Segmenting global tourism markets: A panel club convergence approach

Abstract

This study adopts an advanced panel club convergence approach to analyzing global tourism market segmentation. We empirically examine the convergence process of Turkish global tourism source markets over the period of 2001-2015, covering 81 markets. We further employ a recently developed procedure to test for structural breaks in our data. Three groups of breakpoint-homogenous countries are identified. We then examine within-group club formation and reveal a number of convergence clubs (or segments). The results show the importance of Asian source markets in the post-break periods. This study illustrates the application of structural break and club convergence analysis for segmenting global tourism markets, and generates important implications for tourism organizations to develop global marketing strategies.

Keywords: Market segmentation; panel club convergence; structural break; tourism market; Turkey

1. Introduction

Developing market-oriented global promotion strategies is vital for a destination country's tourism economy, given the intensifying competition among destination countries, resource constraint, and the heterogeneity of tourism source countries (Gretzel et al., 2006; Griffith, 2010; Line & Wang, 2017), and improving destination competitiveness in the long term (Crouch, 2011; Ernst & Dolnicar, 2018; Knežević Cvelbar et al., 2016). Market segmentation enables destination managers to develop efficient and effective marketing strategies for each segment of the market, and consequently to enhance the destination's competitive advantage (Ernst & Dolnicar, 2018). Moreover, since the development of the tourism industry is closely linked to countries' different economic growth stage (De Vita & Kyaw, 2016), identification of different segments of tourism market can provide important insights into the interaction between the development of tourism market and the economy.

The extant tourism market segmentation literature generally focuses on micro-level customer segmentation studies, which are based on individuals' social demographic and behavioral features using analytical methods such as latent class analysis, finite mixture modeling (Dolnicar & Leisch, 2010; Ernst & Dolnicar, 2018). Macro-level segmentation studies often analyze the characters of countries (country-level segmentation) (Bijmolt, Paas, & Vermunt, 2004), and most studies of country-level segmentation are based on macro-level indicators such as socio-economic, political, cultural and geographic variables (Hassan & Craft, 2005). The data used in most of these segmentation studies (both micro- and macro-levels) are of a single-point-in-time nature, hardly have any scholars examined those variables over time by applying highly sophisticated and reliable methods such as panel club convergence for market segmentation studies (Budeva & Mullen, 2014).

Market convergence analysis can provide a better understanding of the market structure that enables national destination tourism administrations to segment a country's markets and develop customized promotion strategies for different groups of source markets (Griffith, 2010). A convergence club is a natural market segment suitable for a unified or standardized marketing program (Okazaki, Taylor, & Doh, 2007). There are three major approaches to market convergence analysis, i.e. beta-convergence, sigma-convergence, stochastic convergence among others. The concept of beta convergence is related to the neoclassical growth model and can be established if there is evidence that relatively poor countries grow faster than rich countries over time (Furceri, 2005). This approach has been heavily criticized for showing convergence that does not actually exist (Panopoulou & Pantelidis, 2009). The concept of sigma convergence focuses on economic output. Sigma convergence can be established if the distribution of output per capita across a group of economies decreases over time (Furceri, 2005). However, for sigma convergence to be established, beta convergence has to be present as a necessary condition (Furceri, 2005; Sala-i-Martin, 1996). Thus, sigma convergence is considered to reflect the actual convergence more accurately than beta convergence (Friedman, 1992). Stochastic convergence examines whether a shock to an economy continues for a long period, usually using unit root and cointegration tests (Sala-i-Martin, 1996) which do not necessarily capture the dynamic of the integration process. Therefore, it is essential to adopt an advanced analytical approach to examining both the market's long-run behavior and the transitional dynamics of the convergence process (Apergis, Christou, & Miller, 2014). Unfortunately, most existing research in tourism market segmentation literature fails to adopt such an approach, thus cannot suitably test real convergence and identify natural segments in global tourism markets.

This study therefore aims to contribute to literature by employing country-level panel data that has both cross-sectional and time-series dimensions and an advanced analytical

approach to tourism convergence analysis: panel convergence methodology (Phillips & Sul, 2007). Phillips and Sul (2007) method enables us to capture the segmentation in a unique manner. Specifically, its clustering algorithm can detect any sub-groups that are converging and provide information on the speed of such convergence. It is a panel approach that does not require any assumptions regarding stationary and allows for individual heterogeneity which can evolve over time. There had been a number of global economic and political changes in the past two decades. Although there had been a range of convergence studies using this method in the economics literature, Phillips and Sul (2007) method has been rarely employed in tourism literature. Furthermore, the influence of such structural breaks on global tourism markets segmentation should not be ignored. We employ the (Bai & Perron, 1998, 2003a, 2003b; Kejriwal & Perron, 2010; Perron & Yabu, 2009) structural break test to identify the locations of breaks. Panel convergence test is employed for the whole period as well as pre- and post-break periods. To our knowledge, the (Bai & Perron, 1998, 2003a, 2003b; Kejriwal & Perron, 2010; Perron & Yabu, 2009) structural break procedure has hardly been employed in market segmentation literature.

In this study, we select Turkey's global tourism markets over an extended period of 2001-2015 for analysis, because despite being one of the most researched contexts for tourism market convergence studies, the structure of tourism source markets for Turkey is not clearly understood (Abbott, De Vita, & Altinay, 2012; Bahar, Dogan, & Bozkurt, 2013; Hepsag, 2015; Ozcan & Erdogan, 2017; Yilanci & Eris, 2012). For instance, while Bahar Bahar et al. (2013); Ozcan and Erdogan (2017); and Yilanci and Eris (2012) find convergence for some countries in their sample, Abbott et al. (2012) find no such evidence. Hepsag (2015) observes convergence exist only in some of the months of the year but not others. In addition, the picture of the tourism market in Turkey can also be broadened by expanding countries under investigation as the above studies often focus on a small number

(i.e., a maximum of 20) of source markets. We expect our study to have important implications for Turkey's global tourism promotion strategies. Our study identifies several clusters of tourist source markets, which enables planners to select appropriate and efficient inbound tourism promotion strategies for different tourist groups of source market accordingly.

2. Literature review

The intelligence of the market and its structure help destination marketing organizations to segment the market and develop effective strategies and tactics for each of the target segments (Kohli & Jaworski, 1990; Polo Pena, Frias Jamilena, & Rodríguez Molina, 2013). According to Dolnicar and Leisch (2010) and Ernst and Dolnicar (2018), there are three major conceptual approaches to conduct market segmentation: natural, reproducible and constructive segmentation. Natural segmentation approach is applied where the market segments exist in reality and can be identified through the data. The reproducible approach is common in case that there is not any natural segment, but market data contain structures, which can be analyzed to reproduce segments that consist of members that share certain similarities. Constructive segmentation approach is adopted in the case that there is no natural segment nor structured data to reproduce segments. Market convergence analysis, a popular field of study in economics, is a natural segmentation approach: one convergence club is in fact a naturally formed segment of the overall market (Griffith, 2010; Okazaki et al., 2007).

Market convergence analysis can provide excellent insights into global market segmentation for two reasons. First, it applies panel data, which usually are large in quantity, covering a long period, extracted from a variety of sources. Second, it uses sophisticated analytical approaches such as club convergence and clustering procedure. Consequently,

market convergence analysis avoids the random effects of segmentation studies using single-point-of-time cross-sectional data (Ernst & Dolnicar, 2018). However, as tourism marketing researchers rarely use data that covers a number of entities over time for segmentation studies (Budeva & Mullen, 2014), to many tourism marketing researchers, convergence analysis appears to be rather unfamiliar.

The club convergence scholars believe that: "per capita incomes of countries that are identical in their structural characteristics converge to one another in the long run provided that their initial conditions are similar as well" (Galor, 1996, p. 1056). As such, we can classify countries that are approaching the same long-run steady state equilibrium as a convergence club (Bartkowska & Riedl, 2012; Durlauf & Johnson, 1995; Quah, 1996). Early researchers used regression tree analysis to test club convergence hypothesis (Durlauf & Johnson, 1995). Later researchers have begun to use endogenized grouping to identify club convergence, by not specifying those factors that contribute to multiple equilibria (e.g. Hobijn & Franses, 2000; Phillips & Sul, 2007). These methods have the advantages of focusing on the cross-sectional distribution of income (sigma convergence) instead of beta convergence. Recent consensus among economists is that the integration of economies shows cluster patterns rather than a unified path of growth (Bartkowska & Riedl, 2012).

Applying the economic convergence concept in the tourism context, Narayan (2006, p. 1153) define tourism market convergence as "a reduction in tourist arrivals" differential. Specifically, such differential is measured using the difference between a) total visitor arrivals into a particular country and b) arrivals that are from a particular tourist source country. The testing of tourism market convergence is an emerging topic in the latest tourism economics literature (e.g. Abbott et al., 2012; Kourtzidis et al., 2018; Lean & Smyth, 2008; Lin & Deng, 2018; Mérida et al., 2016; Narayan, 2006; Solarin, 2018; Tan & Tan, 2013; Tiwari, 2016; Valadkhani & O'Mahony, 2018; Xie, Tiwari, & Chang, 2018).

Most studies of tourism market convergence either use unit root tests with or without breaks (e.g. Lorde & Moore, 2008; Narayan, 2006; Solarin, 2018; Tan & Tan, 2013; Tang, 2011; Tiwari, 2016; Xie et al., 2018), co-integration along with unit root tests (e.g. Abbott et al., 2012; Solarin, 2014; Yilanci & Eris, 2012), or sigma and beta convergence methods (Lin & Deng, 2018). The study by Abbott et al. (2012) is among the five studies that have investigated Turkey's tourism markets which include Bahar et al. (2013), Hepsag (2015), Ozcan and Erdogan (2017) and Yilanci and Eris (2012). Abbott et al. (2012) used monthly data covering the similar period (1996- 2009) of Turkey's source markets, but found no evidence to support the convergence hypotheses in the long run. Yilanci and Eris (2012) employed data between 1996 and 2010 and their results indicated that the hypothesis of convergence was generally supported (10 out of 14 markets). Bahar et al. (2013) also employed data of similar period (i.e., 1995-2009) and their findings suggest that convergence can be justified when utilizing a joint unit root process. Ozcan and Erdogan (2017) used monthly data over the period from 1996 to 2012 and confirm that most of the markets are converging. Hepsag (2015) examined the data on the period from 1996 to 2014, and their results only partially support long-run convergence in the markets.

There are several limitations in the previous tourism market convergence analysis. For example, all the above mentioned five studies are based on stationary or unit root tests where results are obtained for an individual country or a pair of countries. The only exception is Bahar et al. (2013) where the panel unit root test analysis is employed. However, such method either reject or accept the null unit root jointly for the whole panel without a mechanism to investigate sub-convergence groups within the panel. In other words, the heterogeneity in the markets' inter-temporal behavior is neglected and hence the possible convergence clubs within the total markets are not investigated. This suggests the need for convergence analysis to apply more advanced and rigorous methodology. In addition, many

of the previous tourism market convergence studies rely on a small number of source markets included in the sample, which limits the scope of the analysis (Song et al., 2012). The maximum sample size of the sources in the Turkish studies is 20 (Abbott et al., 2012; Hepsag, 2015) and the minimum one is 10 (Bahar et al., 2013).

One of the currently advanced analytical approaches to convergence analysis is club convergence and clustering procedure first proposed by Phillips and Sul (2007). It has several advantages over methods such as unit root and cointegration (Apergis & Payne, 2012; Panopoulou & Pantelidis, 2009). For example, Phillips and Sul (2007) procedure is able to accommodate co-movement in aggregate behavior in the long-term outside the cointegration framework, thanks to its basis on the time-varying factor. In the context of conventional unit root or cointegration tests, we can reject long-run equilibrium when two series under examination in fact converge in the long-run, but their speed of convergence is either not fast enough in the sample period of interest, or they simply have different speed of convergence. We can detect these two cases, however, if one employs Phillips and Sul (2007) method, which adopts a time-varying factor representation. Further, it provides modeling for the transitional effects where individual heterogeneous, as well as a period of transition in a path, are allowed for in the idiosyncratic factor loadings as long as they are ultimately governed by some long–run common stochastic trend. The method is also more powerful when compared with beta or sigma convergence tests. While the beta and sigma convergence tests can reveal the speed of full panel convergence (if present), Phillips and Sul (2007) method, via its club information procedure, can provide valuable additional information not only on the sub-groups convergence but also on the speed of such convergence. Therefore, this procedure provides an ideal tool for analyzing tourism market segmentation. To the best of our knowledge, the only tourism study that employ the Phillips and Sul (2007) method is

Kourtzidis et al. (2018) in the context of examining integration of tourism markets for Australia. However, they did not consider the issue of structural break in their study.

