

Deteriorating Australia-China relations and prospects for the Australian tourism industry

A dynamic demand analysis

Selvanathan, Saroja; Jayasinghe, Maneka; Eliyathamby, Eliyathamby A.Selvanathan

Published in:

Tourism Economics: the business and finance of tourism and recreation

DOI:

[10.1177/13548166221122469](https://doi.org/10.1177/13548166221122469)

E-pub ahead of print: 21/08/2022

Document Version

Early version, also known as pre-print

[Link to publication](#)

Citation for published version (APA):

Selvanathan, S., Jayasinghe, M., & Eliyathamby, E. A. S. (2022). Deteriorating Australia-China relations and prospects for the Australian tourism industry: A dynamic demand analysis. *Tourism Economics: the business and finance of tourism and recreation*, 1-20. <https://doi.org/10.1177/13548166221122469>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

This is a draft only.

Suggested reference: Selvanathan S, Jayasinghe M, Selvanathan EA. Deteriorating Australia-China relations and prospects for the Australian tourism industry: A dynamic demand analysis. *Tourism Economics*. August 2022. doi:[10.1177/13548166221122469](https://doi.org/10.1177/13548166221122469)

**Deteriorating Australia-China relations and prospects for the
Australian tourism industry: A dynamic demand analysis**

Saroja Selvanathan¹ Maneka Jayasinghe*² and E.A Selvanathan³

Abstract

Inbound tourism from China contributes to around 15% of Australian tourist arrivals. However, the political and trade relations between the two countries began to deteriorate since 2018. Considering this environment, using annual data from 1991-2019, this study enables the identification of alternative tourism markets for Australia. The results suggest that maintaining price competitiveness and consumer satisfaction should be high priorities of the Australian tourism policy to attract more tourists. The findings of this study provide insights to formulate new strategies to attract tourists from the other top markets in the event of a decline in Chinese tourist arrivals to Australia.

Key words: Inbound tourism; Australia-China relationship, Tourism price elasticity; Tourism income elasticity

1. Introduction

Tourism is Australia's largest services export. During 2018–19 tourism contributed A\$60.8 billion to the Australian economy and provided jobs for more than 5% of the national workforce (Tourism Research Australia, 2020). Inbound tourism from China to Australia has seen unprecedented growth in recent years; a decade ago, the number of Chinese travellers in Australia was just in the order of 353,000. It then started to increase at a compound growth rate of 15% a year between 2009 and 2018, and the number stands at 1.44 million in 2019, just before COVID-19 (Australian Bureau of Statistics (ABS) 2019). In 2018, China contributed around 15.5% of total tourist arrivals in Australia, overtaking New Zealand (15%), the top Australian tourism market since 1999. Since the mid-1990s, China has been the largest growth market of inbound tourism in Australia before the growth rate began to reduce drastically to 5.5% and 0.5% in 2018 and 2019, respectively (ABS, 2020). Several research papers published on Australian tourism demand before 2018 predicted China as the leading market for Australian inbound tourism in the years to come (see Pham, Nghiem, & Dwyer, 2017; Seetaram, 2010).

However, tensions in the political and trade relations between China and Australia since 2018 are expected to continue in the years to come as both countries are now in some form of war footing, at least in terms of a trade war at the moment (Boyle, 2021; The International Institute for Strategic Studies IISS, 2020). Henderson (2003) noted that academics should acknowledge and incorporate the fundamental relationship between politics and tourism in their studies. This is because tourism is a highly political phenomenon (Richter, 1989). On

the one hand, international tourism is a catalyst for reducing political tension and promoting world peace (D'Amore, 1994). On the other hand, governments can exert political pressure through tourism to either promote tourism with friendly countries or restrict tourism with hostile countries (Richter, 1989). Few studies exist exploring public policy and tourism (Hall 1994, Hall & Jenkins 1995). Furthermore, Legg, Tang and Slevitch (2012) examined how the political ideology of a government shapes an individual's destination choice. Several studies examine the relationship between politics and tourism between two pairs of politically divided nations, such as South/North Korea and Taiwan/China (Prideaux, 2005; Yu, 1998; Yu and Chung, 2001). Some of these studies have used Butler's (1980) model; *the cycle of evolution of a tourist resort*, to understand the structure of bilateral tourism and politics. Although Australia and China cannot be considered as 'politically divided states' as in Butler and Mao's (1996) definition, these studies facilitate the understanding that politics between two countries play a critical role in tourist flows.

Therefore, the current state of Australia-China relations could have serious and adverse implications on the Australian tourism industry and the previous growth forecasts about Chinese visitors to Australia may no longer be applicable under the new political and economic relations between the two countries. While the full impact of the political rift between Australia and China on the Australian tourism industry is not yet apparent due to COVID-19 travel restrictions, some early data published by the ABS reveals a notable drop in Australia's export income from tourism, followed by falling orders from Chinese tourists (Global Times, 2021).

Against this backdrop, this paper explores the prospects of the Australian international tourism market. For this purpose, focusing on the top 20 source countries of Australian international tourism, which contributes to about 88% of total tourist arrivals in Australia, this study seeks to answer the following four research questions (RQ); RQ1: what are the factors

that determine tourist visits to Australia from the top tourism markets?, RQ2: what are the factors that determine Chinese tourist visits to Australia?, RQ3: how different or similar are the factors affecting the Chinese tourist arrivals and other tourist arrivals to Australia, and RQ4: what are the actions Australian tourism industry providers should take in the short-run and long-run in the event of a significant reduction in Chinese tourist arrivals?

In doing so, this study presents interesting policy insights in the form of relevant short-run and long-run elasticities of tourism demand. The findings of this study are intended to assist policymakers and Australian tourism industry stakeholders in formulating new policies to diversify the tourism market by attracting more tourists from the other top markets during the post-COVID-19 period.

While there are several studies on the demand for Australian tourism by top host countries (see, for example, Seetaram, 2010; 2012), this study differs from the existing literature and contributes to new knowledge in three ways: the current study 1) compares the determinants of demand for Australian tourism by China and other top tourism source countries and thereby enables the identification of the most reliable and growing tourism markets for Australia; 2) provides an up-to-date analysis of tourism demand by the top 20 source countries (whereas previous studies have focused on a small number of source countries), and; 3) in contrast to existing studies that focus on a group of source countries in a panel setting, this study analyses the determinants of tourism demand by the top 20 source countries, individually as well as in a panel setting. Valadkhani and O'Mahony (2018) noted that many factors that influence tourists' behaviour are constantly changing and highlighted the need for continual research to understand these dynamic changes.

2. Current status of Australia-China relations

Historically, Australia-China relations have been characterised by strong bilateral trade ties. In 2007 China surpassed Japan and became Australia's largest trading partner, and in 2009 became Australia's largest export market. However, due to the recent political tension between the two countries, bilateral trade and diplomatic relations are weakening.

Tensions initially arose in 2018 when Australia banned Chinese tech giant Huawei from its 5G network. Then in early 2019, the Australian Intelligence Agency determined that China was responsible for a Cyber-attack on various industries, schools, hospitals, government officials and the Australian Parliament (Hitch & Probyn, 2020). The bilateral relationship between the two countries reached a new low following a demand from the Australian foreign minister for an international inquiry into the origins of the coronavirus (COVID-19) pandemic which garnered support from more than 100 countries for a formal investigation to be initiated during early 2020 (IISS, 2020). In 2020, Australia suspended an extradition treaty with Hong Kong and offered to extend the visas of 10,000 Hongkongers who are already in Australia (Bagshaw, 2020). Recently, the cancellation of China's flagship Belt and Road deals with the (Australian) state of Victoria by the Australian Federal Government (Needham, 2021) and the blocking of Chinese companies' \$300 million bid for the Australian construction firm Probuild (Dziedzic, 2021) further deepened the political rift between the two countries.

The weakening relationship has already adversely affected some trade between the two countries; China suspended beef imports from Australia (Reuters, 2020), imposed an 80% tariff on Australian barley (Conifer, 2020), announced new rules for iron ore imports from Australia (Dziedzic, 2020), and banned the import of several other products, such as wine, sugar, and coal (Srinivasan, 2020). Furthermore, the Chinese Government publicly informed its citizens not to travel to Australia and China's Ministry of Education warned Chinese students to reconsider their decisions to study in Australia and requested they look elsewhere, alleging

racism and violence in Australia against the Chinese in connection with the origins of COVID-19 (ABC, 2020).

