LONG-TERM TRENDS OF VISITORS BY AIR BETWEEN NEW ZEALAND AND ITS KEY MARKETS

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ABSTRACT

This paper examines the long-term (1988 to 2011) trends of visitor arrivals and departures by air for three different purposes (holidays, visiting friends and relatives, and business) between New Zealand and its eight key passenger markets. These top markets include Australia, the UK and Ireland, Europe (excluding the UK and Ireland), North America, China, Japan, Korea, and the Association of Southeast Asian Nations (ASEAN). It then tests the significance of the effects of six economic factors on the trends using a single equation econometric approach. These economic factors are real gross domestic product per capita (PCGDP), trade openness, exchange rate, consumer price index (CPI), relative CPI, and crude oil price. We have found that in the vast majority of cases PCGDP is the most important explanatory variable, while trade openness and exchange rate are often significant factors for departure visitors to the Asian markets. The relative importance and magnitude of elasticity of significant factors vary with market, travel purpose and nature of visitors (arrival or departure). These are compared and discussed.

Key words: air passenger travel, economic factors, elasticity, demand modelling.

1 INTRODUCTION

Since 1999, the New Zealand Ministry of Economic Development (now part of the Ministry of Business, Innovation and Employment) has produced annual tourism forecasts[2]. A consulting firm, Covec (2009), has investigated the statistical correlations between visitor arrivals to New Zealand and characteristics of the visitors. However, these studies only cover arrivals for seven or eight countries. The purpose of this research is to examine the long-term trends of both air travel arrivals (by foreigners) and departures (by New Zealand residents) between New Zealand and its eight key markets, namely Australia, the UK and Ireland, Europe (excluding the UK and Ireland), North America, China, Japan, Korea, and the Association of Southeast Asian Nations (ASEAN). These markets include not only top countries but also wider regions. The arrivals and departures are split by the following three travel purposes: holidays, visiting friends and relatives (VFRs), and business (including conventions and education).

This study also tries to better understand the long-term trends in New Zealand's international air passenger travel by testing the significance of the effects of the following six economic factors: real gross domestic product per capita (PCGDP),

[1] The opinions expressed in this paper are those of the authors, and do not necessarily represent the views of the Ministry of Transport.
[2] Information related to the programme can be found at: http://www.med.govt.nz/sectors-industries/tourism/tourism-research-data/forecasts

trade openness, exchange rates, consumer price index (CPI), relative CPI, and crude oil price. Section 2 of this paper provides definitions of these explanatory variables, and Section 3 contains more discussion about the variable selection. Through this research, we seek to answer the following three questions that have important policy implications.

- Which economic factors have a significant effect on the long-term trends of air passenger travel between New Zealand and its key markets?
- What is the relative importance of a significant factor compared to others regarding their effects on the trends?
- To what extent does a significant economic factor affect the air travel demand (demand elasticity)?

Note that this research is not intended for air travel forecasting, as the modelling approach in this work can be different from that used in air travel demand forecasts. In the latter case, an explanatory variable with a "wrong" sign (for example, when PCGDP negatively correlates with travel demand) could be acceptable if the forecasting model has a strong prediction power. However, any variables associated with this problem have to be eliminated from model specifications in this study so that the derived regression equations can give a meaningful explanation about the effects of an economic factor on air travel trends.

2 METHODOLOGY

We have used a conventional single equation econometric method based on multiple linear regressions, which is in a double logarithm linear functional form:

$$LnPCNUM = \alpha LnX + \beta LnY + \gamma \mathrm{Dummy} + \ \ldots + \mathrm{C}$$

Where, PCNUM is the number of departure or arrival air passengers per capita (measured in per 1000 of population) for a purpose to or from a country or region. X, Y and Dummy (variable) are explanatory variables. C is the constant term. This simple approach is easy to use and can generally produce reasonably good empirical results (Witt and Witt, 1995). Although the method could be associated with some issues, typically spurious regressions, it has been used in many tourism and transport demand forecasting studies. For example, BITRE (2012) has used this approach to produce Australian official forecasts of air passenger movement. In recent years advanced econometric modelling techniques have been developed for tourism demand prediction (Li, et. al., 2005; Song and Li, 2008; Hilaly and El-Shishiny, 2008). Interestingly, research has shown that there is no single approach that consistently outperforms others in all situations (Song and Li, 2008).

