) what are the key determinants of tourism demand to St. Lucia? (2) How significant are these determinants factored into visitor's decision when selecting a tourist destination? (3) What impact do shocks to these determinants have on future tourist arrivals and (4) how can the behaviour of these determinants factor into effective policy and managerial strategies to enhance competitiveness?

The rest of the paper details are as follows: section one focuses on a succinct overview of the Saint Lucia tourism sector. The literature review is presented in section two, section three outlines the data and methodology, the analysis of the findings is presented in section four and section five concludes the paper.

Tourism Performance

Stayover arrivals to Saint Lucia have improved significantly over the past 28 years. Figure 1 below shows stayover arrivals to Saint Lucia from 1978-2014. Generally, stayover arrivals have been increasing over time. A closer look at the graph shows a decline in arrivals in 2001, particularly in cruise arrivals, as this can be explained by the aftermath of the terrorist attack that year.

Tourists travelled to Saint Lucia by air totaled 127,011 in 1987. Over time, the volume of air travellers has since increased and in 2015 amounted to 338,158, which is a cumulative

percentage increase of 166.6 percent over the 28-year period or an average of 6.0 percent per year. In comparison, total tourist arrivals to the Caribbean during the same period increased by 106.0 percent or an average of 3.6 percent per annum.

Figure 1 Total Stayover (air & sea) arrivals to Saint Lucia 1987-2015

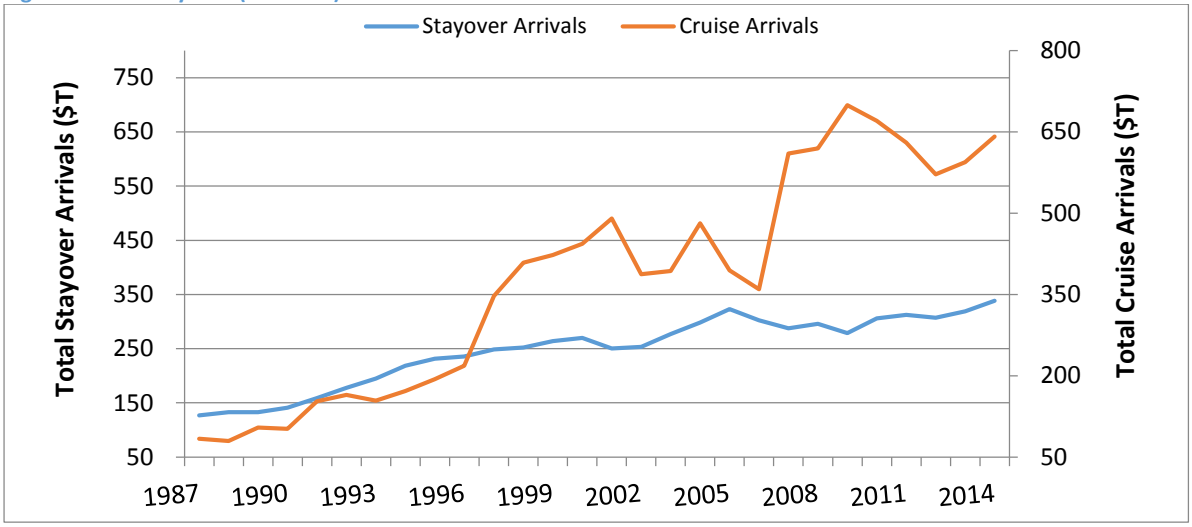


Figure 2 and 3 show that visitor expenditure, as well as its direct contribution to GDP, has been increasing over time. On average, tourist expenditure increased by an estimated 8.6 percent per year to reach $US 746 million in 2014 or 19.3 percent of GDP. In contrast, the World Travel and Tourism Council (WTTC) reported that Travel and Tourism contributed directly to the Caribbean via visitor spending an estimated $US 16.1 billion (or 4.5 percent of regional GDP). Furthermore, Travel and Tourism's direct contribution to GDP has been on an upward trend. In 2014, direct contribution to GDP amounted to $US 209.10 million or 5.4 percent of GDP.

Figure 2 Visitor Expenditure in Saint Lucia 1987-2014

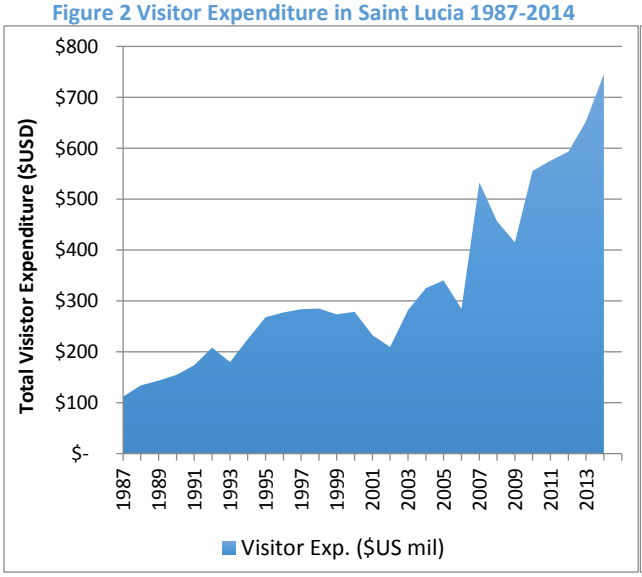
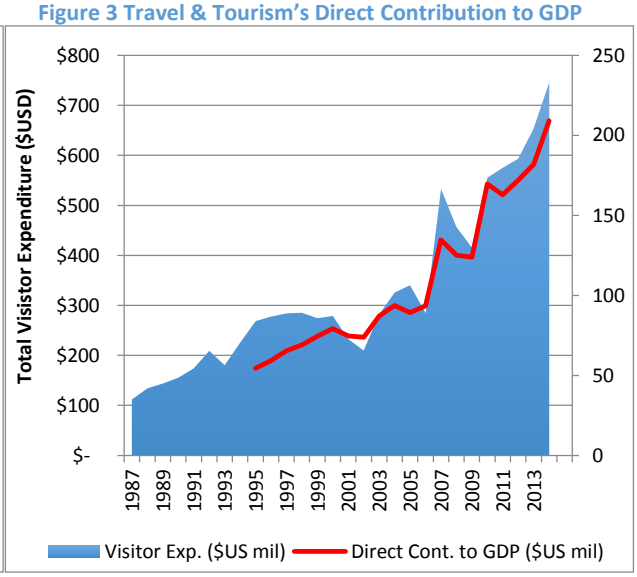