3. A Review of Australian tourism demand studies

Over the last two decades, there has been significant growth in literature on tourism demand, and some of these studies have focused on modelling tourism demand for Australia. In particular, price and income elasticities have been computed using tourism demand models in some of these studies (see, for example, Crouch, 1992; Crouch, Schultz, & Valerio, 1992; Divisekera, 1995; Kulendran & Divisekera, 2007; Kulendran & Dwyer, 2008).

In a review of 100 studies on tourism demand, Lim (1997) found that income is the most frequently used explanatory variable, followed by relative prices and transportation costs. Demand for tourism has been found to be positively associated with consumers spending power and elasticity estimates suggest that tourism is a good with positive income elasticity (a normal good) – where demand increase as income increases (Crouch et al., 1992; Divisekera, 2003; Lim, 1999; Peng et al., 2014; Seetaram, 2010; Selvanathan et al., 2021a). Seetaram (2012), using dynamic panel modelling, found that income is the most important determinant of short-term visits to Australia and that travel to Australia is normal and a luxury good. Similar results were found in Kulendran (1996), Kulendran and King (1997), Lim and McAleer (2001), Divisekera (1995), Divisekera (2003) with respect to short-term international tourist flows to Australia from Japan, New Zealand, Singapore, the UK, and the US.

Research has also found that international tourists to Australia are very responsive to changes in tourism prices in Australia. Lim (1999) and Selvanathan and Selvanathan (2022) found that in most cases, the demand for international tourism is negatively related to price. While

consumer price indices (CPI) were commonly used in many tourism demand modelling studies, Kulendran (1995) and Divisekera (2003) used tourism price indices as a proxy for prices, demonstrating a significant departure from the commonly used CPI. Pham et al. (2017) constructed a tourism price index for Chinese visitors that consists of 70% of the international price index (airfare) and 30% of the domestic price index (cost of living). The authors indicated that Chinese tourists to Australia are more price sensitive than those of other key tourism source markets.

Several studies on tourism demand analysis have suggested that immigration is a catalyst for international tourism flows. For example, Seetaram (2012) examined the tourism-migration nexus, which authors referred to as 'immigration-led tourism' and confirmed the existence of a tourism-immigration nexus in Australia. Using migration flow from China, Pham et al. (2017) found that migration is significantly positive and has a modest effect on Chinese inbound visitors to Australia in the short-run and long-run.

Research suggests that tourists could often promote and convince their neighbours, friends and relatives to visit a particular country after they return home from their trips, which is widely noted as 'word-of-mouth advertising'. It is a form of free publicity based on their experience while they are in a particular destination country. Oppermann (2000), referring to tourism products, notes that habit formation can be translated into tourist revisits. The effect of habit persistence and word-of-mouth advertising has been commonly modelled in the tourism demand literature using a lagged dependent variable (more often tourist arrivals) (for example, see Morley, 1998). Pham et al. (2017) found that the lagged dependent variable for Chinese tourist arrivals in Australia is positive and significant.

Tourism is widely recognised as highly susceptible to external factors and pressures in the wider operating environment (Ritchie, 2004). For example, Dwyer, Forsyth, and Spurr (2006) found that SARS resulted in fewer inbound tourist flows to Australia. Pham et al. (2017)

found that SARS had a significant negative effect on inbound Chinese visitors to Australia. Sheldon and Dwyer (2010) noted that during the GFC, tourism spending, as part of discretionary consumer spending, has seen a more notable fall than the other consumer spending, adversely affecting tourism flows worldwide. Smeral (2009) found about an 11% to 12.5% decline in aggregate demand for foreign travel by Canadian, American, Japanese, and EU-15 tourists in the aftermath of the GFC. Several studies have suggested that the mining boom in Australia during 2005-2007 has adversely affected the tourism industry through the effects of resource constraints and a strong appreciation of the exchange rate (Pham, Jago, Spurr, & Marshall, 2015).

4. A glimpse of the Australian inbound tourism market

Figure 1 shows the number of international tourist arrivals (in billions) to Australia and its growth rate (in percentage) over the period 1991-2019. As can be seen, in general, over this period, there is an upward trend in the total number of tourist arrivals to Australia, except during specific world and domestic events, such as the Asian Financial crises (1997-1998), World Trade Centre Attack (2001), SARS Epidemic (2002-2003), and Global Financial Crises (2007-2008).

[Figure 1 about here]

In this study, we consider the top 20 source countries (China, New Zealand, USA, UK, Japan, Singapore, India, Malaysia, Hong Kong, South Korea, Indonesia, Germany, Taiwan, Canada, Philippines, France, Vietnam, Thailand, Italy and Ireland) that supply tourists to the host country Australia. Figure 2 depicts the average growth rate for the top 20 countries. As can be seen, China (17.9 percent), Vietnam (15.3 percent), India (14.5 percent) and Korea (14.3 percent) depict a double-digit growth rate in the average Australian inbound tourism. During the same period the lowest growth rate was seen from Japan, only 0.4 percent. Figure 3 plots

the average growth in tourist arrivals from source countries against growth in per capita income in source countries. Figure 4 depicts the average growth in tourist arrivals in Australia against growth in tourism prices in Australia. Figure 5 plots the average growth in tourist arrivals from source countries against growth in migration to Australia from source countries. As can be seen, there is a positive relationship between tourist arrival growth rate from the source country and per capita income growth rate in the source country and between tourist arrival growth rate from the source country and migration growth rate from the source country. On the other hand, a negative relationship between the annual Australian tourist arrival growth rate and tourism price growth rate can be seen.

[Figure 2 about here]

[Figure 3 about here]

[Figure 4 about here]

[Figure 5 about here]

5. Model, Research Questions and Methodology

Following Pham et. al. (2017), we propose the following dynamic demand relationship to model the demand for Australian tourism (measured by the number of tourist arrivals to Australia) from country i ($= 1, 2, \dots, 20$ countries) in year t ($= 1991, 1992, \dots, 2019$, the sample years):

$$TG_{it} = \alpha_0 + \alpha_1(TG_{it-1}) + \alpha_2(INCOME_{it}) + \alpha_3(PRICE_t) + \alpha_4(MIGRATION_{it}) + \sum_{j=5}^k \alpha_j(OTHERFACTORS_{jt}) + \varepsilon_{it} \quad (1)$$

where the dependent variable TG_{it} is the tourist arrivals from country i to Australia in year t ; the independent variables are (1) the lagged dependent variable, TG_{it-1} (one- year lagged value of TG_{it}); (2) per capita income, $INCOME_{it}$ (proxied by per capita GDP) of country i in year t ; (3) tourism price level in Australia in year t , $PRICE_t$; and (4) migration flow to

Australia from country i in year t , $MIGRATION_{it}$. We use TG , $INCOME$, $PRICE$, and $MIGRATION$ data in annual growth form. This means that the corresponding coefficients α_2 , α_3 and α_4 can be interpreted as short-run income, price and migration elasticities. Previous literature on tourism demand analysis has identified that tourists could revisit a particular destination after their first visit or provide “free publicity” about the destination. That is, they could promote and convince their neighbours, friends and relatives to visit Australia after they return to their home country from their Australian trip. In the literature, this effect has been modelled using a lagged tourist arrivals variable, which can be either positive or negative depending on the tourist experience in Australia. To capture this effect, we have also included the lag of tourist arrivals in our model specification.

The $OTHERFACTORS$ includes 3 dummy variables: SARS pandemic (SARS=1 in 2003 and SARS=0 for other years), GFC (GFC=1 for years after 2008 and GFC=0 for other years) and Australian Mining Boom (MBOOM=1 for the period 2005-2007 and MBOOM=0 for other years). The selection of the explanatory factors is based on the findings of the existing literature discussed in Section 3 (for example, see, Crouch et al., 1992; Divisekera, 2003; Lim, 1999, Peng et al. 2014; Pham et al., 2017; Selvanathan et al., 2021a, 2021b). Since the initial analysis indicated the exchange rate variable is not statistically significant, we have not included this variable in our model specification. We observed Pham et al. (2017) also excluded exchange rate from their model specification.

