



Department of Economics

Issn 1441-5429

Discussion paper 47/10

A Study of Outbound Tourism From Australia

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Abstract

This paper exploits the dynamic panel data cointegration technique to determine the demand elasticity of short term international departures from Australia with respect to changes in income, real exchange rate, migration and the cost of domestic air travel. The data utilised are from 1991 to 2008 for 47 destinations. The results confirm those of previous studies in showing that income is the single most important determinants of departure from Australia in the short run and in the long run. 61 percent of Australian travellers tend to repeat their visit. Increasing migrations from particular countries has a positive effect on departure to these nations. Real exchange rate is insignificant in explaining departures from Australia. International crisis occurring in year 2002 and 2003 affected departures from Australia in a negative way.

Keywords: Outbound Tourism, Australia, Dynamic Panel Data, Panel Cointegration, Corrected Least Square Dummy Variable.

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Acknowledgements: This study was funded by the Sustainable Tourism Cooperative Research Centre (Qantas) PhD Scholarship. The author is grateful to Professor Peter Forsyth and Professor Larry Dwyer for their comments on this paper.

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A STUDY OF OUTBOUND TOURISM FROM AUSTRALIA

1. Introduction

Australia is currently a net exporter of tourism. According to the latest Tourism Satellite Account published by the Australian Bureau of Statistics (ABS, 2007), in 2006-2007 the net tourism surplus (the total export of tourism good and service minus the import tourism good and services) was \$327 million. This trend is said to change as the Tourism Australia (2008) expects Australia to become a net importer of tourism within the next ten years as outbound tourism grows faster than inbound tourism.

Outbound tourism from Australia is a topic that is extremely under researched. Very few studies have analysed the determinants of short term departures from Australia. These are, Collins and Tisdell (2002 and 2004), Dwyer et al. (1992), Hollander (1982), Philips and Hamal (2000), Smith and Toms (1978), Turner and Witt (2001), Webber (2001) and Witt and Song (2003).

The relative lack of effort put into the study of outbound international travel from Australia, may have resulted from the fact that the relative contribution to Australia from outbound travel is considered to be noticeably lower than that of inbound travel. While inbound international tourism is a source of foreign exchange and impact positively on the GDP, creates employment and brings tax revenue to government, outbound travel is a form of import, and its effect on the country is largely in the opposite direction.

Outbound travel nonetheless, does affect the economy of Australia and deserves more attention in the literature. According to ABS (2009), in 2007-2008 the total expenditure of outbound tourists was approximately \$28.5 billion of which \$3.82 billion was spent on goods and services produced in Australia. This means that there are service producers such as local travel companies, airlines and airports which with reap benefits from outbound travellers. Furthermore, outbound tourism forms part of the consumption of Australians and changes in the outbound tourism represents alterations on the consumption patterns of this nation. On the other hand, Australia represents a market for other destinations and the number of arrivals from Australia, the number of nights spent and the level of expenditure of the Australian tourist can be of consequence to the destinations visited.

The existing literature on outbound tourism from Australia, is based on data prior to 2000. However, the standard of living in Australia has improved and there are other factors such as adverse international conditions which may probably have altered the decision making process of Australian consumers with regards to decisions pertaining to international travels. It is likely that the elasticities estimated in previous studies are now outdated.

This study seeks to fill in the gap by investigating the factors that affect the number of Australian travelling abroad using a recent data set. This paper utilises a panel data set comprising of short term departures from Australia to 47 destinations from 1991 to 2008 to determine the factors that motivate Australian to travel abroad. The estimation technique is Corrected Least Square Dummy Variable (CLSDV). This estimation

method is chosen because, given the small time span over which this study expands, it produces unbiased and consistent estimates compared to other techniques applied in the estimation of dynamic panel data sets such as Anderson and Hsiao (AH) (1992) and Arellano and Bond (AB) (1991) (Kiviet, 1995, Judson and Owen, 1998). A literature review on modelling of outbound tourism and on the application of dynamic panel data methods in the tourism literature are given in the Sections 2 and 3 of this paper. This is followed by an overview of departures from Australia in Section 4. The methodology employed in this study is discussed in Section 5. The results obtained are interpreted and their policy implications are reported in Section 6 of this study. Comments on the limitations of this study are given in Section 7. Section 8 concludes this paper.

2. Determinants of Short Term Departure from Australia

Previous studies on outbound tourism have concluded that income in Australia, exchange rate, migration to Australia and transportation cost to the destination are pertinent in explaining outflow of short term travellers from Australia.

Income in Australia is seen to be the most important determinant of short term departures (Smith and Toms, 1978, Hollander, 1982, Dwyer et al., 1993, Philips and Hamal, 2000, Webber, 2001). These studies conclude that departure is elastic with respect to changes in income.

The impact of exchange rate on departures is tested by Smith and Toms (1978), Hollander (1982), BTCE (1995), Philips and Hamal (2000) and Webber (2001). The evidence is mixed. These authors argue that exchange rate gives an indication of the

cost of holiday abroad for the Australian travellers. But, according to Smith and Toms (1978) it is not significant in explaining departures from Australia. The elasticities calculated by BTCE (1995) varied considerably by country and by purpose of visit. Philips and Hamal (2000) demonstrates that exchange rate explains departures to Fiji and Hong Kong only. Turner and Witt (2001) found that real exchange is insignificant in determining arrivals to New Zealand from Australia.