Figure 3 Travel & Tourism's Direct Contribution to GDP



However, hotel occupancy rates and the average length of stay have both declined over the sample period. Saint Lucia's hotel occupancy rates have oscillated between 50.0 percent and 75.0 percent with a peak rate of 75.3 percent registered in 1998. On the other hand, the

average length of stay had a sharp decline from 12.7 days in 1992 to a minimum of 8.6 days in 1998. On average, visitors are staying between 8 and 10 days with the UK and European visitors being spending the most time in the country.

Figure 4 Hotel Occupancy Rates

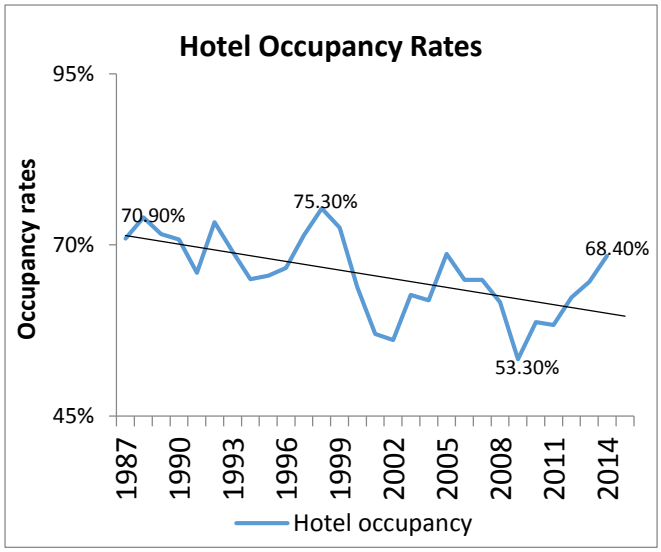
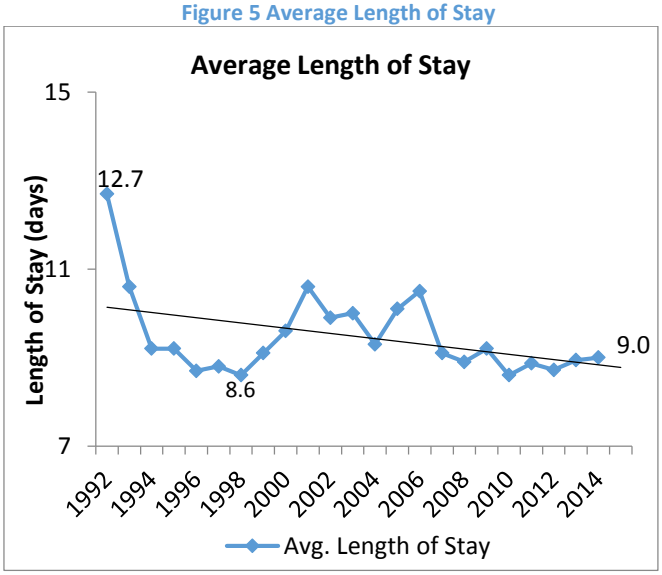


Figure 5 Average Length of Stay



The growth in the tourism sector has also generated a number of new jobs. Based on the labour statistics for Saint Lucia, tourism has contributed to 9,597 jobs in 2014; directly related to the sector. Additionally, the WTTC in 2015 reported that Travel & Tourism directly supported 16,500 jobs (21.5% of total employment). Furthermore, travel and tourism contributed to 36,000 jobs indirectly supported by the industry (46.3% of total employment).

Literature Review

The wealth of literature provides a good understanding of the economic analysis on the topic and how it contributes to the destination's economic output. This review focuses on studies that concentrated on the key determinants of tourism demand, impulse responses from shocks to the key drivers of tourist arrivals and competitiveness.

The economic literature on the determinants of tourism demand is in abundance and has provided key insight into the drivers of tourist arrivals to any particular destination. Tourism demand can be driven by a number of variables, but the majority of studies focused predominantly on price, income and economic factors; demand and supply (Song et al. 2010; Tsounta, 2008). Additionally, most research, in an effort to estimate competitiveness, compared the tourist demand performance of multiple destinations (Laframboise, et al, 2014; ECLAC, 2009; Tsounta, 2008; Craigwell, 2007, 2008).

Uysal (1998) and Tsounta (2008) noted that the tourism system is twofold, the source markets (demand side) and the destination that offers the tourism product (supply side). Similarly, Craigwell (2007) disaggregated explained variables as endogenous; variables that are determined and controlled by the tourist destination, and exogenous; variables that are determined by the source market. In a similar light, Song and Li's (2008) performed an extensive and comprehensive review of econometric methodology on estimating tourism

demand by reviewing 121 journal papers on tourism demand modeling and forecasting. The authors found that tourist arrivals variable was the most popular dependent variable for measuring tourism demand with tourist spending (visitor expenditure) being a distant second; as it incorporates the length of stay and spending behaviour.

The literature also revealed that the studies on the determinants of tourist arrivals or similar studies started with times series data on only one country. Various linear regression techniques such as error correction models, two/three stage moving average, or autoregressive integrated moving average were employed for these studies. As time progressed and more advanced econometric techniques were introduced, a shift to panel data of two or more countries was adopted. Tourism Demand Modeling and Forecasting: Modern Econometric Approaches by Song and Witt (2000) was the first book to compile the modern econometric techniques used by studies to model tourism demand. The majority of the studies in this literature review used panel data with references to other studies that used times series data. Additionally, studies on the topic were predominantly quantitative with non-casual time series models and the causal econometric approaches.