Based on the Model given by Equation (1),

Short-run elasticities can be expressed as

$$\text{Income Elasticity} = \alpha_2; \quad \text{Price Elasticity} = \alpha_3; \quad \text{Migration Elasticity} = \alpha_4 \quad (2)$$

Rearranging Equation (1) (for example, see Li and Maddala, 1999; Pham et. al., 2017), we can derive the long-run elasticities as

$$\text{Income Elasticity} = \frac{\alpha_2}{(1-\alpha_1)}; \quad \text{Price Elasticity} = \frac{\alpha_3}{(1-\alpha_1)}; \quad \text{Migration Elasticity} = \frac{\alpha_4}{(1-\alpha_1)} \quad (3)$$

We use the estimates for $\alpha_1, \alpha_2, \alpha_3$ and α_4 of Equation (1) to compute long run elasticities.

The empirical analysis of this study is carried out at two levels: (1) pooled dynamic panel model, using fixed effect, random effect and System Generalised Method of Moment (GMM-SYS) methods and (2) dynamic single-country level model.

The pooled dynamic panel modelling a) provides an overall picture of the overseas tourism market in relation to Australian inbound tourism, b) improves the efficiency of the estimated parameters due to 20 times large sample size, and c) allows us to control for individual differences and thereby study dynamic adjustment and measure the effects of policy changes. Any possible endogeneity issue will be taken care of by the GMM-sys estimation (Blundell and Bond, 1998). This analysis enables us to answer RQ1 (what are the factors that determine tourist visits to Australia from the top tourism markets).

The dynamic single-country level model estimation, a) enables the understanding of how tourists visiting of respective countries to Australia react to their local conditions and conditions in Australia and b) provides short-run and long-run income, price and other elasticities customised for each country which are instrumental for policy analysis at an individual country level. This analysis enables us to answer RQ2 (what are the factors that determine Chinese tourist visits to Australia?) and RQ3 (how different or similar are the factors affecting the Chinese tourist arrivals and other tourist arrivals to Australia). The dynamic single-country level model together with pooled dynamic panel model enable us to answer RQ4 (i.e., what are the actions Australian tourism industry providers should take in the short-run and long-run in the event of a significant reduction in Chinese tourist arrivals).

A number of previous studies used the dynamic single-country level model specific to a

particular country (for example, see, Pham et al. 2017) and the dynamic panel model (for example, see, Jayasinghe and Selvanathan, 2021; Seetaram, 2010; 2012).

The data on international short-term arrivals (*TG*) for the top 20 source countries were collected from the ABS (2019). Following Pham et. al. (2017), we also constructed a Tourism Price Index variable using 70% of the international price index (airfare) and 30% of the domestic price index (cost of living) (see, also Divisekera, 2003; Kulendran, 1995). The international price index and domestic price index were sourced from ABS (2020). Data for the *MIGRATION* variable was collected from ABS (2019).

As found in a number of previous studies (for example, see, Pham et al. 2017, Seetaram 2012, Witt and Martin 1987) we would expect the sign of the coefficient of TG_{it-1} , α_1 , to be positive. A negative or very small α_1 indicates that there is room for improvement to attract more tourists from those countries by using other means of advertising. This is because, a negative (very small) α_1 suggests that the effect of repeated tourist visits, habit formation and/or word-of-mouth advertising is negative (very small) for visitors from these countries to Australia; hence other forms of active advertising are required to attract tourists from such countries. The sign of the *INCOME* coefficient α_2 is expected to be positive. For the *PRICE* variable, since Australia' high tourism price deters international tourist arrivals, we would expect a negative coefficient for the *PRICE* variable, that is $\alpha_3 < 0$. In general, we would expect a positive coefficient for the *MIGRATION* variable, that is $\alpha_4 > 0$ and the coefficients of the three variables SARS, GFC and MBOOM to be negative as such events are deterrents for travel.

6. Panel model estimation results

The first step in the panel model estimation is to investigate whether each time series in the panel model has the property of cross-sectional independence (CI). Table 1 present the results

for cross-sectional dependence (CD) tests. The null and alternative hypotheses for these tests are H_0 : Time series is CI and H_a : Time series is CD, respectively. As can be seen, for all series the p -value is very small meaning that we reject the null hypothesis at 1% level and conclude that the time-series are CD. As each time series is not CI, we use the second generation Cross-sectional IM, Pesaran Shin (CIPS) unit root test (Pesaran, 2007) which are constructed on the assumption of CD where the null hypothesis is H_0 : time-series is nonstationary. As can be seen in Table 1, all the panel time-series are stationary.

[Table 1 about here]

We now estimate Equation (1) using the panel dataset formed by pooling the 20 single-country datasets. In Table 1, we found that the time series variables are not cross-sectional independent. It is now well known that the existence of cross-sectional dependence in the data can bias the estimates. A number of previous studies in the literature (for example, see Sarafidis and Robertson 2009, Neal 2015, Herzer and Strulik 2017 and, Adams and Opoku 2021) have addressed this issue by time-demeaning the data prior to estimation, including the GMM estimation. Considering that our data also suffer from CD, we follow Sarafidis and Robertson (2009) and Adams and Opoku (2021) and demean the data prior to estimation to reduce/alleviate the CD effect. For each country and each variable, we transformed the data by deviating each variable from its time average before estimation. In Table 2, we present the results using fixed effect, random effect and GMM-SYS estimated with the time-demeaned panel data.

This section answers RQ1 (what are the factors that determine tourist visits to Australia from the top tourism markets?). A comparison of the fixed effect, random effect and GMM-SYS estimation results in Table 2 reveals that the estimation results are similar across the three

models. The results reveal that, except for the migration variable, all the estimated coefficients are broadly similar and are statistically significant.

[Table 2 about here]

Impact of repeated visits, habit formation and word-of-mouth advertising

As can be seen from Columns 2, 5 and 8 of Table 2, the lagged-tourist arrival variable coefficient is positive (about 0.3 to 0.4) and highly statistically significant. This result is consistent with Seetaram (2010) and (2012) findings. The estimated value of $\alpha_1 = 0.3$ means that for every one percentage point increase in the tourist arrivals to Australia in the current year, there will be nearly a 0.3 percentage point increase in the tourist arrivals to Australia in the following year. This indicates that tourists from the countries under consideration have had a positive experience during their travel to Australia. This has resulted in the tourists either making repeated visits to Australia and/or spreading their positive perception about Australia to other potential visitors to Australia.

Income, price and migration elasticities

The implied short-run and long-run income, price and migration elasticities based on the three models are also presented in Columns 3-4, 6-7 and 9-10 of Table 2. As can be seen from the INCOME row of the table, in general, the income elasticities are greater than one (short-run 1.2 and long-run about 1.9), indicating that Australian tourism is considered a luxury by the source country visitors. As can be seen from the PRICE row of the table, both the short-run and long-run price elasticity estimates are negative and less than one in absolute value (short-run ranges between -0.46 and -0.57 and long-run ranges between -0.63 and -0.85), indicating that Australian tourism is price inelastic. Hence, an increase in the Australian tourism price, in general, will have a minimal impact on source country visitors selecting Australia as their holiday destination. The magnitude of the migration elasticity

presented in the MIGRATION row is relatively small compared to the income and price elasticities. As expected, the estimated coefficients of the variables SARS, GFC, and mining boom are generally negative and statistically significant. Similar results have been found in Dwyer et al. (2006; 2016) and Pham et al. (2017).

[Table 3 about here]

7. Single-country estimation results

Before estimating the Model given by Equation (1) using individual country data, we investigated the stationarity of all the time-series variables used in the model to avoid any spurious regression results, using the Dickey and Fuller (1979) and the Phillips and Perron (1988) tests. The results (available on request from the authors) indicate that all the time-series variables are stationary. To correct for serial correlation, we employ the Cochrane-Orcutt procedure to estimate Equation (1) and the estimation results for the top 20 tourist markets of Australia are presented in Table 3. Row 1 of Table 3 presents the results for China and Columns 2-5 of rows 2-20 provide estimation results of the demand model (Equation 1) for the remaining 19 countries. The estimates in Columns 3-5 can also be interpreted as short-run income, price, and migration elasticities. Columns 6-8 of the table presents the corresponding long-run elasticities. This section provides insights for RQ2 (what are the factors that determine Chinese tourist visits to Australia?), RQ3 (how different or similar are the factors affecting the Chinese tourist arrivals and other tourist arrivals to Australia), and RQ4 (what are the actions Australian tourism industry providers should take in the short-run and long-run in the event of a significant reduction in Chinese tourist arrivals?). The Durbin-h statistics and the corresponding p -values confirm that serial correlation is not a problem with the estimated results.