In order to test the significance of the effects of economic factors on air travel trends, a backward elimination procedure was used, where all explanatory variables were first put into modelling and insignificant variables were then removed, leaving only significant ones in the derived regression equation. The standardised regression coefficients were used to determine the relative importance of significant variables. This is a widely accepted approach because standardised coefficients, which measure the change in standard deviations, remove the effects of differing

measurement units, making them directly comparable (Field, 2005). This means that in this study the relative importance of significant factors is not assessed based on the magnitude of their elasticities. In a double logarithm linear equation, regression coefficients can be interpreted as elasticities of the corresponding variables, except for dummy variables. It is problematic to directly compare the elasticities of different variables, as they can be affected by measurement units.

Six economic factors were used as explanatory variables:

- Real gross domestic product per capita (PCGDP, in constant 2000 US dollars), which measures general income, or more broadly speaking, overall economic performance in a country or region
- Trade openness (Open), which is defined as New Zealand's total trade volume with a country or region (i.e. sum of imports and exports) divided by New Zealand's GDP. It is closely related to business connections (Turner and Witt, 2001)
- Exchange rate (Ex), the amount of a foreign currency per NZ dollar, which is related to travellers' living costs
- Consumer price index (CPI) in a destination, which is taken as a proxy for the costs of living in that destination (Witt and Witt, 1995)
- Relative CPI (RCPI), which is defined as CPI of another country or region divided by CPI of New Zealand. It measures the relative price movement between an origin and a destination and is closely related to competition between domestic travel and international travel
- Brent crude oil price (Brent, in US dollars per barrel), which is used as a proxy for airfares.

The following major events (one-off shocks) were taken into consideration using dummy variables:

- The 2008/09 Global Financial Crisis (GFC)
- The 1997/98 Asia Financial Crisis (AFC)
- September 11, 2001 (SEP11)
- The SARS epidemic (of November 2002 – July 2003)
- The 2011 Rugby World Cup (RWC).

These variables have been widely used in tourism demand studies. Annual data from 1988 to 2011 were used in this study and air passenger travel data were obtained from Statistics New Zealand's Travel and Migration Database. The sources of other data include: exchange rates from the Reserve Bank of New Zealand, other New Zealand economic data from Statistics New Zealand, Brent crude oil price data from the US Energy Information Agency, population data from the United Nations, and economic data for other countries or regions from the World Bank (World Development Indicators & Global Development Finance). Statistical analyses were carried out using EViews and SAS Enterprise Guide software packages.

3 INFLUENTIAL FACTORS FOR INTERNATIONAL AIR TRAVEL

According to demand theory, the optimal choice of consumer goods depends on consumers' income and the prices of the goods. It implies that when people get richer, they tend to travel more. Conversely when the costs of travelling to and/or living in a destination increase, people tend to travel less to that destination (Song and Witt, 2000). Previous studies have found that many factors can impact on the demand of international air travel, including travellers' income, living costs in a destination and travel costs to the destination (own price), substitute price, exchange rates, deterministic trends, marketing (advertising expenditure), travellers' tastes, and other social, cultural, geographic and political factors (Song and Witt, 2000; Witt and Witt, 1995; Li, et. al., 2005). The volume of trade between origin and destination countries has a positive influence on business travel and maybe also holiday travel, as awareness of the destination and cross-country personal relationships increase with increasing trade. The impact of trade openness (see Section 2 for its definition) is expected to be similar to that of trade volume (Turner and Witt, 2001). New Zealand has a relatively open immigration policy and migration is found to have a strong effect on New Zealand's tourism (Law et. al., 2009). The effect of migration is expected to be stronger on VFR travel. In addition, factors on the supply side, such as available seats, flight routes and flight frequency, can also affect air travel demand.

Based on an extensive literature review of previous tourism demand studies, Li and colleagues (2005) have found that income and relative prices are the most significant determinants for international tourism demand, and that to capture the effects of one-off events, dummy variables have been commonly used. Although we have used a limited set of explanatory variables in this study, the variable selection is well in line with the literature and economic theory. These variables cover income, own price, relative price, exchange rates and trade. We think that these economic factors are among the key variables determining the long-term trends in New Zealand's international air travel, and that their effects may vary with market, travel purpose and the nature of visitors (arrival or departure).

Omission of other factors in this research mainly results from resource and data constraints. For example, good data on airfares and supply side factors are difficult to obtain. Interestingly, airfares are found to be materially less influential in a tourist arrival study for New Zealand (Covec, 2009). Furthermore, recent studies have been less keen to include the deterministic trend variable in model specifications due to potential statistical issues (Li, et. al., 2005).