Price Factors

Like any other product offered to its targeted markets, price factors are essential and should be included in the estimation. Some of the notable price factors used over the years are real effective exchange rate (Tsounta, 2008; Laframboise et al, 2014), consumer price index (Song and Witt, 2006), relative price which is determined by the ratio of origin and destination market's consumer price index (CPI) (Craigwell, 2007; Song and Witt, 2007; Song et al, 2006). The studies concluded that price factors are found to have a significant impact on tourist arrivals. Eilat and Einav (2004) found that tourist flows are more price sensitive to high GNP countries while they are not very sensitive to fluctuations in prices in low GNP countries. This can be explained by the fact that prices in low developed countries are normally lower than that in more developed countries as it better resembles standard consumption. Additionally, the authors found that price is the most frequently significant variable for tourist arrivals from the US.

Researchers have provided extensive analysis as to which variation of the exchange rate should be used in modeling the determinants of tourism demand. Einav & Eilat (2004), Tsounta (2008), Craigwell & Worrel (2008), Onder et al. (2009), Culiuc (2014), and Laframboise et al. (2014) chose to utilise the real effective exchange rate (REER) over the nominal exchange rate and bilateral real exchange rate. The REEF appears to be the preferred option as it accounts for third-party trading partners and inflation (Culiuc 2014). However, Laframboise et al. (2014) and Culiuc (2014) both argued that unlike the larger more developed countries, tourism flows respond strongly to changes in the destination country's real exchange rate.

Song et al. (2010) posit that destination prices compared with prices in source markets will have a greater influence on tourist expenditure. As such, ECLAC (2009) reported that

Canadian visitors to the Caribbean are price sensitive with regards to the RER whereas British tourist tends to be price insensitive. The elasticity of tourist flows has been significantly examined in the literature. The general consensus is that tourism to developed countries has a price elasticity of about one while tourism to less developed countries is insensitive to price fluctuations (Eilat & Einav 2004).

Income factors

Similar to price factors, income factors play a critical part in explaining tourism demand and provide an indication of how travellers perceive the tourism product offered. The literature found that apart from price, income factors are significant determinants of visitor arrivals. Laframboise et al., 2014 and Song et al. (2010) found that visitors' income level coupled with the prices in the destination country will determine their destination choice as well as how much they spend in the destination country. With regards to the Caribbean, Craigwell & Worrel (2008) paper which focused on the largest Caribbean tourist destinations, observed that the income effect (GDP growth rates) dominated the price effect (CPI; inflation and exchange rates) for visitor arrivals. As a result, tourism is seen as a luxury good as the income elasticity is greater than one (Crouch, 1994; Tsounta, 2008; Craigwell & Worrel, 2008).

A myriad of variables has been utilised to proxy visitor's income level. Among the variables employed, real GDP per capita have been the dominant variable (Toussant, 2008). Other studies have chosen to use Gross Domestic Product (GDP), Gross National Product (GNP), Gross National Income (GNI), and National Disposable Income (NDI). Laframboise et al., (2014), however, used the unemployment rate instead of real income since it was more robust and represents a more powerful indicator for the economic environment.

In addition, other studies have supported the view that income is an important variable in determining tourism flows. As a result, tourism is seen as a luxury good as the income elasticity is greater than one (Crouch, 1994; Tsounta, 2008; Craigwell & Worrel, 2008).

Supply Factors

The availability of airlift to the destination country plays a critical role in the level of tourist flows. The literature shows that the most significant supply factors are total airlifts, room stock and foreign direct investment (Song et al., 2010, Laframboise et al., 2014 and Acevedo et al., 2016). Laframboise et al. (2014) posit that the number of airlines has a statistically positive impact on arrivals and expenditure, while Tsounta (2008) found that the number of airlines servicing a destination affects tourism potential. Song et al. (2010) observed that supply factors (airlifts & hotel room stock) affect tourist arrivals; positive for airlifts and insignificant for hotel rooms. Most recently, Acevedo et al. (2016) found that the number of flights has the largest impact on tourist arrivals to the Caribbean.

Data and Methodology

Data

The study will focus on data from the three main source markets; the United Stated of America (US), Great Britain/United Kingdom (UK) and Canada. Together, these four source markets form an average of 73.0 percent of stayover arrivals to Saint Lucia. The economic data (price, income, & demand factors) on the main sourced markets was sourced from the database of the World Bank, World Travel Tourism Council (WTTC) and the World Tourism Organisation (WTO); Caribbean Tourism Organisation. The tourism data on Saint Lucia (supply factors) was obtained from the Research and Policy Unit of the Ministry of Finance. This data was compiled by the unit, but sourced from the various tourism players in the sector. The dependent variable is stayover arrivals from the respective source markets. The sample data is for the period 1987-2014.

The main data frequency in the study is annual data. However, one caveat to note is that annual data may lack the requirements managers and policymakers need to make informed decisions. With tourism being seasonal, annual data can only provide insight for medium to long-term decisions. As such, the dominant use of annual data for econometric analysis is probably due to lack of or difficulty in obtaining data at a higher frequency (Song and Li, 2008).

Methodology and Estimation

Song and Li (2008) posit that with analysing tourism demand, econometric models possess the ability to analyse the causal relationship between the dependent variables and its influencing factors (explanatory variables). Furthermore, given the number of source markets being considered in the tourism demand analysis, a number of models are required, as each model concerns only one origin-destination relationship.

With the help of existing literature, all the income and price variables will be extracted from available databases. The selection method employed in the study will utilise a linear least squared specified model to identify the most significant variables of tourism demand for Saint Lucia that will be incorporated in the VAR. In addition, a graphical correlation of the variables will assist with identifying the most relevant explanatory variables. This method of identifying the determinants is an important part of tourism demand analysis which cannot be achieved using the VAR model (Song et al., 2006). One caveat to note is that this identification exercise is not the focus of the study instead it's a means of selecting which variables are incorporated in the VAR.