[Table 3 about here]

7.1. Estimation results for China

Row 1 presents the results for China which provide answers to RQ2: what are the factors that determine Chinese tourist visits to Australia? As can be seen, the lagged-tourist arrivals, income, price and stock of migrants are the major determinants that significantly influence the Chinese travellers to visit Australia. This result is consistent with the findings of Pham et al. (2017). While the repeated visits, habit formation and/or word-of-mouth advertising impact on Chinese travellers to come to Australia is statistically significant, the magnitude 0.280 is smaller compared to most of the other countries. The short-run and long-run income elasticities are larger than one indicating that the Chinese travellers consider travelling to Australia as a luxury in the short-run as well as in the long-run. It is also worthwhile noting that the income elasticities for China are greater than those for most of the other countries under consideration. The results also reveal that the demand for tourism to Australia by Chinese travellers is price inelastic in the short-run (-0.81) and elastic in the long-run (-1.14). This means that in the long-run, Chinese tourists are very sensitive to changes in Australian tourism prices. The migration coefficient is positive and statistically significant meaning that the number of Chinese living in Australia is also an important factor that brings more Chinese visitors to Australia.

7.2 Estimation results for other countries

Rows 2-20 in Table 3 provide an understanding of RQ3 (how different or similar are the factors affecting the Chinese tourist arrivals and other tourist arrivals to Australia).

Incorporating all estimation results, the following discussion also provides insights on the actions Australian tourism industry providers should take in the short-run and long-run in the event of a significant reduction in Chinese tourist arrivals; RQ4.

Impact of repeated visits, habit formation and word-of-mouth advertising

As can be seen in Column 2 of Table 3, in the majority of countries the lagged-tourist arrival variable coefficient is positive and highly statistically significant. This result is consistent with the findings of Seetaram (2010) and (2012). Column 2 results also show that the lagged tourist arrival variable in some countries, such as the UK (0.646), Hong Kong (0.600), Singapore (0.588), Germany (0.582), Ireland (0.580), US (0.558), Taiwan (0.538), India (0.533) and Vietnam (0.527) has a higher magnitude than the other countries. This indicates that tourists from these countries have a positive perception towards Australia and tend to encourage their friends, family and neighbours to visit Australia and/or revisit to Australia themselves, resulting in increased tourist flow from these countries in the following year. Overall, for every one percentage point increase in the tourist arrivals from these countries in the current year, there will be more than a 0.5 percentage point increase in the tourist arrivals from these countries to Australia in the following year. As the travellers in these countries already have a positive perception towards Australia, policies should be designed to maintain such a high level of positive view. Further focus on increasing the level of satisfaction of the tourists from these countries would enhance tourism flows in subsequent years. It is also worthwhile noting that in a number of countries in the Asia Pacific region, the lagged tourist arrivals coefficient is low (New Zealand (0.059), Malaysia (0.034), Philippines (0.048), Thailand (0.037) and or even negative in South Korea (-0.096) and Indonesia (-0.057). This indicates that repeated visits, habit formation and/or word-of-mouth advertising is not a very prominent driver of inbound tourism to Australia from these countries. Further investigation should be carried out to find the reason for such low as well as negative values. In the meantime, it is worthwhile undertaking proactive marketing campaigns and programmes to create a positive impression about Australia amongst travellers to attract more tourists from these countries.

Impact of tourist income

The estimated short-run and long-run income elasticities in Columns 3 and 6 of Table 2 are positive for all countries (except negative but statistically insignificant for Taiwan) and are statistically significant in the majority of the countries. The long-run elasticities, for example, are larger than unity for most countries, implying that Australian travel is considered a luxury by those countries, although the magnitude ranges from 1.86 to 6.17. Our results also indicate that for tourists from some countries (Singapore, Germany, and Italy), visiting Australia is a necessity good.

At the individual country level, we observe a greater diversity of the long-run and short-run income elasticities. For example, when considering the long-run income elasticities, Australia is a substantial luxury destination for tourists from Japan, India, South Korea and the Philippines (with income elasticity above 4). For tourists from New Zealand, Ireland, Thailand, France, Canada, Indonesia, and Malaysia, Australia is a marginally luxury destination (with income elasticity ranging between 1.86 and 2.46). Income elasticity of greater than 1 also indicates that the growth rate of tourist arrivals to Australia from such countries has increased at a faster rate than the rate of increase in the per capita income of tourists of those countries. For example, a 1% increase in income of Indian tourists will result in a 2.48% increase in the short run and 5.31% in the long-run in Indian tourist arrivals to Australia.

Pham et al. (2017) reported a similar pattern among Chinese tourists. The magnitude of the long-run income elasticities is generally higher than that of the short-run. A study conducted by PricewaterhouseCoopers (2017) predicted India and Indonesia as two of the fastest-growing countries in the world, in addition to China, the US, Japan, Germany, and the UK during the next several decades. As we observe a highly positive income elasticity for most of these fastest-growing countries, the Australian tourism industry would be well placed in targeting these countries in its tourism promotion strategies.

Impact of tourism price

Columns 4 and 7 of Table 3 present the estimated short-run and long-run price elasticities using the estimated coefficient of price variable (α_3). The estimated price coefficient is negative for all countries (except for Malaysia and the Philippines that have positive but statistically insignificant price coefficients). The price elasticities are generally less than one in magnitude implying that the demand for Australian inbound tourism is price inelastic (less sensitivity for Australian tourism price changes) for most countries. This means that, in case of a price increase in Australian tourism prices, the growth rate of tourist arrivals to Australia from these countries would decrease at a slower rate than the rate of an increase in Australian tourism prices. Since the tourists are generally not that sensitive to price increases, it can be expected that Australia can increase its tourism revenue during a time of tourism price rise. Nevertheless, South Korea and Taiwan show that tourism demand is price elastic (absolute value larger than 1) in the short and long-run, while Vietnam tourism demand is price elastic in the long-run. This means that tourists from these countries are very sensitive to Australian tourism prices and hence including measures such as discounted hotel prices, lower Australian visa fees, tourism package deals, and food vouchers could be used in promotional activities to counter the price sensitivity of the tourists from those countries. The country-specific differences in sensitivity to tourism price changes suggest that targeted strategies are required to attract tourists from various countries. In general, in absolute value, we observe that the long-run price elasticities are about 50% higher than those of the short-run values.

Impact of migration

The short-run and long-run elasticities derived from the migration coefficients α_4 are presented in Columns 5 and 8 of Table 3. The estimated migration coefficient is positive for all countries (except for UK and Indonesia but statistically insignificant). The short-run and long-run elasticities of migration flow are generally positive and less than one, including

China, indicating that tourist arrivals to Australia increase at a slower rate than the rate of migration flow from the source countries. Pham et al. (2017) also found similar results with respect to migration from China. Therefore, Chinese tourist arrivals to Australia due to migration flow from China may not be affected significantly even if the Chinese government imposes any restrictions on the migration flow from China into Australia. The migration elasticity of tourism demand is, however, elastic for tourists from France both in the short-run and long-run.

8 Concluding comments

Tourism is Australia's largest services export and the fourth most valuable export in Australia, making a significant contribution to the country's economy and employment creation. Before Australia-China bilateral relations began to deteriorate in 2018, China was Australia's largest tourism growth market. Several studies conducted before this political rift between the two countries predicted strong and continuous growth of the Chinese inbound tourism market in Australia. However, Australia has already seen a drop in tourism income from Chinese tourists since 2018 due to worsening China-Australia political and trade relations before the start of COVID-19. As a result, tourism operators have started exploring alternative markets in case if there is a fall in tourist arrivals from China during the post-COVID-19 period.

Towards this end, the objective of this research was to examine; what are the factors that determine tourist visits to Australia from the top tourism markets? (RQ1), what are the factors that determine Chinese tourist visits to Australia? (RQ2), how different or similar are the factors affecting the Chinese tourist arrivals and other tourist arrivals to Australia (RQ3), and what are the actions Australian tourism industry providers should take in the short-run and long-run in the event of a significant reduction in Chinese tourist arrivals? (RQ4). The study

focused the inbound tourism to Australia from the top 20 source countries. By focusing on the top 20 Australian tourist markets, we provide insights for the Australian tourism stakeholders in identifying the most reliable and growing tourism markets. The annual data used in this paper spans from 1991 to 2019. We have excluded the data for 2020 and 2021 from our analysis because the international travel to Australia halted from early 2020 until early 2022 due to the COVID-19 border closure. Hence the inclusion of the data for 2020 and 2021 would have distorted the estimation results. Given that the relationship with China has not improved yet and diversification of the tourism market to other countries is vital in Australia's post-COVID tourism recovery, the findings and recommendations emerging from this paper are highly relevant to the post-COVID-19 tourism promotion strategy in Australia.