4 LONG-TERM TRENDS OF INTERNATIONAL AIR TRAVEL

4.1 Arrivals and departures for the Australian market

Australia is New Zealand's most important source and destination of air passenger travel. About 0.45 million Australian residents visited New Zealand in 2011 for each of the purposes of holidays and VFRs (Figure 1). In contrast, the number of air travellers from other key markets for any purpose was well below 0.2 million per annum (Figure 2). This is most likely attributable to the short distance and strong business and family links between the two countries (Australia is New Zealand's

largest trading partner). Arrivals from Australia for holidays and VFRs show a similar strong upward trend (Figure 1a). This demonstrates that although Australia is a traditional source of visitors to New Zealand, there seems to be still room for expansion in this market. The number of New Zealand residents visiting Australia for VFRs is also increasing (Figure 1b). On the other hand, the numbers of both arrivals and departures for business have levelled off in recent years. The negative effect of the 2008/09 Global Financial Crisis on business travel can be clearly seen. Furthermore, the number of New Zealand residents visiting Australia for holidays appears to be volatile.

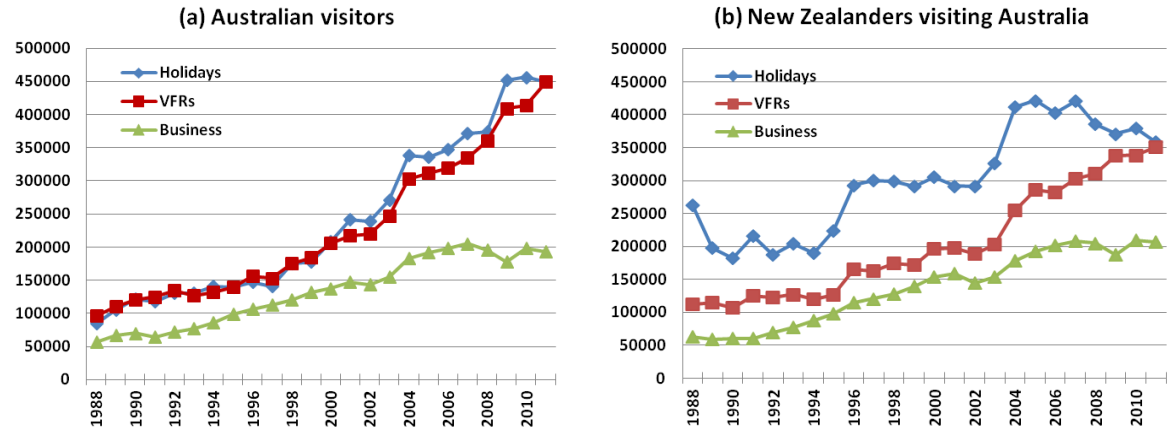

Figure 1: Number of air passenger arrivals and departures for three travel purposes for the Australian markets

4.2 Arrivals and departures for the other seven key markets

Figure 2 shows the trends of air passenger arrivals and departures for three travel purposes related to the other seven markets [the UK and Ireland, Europe (excluding the UK and Ireland), North America, China, Japan, Korea, and the ASEAN]. Regarding holiday arrivals (Figure 2a), a clear downward trend can be seen in recent years for four markets - Japan, the UK and Ireland, Korea, and North America. This is in contrast to the rapid increase in the number of holiday arrivals from China. Interestingly, an overall upward trend is seen for holiday arrivals from other European countries. Note that the 1997/98 Asia Financial Crisis had a huge negative impact on holiday arrivals from Korea. Among the seven markets, New Zealand residents have visited the ASEAN and North America the most for holidays, with the numbers increasing (Figure 2b). On the other hand, the number of holiday departures to the other five markets seems to have levelled off in recent years.

Excluding Australia, the arrivals and departures for VFRs are dominated by those related to the UK and Ireland market (Figures 2c and 2d), probably resulting from strong family and cultural links between New Zealand and the region. North America is also an important source of VFR arrivals, with the number remaining relatively stable in recent years. An upward trend is seen for VFR arrivals from Europe (excluding UK and Ireland), China and ASEAN, which is opposite to the declining trend for Japan and Korea. With regards to VFR departures, an overall upward trend is apparent for all markets except for Korea, and in particular, the increase is faster for those visiting China and the ASEAN.