This analysis is followed by employing a VAR model (Sims, 1980) as used by Song et al., (2004, 2006) on the main tourism demand determinants for a better understanding of their behaviour and its impact on tourism demand for Saint Lucia. The VAR model treats all variables as endogenous, and each variable is specified as a linear relationship of the others (Song and Li, 2008). VARs have shown to produce accurate medium to long-term economic forecast of tourism demand (Song et al, 2000, 2006, 2010). Another advantage of using the VAR is its impulse response component, which can provide useful information for policy

makers in formulating and implementing appropriate medium or long term tourism related strategies. The impulse and forecast component will be done in a follow up paper.

VARs frequently require the estimation of a large number of parameters, therefore, a few technical analyses were required to ensure the soundness of the model and accuracy of the estimated results. A Vector Error Correction (VEC) and Unrestricted VAR were employed for all models to estimate the short-run and long-run impacts, as well as the lag effects with no restrictions. Each model for the respective sourced markets was tested for cointegration, autocorrelation, and stability (misspecification).

Song and Witt (2000) posit a general theoretical model for tourism demand, which indicates the existence of a relationship between stayover arrivals to the destination (*i)* and source market (*j).* Using the existing structure of the tourism demand model, the following was generated:

$$SA_j = f(Pi, SP_iD_j, \varepsilon_{ij}) \text{..... Price model}$$

$$SA_j = f(Yi, SP_iD_j, \varepsilon_{ij}) \text{..... Income model}$$

Where SA_j is the total number of tourist arrivals from source country (*i*) to Saint Lucia (*j*), which proxies total tourism product demanded from Saint Lucia by customers from source market *i*. P*i* is a matrix of price factors, which include:

- $REER_i$ - the real effective exchange rate for source market *i* relative to Saint Lucia; the real effective exchange rate (RER) is used as a price factor to estimate the price effect.
- $Inflation_i$ – Inflation in source market *i*, as measured by the CPI, is the cost to the consumer of acquiring a basket of goods in the destination country relative to the source market.
- $Relative\ Prices_i$– relative prices measure the ratio of the price of good in the source market relative to the good or similar good in the destination market. Here it is generated through the CPI ratio of the source and destination countries and the destination country's direct exchange rate.

$$RP_i = {CPI_i}/{CPI_j} \times Exchange\ rate$$

- CT_i- Cost of transportation from source market i to Saint Lucia; the cost of transportation (TC) is proxied by the average price of crude oil (WTI and BRENT) multiplied by the distance between the source and destination markets.

$Y_i$is a matrix of income factors, which include:

- $Income\ Per\ Capota_i$ - Income per capita for source market *i.* Income per capita is used as an indicator for measuring purchasing power in the destination country. In this study, GNI per capita at constant prices will be used as a proxy for income level.
- GDP_Per_Capita – GDP per capita of the source market over the study period

- GDP_Growth_Rate – GDP growth rate of the source market over the review period
- $Employment$ – annual employment rate in the source market
- SP_j= Substitute price index*;* The substitute price index will indicate whether any change in Saint Lucia tourism product increases or decrease the demand for its substitute counterpart. To generate the substitute index, the study will employ a method utilized by Song and Witt (2006). A weighted average cost of living of selected Caribbean destinations will be estimated for substitute markets using the CPIs, exchange rates and share of tourist arrivals. The substitute countries selected for this study to Saint Lucia's tourism product due to the availability if data was Barbados. The weighted substitute price index is given as:

    - $SP_{is} = \sum_{j=1}^{i} \left[{CPI_i}/{ER_j} \right] \times w_j$
        - Where w_j represents Barbados share of stayover arrivals from source market i to substitute country j and is calculate from $w_j = \left[TSA_i / \sum_{j=1}^{2} TSA_c \right]$, where TSA$c$ is the total stayover arrivals for the competing country and TSAi represents total stayover arrivals from the competing destinations. A positive result will indicate the substitutability of the tourism products while a negative estimation will show that they countries tourism demand and more complementary.

- D_j= Dummy variables highlighting tourism shocks associated with destination/source market
- ε_{ij}= error term with theoretical properties

Marketing is a key variable of interest, but due to data unavailability it was excluded from the model.

The structure of the model is paramount for estimation of parameters, interpretation and analysis. Research has shown that the log-linear is the most common model structure to estimate tourism demand mainly because of its easy interpretation (Tsounta, 2008, Song et al., 2000). Other studies have opted to use a linear specification, double-logarithmic model, probit-logit models or semi-log specification (Witt and Witt as quoted by Tsounta, 2008, Britt, 2008). In this study, a log-linear model will be utilised.

In accordance with the main objectives of the study, the log linear VAR model used is as follows:

$$lnSA_{j-1} = C_1 lnP_{i-1} + C_5 Sp_{i-p} + C_6 D_{ij} + \varepsilon_i \ldots\ldots\ldots\ldots \text{Price VAR}$$

$$lnSA_{j-1} = C_2 lnY_{i-2} + C_5 Sp_{i-p} + C_6 D_{ij} + \varepsilon_i \ldots\ldots\ldots\ldots \text{Income VAR}$$

Where P_i *and* Y_i are vectors of endogenous variables, C is a matrix of the coefficients to be estimated, and p is the order of the autoregression.

The variables in the VAR were regressed against the lag values of all the variables in the model. Caution has to be exercised in the selection of the number of lags in the VAR model. The inclusion of too few lags may obscure the data generation process (DGP) revealing an invalid relationship between variables in the model. However, adding too many lags may result in estimation errors as it may use up the degree of freedom, particularly if one consists of a limited number of observations. The optimal lag used in the respective source market-destination models were determined by the lag structure test.

Findings

Table 1 VECM Models per Source Market

	USA		**Great Britain**		**Canada**	
	Price Model	Income Model	Price Model	Income Model	Price Model	Income Model
R-sq.	0.57	**0.81**	**0.61**	0.59	**0.59**	0.50
Adj. R-sq.	0.38	**0.62**	**0.31**	0.33	**0.36**	0.27

The US Income Model had a higher R^2 indicating that the US income factors are better able to explain the variation in US tourist arrivals to Saint Lucia relative to the price model. Likewise, the R^2 for the UK and Canada Price Model are higher; meaning that majority of the variation in the UK and Canadian arrivals is explained by price factors as opposed to the income models.