This study provides some useful insights to identify potential Australian inbound tourism markets and the factors affecting the demand for inbound tourism in Australia. Tourism Australia (2016) noted some important strategic arrangements were implemented to attract tourists, such as supporting access to Australia by assisting new aviation route development, simplifying the tourist visa application process, granting multiple entry options to key markets, widening criteria for the working holidaymaker visas and promoting working holiday options via global youth campaigns (Tourism Australia, 2016). These reforms have undoubtedly contributed to the growth of the Australian tourism industry in recent years. With the new challenges the industry is facing currently, such as the COVID-19 pandemic and souring relationships with China, the Australian tourism agenda should be carefully thought through.

To this end, it may be worthwhile exploring opportunities to re-establish the links with some of the traditional tourism markets, such as Japan, which was a major tourism market in the early 1990s but gradually declined thereafter. In addition, countries with a rapidly growing middle-class, such as India could have high potential to grow as reliable tourism markets.

References

- ABC (2020) China Warns Citizens Not to Travel to Australia Amid 'Increased' Racism since Coronavirus Outbreak. 6 Jun 2020, Retrieved from <https://www.abc.net.au/news/2020-06-06/do-not-travel-to-australia-china-warns-citizens-of-racism/12328488>
- ABS (2019) 3401.0 - Overseas Arrivals and Departures, Australia, Table 4. Retrieved 10th July 2021, from Australian Bureau of Statistics
- ABS (2020) Australian National Accounts: Tourism Satellite Account 2018-19 Financial Year. Retrieved from <https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-tourism-satellite-account/2018-19>
- Adams S and Opoku EEO (2021). Trade and environmental pollution in Africa: accounting for consumption and territorial-based emissions. *Environmental Science and Pollution Research* 27:44230–44239, <https://doi.org/10.1007/s11356-020-10328-8>.
- Bagshaw E (2020) Australia Suspends Hong Kong Extradition Treaty, Extends Hongkongers' Visas after Security Law Imposed. The Sydney Morning Herald, 9th July 2020, Retrieved from <https://www.smh.com.au/world/asia/australia-suspends-hong-kong-extradition-treaty-extends-hong-kongers-visas-after-security-law-imposed-20200709-p55ak8.html>
- Boyle P (2021) Australia must stop beating the drums of war against China. Retrieved from <https://www.greenleft.org.au/content/australia-must-stop-beating-drums-war-against-china>
- Blundell R and Bond S. (1998) Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87: 115—143.
- Butler R.(1980) The Concept of a Tourist Area Resort Cycle of Evolution: Implications for Management of Resources. *Canadian Geographer* 14: 5–12.
- Butler RW and Mao B (1996) Conceptual and Theoretical Implications of Tourism between Partitioned States. *Asia Pacific Journal of Tourism Research* 1(1): 25-34.
- Commonwealth of Australia (2020) Australia calls for action on Wildlife Wet Markets. [Press release]. Retrieved from <https://minister.awe.gov.au/littleproud/media-releases/wildlife-wet-markets>
- Conifer D (2020) China Imposes 80pc Tariff on Australian Barley for Next Five Years Amid Global Push for Coronavirus Investigation. ABC News. 18th May 2020, Retrieved from <https://www.abc.net.au/news/2020-05-18/china-to-impose-tariffs-on-australian-barley/12261108>
- Crouch G I (1992) Effect of Income and Price on International Tourism. *Annals of Tourism Research*, 19(4): 643-664.
- Crouch G I, Schultz L and Valerio P (1992) Marketing International Tourism to Australia: A Regression Analysis. *Tourism Management* 13(2): 196-208.
- D'Amore L (1994) Tourism: The world's peace industry. In J. Van Harsell *Tourism: An Exploration* (pp. 112–17). Englewood Cliffs: Prentice Hall.

- Dickey D and Fuller W (1979) Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association* 74: 427-431.
- Divisekera S (1995) An Econometric Model of Economic Determinants of International Visitors Flows to Australia. *Australian Economic Papers* 34(65): 291-308.
- Divisekera S (2003) A Model of Demand for International Tourism. *Annals of Tourism Research* 30(1): 31-49.
- Dwyer L, Forsyth P, and Spurr R (2006) Assessing the Economic Impacts of Events: A Computable General Equilibrium Approach. *Journal of Travel Research* 45(1): 59-66.
- Dwyer L, Pham T, Jago L, Bailey G and Marshall J (2016). Modeling the Impact of Australia's Mining Boom on Tourism: A Classic Case of Dutch Disease. *Journal of Travel Research* 55(2): 233-245.
- Dziedzic S (2020) A Hindrance or a Help? What do China's New Ore Regulations Mean for Australian Exporters? ABC News. 24th May 2020, Retrieved from <https://www.abc.net.au/news/2020-05-24/what-do-chinas-new-regulations-mean-for-australia/12280396>
- Dziedzic S (2021) China slams Australian Government for 'politicising trade' over decision to block Probuild sale to Chinese company. ABC News. 13th Jan 2021, Retrieved from <https://www.abc.net.au/news/2021-01-13/china-slams-australia-for-politicising-trade-over-probuild-bid/13053682>
- Global Times (2021) Australia Income from Tourism Decline as Chinese Stay Away. Global Times. 4 March 2021, Retrieved from <https://www.globaltimes.cn/page/202103/1217383.shtml>
- Hall CM (1994) *Tourism and Politics: Policy, Power, and Place*. Chichester: Wiley
- Hall CM and Jenkins JM (1995) *Tourism and Public Policy*. London and New York: Routledge.
- Henderson J C (2003) The Politics of Tourism in Myanmar. *Current Issues in Tourism* 6(2): 97-118.
- Herzer D and Strulik H (2017). Religiosity and income: a panel cointegration and causality analysis. *Applied Economics* 49(30):2922–2938.
- Hitch G and Probyn A (2020) China Believed to be Behind Major Cyber Attack on Australian Governments and Businesses. ABC News. 19 Jun 2020, Retrieved from <https://www.abc.net.au/news/2020-06-19/foreign-cyber-hack-targets-australian-government-and-business/12372470>
- Jayasinghe M and Selvanathan EA (2021) Energy Consumption, Tourism, Economic Growth and CO₂ Emissions Nexus in India. *Journal of the Asia Pacific Economy* 26(2): 361-380
- Kulendran N (1995) Modelling International Short-term Tourist Flow to Australia Using the Demand Function Approach. Paper presented at the National Tourism and Hospitality Conference.
- Kulendran N (1996) Modelling Quarterly Tourist Flows to Australia Using Cointegration Analysis. *Tourism Economics* 2(3): 203-222.
- Kulendran N and Divisekera S (2007) Measuring the Economic Impact of Australian Tourism Marketing Expenditure. *Tourism Economics* 13(2): 261-274.