The number of arrivals and departures for business (Figures 2e and 2f) is generally smaller compared to that for the other two travel purposes. Excluding Australia, the business arrivals and departures are dominated by those related to the North American market. Note that in most cases business air travel appears to be relatively volatile.

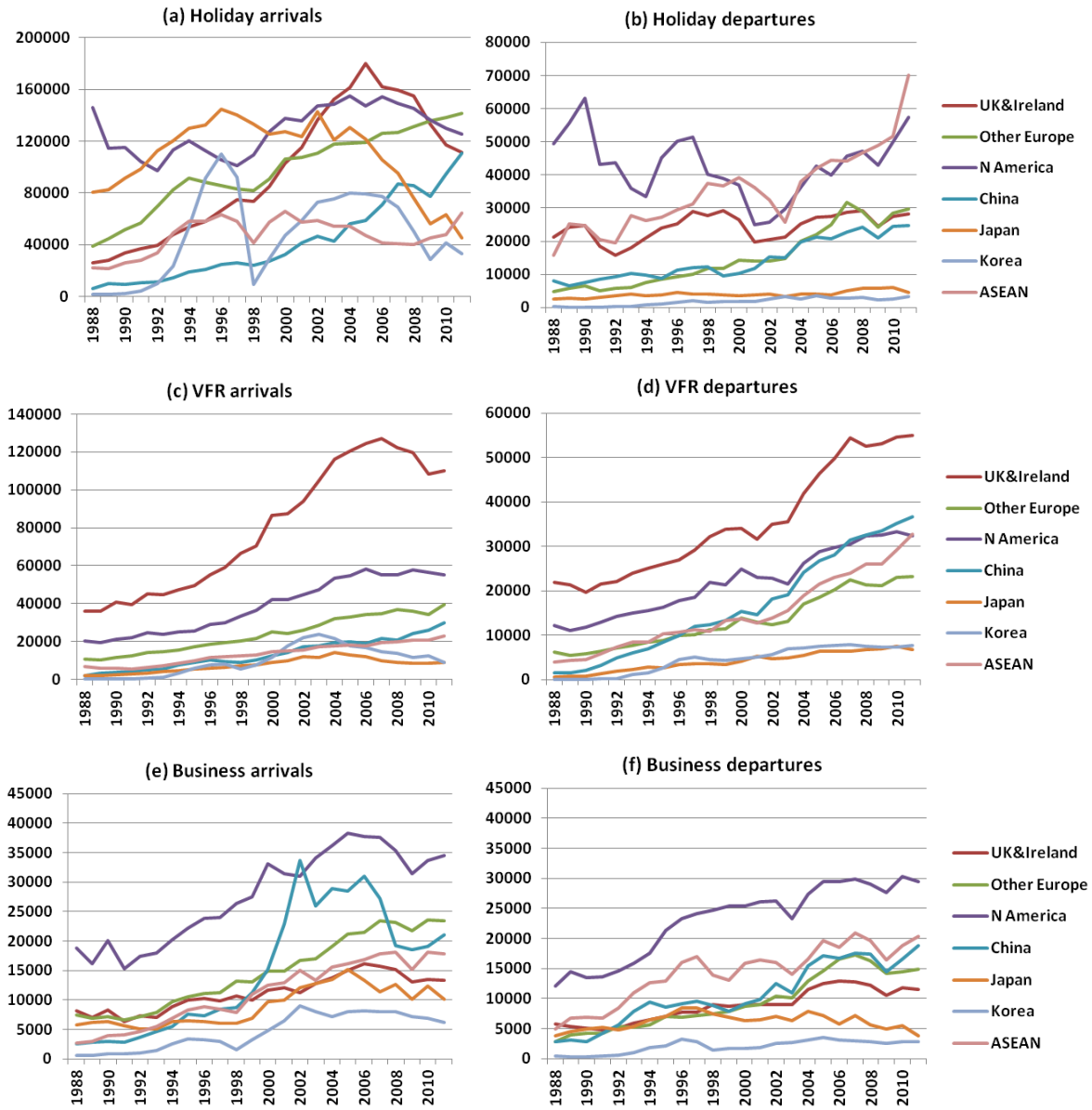

Figure 2: Number of air passenger arrivals and departures for three travel purposes related to key markets (excluding Australia); note that different scales are used in this chart so that the trends can be clearly seen.