Potential structural breaks are an important factor that needs to be considered when analyzing segmentation in global tourism markets. Conventional unit root tests with endogenous structural breaks may be sensitive to the asymmetric treatment of breaks under the null and alternative hypotheses (Kim & Perron, 2009). More importantly, investigating if the trend function is characterized by a break is highly related to the nonstationary properties of the errors which are also unknown as a circular testing problem (Kejriwal & Perron, 2010). We employ Perron and Yabu (2009) test that deal with the circular problem mentioned above and is robust with either I(0) or I(0) noise. Phillips and Sul (2007) method can be applied to both the whole and sub-sample to evaluate the impact of the breaks. To the best of our knowledge, there is no study that adopts Perron and Yabu (2009) procedure to examine structural breaks in the tourism literature. More importantly, based on the structural break results, we form groups of breakpoint-homogenous markets and examine within-group club formation using the Phillips and Sul (2007) method.

3. Methodology

3.1. Empirical context

We include 81 Turkey's tourism source markets and use monthly data for period 2001-2015. Data on the distribution of tourist arrivals to Turkey by nationalities is downloaded from the official website of the Ministry of Culture and Tourism of Turkey (http://www.ktbyatirimisletmeler.gov.tr/TR,9854/sinir-giris-cikis-istatistikleri.html). Table 1 reports the corresponding shares of the tourist arrivals to Turkey from different source market. Despite having a heterogeneous global tourist source markets, Turkey heavily

depends on three major tourist source markets, namely Germany, Russia, and Bulgaria. The market share of the top 10 countries was around 65 percent of international tourist's arrivals over the period 2001 to 2015. Compared with previous studies (e.g. Abbott et al., 2012; Bahar et al., 2013; Hepsag, 2015; Ozcan & Erdogan, 2017; Yilanci & Eris, 2012), this study has a substantially larger sample of countries, which provide more comprehensive and complete picture in terms of the tourism market segmentation in the case of Turkey.

[Table 1 about here]

For our panel convergence analysis, we follow Narayan (2006) and calculate the difference between the total visitor arrivals to Turkey and visitor arrivals from a specific country (x_{it}) as follows:

$$x_{it} = ln\left(\frac{VA_{t,TURKEY}}{VA_{i,t}}\right) \quad (1)$$

where ln denotes the natural logarithm, $VA_{t,TURKEY}$ represents the total international visitor arrivals to Turkey at time t, and $VA_{i,t}$ denotes international visitor arrivals to Turkey from a specific market i. Given Eq. 1, an increase in x_{it} implies declining of market i as a source market for Turkey and *vice versa*.

3.2.Phillips and Sul panel convergence tests

3.2.1. Relative transition paths

The variable X_{it} denotes the number of tourists arrivals in the log for source market i at time t (i.e. time enters the model in a non-linear fashion), where i=1,2,…,N; t=1,2,…,T. Following Phillips and Sul (2007) (P-S hereafter), the variable can be decomposed and reformulated into a common component (μ_t) and a time-varying idiosyncratic element (δ_{it}). Next, P-S define the transition coefficient as h_{it} and to extract the time-varying factor loadings δ_{it} as follows:

$$h_{it} = \frac{X_{it}}{\frac{1}{N}\sum_{i=1}^{N} X_{it}} = \frac{\delta_{it}\mu_t}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}\mu_t} = \frac{\delta_{it}}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}} \quad (3)$$

Then construct the cross-sectional variance ratio $\frac{H_1}{H_t}$ where:

$$H_t = \frac{1}{N}\sum_{i=1}^{N} (\hat{h}_{it} - 1)^2$$

and $\hat{h}_{it}$ denotes the filtered transition parameter coefficients. In this paper, all data adapted the Hodrick and Precott's (1997) filter with the value of lamda set to 14,400 for monthly data to remove the cyclical trend from the original data. The transition distance H_t has a limiting form of $H_t \sim \frac{A}{L(t)^2 t^{2\alpha}}$ $as\ t \to \infty$, where A is a positive constant, $L(t) = log\ log\ (t+1)$ and α denotes the convergence speed.

3.2.2. The log t regression

In order to test for the null hypothesis of convergence, P-S perform the log t regressions such that the null hypothesis of convergence is $H_0: \delta_i = \delta$ and $\alpha \geq 0$ with the alternative $H_1: \delta_i \neq \delta$ for all i or $\alpha < 0$. Perform the following OLS regression:

$$\left(\frac{H_1}{H_t}\right) - L(t) = \hat{a} + \hat{b}\ log\ log\ t + \hat{u}_t \quad (4)$$

where $\hat{b} = 2\hat{\alpha}$ is the fitted coefficient of log t. $\hat{\alpha}$ is the estimate of α in the null hypothesis. To account for the impact of initial conditions on the test, the data for this regression starts at some point $t = [rT]$ with $r > 0$ (we use $r = 0.3$ as recommended by P-S). If $t_{\hat{b}} < -1.65$, the null hypothesis of convergence can then be rejected.

3.2.3. Club convergence algorithm

If the null of global convergence is rejected, a club convergence algorithm can be employed to detect possible sub-group convergence. First order the member (i.e., X_{it}) in the panel according to the last observation. Then form a core group with the group size, k^*,

chosen by maximizing the convergence t-statistic $t_{\hat{b}}(k)$ under the condition that $\min\{t_{\hat{b}}(k)\} > -1.65$. The third step is adding each remaining member one by one to the core group if the associated t-statistic is greater than zero. Convergence criterion will be checked for the club as usual. Finally, run the log t-test on the un-selected countries and form the second club if this set of countries converges. Otherwise, repeat steps one to three to reveal some sub-convergent clusters. If no subgroups are found, then these countries display a divergent behavior.

3.3. Perron and Yabu (2009) Structural break test

Unlike the widely employed Bai and Perron (1998, 2003a, 2003b) structure break test that assumes a stationary noise component, the Perron and Yabu (2009) (P-Y hereafter) procedure tests for a structural change in the trend function of a univariate time series when the noise component is I(0) or I(1). The approach is based on a Feasible Quasi Generalized Least Squares (GLS) procedure that uses a superefficient estimate of the sum of the autoregressive parameters α when α =1. Assuming the following data-generating process:

$$y_t = x_t'\psi + u_t \qquad (5a)$$

$$u_t = \alpha u_{t-1} + e_t \qquad (5b)$$

for $t = 1, \dots, T$, $e_t \sim i.i.d.(0, \sigma^2)$, x_t is a $(r \times 1)$ vector of deterministic components and ψ is a $(r \times 1)$ vector of unknown parameters which are model specific. When the break date is known, based on OLS regression estimates for Eqs 5a and b and a GLS procedure the standard Wald-statistic can be constructed. When dealing with an unknown break, repeat the steps above for all permissible break dates and construct the Exp-Wald statistic as follows:

$$ExpW = log\left[T^{-1}\sum_{\Lambda} \quad exp\left(\frac{1}{2}W(\lambda)\right)\right]$$

where $\Lambda = \{\lambda; \epsilon \leq \lambda \leq 1 - \epsilon\}$ for some $\epsilon > 0$. We set $\epsilon = 0.25$ which is suitable given our sample size and for one break. We employ Model III allowing for an unknown break in both the drift and the trend. The corresponding critical values are provided by P-Y.

4. Empirical results

4.1. Full sample period convergence test results

Table 2 represents the results on $log\ t$ convergence and club convergence tests for period 2001-2015. Since $t - stat < -1.65$, the 81 countries in our sample do not converge as a whole. However, the subsequent club convergence results indicate they do converge into five sub-groups. In all cases, there is convergence in rates as $b < 2$. The first group includes 12 countries and has the fastest speed of convergence compared with other groups. Most of the countries in this group have rather small shares, except Israel which is one of the top 20 sources of Turkey's tourists. The corresponding relative transition path of each club is illustrated in Figure 1. Note that due to the definition of x_{it}, a higher number indicates a relatively lower share and vice versa. The relative transition paths show that countries in Club 1 have increased their shares until around 2008 but towards the end of the sample period their shares declined slightly. There are only two countries in the second club, namely Iceland and Oceania. They are among countries with the lowest shares and their importance to Turkey's tourism market is steadily declining over our sample period. Looking at the third group, their importance to the Turkish tourism market, reflected by the relative transition parameters, has remained largely unchanged.

The fourth convergent group includes 24 countries. Most Asia Pacific countries are in this group (e.g., Australia, India, Indonesia, Malaysia, Philippines, and South Korea). This group's shares initially declined but they picked up gradually after 2008. The most important

findings are with the fifth group including 26 countries. Turkey's top twelve tourist sources are in this group (i.e., Germany, Russia, Bulgaria, UK, Iran, Netherlands, France, Georgia, Greece, USA, Italy, and Azerbaijan). The largest developing country, China and a number of Central Asian countries (e.g., Kazakhstan, Turkmenistan and Uzbekistan) are also in this club. Countries in this group have shares that have increased over the sample period except for two short-lived and trivial declines in 2002 and towards the end of our sample period.

Figures 2a-i further illustrate relative transition paths for each of the 81 countries during the period 2001-2015. Looking at Asian Pacific countries in Club 4, with the exception of Australia, all of them have shown gradually increasing importance to Turkey's tourism market (reflected by the declining transition paths). On the other hand, Turkey's top 20 source markets have not maintained the strong growth evidenced in the early 2000s. In fact, for the majority of the top 20 countries, declines are observed since as early as 2005 (e.g., Germany, Netherland), from 2008/9 (e.g., Ukraine, Austria), or after 2010 (e.g., UK, France, Netherland). It probably reflects the influence of the Turkish government being more east facing since 2005, as well as the negative impact the 2008/9 global financial crisis and later the European debt crisis on some of Turkey's top source markets. Indeed, under the influence of the 2008-2009 financial crisis, there had been significant decline in tourism activity globally (Pechlaner & Frehse, 2010). The post-crisis recovery of the tourism sector came at different speeds, with Asia and the Pacific being the main driver of the rebound whilst Europe has the slowest bounce back due to economic uncertainty affecting the Eurozone (UNWTO, 2011).

[Table 2 about here]

[Figure 1 about here]

[Figures 2i-h about here]

4.2.Structural break and convergence test results

So far, our analysis has been conducted on the full sample period 2001-2015. However, during these 15 years, there had been both global and regional events that might have a structural impact on the Turkish tourism market. For instance, in 2006, the Turkish government has eliminated visa requirements for ordinary foreign visitors from many countries from Central and Northern Africa, Central and East Asia, the Middle East and Latin America. Balli, Balli, and Cebeci (2013) find this policy change has increased the tourist flows from these regions. Globally, there had been the 2008/9 financial crisis that had a far-reaching impact on the global economy. Therefore, we employ the PY structural break test (discussed in Section 3) to identify the location of any possible breaks in our data. We are aware of that there are other structural break tests allowing for more than one breaks such as the sequential tests proposed by Kejriwal and Perron (2010). However, Kejriwal and Perron (2010) also suggest that one must allow a sufficient number of observations in each segment and choose the maximum number of breaks permissible accordingly. If too many breaks for a typically finite sample are allowed, it may introduce low power and/or size distortion. Also as pointed out by Sun and Shi (2015), the one break date detected by PY test is the most significant one for the whole series, whilst the second one detected by for instance the Kejriwal and Perron (2010) test is less important. Following the above suggestions, and taking into account the size of our sample, we employ PY test allowing for one break and the results are reported in Tables 3.

In Table 3, no break is detected for a group of 13 markets. For the rest of the countries, breaks are clustered around three periods, i.e., end of 2004-beginning of 2007 (2004M10-2007M2), 2008/9 (2008M1-2009M2), and 2010-beginning of 2012 (2010M1-2012M4). The first period coincides with Turkey's implementations of a range of reaching out foreign policies to Asia Pacific, Africa and Middle East (Albay, 2015), whilst the second and third

periods echo the recent global financial crisis and the European debt crisis, respectively. Figure 3 provides a summary of the above mentioned three clusters of breaks and the corresponding countries. Bangladesh and Saudi Arabia are dropped from the sample as their break dates are between first and second break clustering periods. Based on the structural break results in Table 3 and Figure 3, we further apply the within-group PS convergence test to the group of 13 no-break countries as well as the three groups of breakpoint-homogeneous countries. Following Coudert and Mignon (2013), we exclude the break periods to avoid extreme variations in the data. The results are presented in Tables 4a-d and the corresponding relative transition paths across clubs are illustrated in Figures 4a-d, respectively. We now explain the results for each group in turn.