The researchers have also assessed the importance of transportation cost as a factor influencing departures from Australia. It is statistically significant in, Dwyer et al. (1992), Hollander (1982), Smith and Toms (1978), and Turner and Witt (2001). The volume of departures is not observed to be highly responsive to changes in transportation cost from Australia. For example, Hollander (1982) estimated airfare elasticity at (-0.4). Turner and Witt (2001) on the other hand found that increases in real airfares from Australia to New Zealand have positive effects on travel to New Zealand. Note that real airfare is the only statistically significant variable in their model. BTCE (1995) calculates a weighted average airfare for using the cheapest fares quoted for the quarter adjusting them for discounts available based on the season, low, shoulder or peak. This variable is statistically insignificant in explaining departures to New Zealand and Indonesia. Seven countries were found to have inelastic responses to changes in airfares while airfare elasticities to Japan, Korea and Taiwan were approximately -1.2.

Dwyer et al. (1992), Hollander (1982) and Smith and Toms (1978) analyse the effect of migration on the volume of departures from Australia. Migration is shown to be an important determinant of departures from Australia in all of three studies. Dwyer et al.

(1992) calculate a migration elasticity of 0.79 for visitors travelling abroad to visit friends and relatives and 0.44 for other visitors and 0.59 for total travellers. Hollander (1982) calculates migration elasticity of one in the pooled sample. Smith and Toms (1978) obtain elasticity of 1.49 for Germany, 4.36 for Italy and 1.76 for UK.

Another variable analysed by the researchers is the price of a substitute destination. Webber (2001) and Song and Wong (2003) calculate a substitute price by taking the weighted index of cost of travel to a number of alternative destinations. Song and Wong (2003) chose Taiwan, Singapore, Thailand, Korea and Japan as a substitute for travel to Hong Kong for Australian travellers. These countries are chosen for their geographic and cultural characteristic deemed similar to Hong Kong. The elasticity of arrivals from Australia to Hong Kong was 0.3. Webber (2003) finds this to be significant for five out of the seven destinations included in his study.

Collins and Tisdell (2002 and 2004) examine the reasons motivating travellers to take international trip for business purposes. Collins and Tisdell (2002) find that there is a cointegrating relationship between outbound international business travel and the returns on investments in Australia. They also exploit quarterly data from 1974 to 1999 to show that aggregate return on business is better at predicting business departures from Australia than real GDP (Collins and Tisdell, 2004).

Some limitations may be noted in the studies which have explored departures from Australia. First, except for BTCE (1995) none of the studies in questions took into account the dynamic nature of departure. According to Pollak (1970), some

consumption may be habit forming. In the case of tourism products, Opperman (2000) states that habit formation is translated into repeat visitation and the proportion of total arrivals to a destination that can be attributed to repeat visitation can be very high.

Second not all the studies analysed the effect of migration which is confirmed as an important determinant of departures by Dwyer et al. (1992), Hollander (1982) and Smith and Toms (1978). The omission of a relevant explanatory variable, from a model may lead to may cause estimate obtained through Ordinary Least Square method to be biased and inconsistent (Green, 2001).

Third, in the studies by Smith and Toms (1978) and Hollander (1982) the authors do not comment on the stationary of their data. There is, therefore, no proof that their results are not spurious. As noted by Philips and Hamal (2000) the sample size of their study is only 14 years for China and 22 years for the rest of the countries. They show that their variables are non-stationary and are not integrated of the same order and conclude that they cannot estimate an error correction model. Given these issues their results should be interpreted with care.

This study seeks to overcome these limitations by using a dynamic model to analyse outbound tourism from Australia.

3. Dynamic Panel Data Techniques to Model Travel Behaviours.

Given the problems of missing data on and short time span of available data sets, the employment of panel dataset is becoming more prevalent in the tourism literature.

Dynamic panel data modelling technique offers numerous advantages to a researcher as discussed in Section 5.1 of this paper. Studies which have applied the dynamic panel data framework to analyse tourism flows include Garín-Muños (2006), Garín-Muños and Montero-Martin (2007), Khadaroo and Seetanah (2007, 2008), Naudé and Saayman (2005) and Seetaram (in press).

Garín-Muños (2006) uses annual data from 1992 to 2002 from 15 markets to estimate demand elasticities for arrivals to Canary Islands from 15 of its markets. Annual data from 1991 to 2003 are utilised by Garín-Muños and Montero-Martin (2007) to assess factors affecting the number of arrivals to the Balearic Islands. Khadaroo and Seetanah (2007) employ data on arrivals to Mauritius over the period 1978 to 2003 to assess the relative importance of transport infrastructure as a demand determinant. Khadaroo and Seetanah (2008) use data from 1990 to 2000 to model bilateral tourism flows among 28 countries. Naudé and Saayman (2005) analyse annual data from 1996 to 2000 to estimate arrivals for 43 African countries.

All of the above mentioned studies applied Arellano and Bond (AB) (1991) technique to estimate their respective models. This method involves employing the lag values of the dependant variable as instruments for estimating the model in the first difference form. However, Kiviet (1995) and Judson and Owen (1999), have shown that for samples where T is small, this estimation technique yields biased and inefficient estimates. Therefore, the coefficients estimated by Garín-Muños (2006), Garín-Muños and Montero-Martin (2007) Khadaroo and Seetanah (2007, 2008) and Naudée and Saayman (2005), may not possess optimum properties such as consistency and efficiency since

the time span over which these studies extend is less than 30 years. Seetaram (in press) estimates the determinants of arrivals to Australia within the dynamic panel data framework using data on arrivals from 1991 to 2007. The author estimates her model using AB technique and the Corrected Least Square Dummy Variable (CLSDV). The long term elasticities computed from the CLSDV differed significantly from the ones computed by the AB method. The paper concludes that demand is of a dynamic nature and that income, exchange rate and airfare are relevant in determining arrivals to Australia in the short run and in the long run.

