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Integration of tourism markets in Australia: A convergence assessment of international visitor arrivals

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Abstract

By applying the methodological framework of transition modeling and econometric convergence tests introduced by Philips and Sul, we reveal the existence of convergence clubs and transition convergence paths of international visitor arrivals for Australia. Specifically, by using monthly data of international arrivals over the period of January 1991 to September 2017, we provide evidence that tourism markets can integrate. The analysis suggests the identification of five distinct convergence clubs. This in turn signifies an integration phenomenon of Australia's tourism market, which is revealed through the different convergence patterns of international visitor arrivals. Finally, it is evident that the revealed integration behavior of Australia's international tourism market, will enable policy makers to target better tourism needs through customized policies.

Keywords: Convergence clubs**;** Monthly arrivals; Transition paths; Australia**.**

Introduction

The convergence of tourism markets by conveying revenue from one country to another, benefits local economies (Tugcu, 2014). Consequently, the convergence patterns of tourism demand can undergo scrutiny by the policy makers in order to capture a profoundly understanding of the implications and the effects on the economy (Faulkner, 1998; Abbott et al., 2012). For instance, the existence of divergent behaviour implies that policy makers have to develop more effective (customized) strategies in order to stimulate inbound tourism. Given the fact that the development of tourism industry is in conjunction with countries' different economic growth stages (De Vita and Kyaw, 2016), the identification of different convergence patterns of international arrivals, can act as a powerful policy tool evaluating the effect of countries' tourism development strategies (Narayan, 2006; Merida et al., 2016).

It worth mentioning that a small number of surveys have examined the phenomenon of convergence in the tourism literature. In addition those few studies in order to reveal convergence patterns of tourism industries have applied the Lagrange multiplier (LM) unit root tests (Narayan, 2006; Lean and Smyth, 2008; Lorde and Moore, 2008; Tiwari, 2016; Ozcan and Erdogan, 2017).In contrast to the few pre-mentioned studies, Lee (2009) has applied a Dickey–Fuller framework, whereas, Tan and Tan (2013) have applied a panel setting with multiple structural breaks to reveal convergence patterns of Singapore's tourism markets.

Given the aforementioned research gap, this is the first study to examine the convergence across international visitor arrivals in Australia from 28 tourism source markets via the two methodological frameworks introduced by Phillips and Sul (2007, 2009). To the best of our knowledge, only the study by Mérida et al. (2016) has applied only the first convergence test introduced by Phillips and Sul (2007) evaluating the existence of convergence clubs for twelve tourism source markets of Spain. The methodological approaches applied have some unique advantages in comparison with the traditional methods applied in the tourism

literature. Apart for its ability to test econometrically for the existence of 'convergence clubs', the applied methodological framework also estimates the convergence paths relative to some identified common trends. Moreover, it accounts directly for transitional heterogeneity and transitional divergence and it does not rely on strong assumptions on trend or stochastic stationarity which are common in visitor arrivals data. Finally, another contribution of our paper is the application of the adopted methodology to the Australian case. According to Kulendran (1996) since Australia is geographically isolated there is not any complementarity or cross-price competition as in other tourism markets (i.e. European). As a result the inbound tourism has been in the core of government and commercial interests in order to promote and develop the tourism industry which is a basic pillar of Australia's economy (Morris et al., 1995). Given Australia's isolated geographical position, the understanding and identification of convergence patterns among international visitor arrivals will enable Australian Tourist Commission to distribute tourism expenditure efficiently based on different segments of international tourism demand (Tsui and Balli, 2017).

Data and Methodological framework

For the purpose of our analysis we apply monthly international visitor arrivals data from 28 source markets. The data have been extracted from Australian Bureau of Statistics, have been seasonally adjusted (Valadkhani and O'Mahony, 2015), and are referring to the period from January 1991 to September 2017.

Concerning the methodological framework, Phillips and Sul (2007, 2009) developed the log t test in order to capture the heterogeneity, which is a vital feature in the panel data setting. Within a panel data context a factor $X_{i,t}$ (i.e. the observed arrivals), can be expressed in the following form:

$$X_{i,t} = \theta_i \mu_t + \varepsilon_{it}. \qquad (1)$$

In the expression (1) the first component $\theta_i \mu_t$ represents the distance between $X_{i,t}$ and the common factor μ_t which is measured from the idiosyncratic element $\theta_{i,t}$ (systematic term) and the second component ε_{it} representing the error term. The principal contribution in the Phillips and Sul (2007, 2009) convergence test is the reformulation of Eq. (1). The reformulation contains the measurement of the time varying of systemic (idiosyncratic) factor loading $\theta_{i,t}$ and the incorporation of the error term ε_{it} alongside with a common factor μ_t. The common element $\theta_{i,t}$ measures the deviation among states which is defined by μ_t. Also it must be noted that all groups formed within the clusters or from the observed sample will converge to a steady state when $\lim_{m \to \infty} \theta_{it+m} = \theta$. As a result Eq (1) can been reformulated as:

$$X_{i,t} = \theta_{i,t} \mu_t \tag{2}$$

By eliminating the μ_t component, Phillips and Sul (2007, 2009) defined the relative transition parameter $h_{i,t}$ as:

$$h_{i,t} = \frac{X_{i,t}}{N^{-1} \sum_{i=1}^{N} X_{i,t}} = \frac{\theta_{i,t}}{N^{-1} \sum_{i=1}^{N} \theta_{i,t}}. \tag{3}$$

In the expression (3) $h_{i,t}$ represents the transition path, whereas the μ_t component is eliminated. Finally, the time varying coefficient $\theta_{i,t}$ is assumed to have the following form:

$$\theta_{i,t} = \theta_i + \sigma_{i,t} + \varphi_{i,t}, \text{ with } \sigma_{i,t} = \frac{\sigma_i}{[L(t)t^\alpha]}, \sigma_i > 0, \tau \geq 0 \text{ and } \varphi_{i,t} \ i.i.d. (0,1). \tag{4}$$

Then the null hypothesis of convergence for i is expressed as:

$$H_0: \theta_{i,t} = \theta, \alpha \geq 0, \tag{5}$$

whereas the alternative hypothesis (non-convergence) as:

$$H_1: \theta_{i,t} \neq \theta, \alpha < 0. \tag{6}$$

Under the Phillips and Sul (2007, 2009) the creation of cross-sectional ratio H_1/H_t is used to construct the following log t regression, which employed to test the null hypothesis of convergence:

$$log\left(\frac{H_1}{H_t}\right) - 2Log\,L(t) = \hat{c} + \hat{\gamma}logt + u_t$$

$$for\; t = [rT], [rT] + 1, \ldots, T \quad for\; some\; r > 0. \tag{7}$$

It must be noted that the cross-sectional variance (H_t) converges to 0 if $\theta_{i,t}$ converges to θ and can be defined as:

$$H_t = N^{-1} \sum_{i=1}^{N}(h_{i,t} - 1)^2 \to 0. \tag{8}$$

In the expression (7) $L(t) = log(t + 1)$, $logt = \hat{\gamma}$ and $\hat{\gamma} = 2\hat{a}$. Specifically, $\hat{a}$ is the estimated a in H_0. Moreover it must be noted that according to Phillips and Sul (2007, 2009) the value of $r = 0.3$, which is adapted from Monte Carlo simulations. Considering the presumptions summarized by Phillips and Sul (2007, 2009), the null hypothesis of convergence is rejected at the 5% level if $t_{\hat{b}} < -1.65$. Finally, we follow the specific four-step group-clustering algorithm as explained by Phillips and Sul (2009) implementing further the log t regression test and in order to see if the original estimated clubs merge further among themselves forming therefore new (merged) clubs.

Empirical Findings

The results obtained when applying Phillips and Sul's (2007) approach, are displayed in Table 1. Initially, we have to test the null hypothesis of convergence for the entire sample, which cannot be rejected since the estimated t-statistics $(t_{\hat{b}})$ value is larger than -1.65($-0.309 > -1.65$) and despite the fact that the estimated value of log t (speed of adjustment) is negative (-0.233). Hence, we continue with the delineation of the convergence clubs. From our analysis we have identified five convergence clubs. Specifically, Club 1 consists of Austria, Greece, Taiwan and Japan, whereas, Club 2 includes UK, Switzerland, Denmark, Norway, Sweden, Italy, Thailand and Indonesia. In addition Club 3 encompasses