For the group of 13 countries that are not subject to structural breaks, Table 4a shows that full panel convergence is rejected and three convergence clubs (in rate as $b < 2$) are identified. Their relative transition paths across clubs (Figure 4a) demonstrate that whilst the five source markets in Club 1 showed declined importance relative to other economies, two Central Asian countries, namely Kazakhstan and Turkmenistan, had formed Club 3 with growing contribution to Turkey's tourism market. Three markets in Club 2 including one of Turkey's most important source market, Russia, have overall maintained their relative importance over the fifteen years. Three countries were divergent, meaning they did not belong to any other convergence club nor did they form any club amongst themselves. Their divergence is possibly due to that Japan/Iraq and Qatar has/have experienced declining/growing shares at a pace much faster than other countries in this group, as evidenced in their individual transition paths in Figures 2g and 2i. Qatar (Figure 2i) has been increasing with an even more accelerated speed than Iraq (Figure 2g), and hence they did not converge despite both on a fast rising trajectory.

Convergence test and club transition paths for the first group of breakpoint-homogenous countries (i.e., with breaks clustered around period 2004M10-2007M2) are outlined in Table 4b and Figure 4b, respectively. There are 38 countries in this group. In the end of year 2004, EU leaders agreed to open talks in 2005 on Turkey's EU accession. However, after a series of meetings during 2005 and 2006, in December 2006, EU partially froze Turkey's membership talks because of Ankara's failure to open its ports and airports to Cypriot traffic. During the same period, the Turkish government implemented several changes in its foreign policies including the elimination of visa requirements for ordinary foreign visitors from a number of previously neglected tourism source regions (e.g., Asia, Africa, Middle East, Latin America) in year 2006. As part of Turkish government's plan to exert its influence in the region, since 2001, the country has exported soap opera to Central Asia, and later since 2004/5, to a much wider area of the Middle East, as well as North African and some Eastern European countries. It is widely regarded as the projection of Turkey's cultural power in the region and beyond by the AKP government (Jabbour, 2015). Balli et al. (2013) find strong evidence that such soap opera exports boosted inbound tourist to Turkey. For the 38 countries that had break dates clustered around this period, six convergence clubs were identified (Table 4b), three (Clubs 1, 2 and 3) with declining shares and the rest (Clubs 4, 5 and 6) with growing shares in Turkey's tourism market (Figure 4b). This is the case for both pre- and post-break periods, although there are also three divergent countries in the former. We observe two important differences between these two periods.

First, there are a number of cases where countries have moved from clubs with increasing/falling shares of tourist arrivals to Turkey in the pre-break period to ones with falling/increasing shares in the post-break period. Specifically, several European countries (e.g., Netherland, Denmark and Luxembourg) have switched from the growing Club 5 to the declining Clubs 1 and 3, while a number of Asian countries (e.g., Philippines, Malaysia and

Indonesia) have made the opposite switch. In the post-break period, countries belong to Turkey's top 30 source markets (except Georgia and Australia) are all in clubs with falling shares (i.e., Clubs 1, 2 and 3). The clubs with rising shares (i.e., Clubs 4, 5 and 6) largely consist of Asian, Latin America and African countries. The growing shares of these regions reflect the positive influence of Turkey's foreign policies mentioned above. Second, comparison between the two periods in Figure 4b shows that market segmentations in the Turkish tourism markets seem to have grown stronger after the break, as reflected by the relative transition paths of the six clubs being located further away from the mean of unity in the post- than in the pre-break period.

Moving to the second group of countries with breaks clustered around the 2008/9 global financial crisis period, two convergence clubs and three divergent countries are identified for this group of 13 countries, both in the pre- and post-crisis period (Table 4c). The importance of countries in Club 1 and 2 as Turkey's source tourism markets has been falling and growing respectively, as indicated by the relative transition paths in Figure 4c. This trend has continued throughout the pre- and post-crisis period, but in the latter period, countries in Club 2 have surpassed countries in Club 1 in terms of shares of tourist arrivals to Turkey. Given that countries in Club 2 in the post-crisis period include two (central and east) Asian (i.e., South Korea and Kyrgyzstan) and African (i.e., Algeria) economies, it again highlights the rising significance of these regions to Turkey's tourism market. In contrast three European countries in this group, namely Finland, Austria and Ireland are part of the declining Club 1 in the pre-crisis period. After the crisis, Finland remains in Club 1 whilst Austria and Iceland become divergent after the crisis due to their contribution to Turkey have been shrinking at an even faster pace (see Figures 2b and 2e).

For the third group of 17 countries that have collective breaks around the European debt crisis period, more convergence clubs are detected in the post-crisis period (i.e., seven

clubs) than in the pre-crisis period (i.e., five clubs) (see Table 4d), implying a more segmented tourism source market for Turkey. The speed of convergence in the sixth and seventh clubs in the post-crisis period are rather fast (i.e., convergence in level as b >2) At country level, Pakistan, Bahrain and Colombia remain in the Clubs with relative rising shares of tourist arrivals to Turkey (i.e., Clubs 4 and 5 in pre-crisis period; Club 6 in post-crisis period) (see Figure 4d). More importantly, the largest developing country, namely China, has formed a convergence club (i.e., Club 7) with western Asian economy Israel after the break and the corresponding relative transition path has demonstrated that their contribution to Turkey's tourism market has been fast growing. We again notice that European countries (i.e., UK, Sweden, France and Norway) belong to clubs with weakening contribution to Turkey's tourism market.

Overall, we find evidence of convergence within various clubs, regardless of whether we take into account breaks or not. Three clusters of breaks are identified and three groups of breakpoint-homogenous countries and one group of no-break countries are formed. Within-group convergence test highlights the importance of Asian countries as growing source markets for Turkey's tourism industry, especially when we examine the more recent post-break period. In contrast, Turkey's traditional top sources of tourists are mainly European countries and although it remains the case, these countries' contribution to Turkey's tourism market has been declining. The number of convergence clubs (e.g., Table 4d and Figure 4d) and the pattern of the relative transition paths across clubs (e.g., Table 4b and Figure 4b) suggest that there are more segments in Turkey's tourism market in the post-break periods.

5. Discussion and conclusions

The main objective of this study is to adopt a fresh approach to segmenting global tourism market, the panel club convergence analysis. Turkey's tourism source markets were selected as the empirical context, with data covering a fifteen-year period. The results reveal various convergence clubs (natural segments) within Turkey's tourism source markets, confirming that the panel club convergence analysis is a helpful tool for global tourism market segmentation.

This study contributes to the existing tourism marketing literature in the following three perspectives. First, we employ Phillips and Sul (2007) panel convergence methodology, which has been neglected in tourism marketing literature, to examine the convergence process in the literature of tourism. This is an approach that is based on a general form of nonlinear time-varying factor models, and it does not require assumptions on the stationarity of the variables of interest. It is an appropriate segmentation tool for analyzing global markets at country level: a convergence club is a natural segment. Second, we further examine the issue of structural break and identify breaks coincide with both Turkey's domestic and global events. Subsequent breakpoint-homogenous groups are formed to evaluate the impact of these events on the within-group club formation of Turkey's tourism source markets. Three, our analysis covers an extensive list of 81 Turkish tourism source markets. To the best of our knowledge, it is the first time such a large dataset is deployed to examine the convergence process for a country's global tourism market.

Our results reveal that for the whole sample period of 2001-2015, the 81 Turkish tourism source markets have not converged to form one unified group but formed five convergence clubs. To examine the issue of possible structural breaks in our data, we further employ the Perron and Yabu (2009) structural break test and identify breaks echoing

Turkey's east facing foreign policies in 2005/6, 2008/9 financial crisis and the 2010/11 European debt crisis period. Further within-group convergence test on the three breakpoint-homogenous and one no-break country groups reveals various number of convergence clubs. Three important findings emerged. First, Asian countries clearly represent a source of further growth for the Turkish tourism market, irrespective of the group of countries under investigation. The taking-off of Asian tourist number in Turkey has been partially due to relatively resilient Asian economies after the recent global financial crisis and the European debt crisis, and partially due to the by relaxed visa requirement to enter Turkey.

Second, in contrast to stronger growth observed in the Asian economies, our results illustrate a rather different picture for Turkey's traditionally important source markets. With the exception of Georgia and Israel, all of Turkey's top 20 source countries have seen their importance as Turkey's source market decreased or stagnated after corresponding breaks. Europe remains the most important source market for Turkey, although their growth in terms of the number of tourist arrivals has not been as strong (e.g., Belgium, Denmark, France, Germany, Greece, Netherlands, Sweden, and Switzerland). As discussed in UNWTO (2012), an important contributing factor of the sluggish growth has been the 2008/9 global financial crisis and the closely followed European debt crisis.

Finally, we find evidence for stronger post-break segmentation in Turkey's tourism market based on the increased number of convergence clubs (e.g., Table 4d and Figure 4d) or larger distance among the transition paths across clubs (e.g., Table 4b and Figure 4b) after the break. On the impact of significant events on tourism segments, Steiner et al. (2012) point out that manifold source country-specific trends would emerge depending on the general economic structure of the country and its national tourism structure. Evidence of Turkey's stronger post-break segmentation probably reflects the diverse source country-specific reaction to Turkey's foreign policy shifts and the two crisis.

The results of our study have important implications for developing truly 'market-orientated' destination promotion strategies (Line & Wang, 2017) and the improvement of destination competitiveness (Crouch, 2011; Knežević Cvelbar et al., 2016). Our findings provide excellent references for Turkey's tourism policy makers and marketing managers to effectively segment its global markets (Ernst & Dolnicar, 2018), and avoid: a) an ineffective, oversimplified, "one size fits all" marketing strategy; or b) very costly, overcomplicated, individual strategies for each markets (Abbott et al., 2012; Mérida et al., 2016; Narayan, 2006). Specifically, within each of convergence club (which is a natural market segment), a unified, standardized marketing approach seems could be very efficient (Okazaki et al., 2007), especially for those convergence clubs that cover many fast-growing and most of the existing major markets, respectively. This is because marketing strategies targeting at one of the tourist source markets within the same convergence club are likely to help increase tourist arrivals from other markets in the same club (Narayan, 2006; Ozcan & Erdogan, 2017). Turkish tourism development will benefit from a promotion strategy that focuses on single or multiple target groups (such as the convergence clubs identified in our study) out of a bigger pool of tourism source markets. Such intensified strategy is also recommended by Abbott et al. (2012) which has been adopted as one of the general guidelines in the 'Tourism Strategy for Turkey – 2023'. Our finding of the rising importance of Asia as Turkey's source market also highlights the urgency for Turkish government (e.g., Ministry of Culture and Tourism) to explore this relatively less exploited markets, especially given Asia's fast-rising levels of disposable income and vast population.

This study is limited to identifying the patterns of convergence in the Turkish global tourism source markets by uncovering information on the convergence clubs, the natural segments for developing marketing strategies. Future studies could provide greater insights for targeted marketing strategy by basing on the convergence clubs identified in our study to

investigate factors such as cultures, communications, migration patterns, demographics, per capita income, the degree of urbanization, and other socio-economic variables to explain such convergence patterns.

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Tables and Figures

Table 1. International arrivals in Turkey (2001-2015) (ranked by average share (%))

Source market	Average share (%)	Source market	Average share (%)	Source market	Average share (%)
GERMANY	19.596	SOUTH KOREA	0.616	PHILIPPINES	0.159
RUSSIA	8.806	CANADA	0.496	MALAYSIA	0.153
BULGARIA	7.175	MOLDOVA	0.495	CROATIA	0.152
UK	6.888	FINLAND	0.491	KUWAIT	0.147
IRAN	5.261	AUSTRALIA	0.489	PORTUGAL	0.137
NETHERLANDS	4.528	CZECH REPUBLIC	0.468	SLOVENIA	0.127
GEORGIA	3.946	LIBYA	0.433	INDONESIA	0.111
FRANCE	3.435	CHINA	0.414	SOUTH AFRICA	0.108
GREECE	2.793	TURKMENISTAN	0.413	PAKISTAN	0.107
USA	2.510	SAUDI ARABIA	0.388	MEXICO	0.102
AZERBAIJAN	2.226	BELARUS	0.387	UAE	0.095
ITALY	2.121	ALGERIA	0.381	NEW ZEALAND	0.088
UKRAINE	2.075	TUNISIA	0.352	ARGENTINA	0.088
AUSTRIA	1.996	LEBANON	0.349	TAJIKISTAN	0.087
BELGIUM	1.985	IRELAND	0.341	SINGAPORE	0.086
SWEDEN	1.516	HUNGARY	0.336	THAILAND	0.048
ROMANIA	1.460	JORDAN	0.311	BAHRAIN	0.040
ISRAEL	1.422	UZBEKISTAN	0.305	CHILE	0.035
IRAQ	1.300	EGYPT	0.292	LUXEMBOURG	0.034
SWITZERLAND	1.176	ALBANIA	0.255	YEMEN	0.033
DENMARK	1.053	BOSNIA AND HERZEGOVINA	0.250	QATAR	0.033
POLAND	1.037	INDIA	0.243	COLOMBIA	0.032
SPAIN	0.996	SLOVAKIA	0.239	SUDAN	0.029
KAZAKHSTAN	0.784	ARMENIA	0.227	VENEZUELA	0.023
NORWAY	0.784	MOROCCO	0.223	BANGLADESH	0.021
JAPAN	0.745	KYRGYZSTAN	0.211	ICELAND	0.021
MACEDONIA	0.695	BRAZIL	0.186	OCEANIA	0.003

Note: data are obtained from the official website of the Ministry of Culture and Tourism of Turkey (http://www.ktbyatirimisletmeler.gov.tr/TR,9854/sinir-giris-cikis-istatistikleri.html).