4 Overview of Departure from Australia

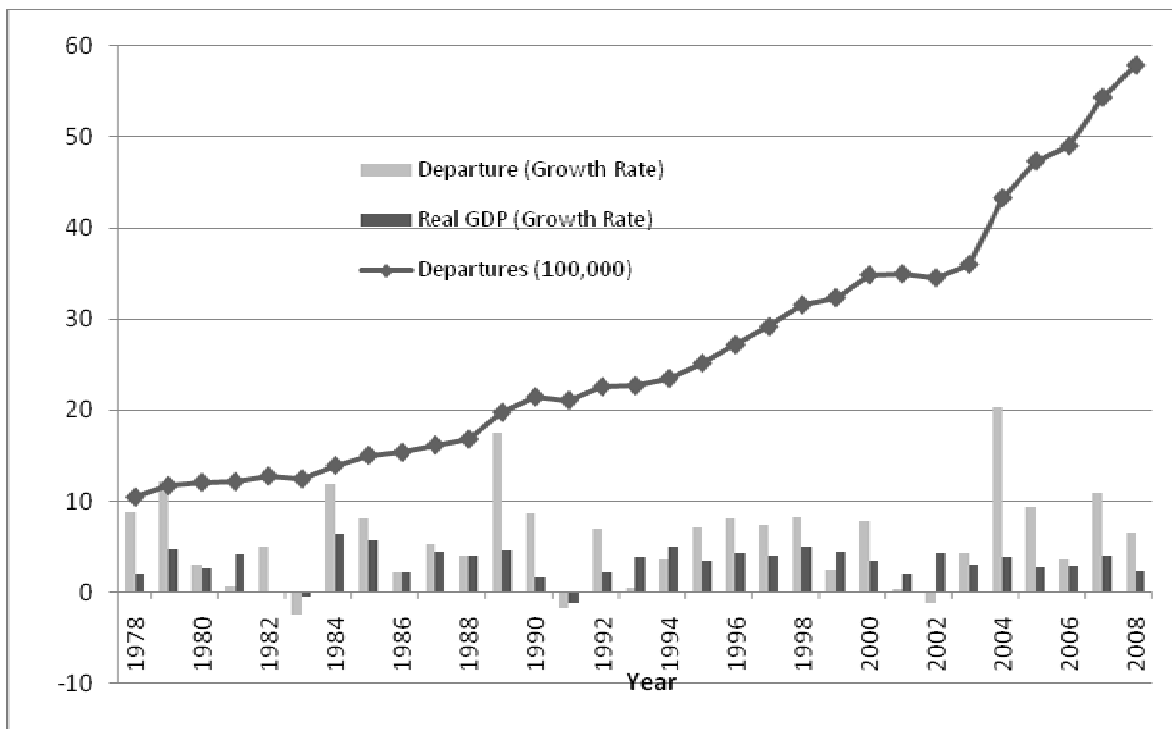
Figure 1 shows the total number of short term departures from Australia, the growth rate of short term departures and the growth rate of real GDP of Australia from 1978 to 2008.

The line graph shows the number of short term departures from Australia from 1978 to 2008. Over this 30 years period, arrivals rose from 1.04 million to 5.8 million. The graph shows that there is a demarcation in the trend in departures. From 1978 to 2001, departures rise by 3.6 million then stagnate for two years after which it gains momentum and rises at faster rate than before. In the last 5 years the number of departures is growing by approximately 2.2 million.

From 1979 to 1989, the growth rate in departure displays a cyclical pattern in with a peak every 5 years, in 1979, 1984 and 1989. In general it is seen that the high growth rate in departures in these years corresponds to a relatively robust growth rate in the real

GDP of Australia. Negative growth rate in departures and real GDP are registered in 1983 and 1991 which can be attributed to adverse economic conditions in Australia.

Figure 1: Short Term Departures from Australia (1978 to 2008)