5 MODELLING RESULTS

5.1 Significant economic factors and their relative importance

Significant economic factors and their relative importance are shown in Table 1. In the vast majority of cases, GDP per capita is the most important factor for both arrivals and departures. Trade openness is a significant factor for outgoing New

Zealanders visiting the Asian markets and for business travel to Australia, but is insignificant for the European and North American markets.

Exchange rates are seldom significant for arrivals but often become a significant factor for New Zealand residents' departures (except for those visiting Europe). This may imply that New Zealanders are sensitive to exchange rates when planning their overseas travel. Relative CPI is often a significant factor for arrivals to New Zealand for holidays or VFRs (except those from Japan). Interestingly, in many cases crude oil price is a significant factor for business travel. A possible reason for this might be that airfares for business travel are generally more expensive than those for other travel purposes.

5.2 Detailed model specifications and elasticities

Detailed model specifications for all individual markets are given in Table 2. The models generally have a satisfactory goodness of fit (as measured by adjusted R^2). Since these models are expressed in a double logarithm linear functional form, the regression coefficients can be interpreted as elasticities of corresponding explanatory variables, except for dummy variables.

Nearly all the elasticities of real GDP per capita are over one (i.e. they are elastic so that a 1% increase in real GDP per capita has seen a greater than 1% increase in air travel). As seen in Figure 3, the elasticities of GDP per capita are higher for arrivals from Japan and Korea (possibly partly reflecting the volatility for both markets), but lower for arrivals from China and ASEAN (likely resulting from their high growth rate of PCGDP). This is particularly true for holiday or VFR arrivals. It should be noted that China and ASEAN are generally developing travel markets to New Zealand. If their economies continue to grow rapidly, these markets are likely to be a very large source of new visitors to New Zealand in the future.

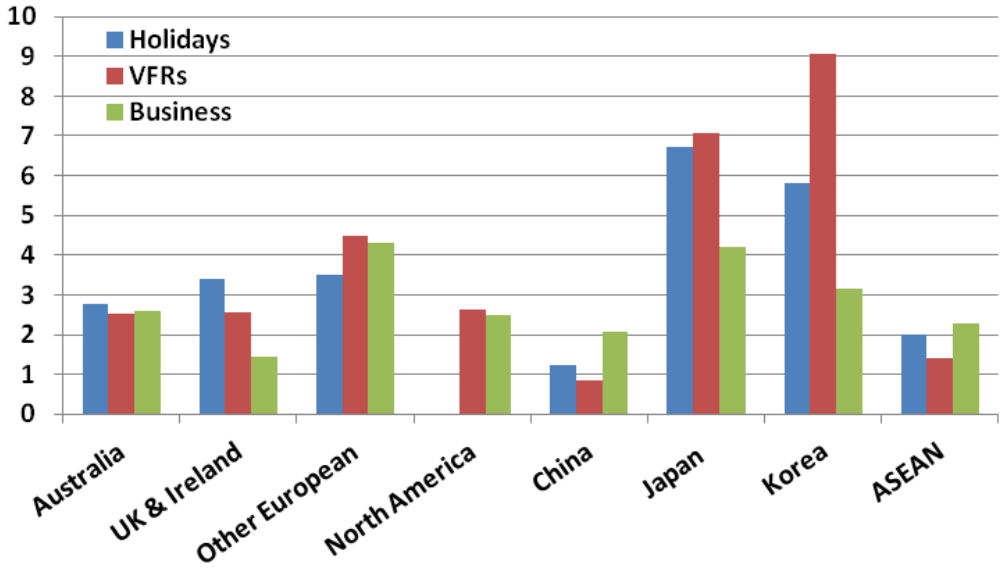

Figure 3: Comparison of elasticities of GDP per capita for arrivals; note that PCGDP is not a significant variable for arrivals from North America