Table 2: The $log\ t$ convergence and club convergence tests results (2001M1-2015M12)

$log\ t$ convergence tests	
$\hat{b}: -0.185$ $t-stat: -10.701$*	
club convergence tests	
Club 1 $\hat{b}: 0.363$ $t-stat: 16.213$	ARMENIA(50) BANGLADESH(79) IRELAND(43) ISRAEL(19) LUXEMBOURG(72) MOLDOVA(31) NEW_ZEALAND(64) QATAR(80) SINGAPORE(67) SLOVENIA(58) SUDAN(74) VENEZUELA(77)
Club 2 $\hat{b}: -0.116$ $t-stat: -0.680$	ICELAND(78) OCEANIA(81)
Club 3 $\hat{b}: 0.237$ $t-stat: 11.412$	ALBANIA(46) BAHRAIN(73) BELARUS(38) BOSNIA_AND_HERZEGOVINA(47) CHILE(71) COLOMBIA(75) CROATIA(56) HUNGARY(37) JAPAN(26) KYRGYZSTAN(53) MACEDONIA(27) MEXICO(62) PORTUGAL(57) SPAIN(21) TAJIKISTAN(68) THAILAND(70) YEMEN(76)
Club 4 $\hat{b}: 0.164$ $t-stat: 3.152$	ALGERIA(35) ARGENTINA(66) AUSTRALIA(30) AUSTRIA(14) BELGIUM(15) CANADA(29)

	CZECH_REPUBLIC(33) DENMARK(20) EGYPT(44) INDIA(49) INDONESIA(63) JORDAN(42) MALAYSIA(59) MOROCCO(52) PAKISTAN(61) PHILIPPINES(55) ROMANIA(16) SLOVAKIA(51) SOUTH_AFRICA(60) SOUTH_KOREA(28) SWITZERLAND(18) TUNISIA(40) UAE(69) UKRAINE(13)
Club 5 $\hat{b}$: 0.055 $t-stat$: 1.080	AZERBAIJAN(12) BRAZIL(54) BULGARIA(3) CHINA(34) FINLAND(32) FRANCE(7) GEORGIA(8) GERMANY(1) GREECE(9) IRAN(5) IRAQ(23) ITALY(11) KAZAKHSTAN(24) KUWAIT(65) LEBANON(39) LIBYA(41) NETHERLANDS(6) NORWAY(25) POLAND(22) RUSSIA(2) SAUDI_ARABIA(48) SWEDEN(17) TURKMENISTAN(36) UK(4) USA(10) UZBEKISTAN(45)

Note: * indicates rejection of the null hypothesis of convergence at the 5% significance level. GAUSS programme used to carry out these tests are available from Professor Donggyu Sul's homepage: http://www.utdallas.edu/~dxs093000/papers/Recent%20Working%20Papers1.htm

Table 3: Perron and Yabu (2009) break test results (2001M1-2015M12)

	Country	*Exp-W*	Break location
1	GERMANY	11.61	2005M06
2	RUSSIA	-0.03	
3	BULGARIA	21.40	2006M02
4	UK	24.81	2010M10
5	IRAN	33.19	2012M02
6	NETHERLANDS	23.14	2004M12
7	FRANCE	7.28	2011M02
8	GEORGIA	8.18	2006M02
9	GREECE	2.01	
10	USA	13.84	2005M04
11	ITALY	0.04	
12	AZERBAIJAN	-0.10	
13	UKRAINE	7.82	2008M11
14	AUSTRIA	4.58	2008M11
15	BELGIUM	4.06	2005M03
16	ROMANIA	10.32	2006M02
17	SWEDEN	3.19	2011M04
18	SWITZERLAND	33.98	2005M08
19	ISRAEL	56.40	2010M06
20	DENMARK	22.22	2006M05
21	SPAIN	16.82	2006M07
22	POLAND	2.60	
23	IRAQ	0.10	
24	KAZAKHSTAN	0.17	
25	NORWAY	14.98	2012M02
26	JAPAN	-0.22	
27	MACEDONIA	100.61	2007M01
28	SOUTH_KOREA	6.34	2008M06
29	CANADA	11.83	2005M06
30	AUSTRALIA	10.46	2005M04
31	MOLDOVA	0.24	
32	FINLAND	13.01	2008M09
33	CZECH_REPUBLIC	11.26	2007M02
34	CHINA	4.89	2012M02
35	ALGERIA	3.32	2008M01
36	TURKMENISTAN	0.45	
37	HUNGARY	5.42	2012M04
38	BELARUS	28.06	2004M10

39	LEBANON	31.08	2010M03
40	TUNISIA	122.24	2006M10
41	LIBYA	24.17	2011M12
42	JORDAN	5.48	2004M10
43	IRELAND	80.75	2008M04
44	EGYPT	12.59	2012M02
45	UZBEKISTAN	12.18	2006M02
46	ALBANIA	38.59	2010M01
47	BOSNIA_AND_HERZEGOVINA	19.95	2010M05
48	SAUDI_ARABIA	204.82	2007M09
49	INDIA	25.35	2006M05
50	ARMENIA	19.51	2004M10
51	SLOVAKIA	27.59	2006M10
52	MOROCCO	12.73	2006M01
53	KYRGYZSTAN	20.67	2009M01
54	BRAZIL	6.10	2005M05
55	PHILIPPINES	16.33	2005M12
56	CROATIA	13.24	2011M06
57	PORTUGAL	2.89	2007M02
58	SLOVENIA	20.50	2007M01
59	MALAYSIA	6.78	2004M11
60	SOUTH_AFRICA	55.13	2005M03
61	PAKISTAN	3.51	2011M08
62	MEXICO	11.28	2004M12
63	INDONESIA	3.30	2005M12
64	NEW_ZEALAND	43.46	2005M03
65	KUWAIT	18.91	2008M03
66	ARGENTINA	3.15	2004M10
67	SINGAPORE	3.00	2009M02
68	TAJIKISTAN	19.59	2008M07
69	UAE	6.50	2008M05
70	THAILAND	0.50	
71	CHILE	7.27	2004M12
72	LUXEMBOURG	5.59	2005M06
73	BAHRAIN	5.13	2011M09
74	SUDAN	0.76	
75	COLOMBIA	6.86	2012M04
76	YEMEN	21.86	2004M10
77	VENEZUELA	20.52	2005M11
78	ICELAND	5.24	2004M12
79	BANGLADESH	7.62	2007M04
80	QATAR	1.37	
81	OCEANIA	8.97	2005M10

Note: The third and fourth columns present the Perron and Yabu (2009) test statistics (Model III) for one break (i.e., ExpW test) and the location of the breaks respectively. The critical value at 5% for the test is 2.72. GAUSS codes are obtained from http://people.bu.edu/perron/.

Table 4a: The $log\ t$ convergence and club convergence test results for no-break countries (2001M1-2015M12)

$log\ t$ convergence tests	
$\hat{b}: -0.133$ $t-stat: -8.050$*	
club convergence tests	
Club 1 $\hat{b}$: 0.097 $t-stat$: 1.868	GREECE(9) ITALY(11) AZERBAIJAN(12) POLAND(22) MOLDOVA(31)
Club 2 $\hat{b}$: 0.572 $t-stat$: 117.131	RUSSIA(2) THAILAND(70) SUDAN(74)
Club 3 $\hat{b}$: 0.578 $t-stat$: 4.815	KAZAKHSTAN(24) TURKMENISTAN(36)
Divergent $\hat{b}$: -1.831 $t-stat$: -25.110*	IRAQ(23) JAPAN(26) QATAR(80)

Table 4b: The $log\ t$ convergence and club convergence test results for the first group of breakpoint-homogeneous countries (breaks clustered around period 2004m10-2007m2)

$log\ t$ convergence tests			
Prior to 2004M10 $\hat{b}: -0.557$ $t-stat: -201.525^{*}$		Post 2007M2 $\hat{b}: -0.382$ $t-stat: -70.694^{*}$	
club convergence tests			
Prior to 2004M10		Post 2007M2	
Club 1 $\hat{b}: 0.203$ $t-stat: 8.381$	USA(10) ROMANIA(16) MACEDONIA(27) SOUTH_AFRICA(60) MEXICO(62) ARGENTINA(66)	Club 1 $\hat{b}: 0.308$ $t-stat: 2.208$	GERMANY(1) NETHERLANDS(6) USA(10) BELGIUM(15) ROMANIA(16) SPAIN(21) ARMENIA(50) SLOVENIA(58)
Club 2 $\hat{b}: 1.509$ $t-stat: 8.983$	SPAIN(21) UZBEKISTAN(45) INDONESIA(63) ICELAND(78)	Club 2 $\hat{b}: 0.504$ $t-stat: 4.473$	BULGARIA(3) CANADA(29) CZECH_REPUBLIC(33) BELARUS(38) VENEZUELA(77) ICELAND(78)
Club 3 $\hat{b}: 0.542$ $t-stat: 9.250$	GERMANY(1) GEORGIA(8) BELGIUM(15) CANADA(29) AUSTRALIA(30) CZECH_REPUBLIC(33) TUNISIA(40) SLOVAKIA(51) BRAZIL(54) PHILIPPINES(55) PORTUGAL(57) MALAYSIA(59) NEW_ZEALAND(64) CHILE(71)	Club 3 $\hat{b}: 0.288$ $t-stat: 5.046$	SWITZERLAND(18) DENMARK(20) MACEDONIA(27) PORTUGAL(57) NEW_ZEALAND(64) LUXEMBOURG(72)
Club 4 $\hat{b}: 0.039$ $t-stat: 9.998$	JORDAN(42) MOROCCO(52)	Club 4 $\hat{b}: 0.135$ $t-stat: 1.041$	AUSTRALIA(30) TUNISIA(40) JORDAN(42) SLOVAKIA(51) BRAZIL(54) MEXICO(62)
Club 5 $\hat{b}: 0.604$ $t-stat: 20.539$	NETHERLANDS(6) DENMARK(20) INDIA(49) LUXEMBOURG(72) YEMEN(76) VENEZUELA(77) OCEANIA(81)	Club 5 $\hat{b}: 0.604$ $t-stat: 20.539$	UZBEKISTAN(45) INDIA(49) MOROCCO(52) PHILIPPINES(55) MALAYSIA(59) SOUTH_AFRICA(60) INDONESIA(63) CHILE(71) YEMEN(76) OCEANIA(81)

Club 6 $\hat{b}$: 9.408 $t-stat$: 3.089	ARMENIA(50) SLOVENIA(58)	Club 6 $\hat{b}$: 2.717 $t-stat$: 1.630	GEORGIA(8) ARGENTINA(66)
Divergent $\hat{b}$: $-$ 0.808 $t-stat$: $-$24.475	BULGARIA(3) SWITZERLAND(18) BELARUS(38)		

Table 4c: The $log\ t$ convergence and club convergence test results for the second group of breakpoint-homogeneous countries (breaks clustered around 2008/9 global financial crisis period)

$log\ t$ convergence tests			
Prior to 2008M1 $\hat{b}$: $-$ 0.113 $t-stat$: $-$8.468*		Post 2009M2 $\hat{b}$: $-$ 0.342 $t-stat$: $-$109.889*	
club convergence tests			
Prior to 2008M1		Post 2009M2	
Club 1 $\hat{b}$: 0.103 $t-stat$: 1.262	UKRAINE(13) AUSTRIA(14) FINLAND(32) IRELAND(43) SINGAPORE(67)	Club 1 $\hat{b}$: 0.016 $t-stat$: 0.923	UKRAINE(13) FINLAND(32) SINGAPORE(67) TAJIKISTAN(68) UAE(69)
Club 2 $\hat{b}$: 0.024 $t-stat$: 3.660	SOUTH_KOREA(28) KUWAIT(65) UAE(69)	Club 2 $\hat{b}$: 1.112 $t-stat$: 16.215	SOUTH_KOREA(28) ALGERIA(35) KYRGYZSTAN(53)
Divergent $\hat{b}$: $-$ 2.834 $t-stat$: $-$247.797	ALGERIA(35) KYRGYZSTAN(53) TAJIKISTAN(68)	Divergent $\hat{b}$: $-$ 3.093 $t-stat$: $-$118.819	AUSTRIA(14) IRELAND(43) KUWAIT(65)