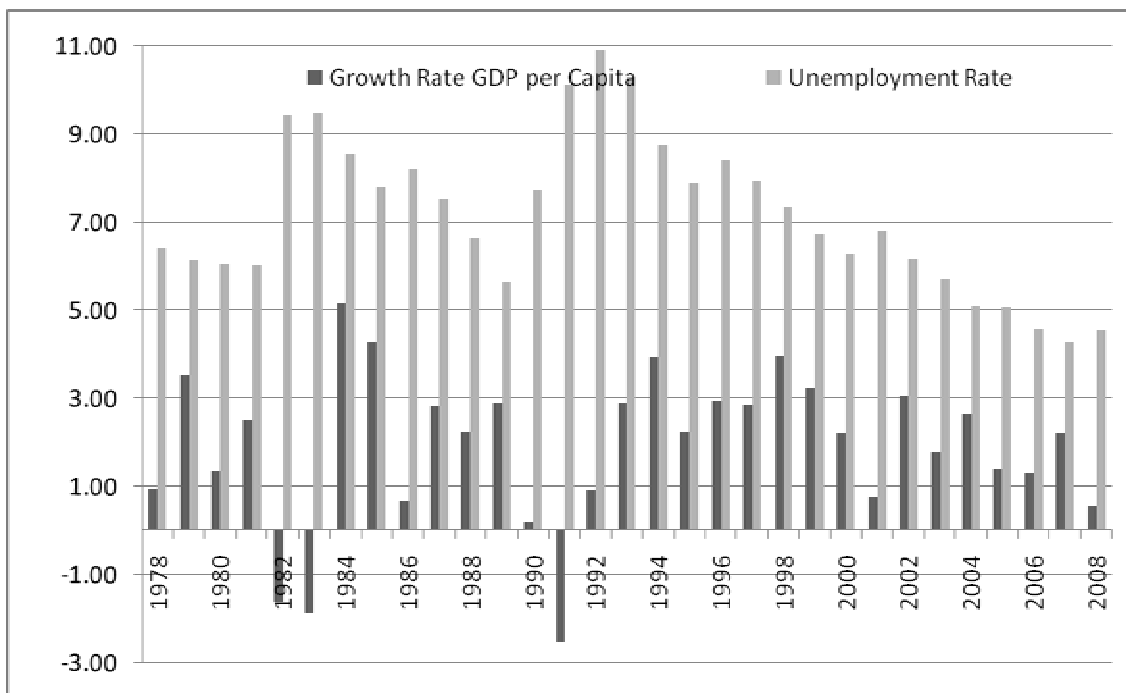


Source: Data for this figure were collected from ABS, category 3401.

In 1983, the growth rate of real GDP is negative and as illustrated in Figure 2, real GDP per capita is falling and the unemployment rate in Australia is higher than nine percent. High unemployment in 1992 and 1993 may reflect poor consumer confidence which can explain the negligible growth in departures in 1993. On the other hand, the relatively sharp increase in departure as from 2004 corresponds to unemployment rates reaching its lowest level of five percent and less during the 30 year period.

However, economic conditions alone do not explain the trend in departures as seen by the conditions in 2001, when real GDP, GDP per capita show healthy growth and unemployment is contained, while departure is stagnating.

Figure 2: Growth Rate of GDP per capita and Unemployment Rate in Australia (1978 to 2008)



Source: Data for this figure were collected from Federal Reserve Bank of Australia.

The trend here may be explained by international predicaments such as the terrorist attack on the World Trade Centre in 2001 followed by the second Gulf War. In 1991 the first Gulf War may have added to the negative effect of recession in Australia on international departures. Unfavourable conditions which occurred in some of the South Asian destinations which are highly popular among Australian travellers will have affected the number of departures to those destinations. These are the bombing in Bali where the casualties amongst the Australia holiday makers are the highest, the outbreak

of Severe Acute Respiratory Syndrome (SARS) in 2003 and Avian Influenza in 2004. In 1999 the Asian financial crisis, may have caused the sluggish growth in departures which is lower than average. On the other hand, the current global financial crisis which started in 2008, reflected in the drop in the growth rate of GDP per capita, does not seem to have had an impact of international departures. A priori, this seems implausible given the scale of crisis. On the other hand, consumers may have pre-booked their trip and have been locked in a contract which prevents them from cancelling their trips. In this case, departure can be expected to be adversely affected in 2009.

Table 1 shows the top 25 destinations among Australian travellers in 1991 and in 2008. For each year they are ranked by order of importance in terms of number of departures. Overall the number of departures to these destinations has risen from 1991 to 2008. Indonesia is the only destination which registered a fall in arrivals from Australia during this period. Departure to Indonesia declined from 214,100 in 1991 to 194,900 in 2008, which can be explained by the political instability, riots and acts of terrorism which this country witnessed in the last twelve years. Despite these, Indonesia however, remains the 9th most popular destination for Australians.

Table 1: 25 Most Population Destinations (1991 and 2008).

1991			2008		
Destination	Number	%	Destination	Number	%
1. New Zealand	353 400	15.01	1. New Zealand	864 700	17.50
2. USA	288 400	12.25	2. USA	440 300	8.91
3. UK	254 400	10.80	3. UK	412 800	8.36
4. Indonesia	214 100	9.09	4. Thailand	288 000	5.83
5. Hong Kong	130 600	5.55	5. China	251 000	5.08
6. Singapore	91 600	3.89	6. Singapore	210 900	4.27
7. Malaysia	84 600	3.59	7. Fiji	202 400	4.10
8. Fiji	83 000	3.53	8. Hong Kong	196 300	3.97
9. Thailand	71 900	3.05	9. Indonesia	194 900	3.94
10. Philippines	47 300	2.01	10. Malaysia	168 000	3.40

11. Italy	45 200	1.92	11. Viet Nam	125 400	2.54
12. Japan	42 700	1.81	12. Italy	108 800	2.20
13. Canada	39 700	1.69	13. India	106 100	2.15
14. China	39 200	1.66	14. Japan	100 300	2.03
15. Papua New Guinea	33 900	1.44	15. Canada	90 400	1.83
16. Viet Nam	32 500	1.38	16. Philippines	85 500	1.73
17. Germany	32 300	1.37	17. France	72 600	1.47
18. Taiwan	28 400	1.21	18. Germany	69 900	1.41
19. Greece	28 000	1.19	19. South Africa	57 300	1.16
20. France	27 900	1.18	20. Papua New Guinea	45 600	0.92
21. India	27 100	1.15	21. Greece	45 400	0.92
22. Vanuatu	20 400	0.87	22. Vanuatu	40 300	0.82
23. Norfolk Island	19 900	0.85	23. Taiwan	37 700	0.76
24. South Africa	15 700	0.67	24. Ireland	33 200	0.67
25 Lebanon	14 700	0.62	25. South Korea	31 400	0.64
Others	295 200	12.5	Others	661 400	13.4
Total	2 354 500	100	Total	4 940 600	100

Source: Data for table were collected from ABS, category 3401.