Germany, Netherlands, Singapore, China, Hong Kong and Canada, whereas, Club 4 contains New Zealand, Ireland, Belgium, France, Spain, Malaysia, Philippines, South Korea and USA. Finally, the last club (Club 5) has solely one member: India. Interestingly enough, the speed of adjustment $(\log t)$ is negative for the majority of clubs. This insinuates the subsistence of divergence. Yet, Phillips and Sul (2007, 2009) underlined that if the null hypothesis $\hat{\gamma} = 2\hat{a}$ is statistically disparate from zero the null hypothesis cannot be rejected $(-1.65 < t_{\hat{b}} < 0)$. Figure 1 presents the transition curves of the identified clubs under the assumption of sample's overall convergence to unity. The transition curves displayed reveal whether the identified clubs converge or divergence from below or above unity over the examined period. We can see that Club 5 (India) has an upward trend approaching and eventually reaching cross-sectional average in the last months of 2006. After this point onwards its transition path appear to be divergent. Similarly, the transition path of Club 1 (Austria, Greece, Taiwan and Japan) shows a convergent behaviour approaching cross-sectional average (unity) from above. It is evident that from the end of 2002 up to the last months of 2006 Club 1 converges towards sample's average level of international visitor arrivals (i.e. towards unity). Furthermore, Figure 1 presents a similar transition path among Clubs' 2,3 and 4. This phenomenon is more pronounced for Clubs 3 and 4 which follow almost identical transition path, whereas, for the case of Club 2 it is evident that it had a similar trend with Clubs 3 and 4 only up to the third half of 2012. However, after this point onwards Club 2 exhibits a transitional divergence. Indeed, when further employing the Phillips and Sul's (2009) test, which further merges the convergence Clubs identified previously; the results suggest (Table 1) that we can further accept the null hypothesis of convergence, since the initial five Clubs have been converged into three Clubs. Specifically, the first new Club (I) contains the original identified Clubs 1 and 2 with a t-statistic value of -0.283. The second Club (II) now contains the previous identified

Clubs 3 and 4 with a t-statistic value of -0.295. Finally, as also estimated previously India forms a separate third Club (III) with a t-statistic value of 0.350.

Table 1 about here

The picture of the transition curves of the new formed Clubs is displayed in Figure 2. Club I appears to have a convergent path up to the end of 2006. However, the negative trend after this point onwards suggest a divergent transition path. Moreover Club II has a slightly upward trend but as it is observed it converges towards sample's average level of international visitor arrivals. Finally, Club's III (which contains only India) transition path displays and reaches convergence at the third quarter of 2007. However, after this point onwards the upwards trends continue suggesting divergence. This finding aligns with those findings by Valadkhani and O'Mahony (2018) suggesting that one of Australia's largest inbound market is India and as a result diverges with the other Clubs. In addition it is evident that European inbound markets are shared among Clubs I and II suggesting that a different marketing strategies to stimulate further tourism demand is needed. In fact Club II consists (among other inbound markets) of China and New Zealand which is traditional the largest leading source markets for Australia. In fact even though U.K. (Club I) is also a traditional source of tourism demand for Australia, according to Tsui and Balli (2017) has been recently overtooked by China (Club II). This is also evident of why the two Clubs show a divergence path especially after the end of 2006.

Figures 1 & 2 about here

Conclusions

The paper by applying the methodological frameworks introduced by the studies of Phillips and Sul (2007, 2009), examines for the first time the convergence patterns of international tourism arrivals in Australia. By using monthly data over the period January 1991 to September 2017, the empirical evidence suggest that the hypothesis of full convergence was attested. Moreover, we have identified five distinct convergence clubs alongside with their

transition paths. The benefit of revealing and understanding demand patterns has been well highlighted throughout the tourism literature (Faulkner, 1998). To this end our study presents how different methodological developments can be applied from policy makers, in order to 'unlock' the different tourism demand patterns. It is evident that the identification of convergence paths and the integration of international visitor arrivals as presented in this paper, can be the first vital step for policy makers in order to direct and customize better their target policies. Finally, the identification of tourism convergence patterns provide policy makers with the ability to respond better to different pressures in relation to the adjustments of services and facilities provided. Future research can be directed towards the development and presentation of a unified analytical tool-framework, which will be able to identify convergence patterns which are based to common ethnic, geographic, and socio-cultural characteristics of tourism demand. This in turn will provide the policy makers with the ability to target and respond more efficiently to the different demand changes within dynamic environments.

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Table 1. Convergence Club classification

	Phillips and Sul (2007)				Phillips and Sul (2009)	
Category	log t	t-stat	New club	Final classification	log t	t-stat
Full sample [28]	-0.233	-0.309				
Club 1 [4]	0.182	0.204	1 + 2	Club I	-0.106	-0.283
Club 2 [8]	0.135	0.232				
Club 3 [6]	-0.027	-0.039	3+ 4	Club II	-0.17	-0.295
Club 4 [9]	-0.191	-0.35				
Club 5 [1]	-0.483	-0.645	5	Club III	-0.191	-0.35