US Market Findings

Table 2 U.S. Market VECM Price Model

Long-Run	**VAR Price Variables**	**Estimated Coefficient**
	Transportation Cost(-1)	1.74***
	Relative Prices(-1)	-7.37***
	Substitute Price Index(-1)	-2.12***
Short-Run	Relative Prices(-1)	-2.02*
	Inflation(-1)	-0.17**
	Substitute Price Index(-1)	2.34**
	R-squared	**0.57**
	Adj. R-squared	**0.38**

The VECM price model results for the US market showed that US prices relative to St. Lucia's and the substitute price index are significant factors to observe in both runs. The estimated result saw Saint Lucia as a substitute tourist destination to Barbados in the short-run but eventually becomes a complimentary destination in the long-run. In the same vain, US inflation has a negative impact on Saint Lucia's tourism demand product particularly in the short-run but becomes insignificant in the long-run. Relative price (RP) is negative and significant at the 1.0 percent level in the long-run and 10.0 percent level in the short-run. This

variation in the magnitude and significant of the RP variable shows that US stay over arrivals are less fretful of price changes in the long run but more mindful in the long run.

The VECM income model was estimated with two ranks and lags. The estimated results found that US income variables better explained the variations in U.S. demand for Saint Lucia's tourism products compared to the price variables.

Table 3 U.S. Market VECM Income Model

Long-Run	**VAR Income Variables**	**Estimated Coefficient**
	Income Per Capita (-1)	-6.48***
	Employment (-1)	6.02***
	GDP Growth (-1)	-45.55***
	Substitute Price Index(-1)	0.89***
Short-Run	Income Per Capita (-1)	-23.61*
	Income Per Capita (-2)	-26.63**
	Employment (-2)	2.11**
	GDP Growth (-1)	-24.21**
	GDP Growth (-2)	2.95*
	Substitute Price Index(-1)	-1.98*
	Substitute Price Index(-2)	-1.63*
	R-squared	**0.81**
	Adj. R-squared	**0.62**

The U.S. income variables found that income per capita is negative and significant in both runs indicating that US visitors with higher levels of income will travel less to Saint Lucia (**inferior good**). Likewise, GDP growth, which proxies economic prosperity, shows that increased US economic activity in the short-run will decrease Saint Lucia's US stay-over arrivals numbers, but over time more stay-over arrivals from the US will visit the country.

However, the employment rate was found to be positive in both runs but only significant at lags two in the short-run, indicating that as US stay-over arrivals to Saint Lucia are those with a steady job and are more likely to travel over time. Furthermore, estimated results found Saint Lucia to be a complimentary tourist destination to Barbados at both lags in the short run but a substitute in the long-run.

The UVAR model in the table below mirrored the results of the VECM. The income model had a higher R^2 indicating that US income variables, without restrictions, better explained the variation in the US tourism demand to Saint Lucia. One key observation is that the price and income variables are more significant at the second and third lags, indicating that US visitors plan their vacation to Saint Lucia in advance and current US stay-over arrivals are not

explained by price levels and income status which exist today. Furthermore, US GDP growth two and three period prior appears to be a good indicator of future US stay-over arrivals as it is positive and significant at lags two and three.

Table 4 U.S. Market Unrestricted VAR Model

Unrestricted VAR Models	
Price Variables	**Estimated Coefficient**
REER(-3)	-4.33*
Slu Disaster(-2)	-0.92*
R-squared	**0.91**
Adj. R-squared	**0.28**
Income Variables	**Estimated Coefficient**
GDP Growth(-2)	32.07***
GDP Growth(-3)	8.46***
Income Per Capita(-2)	-37.14**
Income Per Capita(-3)	24.24**
Employment Rate(-2)	1.42*
Employment Rate(-3)	-3.38***
Financial Dummy(-2)	0.48***
Slu Disaster(-1)	-0.08*
Slu Disaster(-3)	-0.20***
Substitute Price Index(-1)	-1.94**
Substitute Price Index(-3)	3.42***
R-squared	**0.98**
Adj. R-squared	**0.81**

Great Britain (UK) Market Findings

The estimated results from the UK VAR models found that the price variables better explained the variation in UK stay-over arrivals to Saint Lucia compared to the income variables.

Table 5 U.K. Market VECM Price Model

Long-Run	**VAR Price Variables**	**Estimated Coefficient**
	Transportation Cost(-1)	1.62***
	Relative Prices(-1)	2.24***
	REER U.K.(-1)	1.48***
	Inflation(-1)	0.61***
	Substitute Price Index(-1)	-10.30***
Short-Run	----------	------
	R-squared	**0.61**
	Adj. R-squared	**0.31**

The results from the VAR model above found that the price variables are significant factors, which influence a UK visitor's decision when choosing Saint Lucia as their destination of choice. With all significant price variables at the 1.0 percent level, UK stay-over arrivals are price sensitive. Therefore, any favorable changes in the respective variables may affect UK visitor's decision to travel to Saint Lucia. Similar to US stay-over arrivals, UK arrivals saw Saint Lucia as a strong complement tourist destination to Barbados. Therefore, UK visitors are more likely to select Barbados as their destination of choice over Saint Lucia in the long-run.

Table 6 U.K. Market VECM Income Model

Long-Run	**VAR Income Variables**	**Estimated Coefficient**
	Employment Rate(-1)	3.84**
	Income Per Capita (-1)	-1.06*
	GDP Growth (-1)	61.42***
	Substitute Price Index(-1)	-4.27***
Short-Run	GDP Growth (-1)	6.06***
	Substitute Price Index(-1)	1.16***
	R-squared	**0.61**
	Adj. R-squared	**0.31**

The UK income model found that higher economic prosperity in the UK economy leads to higher UK stay-over arrivals to Saint Lucia in both runs. In addition, a higher employment rate in the UK, which was found to be significant at the 5.0 percent level, also leads to increased stay-over arrivals to Saint Lucia. However, UK travellers tend to choose a different tourist destination when there is an uptick in their income level. Unlike the US, UK visitors see Saint Lucia's tourism product as a substitute to Barbados in the short-run but a complementary destination in the long-run.