New Zealand, UK and USA are the three most popular destinations. The relative importance of UK and USA has slightly fallen in favour of following upcoming destinations in Asia: China, Fiji, India, Singapore, Thailand, and Viet Nam. These destinations have recorded remarkable growth. One of the possible reasons for this trend is the relatively high value of the Australian dollar in these countries and their proximity to Australia making the travel cost to these destinations lower. Another factor is the advent on low cost flight on Asian routes as from 2006 which further reduces the travel cost from Australia.

5. Methodology

5.1 The Model

The demand equation for the total departure from Australia is specified as:

$$LD_{it} = \beta_0 + \gamma LD_{it-1} + \beta_1 LE_t + \beta_2 LP_{it} + \beta_3 LM_t + \beta_4 LDF + \beta_5 D_{1993} + \beta_6 D_{2001} + \beta_7 D_{2002} + \beta_8 D_{2003} + \mu_i + \varepsilon_{it} \quad (1)$$

Where $i = 1, 2, 3, \dots, 47$.

LD is the log of departures

LE is the income variable

LP is the log of real exchange rate

LM is the log of the migration to Australia.

LDF is the log of domestic airfare index,

D are dummy variables.

The β 's, and γ are the parameters to be estimated. LD_{it} is the natural log of the number of departure to country i . Since only yearly data is available for some variables, this study made use of annual data. Monthly country specific data on total departures is obtainable from the Australian Bureau of Statistics and then are aggregated into annual data.

$LD_{i,t-1}$ is obtained by lagging LD_{it} by one period. This variable reflects the effect of habit persistence. The coefficient of this variable will show the extent to which departures in the current period are dependent on departures in the previous year. γ is the habit forming coefficient and it is expected to be less than one for the stability of the system.

LE_{it} is the income variable. β_1 is expected to be greater than zero since it is assumed that consumers will treat holidays abroad as a luxury consumption. The log of the real average weekly earnings in Australia is included in the model to account for the income effect. This is obtained by dividing the average weekly earnings in Australia by the

consumer price index (CPI) and applying the natural logarithmic transformation. The data are available from the Federal Reserve Bank of Australia (2009).

LPI_{it} is the natural log of the real exchange rate of the Australian dollar in terms of the currency of the destinations CPI_{it} is selected as the proxy for the cost of living at the destination i which the Australian traveller faces. It is calculated as:

$$LPI_{it} = \ln \left[\frac{CPI_{it}}{CPI_{Aus:t}} \times exrate_{it} \right] \quad (2)$$

$CPI_{Aus:t}$ is the consumer price index in Australia in time t . CPI_{it} is the consumer price index in country i in time period t , and $exrate_{it}$ is the exchange rate between country i and Australia. The respective exchange rates between the Australian dollar and a few of the destination are obtained from the Federal Reserve Bank of Australia (RBA). For the majority of the destination the exchange rate in American dollars are retrieved from the International Financial Statistics (IFS) published by the International Monetary Fund (2009). These are then converted into Australian dollar equivalent using the exchange rate between Australian dollar and American dollar from data gathered from the Federal RBA. The CPIs of the destinations are obtained from the IFS. The base year for the calculation is 1990. The coefficient of this variable β_2 , is expected to be positive.

LM_{it} is the estimated resident population born overseas. This acts as the proxy for stock of immigration in Australia. The data is only available for the census years, 1991, 1996, 2001 and 2006. ABS publishes an estimate of the stock of migrant in Australia for the

inter census years. However, since 1997, ABS has improved the method of calculating this variable. The data prior is 1997 is therefore, not strictly comparable to those after 1997. The method of White (2007) is used to calculate the stock of immigrants in Australia.

White (1997) assumes that, the immigrant population in a particular year is equal to the sum of the stock of immigrants in the previous year and the net inflow of migrant during the current year. This can be written as the Equation 3 below:

$$\mathbf{M}_{ijt+1} = \mathbf{F}_{ijt} - \delta_{ijt} \tag{3}$$

Where \mathbf{M}_{ijt} is the number of people born in \mathbf{i} and residing in country \mathbf{j} in year $\mathbf{t+1}$.

\mathbf{F}_{ijt} is the fresh permanent arrivals from \mathbf{i} to country \mathbf{j} in year \mathbf{t} .

δ_{ij} is a variable representing change in the migration flows.

Equation (3) shows the difference between the stocks of migrants between two census years, taken into account the fresh arrivals during the five inter-censal period. It includes factors like departures of migrants, death of the migrant from country \mathbf{i} . It will also take into account reporting errors arising from census data. Such errors include for example failure to report country of birth in the census documents.

Assuming that \mathbf{j} is Australia then equation (4) may be re-written as:

$$\mathbf{M}_{it+1} = \mathbf{F}_{it} - \delta_{it} \tag{4}$$

The estimated resident population born overseas in 1992 is given as

$$M_{i1992} = F_{i1991} - \delta_i$$

Since data on δ_i is not available, it is assumed for simplicity that the number of departures and deaths of migrants is spread evenly across inter-census years.

Using the method of White (2007) Equation (5) is obtained:

$$\hat{\delta}_i = \frac{1}{5} \left\{ M_{1996} - \left(M_{1991} + \sum_{t=1991}^{1996} F_{it} \right) \right\} \quad (5)$$

Substituting Equation 5 in Equation (4) yields:

$$M_{i1992} = F_{i1991} + \frac{1}{5} \left\{ M_{1996} - \left(M_{1991} + \sum_{t=1991}^{1996} F_{it} \right) \right\} \quad (6)$$

This method of estimating the estimated resident population born overseas is preferable to the alternative which is to have recourse to the published data from ABS, as it is consistent and data are comparable over the period under study.