- Kulendran N and Dwyer L (2008) Measuring the Return from Australian Tourism Marketing Expenditure. *Journal of Travel Research* 47(3): 275-284.
- Kulendran N and King ML (1997) Forecasting International Quarterly Tourist Flows using Error-correction and Time-series Models. *International Journal of Forecasting* 13(3): 319-327.
- Legg M P, Tang C H and Slevitch L (2012) Does Political Ideology Play a Role in Destination Choice? *American Journal of Tourism Research* 1(2): 45-58
- Hongyi Li and Maddala G S (1998) Bootstrap Variance Estimation of Nonlinear Functions: An Application to Long-run Elasticities of Energy Demand. *The Review of Economics and Statistics* 81(4): 728–733.
- Lim C (1997) Review of International Tourism Demand Models. *Annals of Tourism Research* 24(4): 835-849.
- Lim C (1999) A Meta Analysis Review of International Tourism Demand. *Journal of Travel Research* 37(3): 273-284.
- Martin C A and Witt S F (1987) Tourism Demand Forecasting Models: Choice of Appropriate Variable to Represent Tourists' Cost of Living, *Tourism Management* 8(3): 233-246
- Morley CL (1998) A Dynamic International Demand Model. *Annals of Tourism Research* 25(1): 70-84.
- Neal, T (2015). Estimating heterogeneous coefficients in panel data models with endogenous regressors and common factors. Working Paper, The University of New South Wales, Australia.
- Needham K (2021) Australia Cancels Belt and Road Deals; China Warns of Further Damage to Ties. Reuters. 21st April 2021, Retrieved from <https://www.reuters.com/world/china/australia-cancels-victoria-states-belt-road-deals-with-china-2021-04-21/>
- Oppermann M (2000) Tourism Destination Loyalty. *Journal of Travel Research* 39(1): 78-84.
- Peng B, Song H, Crouch G I and Witt S F (2014) A Meta-Analysis of International Tourism Demand Elasticities. *Journal of Travel Research* 54(5): 611-633.
- Pesaran MH (2007) A Simple Panel Unit Root Test in the Presence of Cross-section Dependence. *Journal of Applied Econometrics* 22(2): 265-312.
- Pham T, Jago L, Spurr R and Marshall J (2015) The Dutch Disease Effects on Tourism – The Case of Australia. *Tourism Management* 46: 610-622.
- Pham TD, Nghiem S and Dwyer L (2017) The Determinants of Chinese Visitors to Australia: A Dynamic Demand Analysis. *Tourism Management* 63: 268-276.
- Phillips P and Perron P (1988) Testing for a Unit Root in Time Series Regression. *Bimetrika* 75: 335-346.
- PricewaterhouseCoopers (2017). The World in 2050. Retrieved from <https://www.pwc.com/gx/en/research-insights/economy/the-world-in-2050.html>
- Prideaux B (2005) Factors Affecting Bilateral Tourism Flows. *Annals of Tourism Research* 32(3): 780–801.

- Reuters (2020). China Suspends Beef Imports from Sixth Australian Beef Supplier. Reuters. 7th December 2020, Retrieved from <https://www.reuters.com/article/china-australia-trade-beef-idUKKBN28H135>
- Richter LK (1989) *The politics of tourism in Asia*. Honolulu: University of Hawaii Press.
- Ritchie B W (2004) Chaos, Crises and Disasters: A Strategic Approach to Crisis Management in the Tourism Industry. *Tourism Management* 25(6): 669-683.
- Sarafidis V and Robertson D (2009). On the impact of error cross-sectional dependence in short dynamic panel estimation. *Econ J* 12(1):62–81.
- Seetaram N (2010) Use of Dynamic Panel Cointegration Approach to Model International Arrivals to Australia. *Journal of Travel Research* 49(4): 414-422.
- Seetaram N (2012) Immigration and International Inbound Tourism: Empirical Evidence from Australia. *Tourism Management*: 33(6) 1535-1543.
- Seetaram N and Dwyer L (2009) Immigration and Tourism Demand in Australia: A Panel Data Analysis. *Anatolia* 20(1): 212-222.
- Selvanathan, EA, Selvanathan, S (2022) What makes Vietnam a Preferred Tourism Destination? An Empirical Analysis, *Tourism Analysis* 27(1): 1–18
- Selvanathan EA, Jayasinghe M and Selvanathan S (2021a) Dynamic Modelling of Inter-relationship between Tourism, Energy Consumption, CO₂ Emissions and Economic Growth in South Asia. *Int J Tourism Res* 23: 597– 610.
- Selvanathan EA, Jayasinghe M and Selvanathan S (2021b) International tourism and infectious disease transmission nexus: A cross-country and regional study. *Journal of Travel Research*, Doi:[10.1177/00472875211048932](https://doi.org/10.1177/00472875211048932)
- Sheldon P and Dwyer L (2010) The Global Financial Crisis and Tourism: Perspectives of the Academy. *Journal of Travel Research* 49(1): 3-4.
- Smeral E (2009) Impacts of the World Recession and Economic Crisis on Tourism: Forecasts and Potential Risks *Journal of Travel Research* 49(1): 31-38.
- Song H and Wong K K F (2003) Tourism Demand Modeling: A Time-varying Parameter Approach. *Journal of Travel Research*, 42(1): 57-64.
- Srinivasan P (2020) China's Trade War with Australia is Affecting a Growing Number of Industries. How did We Get Here? ABC News. 10th December 2020, Retrieved from <https://www.abc.net.au/news/2020-12-10/chinas-trade-war-with-australia-export-industry/12967190>
- The International Institute for Strategic Studies (IISS) (2020) The Deterioration of Australia–China Relations." Retrieved from <https://www.iiss.org/publications/strategic-comments/2020/australia-china-relations>
- Tourism Australia (2016) Tourism 2020 (Accessed July 2021) <http://www.tourism.australia.com/about-us/tourism2020.aspx>.
- Tourism Research Australia (2020) State of the Industry 2018–19 In Canberra: Tourism Research Australia.
- Tourism Research Australia (2021) International Visitor Survey Results March 2021 In Canberra: Tourism Research Australia.
- Yu L (1998) Travel between Politically Divided China and Taiwan. *Asia Pacific Journal of Tourism Research* 2(1): 19–30.

Yu L and Chung M H (2001) Tourism as a Catalytic Force for Low-Politics Activities between Politically Divided Countries: The Cases of South/North Korea and Taiwan/China. *New Political Science* 23(4): 537-545

Valadkhani A and O'Mahony B (2018) Identifying Structural Changes and Regime Switching in Growing and Declining Inbound Tourism Markets in Australia. *Current Issues in Tourism* 21(3): 277-300.

Witt SF and Martin CA (1987) Econometric Models for Forecasting International Tourism Demand. *Journal of Travel Research* 25(3),:23-30.

Draft Only

Table 1: Test for cross-sectional dependence (CD) and Panel unit-root test

Variable	Cross-sectional dependence (CD) test		CIPS Panel unit-root test
	Bias-corrected scaled LM	Pesaran CD	CIPS
(1)	(2)	(3)	(4)
Tourist Arrivals (TG)	22.08 (0.000)	16.98 (0.000)	-3.41 (<0.010)
Lagged Tourist Arrivals (TG(-1))	21.45 (0.000)	16.88 (0.000)	-3.52(<0.010)
INCOME	33.37 (0.000)	21.89 (0.000)	-3.07 (<0.010)
PRICE	243.27 (0.000)	70.29 (0.000)	-5.13 (<0.010)
MIGRATION	16.58 (0.000)	12.23 (0.000)	-2.68 (<0.010)

Note: *p*-values are given in parenthesis

Draft Only

Table 2: Panel estimation results

	Fixed Effect Model			Random Effect Model			SYS-GMM		
	Coefficient	Short-run elasticities	Long-run elasticities	Coefficient	Short run elasticities	Long-run elasticities	Coefficient	Short-run elasticities	Long-run elasticities
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	1.752 (0.027)***			1.703 (0.031)***			3.899 (0.000)***		
Lag of tourist arrivals (TG_{t-1})	0.278 (0.000)***			0.282 (0.000)***			0.388 (0.000)***		
Per capita GDP (INCOME)	1.179 (0.000)***	1.18	1.63	1.033 (0.000)***	1.03	1.44	1.186 (0.000)***	1.19	1.94
Price index (PRICE)	-0.457 (0.005)***	-0.46	-0.63	-0.573 (0.006)***	-0.57	-0.80	-0.522 (0.000)***	-0.52	-0.85
Migration (<i>MIGRATION</i>)	0.008 (0.786)	0.01	0.01	0.010 (0.727)	0.01	0.01	0.024 (0.204)	0.02	0.04
<i>SARS</i>	-9.827 (0.000)***			-9.974 (0.000)***			-10.029 (0.000)***		
<i>GFC</i>	-2.654 (0.024)**			-2.873 (0.013)**			-7.361 (0.004)***		
<i>MBOOM</i>	-4.212 (0.013)**			-4.039 (0.017)**			-5.508 (0.009)***		
Akaike info criterion (AIC)	7.777			7.716					
Schwarz criterion	8.005			7.783					
Hannan-Quinn criterion	7.867			7.742					
Durbin h-test	1.781 (0.963)			2.142 (0.984)					
Hansen J-test							14.170 (0.224)		
AR(2) test							0.560 (0.574)		