Notes: The numbers in brackets indicate the number of countries within a group.
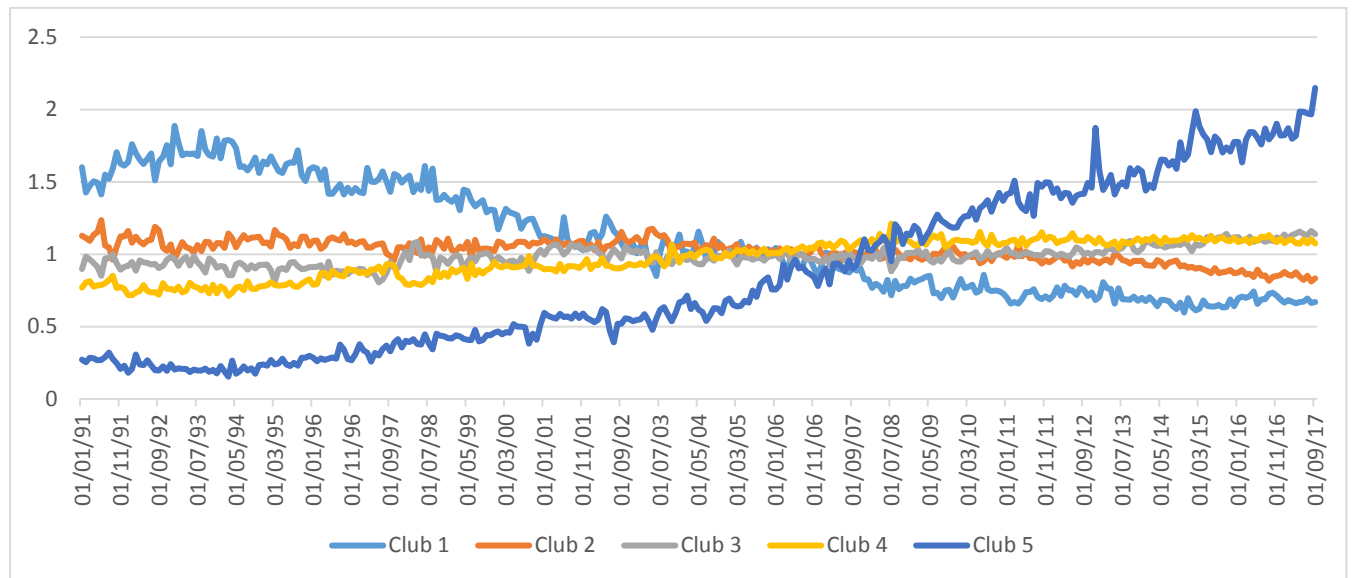
Figure 1. Transition path for the evaluated clusters based on Phillips and Sul's (2007) approach.
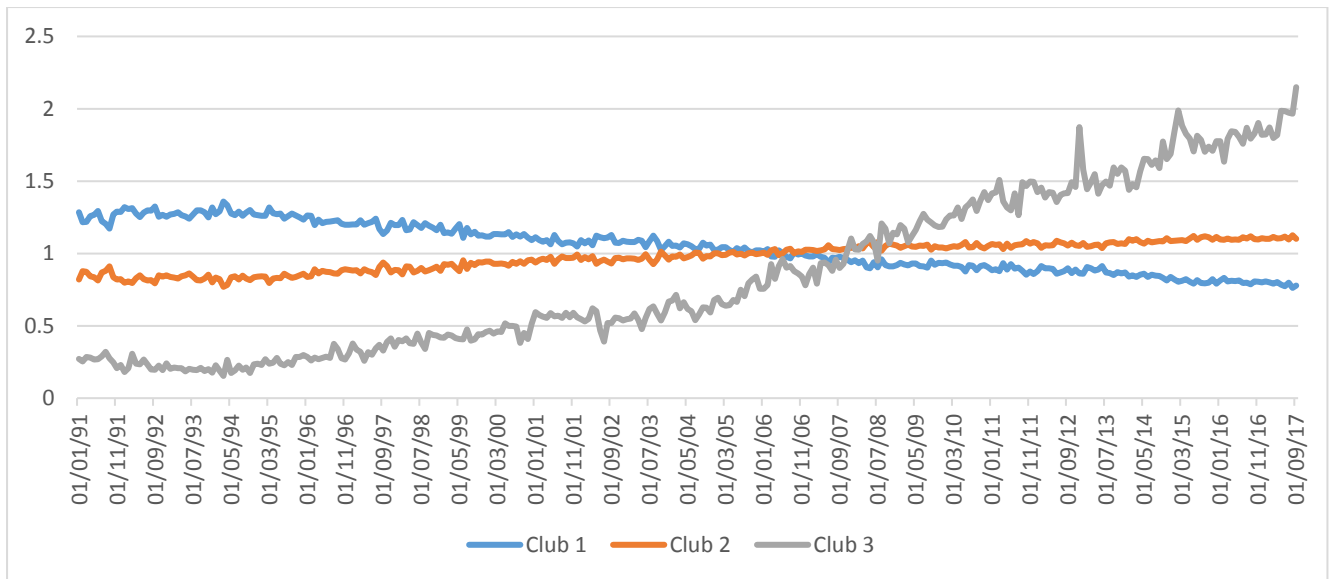
Figure 2. Transition path for the evaluated clusters based on Phillips and Sul's (2009) approach.