Table 1: Significant economic factors and their relative importance

			PCGDP	Trade openness	Exchange rate	Crude oil price	RCPI
Australia	Australian resident arrivals	Holidays	1st		3rd		1st
		VFRs	1st		3rd		1st
		Business	1st			2nd	
	NZ resident departures	Holidays	1st		3rd		2nd
		VFRs	1st				
		Business	1st	2nd			
UK and Ireland	UK & Irish resident arrivals	Holidays	1st				2nd
		VFRs	1st				2nd
		Business	1st				
	NZ resident departures	Holidays	1st				2nd
		VFRs	1st				
		Business	1st			2nd	
Europe (excluding UK & Ireland)	European resident arrivals	Holidays	1st				2nd
		VFRs	1st				2nd
		Business	1st				
	NZ resident departures	Holidays	1st				2nd
		VFRs	1st				
		Business	1st				
North America	North American resident arrivals	Holidays					1st
		VFRs	1st				
		Business	1st			3rd	CPI
	NZ resident departures	Holidays			2nd		1st
		VFRs	1st				
		Business	1st				
China	Chinese resident arrivals	Holidays	1st				2nd
		VFRs	1st				2nd
		Business	1st			2nd	
	NZ resident departures	Holidays	3rd	1st	3rd		2nd
		VFRs		1st	2nd		
		Business		1st	2nd		
Japan	Japanese resident arrivals	Holidays	1st	3rd		2nd	
		VFRs	1st		2nd		
		Business	1st				
	NZ resident departures	Holidays					1st
		VFRs		2nd		2nd	1st
		Business		1st	2nd		
Korea	Korean resident arrivals	Holidays	1st			3rd	1st
		VFRs	1st			3rd	2nd
		Business	1st			3rd	CPI
	NZ resident departures	Holidays	1st	4th	2nd	2nd	
		VFRs	2nd	2nd	1st	2nd	
		Business	1st	4th	2nd	2nd	
ASEAN	ASEAN resident arrivals	Holidays	1st		3rd	2nd	
		VFRs	1st				2nd
		Business	1st			2nd	
	NZ resident departures	Holidays	1st	3rd	1st		
		VFRs	2nd	1st	2nd		
		Business	2nd	1st		2nd	

Ranking key: 1st 2nd 3rd 4th

Note: In two cases (North America and Korea) CPI, rather than relative CPI, is a significant factor; the ranking keys indicate relative importance of explanatory variables, with the first order being the most important.

Table 2: Summary of detailed model specifications

Market	Travel purpose	Arrivals	Adjusted R^2	Departures	Adjusted R^2
Australia	Holidays	$2.76LnPCGDP - 0.679LnEx - 25.2 + [AR(1) = 0.534]$	0.96	$1.30LnPCGDP + 0.802LnEx - 8.78$	0.78
	VFRs	$2.53LnPCGDP - 0.675LnEx - 23.0 + [AR(1) = 0.644]$	0.97	$2.50LnPCGDP - 21.7 + [MA(1) = 0.513 \dots]$	0.90
	Business	$2.61LnPCGDP - 0.108LnBrent - 0.117GFC - 23.7 + [MA(1) = 0.739 \dots]$	0.98	$2.86LnPCGDP + 0.475LnOpen - 24.7 + [MA(1) = 1.00 \dots]$	0.97
UK and Ireland	Holidays	$3.39LnPCGDP + 2.51LnRCPI - 34.0 + [AR(1) = 0.326] + [MA(1) = 1.00 \dots]$	0.98	1988 – 2000: $2.68LnPCGDP - 2.47LnRCPI - 25.3$ 2001 – 2011: $2.81LnPCGDP - 0.0772GFC - 27.2$	0.76 0.92
	VFRs	$2.57LnPCGDP + 0.688LnRCPI - 25.8$	0.98	$2.12LnPCGDP - 19.5 + [MA(1) = 0.612 \dots]$	0.94
	Business	$1.43LnPCGDP - 16.2$	0.89	$2.55LnPCGDP - 0.109LnBrent - 0.114GFC - 0.110SEP11 - 24.9$	0.94
Europe (excluding UK & Ireland)	Holidays	$3.50LnPCGDP + 1.78LnRCPI - 37.3 + [MA(1) = 0.942 \dots]$	0.95	$4.15LnPCGDP - 2.24LnRCPI - 41.3 + [AR(1) = 0.446]$	0.97
	VFRs	$4.47LnPCGDP + 1.53LnRCPI - 0.106SEP11 - 48.5$	0.97	$3.11LnPCGDP - 30.7 + [MA(1) = 0.618 \dots]$	0.94
	Business	$4.31LnPCGDP - 47.4 + [AR(1) = 0.492]$	0.96	$2.99LnPCGDP - 29.8 + [AR(1) = 0.468]$	0.97
North America	Holidays	$4.01LnRCPI - 0.931 + [AR(1) = 0.604]$	0.71	$0.526LnEx - 5.13LnRCPI - 0.224SEP11 + 2.49$	0.79
	VFRs	$2.62LnPCGDP - 29.5$	0.98	$2.14LnPCGDP - 20.2 + [MA(1) = 0.483 \dots]$	0.90
	Business	$2.82LnPCGDP - 0.815LnCPI - 28.3$ or $2.17LnPCGDP - 0.0813LnBrent - 24.9$	0.94 0.91	$1.21LnPCGDP - 10.6 + [AR(1) = 0.704]$	0.90
China	Holidays	$1.24LnPCGDP + 0.508LnRCPI - 12.4$	0.98	$1.16LnPCGDP + 0.549LnEx + 0.415LnOpen - 0.889LnRCPI - 10.0$	0.91
	VFRs	$0.862LnPCGDP + 0.615LnRCPI - 0.133AFC - 10.7 + [AR(1) = 0.500]$	0.98	$1.26LnOpen + 1.08LnEx + 4.00$	0.94
	Business	$2.08LnPCGDP - 0.939LnBrent(-2) - 16.2$	0.82	$0.598LnOpen + 0.786LnEx + 1.86$	0.92
Japan	Holidays	$6.72LnPCGDP + 0.921LnOpen - 0.477LnBrent - 66.6 + [AR(1) = 0.365]$	0.92	$-0.462LnRCPI - 0.204SARS + 0.0721 + [MA(1) = 0.908 \dots]$	0.62
	VFRs	$7.07LnPCGDP - 1.09LnEx - 72.8 + [MA(1) = 0.969 \dots]$	0.93	$-8.10LnRCPI(-2) - 0.475LnBrent - 0.569LnBrent(-2) + 4.56$	0.77
	Business	$4.20LnPCGDP - 47.0 + [MA(1) = 0.746 \dots]$	0.79	1988 – 1998: $-0.341LnBrent - 6.40LnRCPI - 0.300AFC + 2.97$ 1999 – 2011: $0.736LnOpen + 0.500LnEx + 0.612$	0.94 0.74

