

## Financial Convergence in the Asia Pacific Economies

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### ABSTRACT

Asia Pacific Economic Cooperation (APEC) is an example of a regionalism with aims to improve quality of growth and strengthen regional economic integration through free and open trade and investment. The purpose of this study is to investigate how far have Malaysia performed from its financial development perspective compared to the other member countries and simultaneously address the issue whether the formation of APEC as an economic cooperation has been successful or remains heterogeneous. By applying annual panel data, the hierarchical cluster results suggest the existence of convergence clubs among the Asia Pacific countries. Malaysia is found to be converging towards richer countries' convergence club. In this respect, in order for the national leaders to continue with strong commitment to support financial development with a shared commitment to the Asian regionalism, the countries with relatively under-developed financial system are expected to relieve their existing credit constraints. Meanwhile, the challenge for Malaysia and other countries with relatively well-developed financial system lie in making their financial services more available to the region over the coming years.

*JEL Classifications:* O18, O47, R11, R58

*Keywords:* convergence, hierarchical cluster analysis, financial sector, panel data, APEC.

### INTRODUCTION

Asia Pacific Economic Cooperation (APEC) is an example of an economic integration with aims to improve quality of growth and strengthen regional economy through free and open trade and investment. Among the benefits that a country will acquire when practice economic integration and cooperation are strengthening ties with other countries through an expansion of their markets and promotion of competition by eliminating barriers to trade among the member-countries. Its recent initiatives were launched to promote connectivity in the region in order to support infrastructure development and investment including right regulatory frameworks, robust financial markets, and managing risks. According to APEC Senior Officials' Meeting in February, 2013, a more connected Asia-Pacific will assist the flow of goods, services, capital, and skilled people in the region. In achieving its mission, APEC intends to provide sound and credible policies through regional macroeconomic and financial developments on domestic and region<sup>1</sup>.

Financial development is described as the factors, policies, and institutions that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services. The higher the degree of financial development, the wider the availability of financial services that allow for the diversification of risks. This increases the long-run growth trajectory of a country and ultimately improves the welfare and prosperity of producers and consumers with access to financial services (World Economic Forum, 2011). Financial development also contributes more to the causal relationship to economic growth in the developing economies (Habibullah and Eng, 2006).

The relationship between the degree of financial development and economic growth (Goldsmith, 1969) has been argued in many literature. Empirical evidence shows financial developments are significant to economic growth (Levine, 1997). However, on the other hand, the

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<sup>1</sup> Refer to link <http://www.apec.org/Groups/Other-Groups/Finance-Ministers-Process.aspx>  
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recent few crises may imply a rethinking of the role of finance (Baltagi and Demetriades, 2011). Simultaneously, a related issue to financial development, i.e. tendency for convergence of the financial sector emerges, with two conflicting views. Some scholars claim that globalisation, economic integration, harmonisation of regulations and corporate governance rules have led to the convergence of the financial system characteristics, whilst others state that the financial markets remain heterogeneous despite integration and globalisation.

### Financial Sector's Performance in the Asia Pacific Region

Although there is a two-way link between the development of the financial system and economic growth whereby a deeper financial system which would lead to higher degree of financial development, tends to boost subsequent economic growth (Goldsmith, 1969; McKinnon, 1973; Shaw, 1973), the level of per capita income is also a major determinant of current financial depth (Greenwood and Jovanovic, 1990).

Figure 1 shows that the developing Asia Pacific's credit market, especially in East Asian region, is higher since the starting initial stage of financial liberalisation<sup>2</sup> in the 1980s. However, this deepening remained subdued since the Asian crisis and this probably reflects, at least to some extent, a correction of pre-crisis excesses.

The Asian region are seen to be heading towards a more broad-based financial system. With broad access to financial services, poverty can be alleviated as the authority release or minimise credit constraints which prevent the poor or those with no collateral from engaging in profitable businesses and facilitates the entry of new and innovative firms that may be capital constrained earlier.

Several entities for instance, the Financial Sector Assessment Program (FSAP), developed by the World Bank (WB) and the International Monetary Fund (IMF), is established to strengthen the financial systems by analysing the linkages between the financial sector and the macro-economy, and to promote harmonisation and international convergence of key financial policy area<sup>3,4</sup>, in recognition of the need for stronger policies to foster stability and development. With regards to the above, the issues pertaining to the convergence of the financial sector as a result of economic integrations emerge and yet to be explored for the developing countries especially Asia. There are many theory and empirical applications on per capita income convergence. However, there is neither a theory of financial system convergence, nor of an 'optimum financial system' (World Bank, 2010). Financial convergence is essential to establish commonality in the region for policy-making, harmonised regulatory and supervision and efficient financial system. Are the financial sectors in the Asia Pacific lower-income countries catching up to the higher-income ones, and, is there a tendency for the poorer countries financial sectors to grow more rapidly than the richer countries, and thereby to converge in living standards in the long-run?