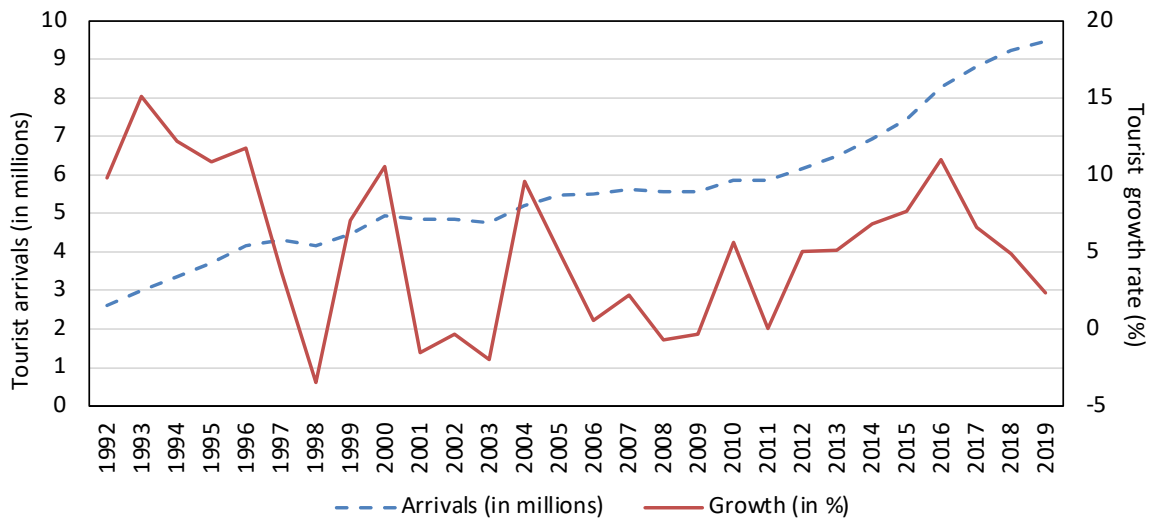
Note: *p*-values are given in parenthesis. * Significant at 10%, ** significant at 5% and *** significant at 1%.

Table 3: Cochrane-Orcutt estimation results and implied elasticities

Country (1)	TG _{t-1} (α_1) (2)	Estimated coefficients/ Short-run elasticities			Long-run elasticities			Adj-R ² (9)	Durbin-h-test (10)
		INCOME (α_2) (3)	PRICE (α_3) (4)	MIGRATION(α_4) (5)	INCOME (6)	PRICE (7)	MIGRATION (8)		
1 China	0.280 (0.078)*	4.006 (0.013)**	-0.818 (0.069)*	0.090 (0.038)**	5.56	-1.14	0.13	0.737	1.740 (0.959)
2 NZ	0.059 (0.777)	1.748 (0.062)*	-0.925 (0.063)*	0.812 (0.116)	1.86	-0.98	0.86	0.304	2.018 (0.978)
3 USA	0.558 (0.008)***	1.408 (0.049)**	-0.216 (0.511)	0.052 (0.881)	3.19	-0.49	0.12	0.587	0.286 (0.612)
4 UK	0.646 (0.002)***	0.953 (0.073)*	-0.173 (0.429)	-0.041 (0.268)	2.69	-0.49	-0.12	0.767	-1.434 (0.076)
5 Japan	0.481 (0.146)	2.223 (0.803)	-0.426 (0.351)	N/A	4.28	-0.82	N/A	0.567	-0.428 (0.334)
6 Singapore	0.588 (0.000)***	0.268 (0.271)	-0.190 (0.529)	0.033 (0.513)	0.65	-0.46	0.08	0.679	0.525 (0.700)
7 India	0.533 (0.002)***	2.482 (0.006)***	-0.457 (0.308)	0.217 (0.003)***	5.31	-0.98	0.46	0.877	0.520 (0.698)
8 Malaysia	0.034 (0.846)	2.120 (0.002)***	0.420 (0.432)	0.360 (0.492)	2.19	0.43	0.37	0.575	0.480 (0.684)
9 Hong Kong	0.600 (0.000)***	1.275 (0.018)**	-0.043 (0.924)	0.085 (0.375)	3.19	-0.11	0.21	0.600	0.075 (0.530)
10 South Korea	-0.096 (0.282)	6.757 (0.000)***	-1.399 (0.089)*	N/A	6.17	-1.28	N/A	0.789	1.280 (0.900)
11 Indonesia	-0.057 (0.530)	2.514 (0.000)***	-0.528 (0.147)	-0.003 (0.940)	2.38	-0.50	0.00	0.716	2.576 (0.995)
12 Germany	0.582 (0.001)***	0.307 (0.501)	-0.045 (0.867)	N/A	0.73	-0.11	N/A	0.439	0.260 (0.603)
13 Taiwan	0.538 (0.000)***	-0.116 (0.789)	-1.106 (0.086)*	0.558 (0.083)*	-0.56	-3.01	1.53	0.594	-0.205 (0.419)
14 Canada	0.358 (0.067)*	1.536 (0.005)***	-0.577 (0.059)*	0.784 (0.068)*	2.39	-0.90	1.22	0.640	0.310 (0.622)
15 Philippines	0.048 (0.793)	4.273 (0.000)***	0.211 (0.715)	0.300 (0.028)**	4.49	0.22	0.32	0.504	0.923 (0.822)
16 France	0.138 (0.462)	1.948 (1.083)	-0.213 (0.634)	1.745 (0.035)**	2.26	-0.25	2.02	0.378	2.287 (0.989)
17 Vietnam	0.527 (0.016)**	1.764 (0.044)**	-0.549 (0.442)	0.097 (0.924)	3.73	-1.16	0.21	0.722	15.745 (1.000)
18 Thailand	0.037 (0.839)	2.371 (0.007)***	-0.064 (0.935)	N/A	2.46	-0.07	N/A	0.251	0.605 (0.728)
19 Italy	0.395 (0.062)*	0.334 (0.703)	-0.401 (0.457)	N/A	0.55	-0.66	N/A	0.181	0.325 (0.628)
20 Ireland	0.580 (0.005)***	0.815 (0.068)*	-0.421 (0.500)	0.853 (0.160)	1.94	-1.00	2.03	0.609	1.646 (0.950)

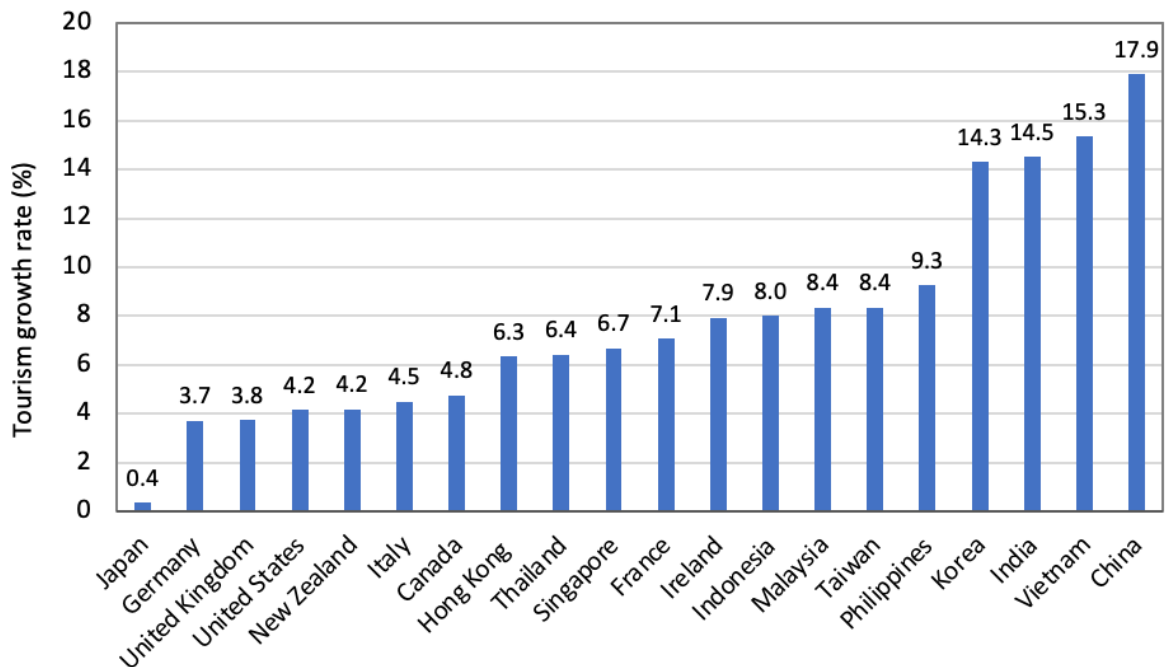
Note: *p*-values are given in parenthesis. * Significant at 10%, ** significant at 5% and *** significant at 1%. N/A: migration data not available for Japan, Korea, Germany, Thailand, and Italy. Short-run and long-run elasticities are calculated using Equations (2) and (3). Null hypothesis of Durbin-h test: H₀: No serial correlation. In the interest of brevity, the estimation results for the three dummy variables in single country model are not reported in the paper but are available on request. Generally, the estimated coefficients related to SARS, GFC and mining boom are negative. It is worthwhile noting that the tourism demand is price inelastic with the panel data estimation results (Table 2), as they are all statistically significant and less than one in absolute value in the short-run as well as long-run across the three estimation methods. At the individual country level results (Table 3) not many of the price elasticities are statistically significant. This may be due to the use of small sample (29 observations) in the individual country model. However, the magnitude of the negative price elasticities in the short-run (Column 4) 16 out of 20 and in the long-run (column 7) 13 out of 20 are less than one.