Table 4d: The $log\ t$ convergence and club convergence tests results for the third group of breakpoint-homogeneous countries (breaks clustered around the European debt crisis period)

$log\ t$ convergence tests			
Prior to 2010M1 $\hat{b}: -0.113$ $t-stat: -8.468^{*}$		Post 2012M4 $\hat{b}: -0.342$ $t-stat: -109.889^{*}$	
club convergence tests			
Prior to 2010M1		Post 2012M4	
Club 1 $\hat{b}: -0.413$ $t-stat: -1.522$	ISRAEL(19) BOSNIA_AND_HERZEGOVINA(47)	Club 1 $\hat{b}: -0.150$ $t-stat: -1.145$	NORWAY(25) LIBYA(41)
Club 2 $\hat{b}: 0.317$ $t-stat: 1.848$	FRANCE(7) CHINA(34) HUNGARY(37) LIBYA(41) ALBANIA(46)	Club 2 $\hat{b}: 0.080$ $t-stat: 0.100$	FRANCE(7) EGYPT(44) CROATIA(56)
Club 3 $\hat{b}: 0.945$ $t-stat: 18.019$	UK(4) SWEDEN(17) LEBANON(39) EGYPT(44) CROATIA(56)	Club 3 $\hat{b}: -0.089$ $t-stat: -0.769$	UK(4) SWEDEN(17)
Club 4 $\hat{b}: 0.705$ $t-stat: 2.664$	IRAN(5) PAKISTAN(61)	Club 4 $\hat{b}: -0.718$ $t-stat: -1.149$	LEBANON(39) ALBANIA(46)
Club 5 $\hat{b}: 0.259$ $t-stat: 9.024$	NORWAY(25) BAHRAIN(73) COLOMBIA(75)	Club 5 $\hat{b}: 1.853$ $t-stat: 10.076$	IRAN(5) HUNGARY(37) BOSNIA_AND_HERZEGOVINA(47)
		Club 6 $\hat{b}: 2.487$ $t-stat: 8.110$	PAKISTAN(61) BAHRAIN(73) COLOMBIA(75)
		Club 7 $\hat{b}: 4.003$ $t-stat: 5.932$	ISRAEL(19) CHINA(34)

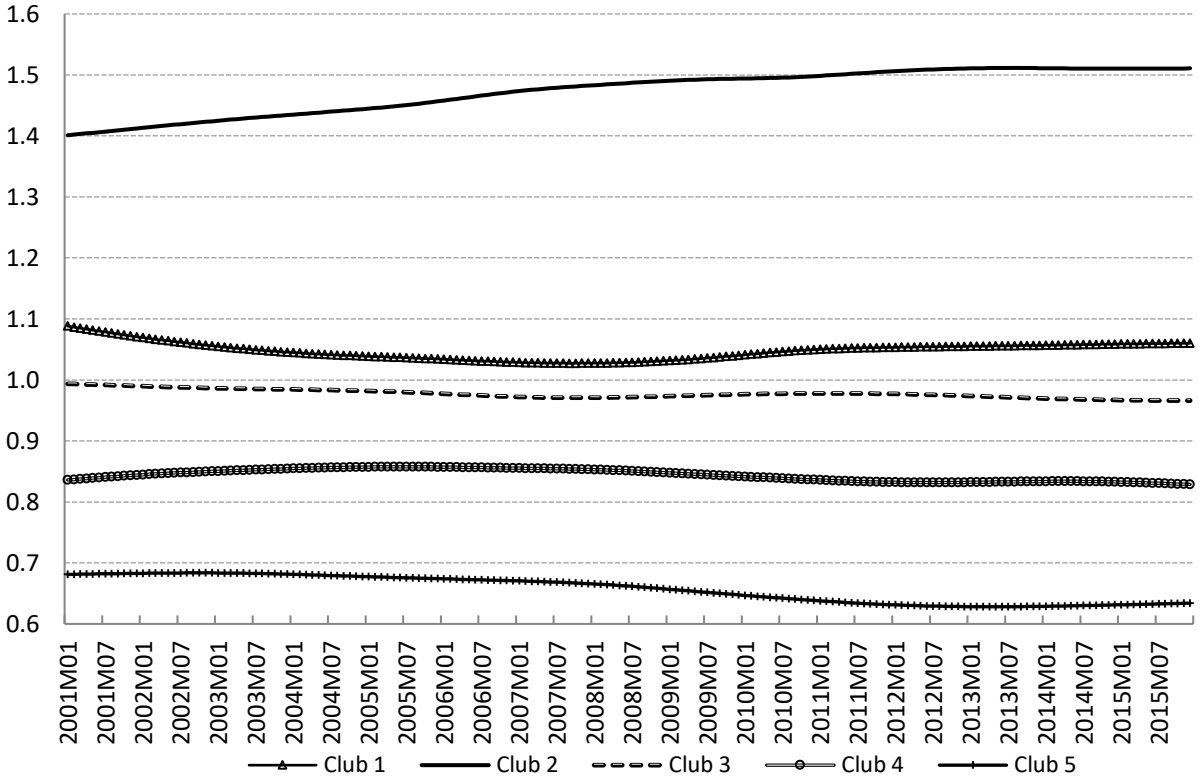

Figure 1: Relative transition paths across clubs (2001M1-2015M12)

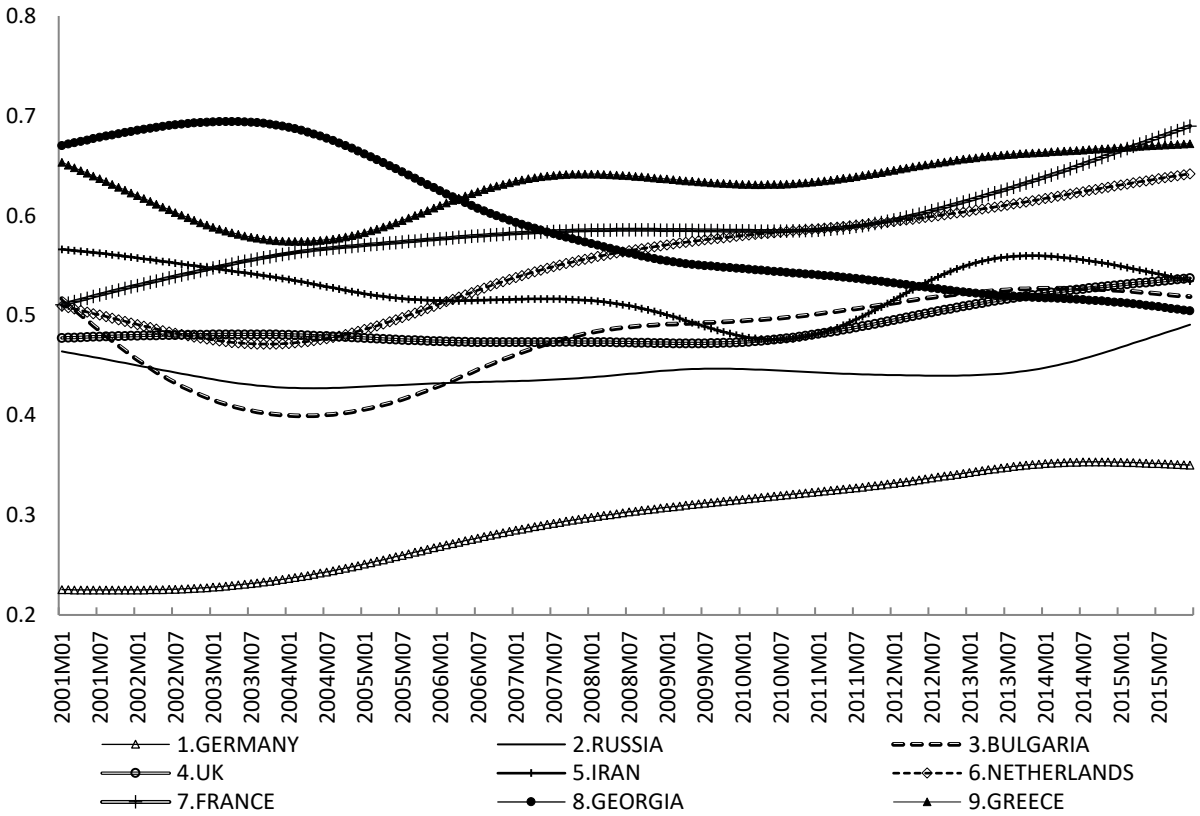

Figure 2a. Relative transition paths for countries 1-9 (2001M1-2015M12)

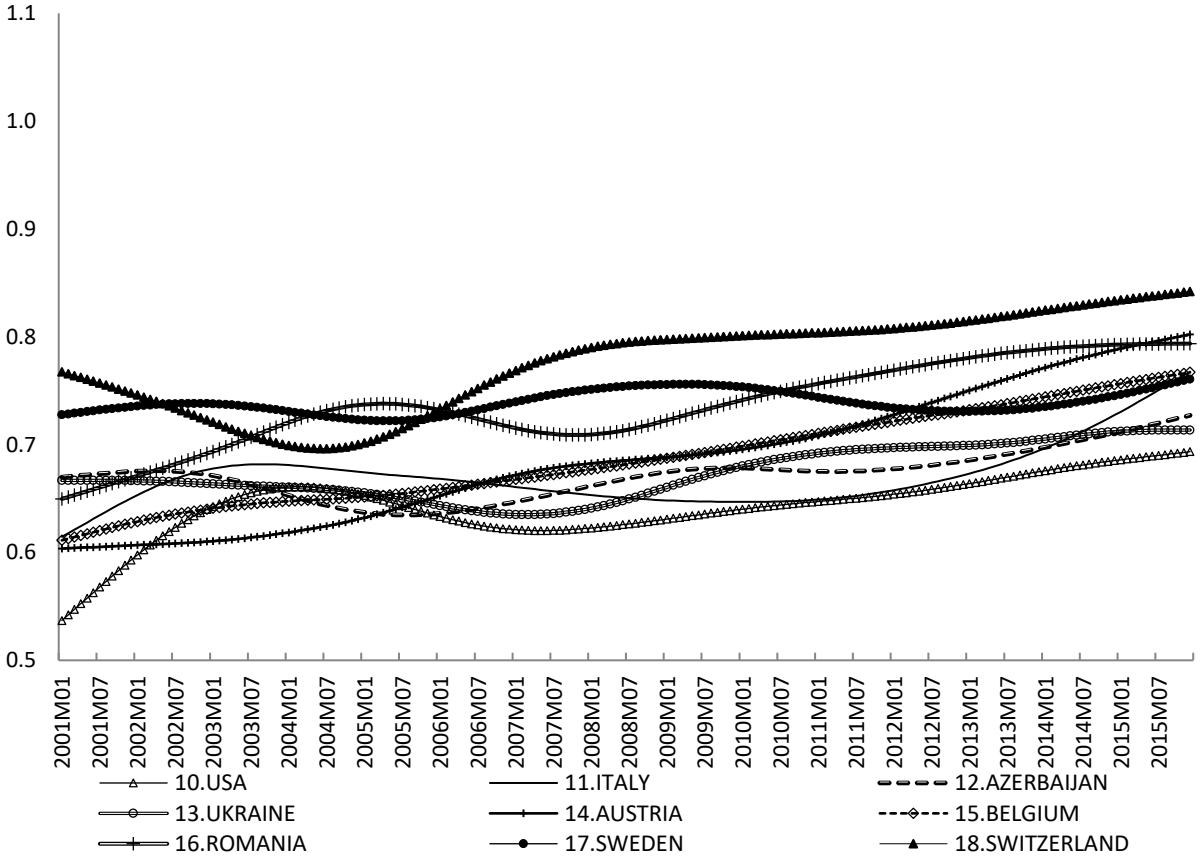

Figure 2b. Relative transition paths for countries 10-18 (2001M1-2015M12)