The White (2001) method of calculating the estimated resident population of Australia is not without limitations. This method assumes that δ_i is spread out evenly during the inter-censal year meaning that δ_i is constant for these years. This is a quite strong assumption. This introduces a certain level of measurement errors in the computation of the migration variable which may have some impact on the value of the elasticity computed. In reality, however, it is most probable that δ_i does not differ significantly from year to year and this error is not expected to be of great consequence.

The variable **LDF** is the log of Domestic Airfare Index which is published by the Department of Infrastructure, Transport, Regional Development and Local Government. In this study, it is assumed that Australian perceive interstate domestic holidays as a substitute for international holidays. An index of the cost of domestic holiday constituting of accommodation and travel cost will be more suitable as price of substitute. However, in the absence of this index, the local cost of air travel is used. The underlying assumption is that the majority of long distance interstate holidays involve air travel.

Four dummy variables are included in model each representing the years, 1993, 2001, 2002 and 2003. Figure 1 shows that these four years had impacted negatively on the growth rate of departures from Australia. Their significance will indicate the extent to which, economic and other adverse international conditions affected travel from Australia.

The parameters β_1 , β_2 , β_3 and β_4 are short run demand elasticities. Assuming that there exists long run steady state equilibrium such that $LD_t = LD_{t-1}$, the long run elasticities may be computed by dividing the respective β by $(1 - \gamma)$.

5.2 Unit Root Testing

Classical statistical inference implies that variables are mean reverting. However, economics variables which tend to evolve over time are not always stationary and failure to account for these will result in spurious regression results. To circumvent such

problems, unit roots and cointegration are carried out to ascertain that regression results are valid. However, while testing for unit root cointegration is standard in the time series literature, it is quite recent in panel data analysis (Baltagi, 2001).

In the panel data setup, panel unit roots tests have higher power than unit root based on individual times series for each of the cross section since the later perform poorly when data period are short (Baltagi, 2001, Banerjee et al., 2004, Levin Lin and Chu, 2002, Im, Persaran and Shin, 2003, Pedroni, 1999). The two most commonly used unit root test are Levin Lin and Chu (LLC) (2002) and Im Pesaran and Shin (IPS) (2003). The fundamental difference between these two tests rest on the assumption made regarding the autoregressive process (Baltagi, 2001). LLC assumes that the autoregressive process is common for all cross sections. IPS assumes that the persistence parameter, are allowed to vary across the cross sections.

The LLC and IPS tests are performed on each of the explanatory variables included in Equation (1) apart from the dummies. The t-statistics computed and their respective probability values are reported in Table 2.

Table 2: Results of Stationary Testing.

Variables	Levin Lin Chu		Im, Pesaran and Shin	
	<i>Level</i>	<i>First Difference</i>	<i>Level</i>	<i>First Difference</i>
LD	2.914 (0.002)	-7.409 (0.000)	3.169 (0.999)	-13.553 (0.000)
LM	1.641 (0.955)	-3.892 (0.000)	7.4691 (0.999)	-4.108 (0.000)
LP	-3.354 (0.084)	-8.636 (0.000)	0.1255 (0.550)	-8.909 (0.000)
LE	0.283 (0.611)	18.310 (0.000)	8.569 (0.999)	26.630 (0.000)
LDF	5.556 (0.999)	-30.369 (0.000)	9.765 (0.999)	-21.638 (0.000)

Source: Computed from the respected methodology discussed. The p-values are given in parentheses

Both tests indicate that **LM**, **LP**, **LE** and **LDF** are integrated of order one this implies that the series are not stationary. The tests however, give contradicting results for **LD**. The LLC show that this variable is stationary while IPS points out that this variable contains a unit root. Hsiao (2003) suggests that the IPS test has higher power than the LLC test it is therefore, concluded that **LD** has a unit root. Since the entire set of variables has unit roots, the next step is to perform cointegration tests to assess whether there is a long term equilibrium relationship amongst them.

5.3 Testing for Cointegration

When variables are individually integrated of order one i.e $I(1)$, a linear combination of these variables can still be stationary (Baltagi, 2001, Banerjee et al., 2004, Pedroni, 2004). This means that they are co-integrated and there is at least one cointegrating vector which renders the combination of variables stationary.

Panel cointegrating techniques have been developed to allow researchers to pool information regarding common long run relationships from across the panel. Such techniques allow the associated short run dynamic and fixed effects to be heterogeneous across the different member of the panel (Baltagi, 2001, Banerjee et al., 2004, Pedroni, 1999, 2004).

In this study the Pedroni (1999) test is used. Pedroni (1999) proposes seven tests for cointegration in the panel data framework. Pedroni (1999) refers to four of the tests as the '*panel cointegrating statistics*' or the (Pedroni, 1999, pp. 658) within-dimension based statistics. In these tests, he assumes that there is a common cointegrating

relationship among the variables. For these four tests, the residuals are pooled across the time dimension of the panel. By contrast, the remaining three tests are called the ‘*group mean cointegrating statistics*’ or the between-dimension. These tests are based statistics are based on pooling the residuals of the regression along the cross sections of the panel Pedroni (1999). In these tests estimators average the individually estimated autoregressive coefficient for each cross section. (Pedroni (1999)).

The group mean statistics can be considered as more accurate, as they allow for more heterogeneity among the countries, and produce consistent estimates (Pedroni, 2001). The higher value of the group mean statistics can be considered to be a more accurate representation of the average long run relationship (Pedroni, 2001)

The Pedroni tests for cointegration are performed using the software EViews 6 and the results are displayed in Table 3.