Table 7 U.K. Market Unrestricted VAR Model

Unrestricted VAR Models	
Price Variables	**Estimated Coefficient**
Transportation Cost(-3)	0.27**
Relative Price(-1))	0.94**
REER UK(-2))	1.59**
Substitute Price Index(-1)	2.02**
Substitute Price Index (-2)	-2.51**
R-squared	**0.97**
Adj. R-squared	**0.66**
Income Variables	**Estimated Coefficient**
-	-
R-squared	**0.95**
Adj. R-squared	**0.41**

The unrestricted VAR also found price variables to be significant factors in understanding what influences UK stay-over arrivals to come to Saint Lucia. Albeit the magnitudes of the variables are small, UK stay-over arrivals are relatively price sensitive when choosing their tourist destination. The substitute price index shows that Saint Lucia switches from a substitute to a complement destination over time for UK visitors. Though income variables better explains variations in UK stay-over arrivals, none were significant in the unrestricted VAR.

Canada Market Findings

Variations in stay-over arrivals from Canada are explained predominantly by price factors compared to income factors.

Table 8 Canada Market Price and Income VECM Models

Long-Run	**Price Variables**	**Estimated Coefficient**
	REER(-1)	9.76**
	Substitute Price Index(-1)	-3.12
Short-Run	**Price Variables**	**Estimated Coefficient**
	REER(-1)	2.30**
	Inflation(-1)	-0.06*
	Substitute Price Index(-1)	-1.47
	R-squared	**0.59**
	Adj. R-squared	**0.36**
Long-Run	**Income Variables**	**Estimated Coefficient**
	Substitute Price Index(-1)	-0.90**
Short-Run	Substitute Price Index(-1)	0.79
	R-squared	**0.51**
	Adj. R-squared	**0.28**

The real effective exchange rate, which measures the price effect, is positive and significant in both runs. This estimated result indicates that some aspect of stay-over arrivals numbers from the source market is driven by the strength of the Canadian dollar. In addition, the inflation rate is estimated to have an adverse effect on the level of Canadian stay-over arrivals to Saint Lucia as it negative and significant in the short-run. Furthermore, albeit insignificant, Saint Lucia is estimated to be a substitute tourist destination to Barbados in the short-run but a complementary destination in the long-run.

The unrestricted VAR again showed similar results to the VEC price and income model, regarding the overall significant of the model. The price model showed to explain a higher percentage of the variation in stay-over arrivals to Saint Lucia compared to the income model. However, none of the estimated results from the unrestricted price and income models

were significant indicating that further assessment may be required. One key observation was that for the majority of the variables, the estimated results always changed sings for the second lag.

Conclusion

Understanding the significant of tourism demand and particularly what drives Saint Lucia's stay-over arrivals to the country is of critical important to the performance and sustainability of the sector. The above results of the respective markets are preliminary as the lack of data on other crucial variables may have limited the outcome of the paper. Nevertheless, tourism is a crucial sector for the Saint Lucia economy and there is an urgent need to understand the determinants of Saint Lucia's tourism product by source markets with the data that is available.

The main findings from the estimated econometric results are:

a) Estimated results generated indicated that the income variables explained more of the variation in US stay-over arrivals to Saint Lucia, whereas the price variables were found to better explained the disparity in the levels of UK and Canadian stay-over arrivals to Saint Lucia.
b) US and Canadian stayover arrivals found Saint Lucia to be a substitute tourist destination to Barbados in the short-run but a complimentary destination in the long-run.
c) Economic prosperity in the US economy contributes to higher stayover arrivals in the long-run. Likewise, employment is a key indicator of US stay-over arrivals as the research found that US arrivals that are employed or have been employed over time are more likely to travel to the island.
d) The price and income variables are more significant at the second and third lags, indicating that US visitors plan their vacation to Saint Lucia in advance and current US stay-over arrivals are not explained by price levels and income status which exist today.
e) UK stay-over arrivals were observed to be price sensitive. The UK income model found that higher economic prosperity in the UK economy resulted in higher UK stay-over arrivals to Saint Lucia in both run. Furthermore, UK visitors see Saint Lucia's tourist product as a substitute to Barbados in the short-run but a complementary destination in the long-run.

f) The Canadian models estimated results indicated that some aspect of stay-over arrivals from the source market is driven by the strength of the Canadian dollar. In addition, Saint Lucia was observed as substitute tourist destination to Barbados in the short-run but a complementary destination in the long-run for the Canadian arrivals.

Saint Lucia's tourism entities will need to pay particular attention to the price and income variations of the respective market. This approach may require the redevelopment, repackage, position and distribution of the tourism product to fit the dynamic needs of the source market. With recent economic uncertainties in some of the major source markets (Europe/UK), a proactive approach may have to be employed to navigate the intricacies of the market.

Recommendations

- Strategic pricing marketing to the source markets that are price sensitive as it may produce higher returns to Saint Lucia since we have some form on control on the price of Saint Lucia's tourism product.
- More comprehensive surveillance of the income and price factors of the major source markets by the respective tourism bodies (*SLHAT*, *SLTB and Ministry of Tourism*) to make more accurate projections and strategic policies, forecasting, marketing and promotional activities around those projections.
- More reliable data collection methods to allow for more complex analysis for a better understanding of the source markets and trends in the international tourism industry and its impact on Saint Lucia's tourism sector. This will allow for more strategic policies and efficient allocation of scarce tourism resources (financial, physical or technological).
- A qualitative component of this paper should be conducted to answer and get an alternative understanding of the estimated results of the determinants of tourism demand to Saint Lucia from the major international markets.
- A larger sample period should be utilized to accommodate for the problem of degrees of freedom and also to allow for the incorporation of other ECCU countries in the substitute price index.
- Other explanatory factors such as marketing, supply factors: airlifts, room stock and FDI, and social factors to estimate social effects of tourism demand.