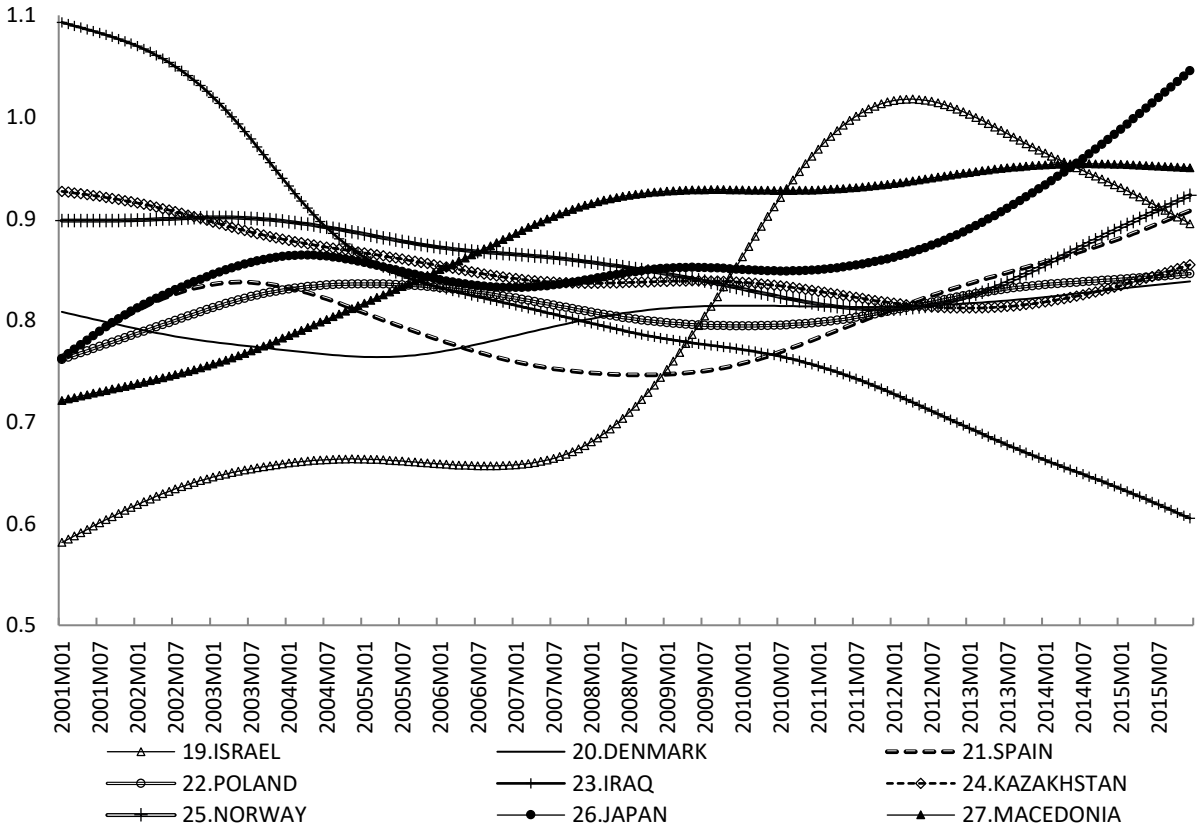

Figure 2c. Relative transition paths for countries 19-27 (2001M1-2015M12)

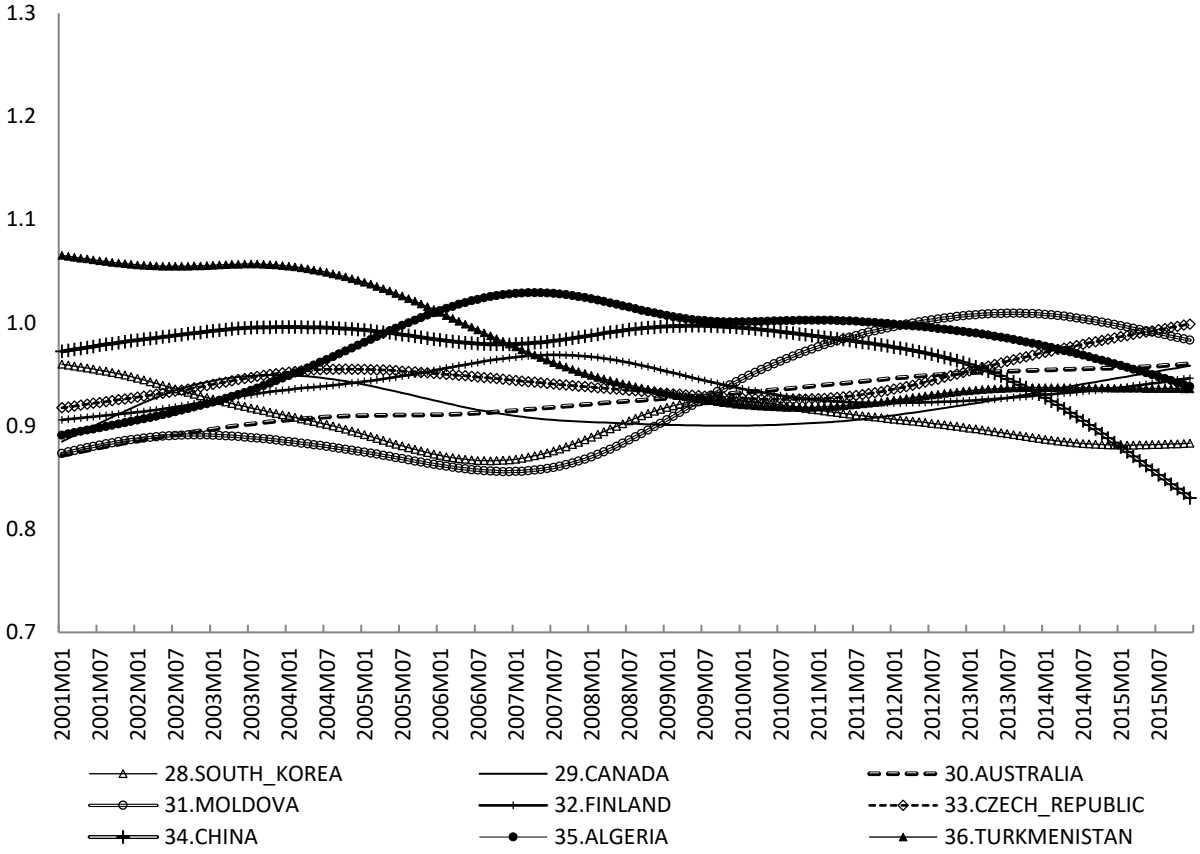

Figure 2d. Relative transition paths for countries 28-36 (2001M1-2015M12)

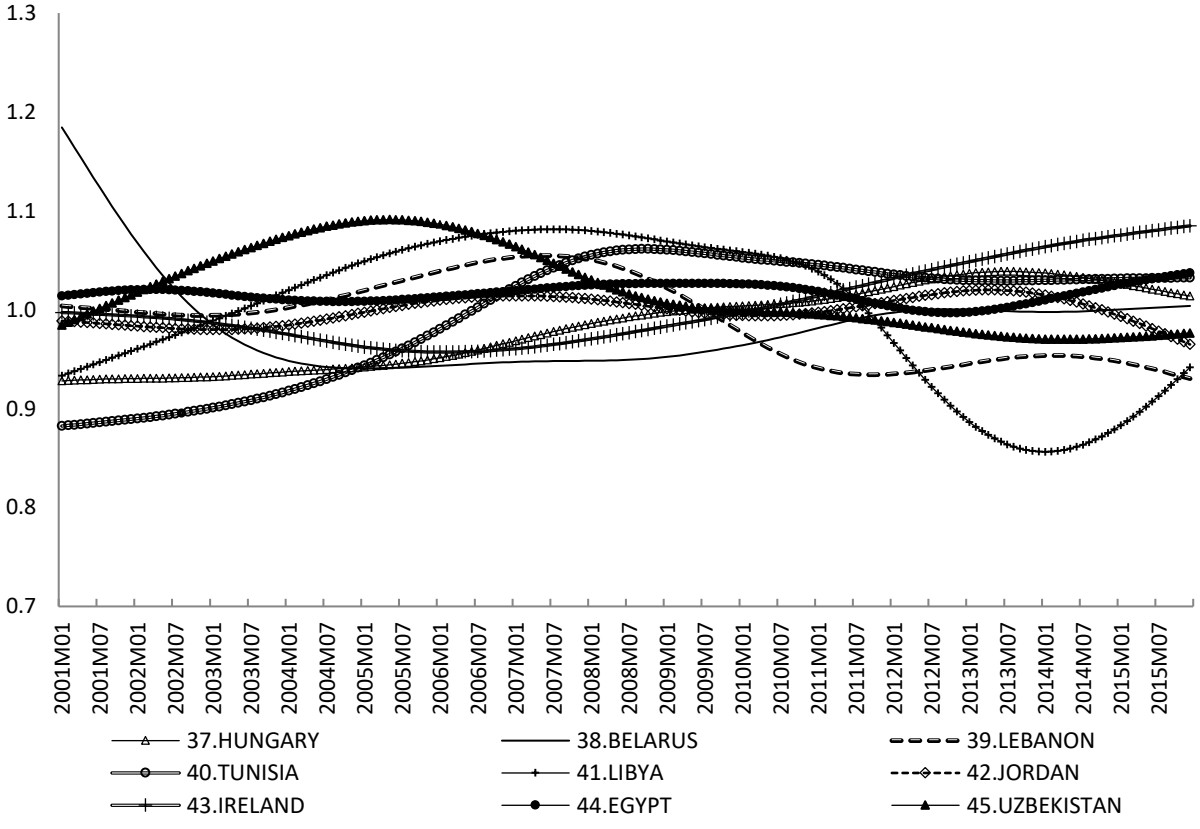

Figure 2e. Relative transition paths for countries 37-45 (2001M1-2015M12)

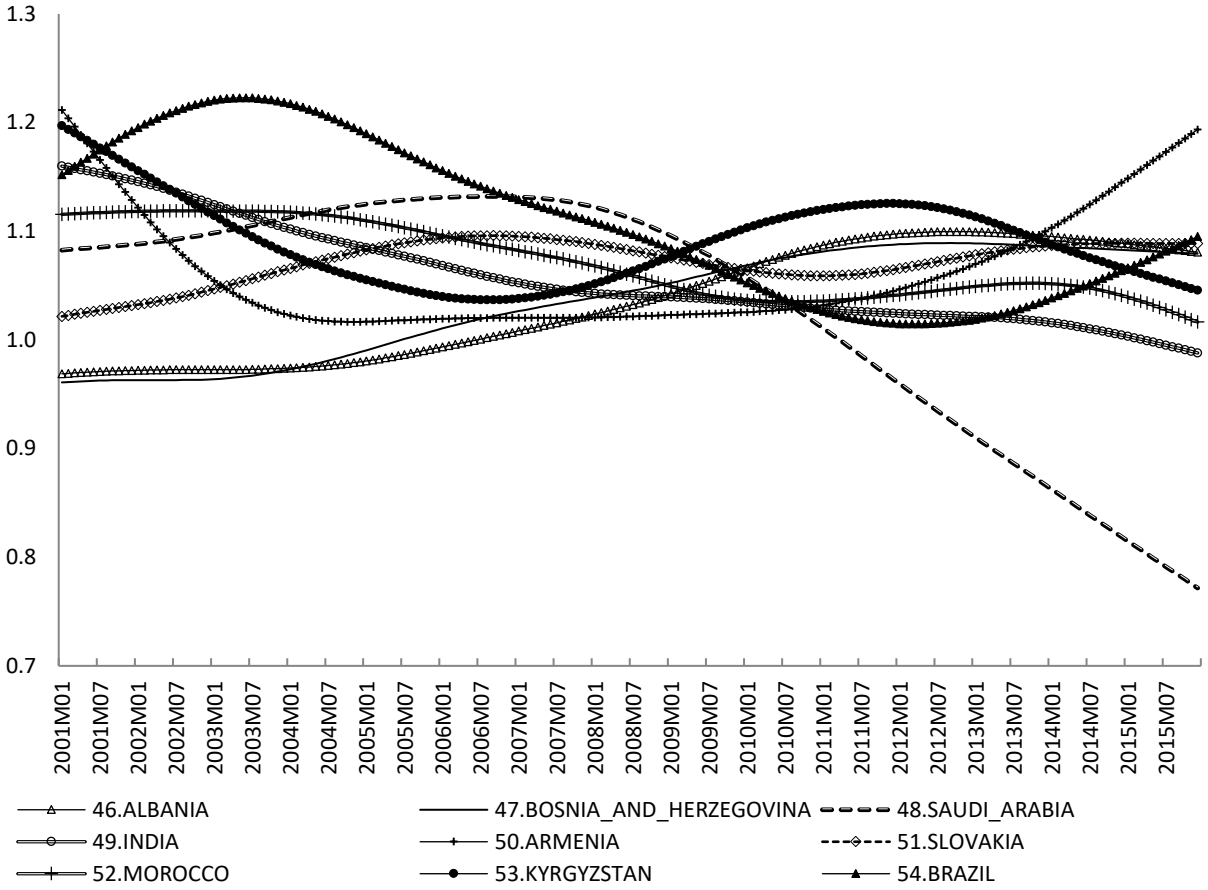

Figure 2f. Relative transition paths for countries 46-54 (2001M1-2015M12)