Table 3: Results of Pedroni Cointegration Tests

<i>Panel Cointegration Tests</i>				<i>Group Mean Cointegration Tests</i>		
<i>V</i>	<i>Rho</i>	<i>PP</i>	<i>ADF</i>	<i>Rho</i>	<i>PP</i>	<i>ADF</i>
0.690	-0.876	-8.860	-8.576	2.463	-11.497	-10.094
(0.245) *	(0.191) *	(0.000)	(0.000)	(0.039)	(0.000)	(0.000)

P-values are given in parentheses. An asterisk represents the failure to reject of the null hypothesis of “no cointegration” at the 5 % level of significance.

V, Rho, PP and ADF are the panel cointegrating statistics. Rho, PP, ADF are the between dimension statistics. From the results in Table 5 is can be seen that the Panel V test and Panel Rho test fail to reject the null hypothesis of no cointegration while the

remaining tests, confirm the presence of a cointegrating vector. The Group Mean Cointegration tests systematically yield higher statistics. It is concluded that there is a long run equilibrium relationship among the variables under study. This means that although the variables are not individually stationary, there exists at least one linear combination of these variables which is stationary.

It can be noted however, that the unit root tests (LLC and IPS) and cointegration test discussed (Pedroni, 1999) have increased the probability of determining whether data are stationary or not and whether variables are cointegrated (Banerjee et al. 2004). However, the main limitation of these unit root and cointegration tests is that they assume no cross sectional correlation in the sample (Banerjee et al. 2004). Banerjee et al. (2004) show that the results of cointegration tests are susceptible to dependence among the cross sections. It means that if the cross sections are not independent, the power of the tests is reduced. In spite of this, in panel data sets, the problem of spurious regression results are unlikely to be as serious as in pure time series since as demonstrated by Phillips and Moon (1999). Noise in time series regression is lessened by pooling cross section and time series observations implying that the model may be estimated in level form without risking spurious results Phillips and Moon (1999).

5.4 Estimation Technique

The fixed effect model is chosen for the two reasons given by Judson and Owen (1999). First, the sample contains most of the destinations of interests and the countries included have not been randomly chosen from a larger population of destinations. Second, Judson and Owen (1999) argue that if the individual effect represents omitted

variables then the country specific characteristics are more likely to be correlated with the other regressors which make the fixed effect technique more appropriate. In our sample, transportation cost to the destination is omitted, so the use of fixed effects estimation technique is justified.

Hsiao (2003) argues that in Equation (1), \mathbf{LD}_{it-1} will be correlated with the mean of the stochastic error term models $\bar{\varepsilon}_it$ by construction and will be correlated to ε_{it-1} which is contained in $\bar{\varepsilon}_it$. The implication is that estimates of parameters computed using the Least Square Dummy Variable (LSDV) technique are biased and consistent only when $\mathbf{T} \rightarrow \infty$ (Nickell, 1981, Anderson and Hsiao, 1981, Arellano Bond, 1991, Kiviet, 1995, Judson and Owen, 1999).

Anderson and Hsiao (AH) (1981) and Arellano and Bond (AB) (1991) show that the bias may be reduced by first differencing the Equation (1) and using the lagged level value of the \mathbf{LD}_{it} as instruments. Arellano and Bond (1991) argue that more efficient estimator can be obtained taking in additional instruments whose validity is based on orthogonality between lagged values of the dependent variable \mathbf{LD}_{it} and the errors ε_{it} .

These results are confirmed by Kiviet (1995) and Judson and Owen (1999). However the bias persists in samples with small \mathbf{T} (Kiviet, 1995; Owen et al 1999). In fact it increases with the value γ and decreases with \mathbf{T} (Kiviet, 1995). An estimator that relies on lags as instruments under the assumption of white noise errors would lose its consistency if in fact the errors are serially correlated (Kiviet, 1995).

Since the LSDV estimates are more efficient than any other classes of estimates developed for autoregressive panel data models, removal of the bias of LSDV estimates open the possibility of obtaining more powerful estimates (Kiviet, 1995). Kiviet (1995) evaluated the bias in the true parameters based on a Monte Carlo study. Since true parameters are seldom known, Kiviet (1995) suggest that these be replaced with estimates obtained from techniques such as Instrument Variables (IV) proposed by Anderson and Hsiao (AH) and Arellano and Bond (1991) to obtain unbiased and efficient parameters.

The sample in this study is of dimensions 47 cross section and spread over 18 years. The sample is balanced meaning that the same number of observations is available for each destination. Given these characteristics, it is decided CLSDV is the most suitable way of estimating Equation (1). For comparison purposes, the regression is also estimated using AB technique. The software used for this exercise is STATA10. Long term elasticities were calculated manually and validated by cross checking. The estimation results using AB and CLSDV are reported in Table 5 below.

6. Results

Table 4 shows the results of the regression. A systematic difference between the coefficients obtained using AB and CLSDV methods is observed for all the variables although the discrepancy between the two sets of estimates are negligible in the case of the dummy variables. The difference in γ computed from each of the method implies that the long run elasticities computed are noticeably different. All the estimated coefficients other than **LDF** have the expected signs as discussed in Section 5.2. the

variables which are not stationary at the ten percent of level of significance are left out from Model 2.