References

Acevedo, S., Han, L., Kim, M., & Laframboise, N. (2016). Flying to Paradise: The Role of Airlifts in the Caribbean Tourims Industry. *International Monetary Fund*.

Craigwell, R. (2007). Tourims Competitiveness in Small Island Developing States. *World Institute for Development Ecomonic Research*, Research Paper No. 2007/19.

Craigwell, R., & Worrel, D. (2008). The Competitiveness of Selected Caribbean Tourism Markets. *Central Bank of Barbados Working Paper*.

Crouch, G. (1994). The Study of International Tourism Demand: A Survey of Practice. *Journal of travel Research, Vol. 32 No.4*, 41-55.

Culiuc, A. (2014). Determinants of International Tourism. International Monetary Fund . *International Monetary Fund Working Paper*, WP/14/82.

Eilat, Y. E. (2004). Determinants of International Tourism: A Three Dimentional Panel Data Analysis. *Applied Economics, Vol.30*, 1315-1327.

Evridiki, T. (2008). What Attracts Tourists to Paradise? *IMF Working Paper*, WP/08/277.

John, D., Kirk, H., Stefano, P., & Lisa, S. (2001). Tourism and the Environment in the Caribbean: An Economic Outlook. *The World Bank Environmental Economics Series, No. 80*.

Laframboise, N., Mwase, N., Park, J., & Zhou, Y. (2014). Revisiting Tourism Flows to the Caribbean: What is Driving Arrivals? *IMF Working Paper*, WP/14/229.

Lamframboise, N., Mwase, N., Park, J., & Zhou, Y. (2014). Revisiting Tourism Flows to the Caribbean: What is driving Arrivals? *International Monetary Fund Working Paper*, WP/14/229.

Onder, A., & Candemir, A. K. (2009). An Emperical Analysis of the Determinants of International Tourism Demand: The Case of Izmir. *European Planning Studies, Vol. 17, Iss 10*, 1525-1533.

Song, H., & Li, G. (2008). Tourism Demand Modelling and Forecasting - A Review of Recent Research. *Tourism Management. Vol. 09. Iss. #2.* , 203-220.

Song, H., & Witt, S. F. (2000). *Tourism Demand Modelling and Forecasting: Modern Econometric Approaches.* London and New York: Routeledge Taylor and Francis Group.

Song, H., & Witt, S. F. (2006). Forecasting International Tourist Flows to Macau. *Tourism Management. Vol.27. No.02*, 214-224.

Song, H., Li, G., Witt, S., & Fei, B. (2010). Tourism Demand Modeling and Forecasting: How Should Demand be Measured? *Tourism Economics, Vol. 16*, 63-81.

Song, H., Wong, K., & Chon, K. (2006). Bayesian Models for Tourism Demand Forecasting. *Tourism Management, Vol. 07, No. 05*, 773-780.

Tsounta, E. (2008). What Attracts Tourist to Paradise? *International Monetary Fund Working Paper*, WP/08/277.

Witt, S. F., Song, H., & Anhill, S. W. (2004). Forecasting Tourism-Generated Employment: The Case of Denmark. *Tourism Economics. Vol. 10. Iss. 2*, 167-176.

Appendix

US VECM Findings

	Price Variables			Income Variables	
Long-Run			**Long-Run**		
	Transportation Cost(-1)	1.74***		Income Per Capita (-1)	-6.48***
	Relative Prices(-1)	-7.37***		Employment (-1)	6.02***
	REER(-1)	3.06		GDP Growth (-1)	-45.55***
	Inflation(-1)	**-0.16**		Substitute Price Index(-1)	0.89***
	Substitute Price Index(-1)	-2.12***		Trend(66)	0.05***
	Trend(66)	-0.09***		C	175.23
	C	-6.45			
Short-Run			**Short-Run**		
	Transportation Cost(-1)	0.18		Income Per Capita (-1)	-23.61*
	Relative Prices(-1)	-2.02*		Income Per Capita (-2)	-26.63**
	REER(-1)	0.64		Employment (-1)	1.85
	Inflation(-1)	**-0.17****		Employment (-2)	2.11**
	Substitute Price Index(-1)	2.34**		GDP Growth (-1)	-24.21**
	c	-0.07		GDP Growth (-2)	2.95*
				Substitute Price Index(-1)	-1.98*
				Substitute Price Index(-2)	-1.63*
				C	1.01***
	R-squared	**0.57**		**R-squared**	**0.81**
	Adj. R-squared	**0.38**		**Adj. R-squared**	**0.62**

US market Unrestricted VAR Findings

Unrestricted VAR PRICE FACTORS	Coefficients	Unrestricted VAR INCOME FACTORS	Coefficients
Transportation Cost(-1)	1.69	GDP Growth(-1)	-15.94
Transportation Cost(-2)	0.21	GDP Growth(-2)	32.07***
Transportation Cost(-3)	-0.01	GDP Growth(-3)	8.46***
Relative Prices(-1)	2.62	Income Per Capita(-1)	7.07
Relative Prices(-2)	-11.85	Income Per Capita(-2)	-37.14**
Relative Prices(-3)	-2.82	Income Per Capita(-3)	24.24**
REER(-1)	12.12	Employment Rate(-1)	1.15
REER(-2)	-0.38	Employment Rate(-2)	1.42*
REER(-3)	-4.33*	Employment Rate(-3)	-3.38***
Inflation(-1)	-0.52	Financial Dummy(-1)	0.00
Inflation(-2)	-0.69	Financial Dummy(-2)	0.48***
Inflation(-3)	-0.72	Financial Dummy(-3)	0.03
Substitute Price Index(-1)	-1.48	Slu Disaster(-1)	-0.08*
Substitute Price Index(-2)	3.65	Slu Disaster(-2)	-0.12
Substitute Price Index(-3)	-1.34	Slu Disaster(-3)	-0.20***
Slu Disaster(-1)	-0.60	Substitute Price Index(-1)	-1.94**
Slu Disaster(-2)	-0.92*	Substitute Price Index(-2)	-1.80
Slu Disaster(-3)	-0.90	Substitute Price Index(-3)	3.42***
C	-2.48	C	1.54**
R-squared	**0.91**	**R-squared**	**0.98**
Adj. R-squared	**0.28**	**Adj. R-squared**	**0.81**