Table 2 continued

Market	Travel purpose	Arrivals	Adjusted R^2	Departures	Adjusted R^2
Korea	Holidays	$5.82LnPCGDP - 1.58LnBrent - 1.14GFC - 1.15AFC - 49.2 + [MA(1) = 1.00 \dots]$	0.93	$7.00LnPCGDP - 0.798LnBrent + 2.06LnEx + 1.51LnOpen - 76.7$	0.89
	VFRs	$9.06LnPCGDP - 1.87LnBrent - 1.49LnEx - 0.592GFC - 70.7$	0.97	$7.61LnPCGDP - 1.11LnBrent + 3.64LnEx + 4.15LnOpen - 80.1 + [MA(1) = 0.453 \dots]$	0.92
	Business	$3.15LnPCGDP - 0.290LnBrent - 0.313AFC - 31.0 + [MA(1) = 0.929\dots]$	0.96	$3.06LnPCGDP - 0.393LnBrent(-1) + 1.10LnEx + 1.97LnOpen(-1) - 29.4$	0.79
ASEAN	Holidays	$2.00LnPCGDP - 0.610LnBrent - 0.705LnEx - 0.449AFC - 15.8$	0.81	$0.292LnOpen + 0.335LnEx - 0.390SARS + 1.92$ *or* $0.285LnOpen + 1.17LnPCGDP - 0.395SARS - 8.38$	0.73 0.70
	VFRs	$1.41LnPCGDP + 2.32LnRCPI - 16.9 + [AR(1) = 0.466]$	0.96	$0.880LnOpen + 0.532LnEx + 2.84 + [MA(1) = 0.454 \dots]$ or $0.668LnOpen + 2.50LnPCGDP - 21.1 + [MA(1) = 0.575 \dots]$	0.94 0.95
	Business	$2.29LnPCGDP - 0.175LnBrent - 24.8 + [MA(1) = 0.526 \dots]$	0.96	$1.68LnPCGDP + 0.799LnOpen - 0.304LnBrent - 11.0$	0.79

Notes: PCGDP, real gross domestic product per capita; Open, trade openness; Ex, exchange rates; Brent, Brent crude oil price; CPI, consumer price index; RCPI, relative CPI; GFC, Global Financial Crisis (later 2008 – 2009); AFC, Asia Financial Crisis (later 1997 throughout 1998); SEP11, September 11, 2001 terrorism attack; SARS, SARS epidemic (November 2002 – July 2003), RWC, the 2011 Rugby World Cup. AR(1), the first-order autoregressive term; MA(1), the first-order moving average term, note that other information related to the MA(1) term such as BACKCAST=1988 and ESTSMPL="1988 2011" is not shown in the equations; When the name of a variable is followed by (-1) or (-2), it represents the one-step or two-step lag of the variable.