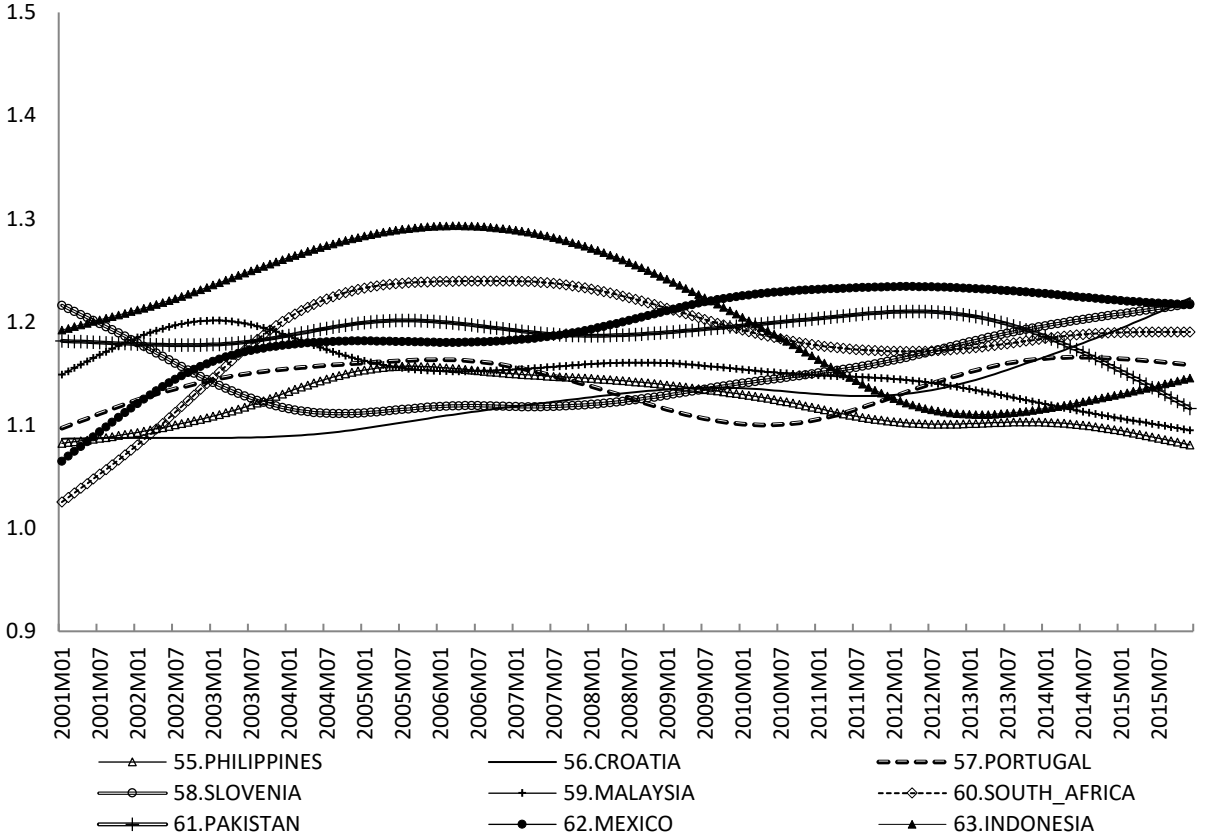

Figure 2g. Relative transition paths for countries 55-63 (2001M1-2015M12)

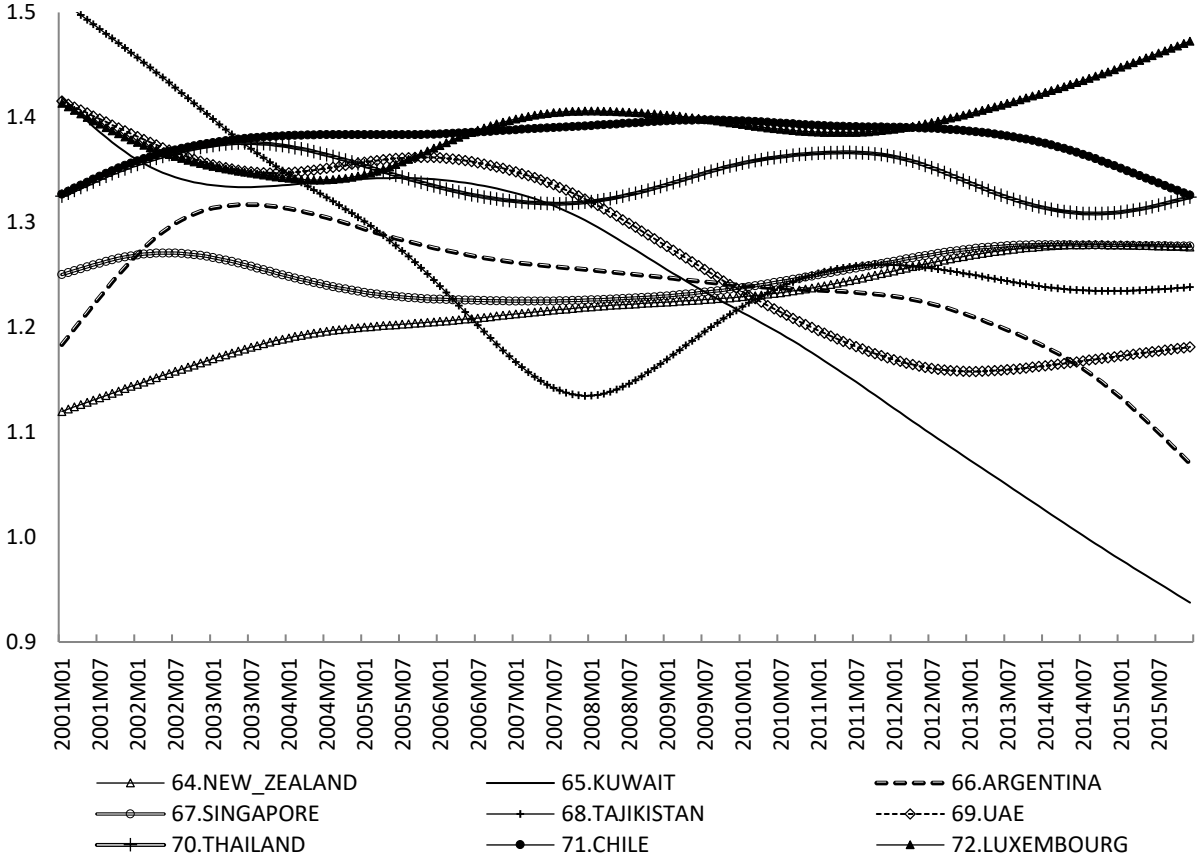

Figure 2h. Relative transition paths for countries 64-72 (2001M1-2015M12)

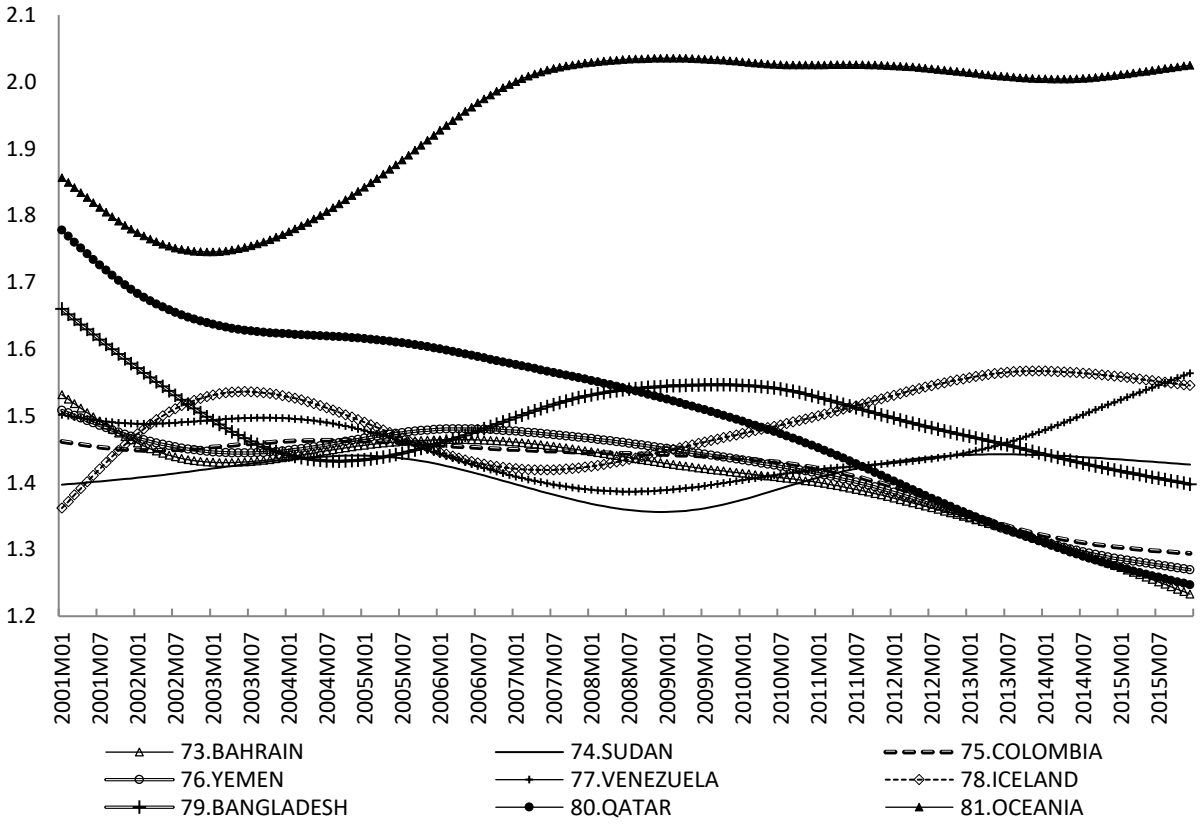

Figure 2i. Relative transition paths for countries 73-82 (2001M1-2015M12)