Figure 1: Tourist Arrivals and tourism growth rates, Australia, 1991-2019



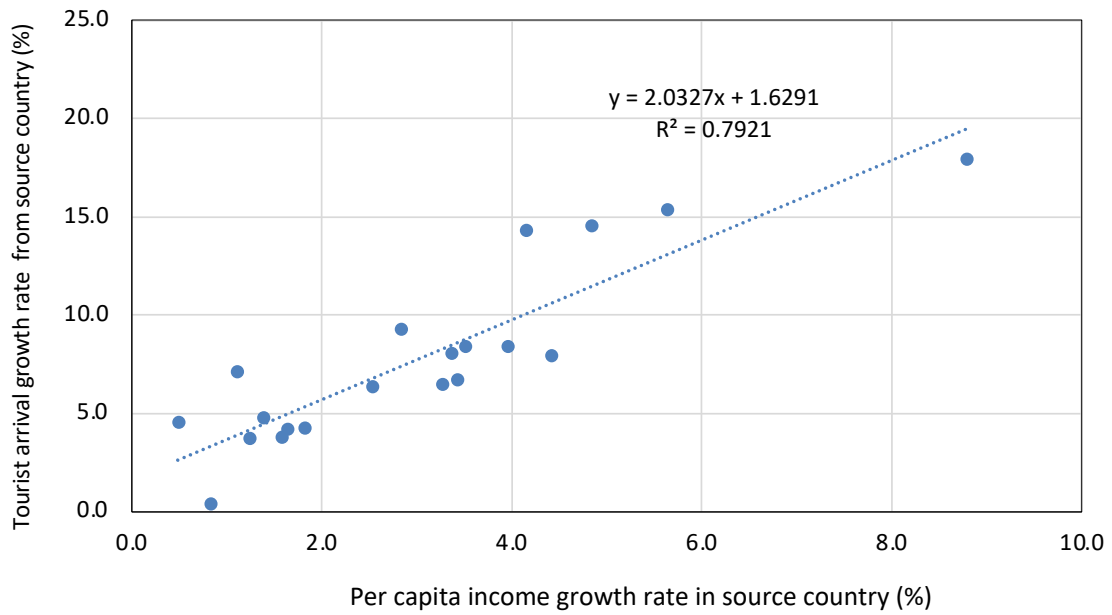
Source: Based on ABS (2020) data

Figure 2: Average Australian inbound tourism growth rate from top 20 source countries, 1991-2019



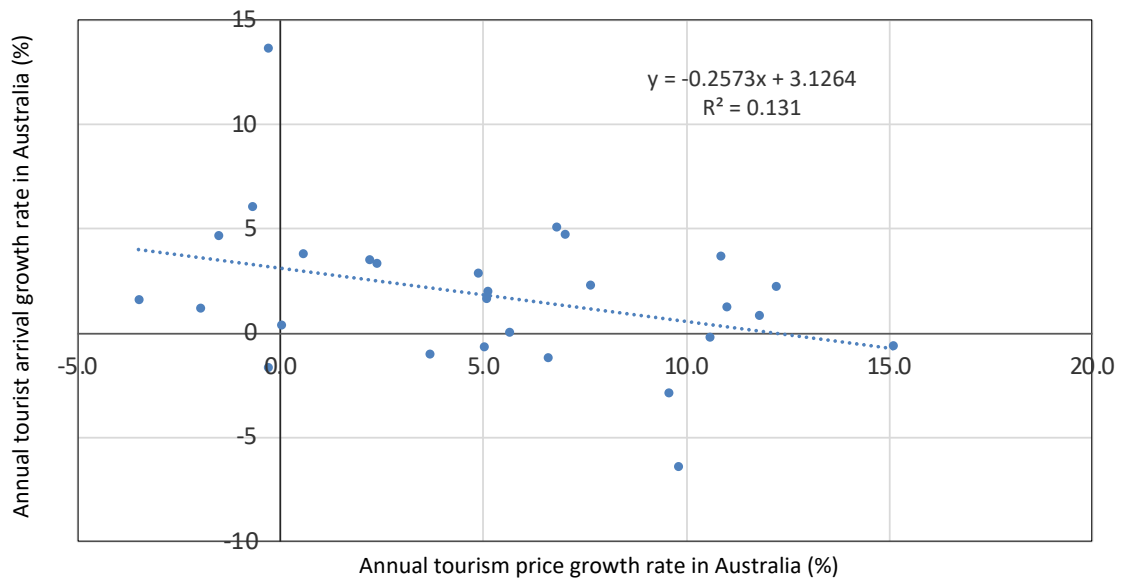
Source: Based on ABS (2020) data.

Figure 3: Average Australian tourist arrival growth rate against per capita income growth rate, top 20 source countries, 1991-2019



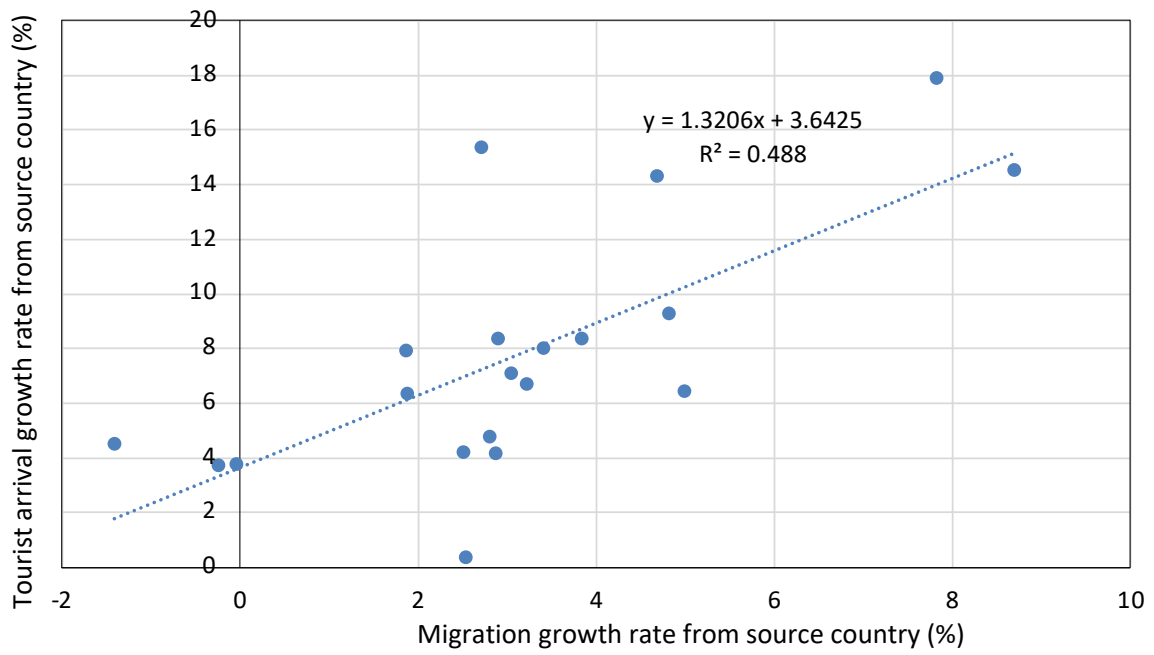
Source: Based on ABS (2020) data.

Figure 4: Average Australian tourist arrival growth rate against tourism price growth rate, 1991-2019



Source: Based on ABS (2020) data.

Figure 5: Average Australian tourist arrival growth rate against migration growth rate from top 20 source countries, 1991-2019



Source: Based on ABS (2020) data.

Draft