Table 4: Estimation Results

Variables	Model 1		Model 2	
	AB	CLSDV	AB	CLSDV
LD_{t-1}	0.6694 ⁺ (0.0416)	0.7246 ⁺ (0.0328)	0.5616 ⁺ (0.0429)	0.6173 ⁺ (0.0240)
LE	1.143 ⁺ (0.1335)	0.9832 ⁺ (0.1507)	1.3947 ⁺ (0.1754)	1.2666 ⁺ (0.0242)
LP	0.0025 [*] (0.0047)	0.0057 [*] (0.0063)		
LM	0.2055 ⁺⁺ (0.0404)	0.1794 ⁺ (0.0467)	0.2716 ⁺ (0.6916)	0.1946 ⁺ (0.0391)
LDF	-0.4766 [*] (0.3291)	-0.5743 [*] (0.2649)		
D1993	-0.0260 [*] (0.0261)	-0.0266 [*] (0.0306)		
D2001	-0.0238 [*] (0.0206)	-0.0270 [*] (0.0279)		
D2002	-0.0948 ⁺ (0.0243)	-0.0956 ⁺ (0.0265)	-0.0879 ⁺ (0.0230)	-0.0884 ⁺ (0.0242)
D2003	-0.0621 ⁺ (0.0245)	-0.0582 ⁺ (0.0310)	-0.0673 ⁺ (0.0235)	-0.0614 ⁺ (0.0245)
<i>Long Run Elasticities.</i>				
LE	3.4573	3.570	3.181	3.3010
LP	0.0076	0.0207		
LM	0.6216	0.6514	0.8310	0.5085
LDF	-1.4416	-2.085		

Source: Computed by author from respective data sets listed in methodology. CLSDV is the preferred estimation technique it produces unbiased and efficient estimates in such samples. *Not Significant at 10 percent level of significance. ⁺ significant at 1 percent level of significance.

The results show that 61 percent of Australian travellers repeat their visitation. Income is the primary determinant of departures confirming the results obtained by Dwyer et al., (1993), Hollander, (1982), Philips and Hamal (2000), Smith and Toms, (1978) and Webber, (2001). Income elasticity of departure is 1.3 in the short run. In the long run, the number of departures becomes even more responsive to changes real weekly earnings as elasticities increase to 3.3. Economic growth which brings about

improvement in the standard of living in Australia will act as a major stimulus to outbound travel.

Migration is a significant determinant of departure. A 10 percent increase in the number of Australian resident born in a particular destination will increase departure to that destination by 1.95 percent in the short run and 5 percent in the long run. These results give an indication of the direction that departures will take in the future and confirm that the trend in migration to Australia will play a major in influencing travel behaviours of Australian residents.

Years 2002 and 2003 have had international departures showing the susceptibility of Australian travellers to adverse international conditions. Events in 2001 do not have any major impact on departures from Australia. Note that in 2001 the economic conditions in Australia were highly conducive to foreign travel. This can be expected to have had a positive impact on departures in the earlier months of the year and thus, offsetting the effect of the crisis occurring in September.

Domestic transportation cost is not significant in explaining departures from Australia. Moreover, the coefficient is not of the expected sign. The negative coefficient shows that domestic transportation is considered as a complement. This result may be reflecting the fact that domestic transportation is part of the total travel cost of the Australian traveller who transits through a different domestic city to board the international flight. To some extent this variable is measuring the effect of changes in transportation costs to the destination.

The surprising results is that real exchange rate does not have any influence in the decision making process of the Australian traveller. One way to explain this is that decision to travel can take place several months before the actual travel date and the exact exchange rate which is taken into account is not known. On the other hand, in this study aggregate annual data are used and this may not reflect the actual exchange rate considered by the traveller. Furthermore, real exchange rate is made up of two components, the exchange rate and the relative prices level of Australia and the destination. The positive effect of appreciation of the Australian dollar on departures can be offset by rising prices at the destination. This study demonstrates that real exchange rate may not be an adequate proxy for prices at the destination. This result calls for more in-depth study of the effect of real exchange rate on the choice of destination by Australian travellers.

7. Limitation of the Study

The main limitation of this study is that, due to lack of data, transportation cost has been left out of the model estimated. However, given the methodology used, the exclusion of the transport variable will not affect the reliability of the other elasticities estimated. Another limitation of this study is that it does not include a measure for the price of substitutes which has been observed to be significant in determining the choice of destinations of Australian travellers by Song and Wong (2003) and Webber (2001). Since this study is based on a panel which includes most of the destinations visited by Australian, it is difficult to obtain the prices of substitutes using a similar methodology as Song and Wong (2003) and Webber (2001).

The absence of disaggregated data by purpose of visit has been the principal reason for the use of the total number of departures as dependant variable. Song and Wong (2003) who use the similar dependent variable in their model state that, while results provide valuable insights on the determinants of demand, they may not reflect the exact reactions of the different market segments when faced with changes in these determinants. The empirical results of study will therefore, be improved by making distinguishing travellers by purpose of study.

8. Conclusion

This paper analyse the trend in international short term departures from Australia using dynamic panel cointegration technique. Data for 47 countries from 1991 to 2008 are utilised. The results show that departures are of a dynamic nature and that 61 percent of travellers from Australia repeat their visits. Conforming to results from previous studies, this paper shows that income, measured by the average real weekly earning in Australia is the single most important determinant of departures in the short run and in the long run. International crisis occurring in year 2002 and 2003 are detrimental to departure from Australia. Real exchange rate is however insignificant in explaining departures. These results are surprising as real exchange rate has been included in the model to capture the effect of changes in the price of international holidays. The latter results warrant for further investigation into the reaction of Australian travellers to changes in the price of the holiday. It is concluded that the economic growth which leads to high real earning in Australia which as a major stimulus to international departures. On the other hand, the trend in international departures from Australia, will be dictated by the immigration policy of the country.

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