On the other hand, except for the Korean market, the elasticities of crude oil price, trade openness, and exchange rate are often below one (i.e. they are inelastic). Interestingly, their elasticities are generally higher for the Korean market. This could partly reflect the volatility of air travel to and from Korea. The elasticities of relative CPI vary largely with market and travel purpose. For example, its elasticity is significantly higher for holiday arrivals from the UK and Ireland than that for VFRs (2.51 *vs.* 0.688). However, the elasticities are similar between holiday arrivals and VFR arrivals from other European countries and China.

6 DISCUSSION

Most models we have developed have an adjusted R^2 value close to or better than 0.90, demonstrating that the six economic factors used in this study are key variables determining the long-term trends in New Zealand's international air passenger travel, although CPI appears to be the least influential among them. The modelling results also confirm that the effects of these economic factors vary with market, travel purpose and the nature of visitors (arrival or departure). However a relatively low adjusted R^2 value (< 0.75) is associated with a few models, suggesting that other important variables may have been missing from the model specifications under some circumstances.

The finding that GDP per capita is the most important factor for most cases and nearly all of its elasticities are above one is consistent with the observation by IATA (2011) that air travel has rapidly expanded in the past four decades as the world's economies grew and expansion in air travel volume (measured in revenue passenger kilometres) is three times greater than the growth of the world's economies, partly reflecting the high income elasticity of air travel. This demonstrates that the general income level, or more broadly speaking, the overall economic performance in a source country or region, is a key driver of air travel. The economic boom in China is likely to be one of the key drivers for the rapid growth in Chinese visitors to New Zealand.

The strong growth in both VFR arrivals and departures for the Chinese and ASEAN markets is likely to have been partly driven by New Zealand's relatively open immigration policy, especially changes to immigration policy starting from the mid-1980s. Since then, the sources of migrants have become more diverse, with particularly large increases in migrants from Asia and Africa (Law et. al., 2009).

The finding that trade openness is a significant factor for outgoing New Zealand residents visiting Asia supports the suggestion that as business connections with the region increase, New Zealand residents know more about the area and build stronger cross-country personal relationships, which consequently mean they are more likely to visit.

As mentioned earlier, some of the major events have also significantly impacted on international air travel. However, quantitatively assessing the effects of these events is out of scope of this research. Moreover, it should be acknowledged that in addition to economic conditions, tourists' time budget for travel may also need to be taken into account when studying international air travel demand.

7 SUMMARY

The long-term trends of international air passenger travel between New Zealand and its eight key markets are studied against six economic factors and five major events. Based on the analyses, we reach the following conclusions:

- Australia will continue to be the most important source of visitors to New Zealand for some years ahead and the market is still expanding.
- The number of holiday visitors from Japan, the UK and Ireland, Korea, and North America has been decreasing, which is in contrast with the rapid increase in the number of Chinese visitors.
- After Australia and Pacific Islands (for which the data are not shown here), New Zealand residents have visited the ASEAN and North America the most for holidays, with the numbers increasing. The number of outgoing New Zealand residents for VFRs to most key markets is also increasing, partly driven by New Zealand's relatively open immigration policy.
- In the vast majority of cases, GDP per capita is the most important factor for both arrivals and departures, demonstrating that the general income level or overall economic performance in a source country or region is a dominant driver of air travel.
- Trade openness is a significant factor for outgoing New Zealanders visiting the Asian markets.
- Nearly all the elasticities of real GDP per capita are greater than one. Air travel to and from New Zealand is particularly sensitive to changes in economic growth rates. However, except for the Korean market, the elasticities of crude oil price, trade openness, and exchange rate are often below one.
- The elasticities of relative CPI vary largely with market and travel purpose.

The modelling results are generally sensible and consistent with previous studies. They will provide useful references to relevant research. Nevertheless, this work uses a simple modelling approach that could be associated with statistical issues, and a limited set of economic factors. Caution should be taken when interpreting these modelling results. There is scope for future research, in which an advanced modelling approach could be used and more explanatory variables included, especially those factors on the supply side. In that case, quarterly data are probably required so that sample size can be large enough for using advanced models.

ACKNOWLEDGEMENTS

We thank our colleagues at the Ministry of Transport for their assistance and useful comments.

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