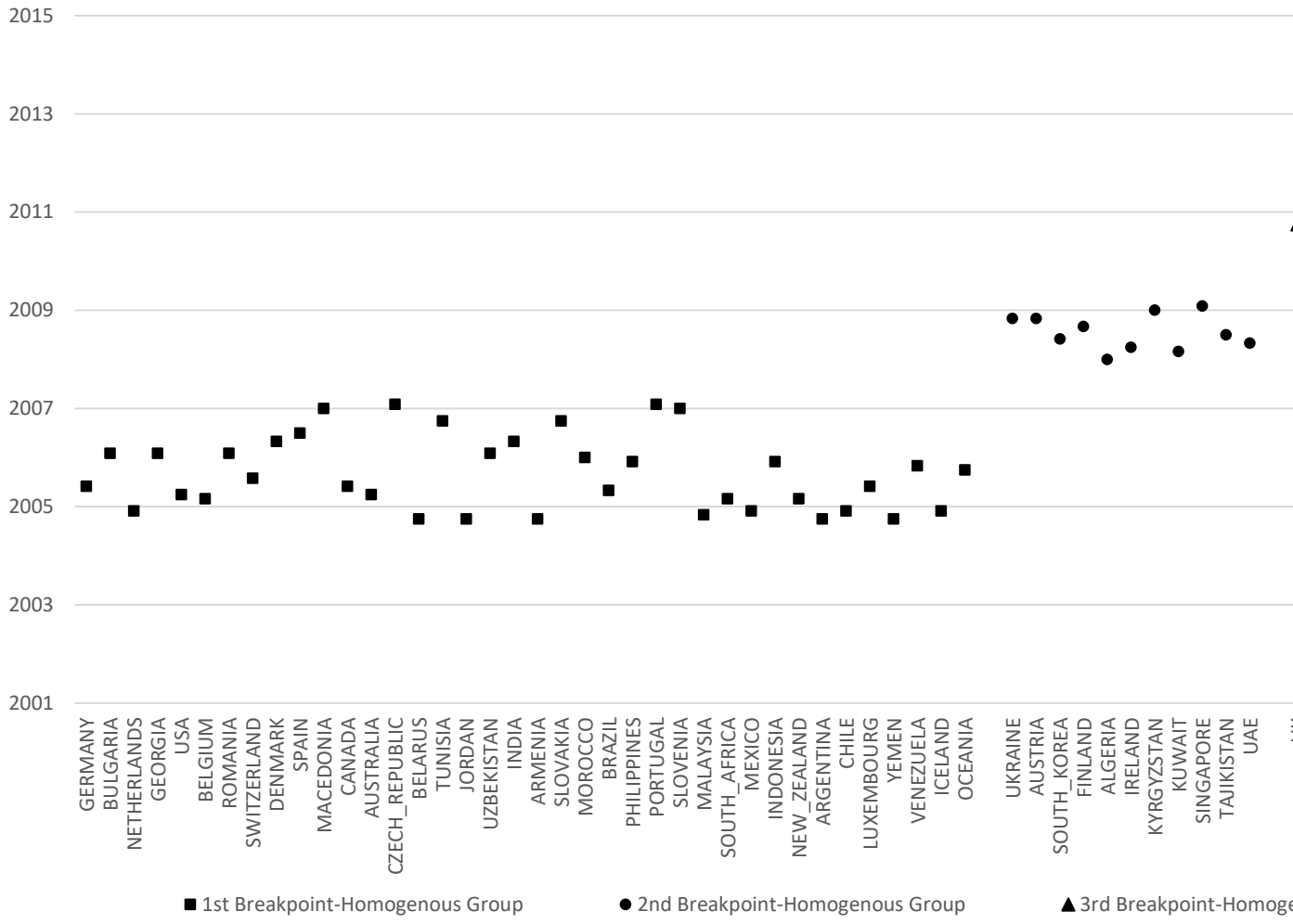

Figure 3. Summary of break locations and countries

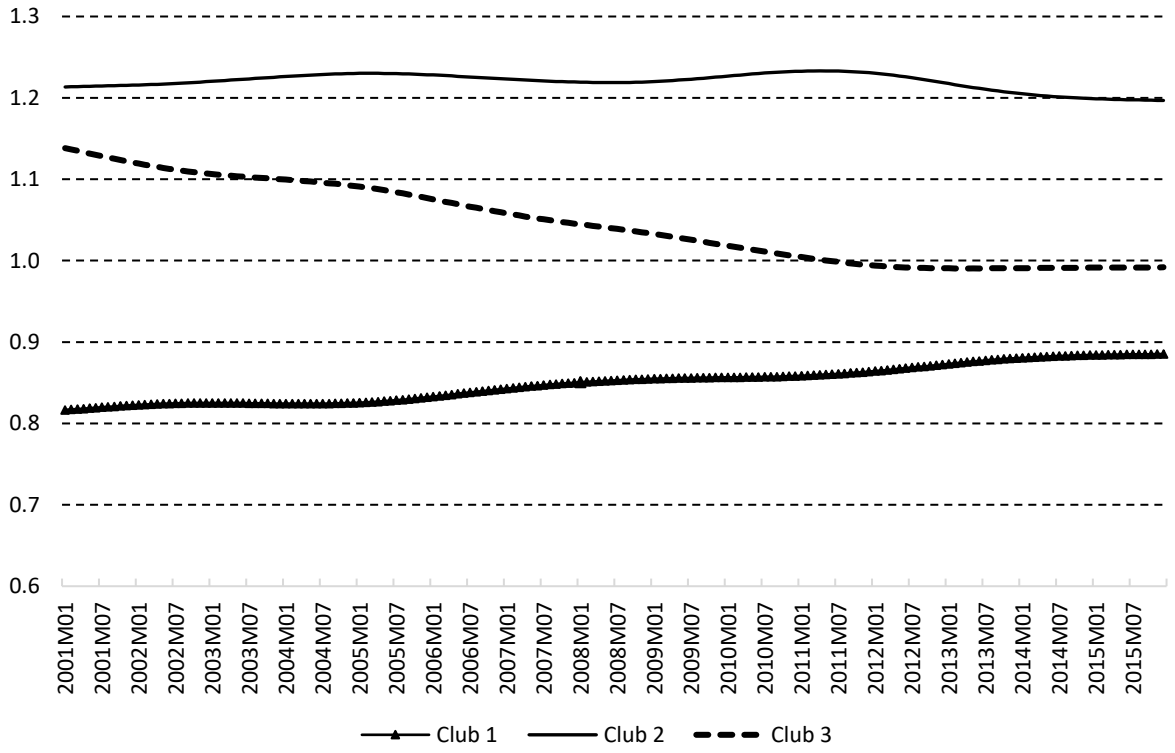

Figure 4a. Relative transition paths across clubs (for no-break countries)

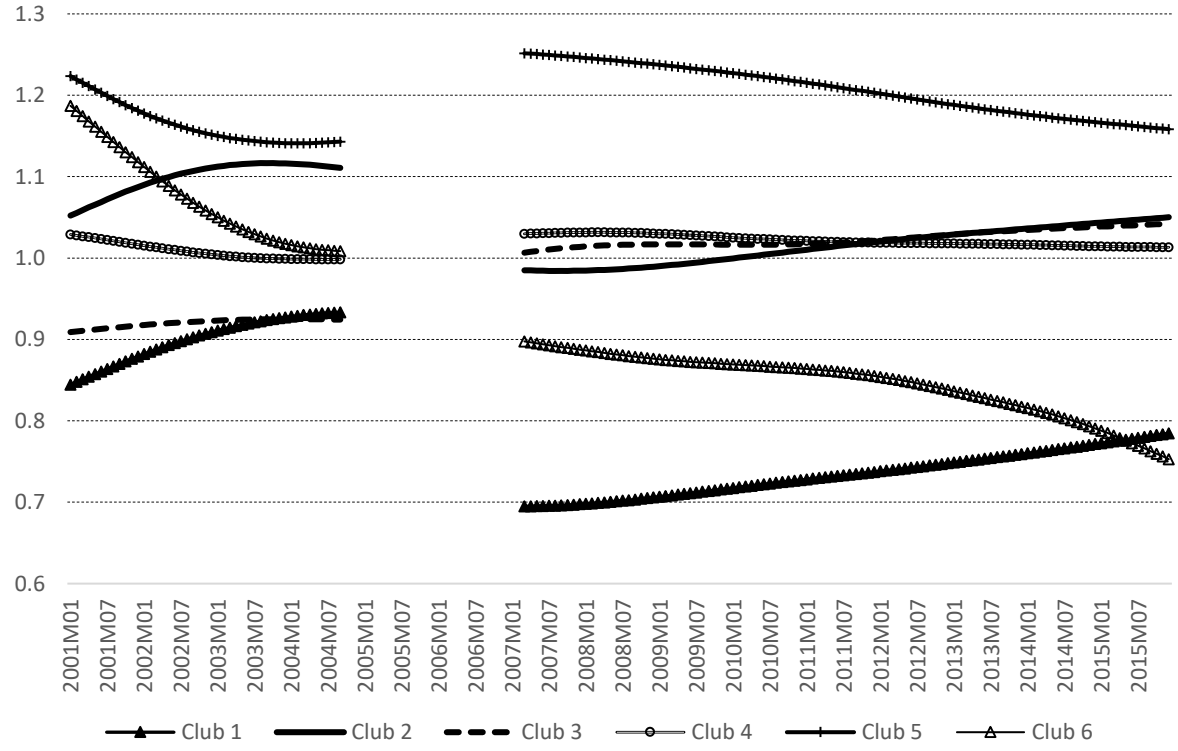

Figure 4b. Relative transition paths across clubs (1st breakpoint-homogenous group)

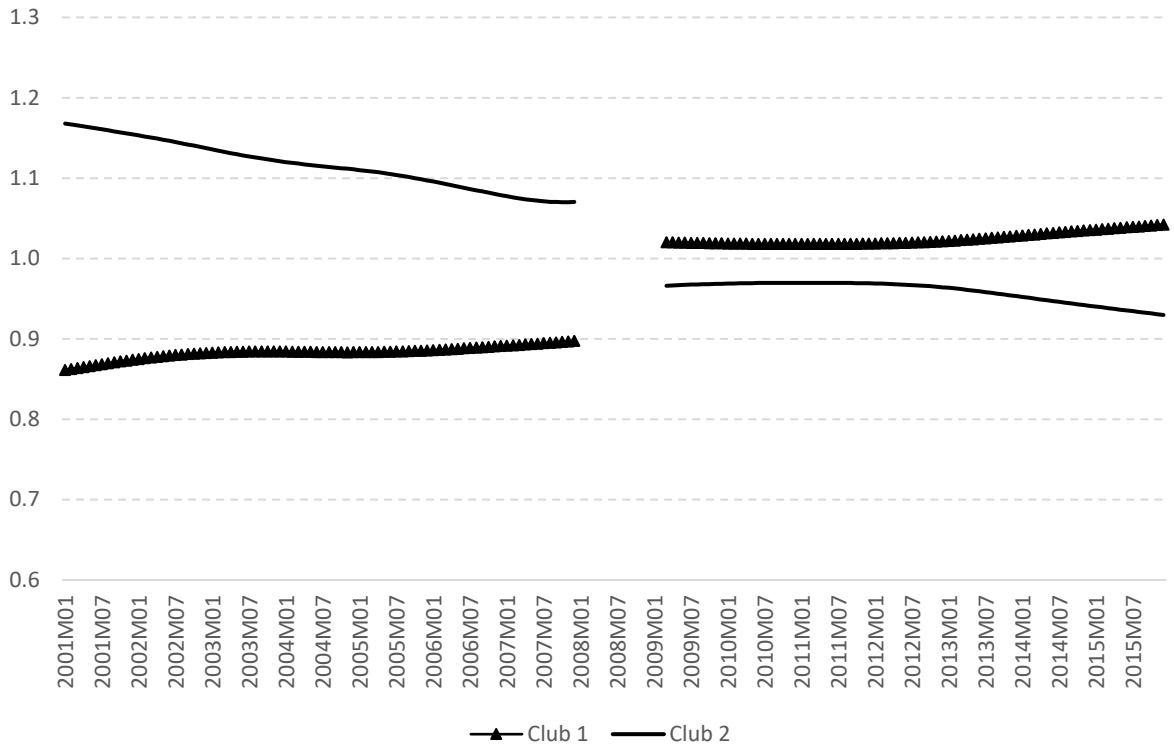

Figure 4c. Relative transition paths across clubs (2nd breakpoint-homogenous group)

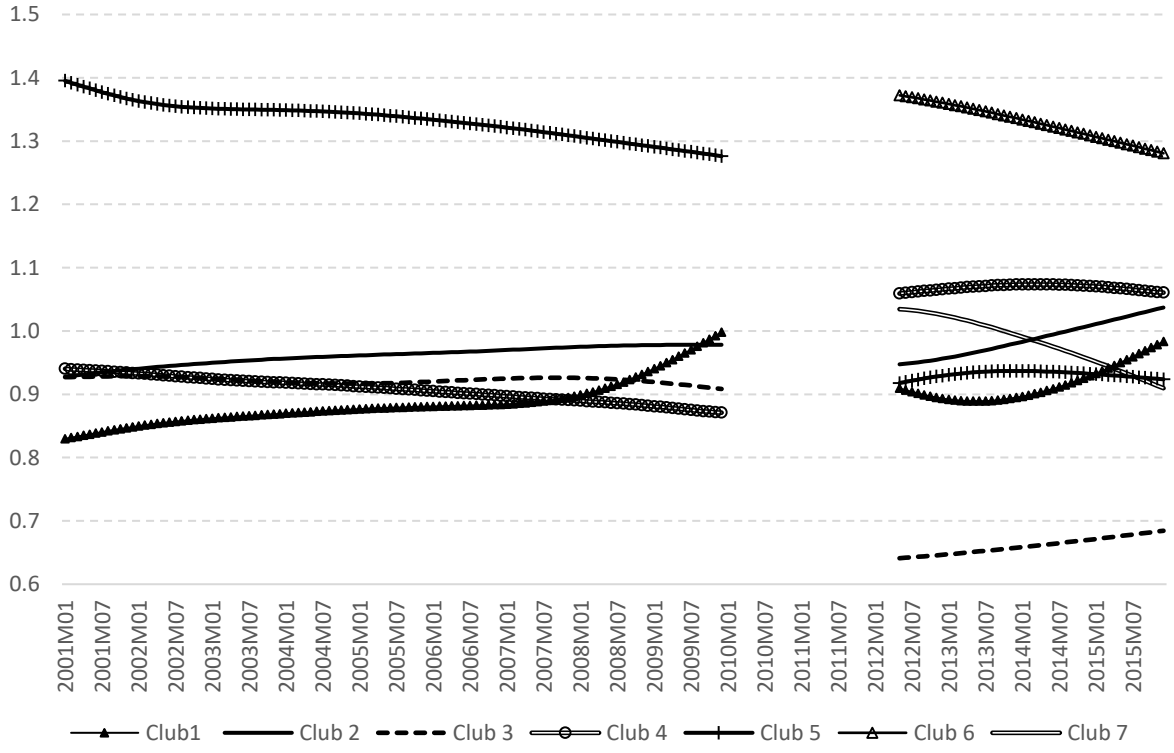

Figure 4d. Relative transition paths across clubs (3rd breakpoint-homogenous group)