UK VECM Findings

	UK Price Variables			UK Income Variables	
Long-Run	Transportation Cost(-1)	1.62***	**Long-Run**	Financial Dummy (-1)	-0.802058
	Relative Prices(-1)	2.24***		Employment Rate(-1)	3.84**
	REER_UK(-1)	1.48***		Income Per Capita (-1)	-1.06*
	Inflation(-1)	0.61***			
	Substitute Price Index(-1)	-10.30***		GDP Growth (-1)	61.42***
	Financial_dummy(-1)	2.01***		Substitute Price Index(-1)	-4.27***
	C	24.43136		C	-10.66217
Short-Run			**Short-Run**		
	Transportation Cost(-1)	0.13		Financial Dummy (-1)	0.14
	Relative Prices(-1)	0.42		Employment Rate(-1)	-0.48
	REER_UK(-1)	0.46		Income Per Capita (-1)	-6.44
	Inflation(-1)	-0.10		GDP Growth (-1)	6.06***
	Substitute Price Index(-1)	0.33		Substitute Price Index(-1)	1.16***
	Financial_Dummy(-1)	0.03		C	0.68**
	C	0.34*			
	R-squared	**0.610844**		**R-squared**	**0.5995**
	Adj. R-squared	**0.305078**		**Adj. R-squared**	**0.332509**

UK Unrestricted VAR Findings

Unrestricted VAR PRICE FACTORS	Coefficients	Unrestricted VAR INCOME FACTORS	Coefficients
Transportation Cost(-1)	-0.11	Employment Rate(-1)	-0.82
Transportation Cost(-2)	-0.31	Employment Rate(-2)	2.29
Transportation Cost(-3)	0.27**	Employment Rate(-3)	1.00
Relative Prices(-1)	0.94**	GDP_Per Capita(-1)	-43.37
Relative Prices(-2)	-0.14	GDP_Per Capita(-2)	30.69
Relative Prices(-3)	-1.46	GDP_Per Capita(-3)	2.23
REER_UK(-1)	-0.82	GDP Growth(-1)	45.63
REER_UK(-2)	1.59**	GDP Growth(-2)	7.98
REER_UK(-3)	-1.52	GDP Growth(-3)	-0.20
Inflation(-1)	-0.10	Financial_Dummy(-1)	-0.05
Inflation(-2)	0.35	Financial_Dummy(-2)	-0.12
Inflation(-3)	0.26	Financial_Dummy(-3)	-0.22
Substitute Price Index(-1)	2.02**	Substitute Price Index(-1)	-0.50
Substitute Price Index(-2)	-2.51**	Substitute Price Index(-2)	0.94
Substitute Price Index(-3)	0.86	Substitute Price Index(-3)	-1.14
Financial_Dummy(-1)	0.48***	Slu Disaster(-1)	0.09
Financial_Dummy(-2)	-0.17	Slu Disaster(-2)	-0.02
Financial_Dummy(-3)	-0.17	Slu Disaster(-3)	0.01
C	-0.28	C	4.13
R-squared	**0.97**	**R-squared**	**0.95**
Adj. R-squared	**0.66**	**Adj. R-squared**	**0.41**

Canada VECM Findings

	Canada Price Variables			Canada Income Variables	
Long-Run	Transportation Cost(-1)	0.37	**Long-Run**	GDP_Per Capita(-1)	-1.80
	Relative Prices(-1)	1.57		Employment Rate(-1)	-1.56
	REER(-1)	9.76**		Income Per Capita (-1)	5.62
	Inflation(-1)	-0.10		GDP Growth (-1)	-132.86
	Substitute Price Index(-1)	-3.12		Substitute Price Index(-1)	-0.90**
	C	0.77		C	13.38
Short-Run	Transportation Cost(-1)	-0.14	**Short-Run**	GDP_Per Capita(-1)	9.04
	Relative Prices(-1)	0.11		Employment Rate(-1)	3.22
	REER(-1)	2.30**		Income Per Capita (-1)	-12.35
	Inflation(-1)	-0.06*		GDP Growth (-1)	4.23
	Substitute Price Index(-1)	-1.47		Substitute Price Index(-1)	0.79
	C	0.09**		C	0.10
	R-squared	**0.59**		**R-squared**	**0.51**
	Adj. R-squared	**0.36**		**Adj. R-squared**	**0.28**

Canada Unrestricted VAR Findings

Unrestricted VAR PRICE FACTORS	**Coefficients**	**Unrestricted VAR INCOME FACTORS**	**Coefficients**
Transportation Cost(-1)	-0.12	Employment Rate(-1)	-0.65
Transportation Cost(-2)	0.31	Employment Rate(-2)	-0.71
Relative Prices(-1)	0.50	Income Per Capita(-1)	5.96
Relative Prices(-2)	0.05	Income Per Capita(-2)	-0.26
REER(-1)	0.67	GDP_Per Capita(-1)	-21.44
REER(-2)	-0.94	GDP_Per Capita(-2)	15.37
Inflation(-1)	0.066	GDP Growth(-1)	13.06
Inflation(-2)	0.041	GDP Growth(-2)	-0.29
Substitute Price Index(-1)	-0.53	Substitute Price Index(-1)	0.623
Substitute Price Index(-2)	0.611	Substitute Price Index(-2)	-0.605
Slu Disaster(-1)	0.137	Slu Disaster(-1)	0.194
Slu Disaster(-2)	-0.06	Slu Disaster(-2)	0.040
C	-0.338	C	-0.151
R-squared	**0.65**	**R-squared**	**0.63**
Adj. R-squared	**0.16**	**Adj. R-squared**	**0.10**