The purpose of this study is to evaluate the developing economies financial convergence as a result of APEC integration from their financial development perspectives, as a result of non-financial factors. Financial development can be measured by factors such as size, depth, access, and the efficiency and stability of a financial system, which includes its markets, intermediaries, range of assets, institutions, and regulations. This study will look at the size of the banking financial services in terms of its credit perspectives. A non-parametric hierarchical cluster analysis will be employed to identify any existence of convergence clubs in the region based on the heterogeneous economic factors in the Asia Pacific. The issues whether the countries have achieved a certain degree of convergence in financial terms will provide some insights into research questions which are particularly relevant both theoretically and also for policy reasons because the development in the financial sector may have important implications for APEC towards achieving their mission financially and economically, hence should be carefully monitored. This paper is structured as follows; Literature Review in Section 2, Methodology in Section 3, the Empirical Results in Section 4 and the Conclusion in Section 5.

<sup>2</sup> Financial liberalisation is one process to eliminate the impediments to financial development (Nissanke and Aryeetey, 1998).

<sup>3</sup> The Financial Stability Board (FSB) hosted by the Bank of International Settlements designated 12 policy areas for sound financial systems. The areas highlighted deserve priority implementation depending on country circumstances.

Refer to link <http://www.financialstabilityboard.org/about/overview.htm>

<sup>4</sup> [web.worldbank.org](http://web.worldbank.org) > ... > WBI Learning Programs > Financial Sector.

## LITERATURE REVIEW

There are several non-parametric approaches using hierarchical cluster analysis to measure convergence found based on empirical reviews. For example, Castellacci (2006) and Tsangarides and Qureshi (2008) both apply single-, complete-, Ward's and average-linkage methods in performing clustering techniques. Both results retrieved through the analysis show that the groupings do not depend on the type of agglomerative method used and remain similar across the aggregation algorithms. Meanwhile, following Mojena (1977), Groeneveld et al. (1998) examine several important macroeconomic key variables for the period 1979-1995 for European monetary and real convergence by employing Ward's-linkage, as Mojena claims that Ward's Method appears to be an excellent choice, taking into consideration the importance of consistency among the conceptualisation of clusters, the measure of association, the type of input data and the clustering method. Miron et al. (2009) find similar results when they investigate real convergence for selected Eastern European Countries based upon distances and clusters methodology by employing K-means and hierarchical Ward clusters. On the contrary, Desarbo et al. (1991) conclude that different clustering methods often sometimes produce different results in terms of cluster structure and membership after applying several hierarchical and partitional cluster analysis.

There are also empirical studies performing a combined hierarchical and non-hierarchical method, called two-stage. For instance, Sanz and Velazquez (2004) examine the OECD government expenditure composition from 1970 to 1997. They perform a two-stage cluster analysis method, whereby performing hierarchical Ward's method in the first step and k-means non-hierarchical method in the later step. It is found that performing the two-stage method will minimise the disadvantages of performing the later step by introducing the number of clusters and their centroids obtained from the first step.

## METHODOLOGY

Table 1 shows the list of countries selected for the study. The classification of countries is being adopted from The World Bank. The countries selected ranges from highly advanced to less developed Asia Pacific.

This study attempts to infer the Asia Pacific financial club convergence based on the following model below:

$$DCP = f \{ FDI, OPE, POP, GDPC \} \quad (1)$$

where:

- DCP = Private Sector Credit as a percentage to GDP
- FDI = Foreign Direct Investment as a percentage to GDP
- OPE = Trade Openness
- POP = Population growth rate
- GDPC = Real GDP per capita (US\$)

The dependent variable is DCP while the non-financial independent variables are FDI, OPE, GDPC and POP. The study period is selected starting from the initial stage whereby the degree of financial integration in the Asia Pacific has significantly increased in the 1980s and 1990s. All panel data are in logarithm form, spanning from year 1980 to 2009.

FDI is considered as one of the most important channels through which financial globalisation benefit the economy (Campos and Kinoshita, 2008) through the long term capital investment. More countries are willing to liberalise their long term capital account compared to their short-term capital account. At the same time, FDI can serve as a substitute for domestic expenditures on technological adaptation and imitation as the foreign activity is likely to have some advantages over local imitation (Barro, 1994). The ratio of investment to GDP is positively related to financial development (Abzari et al., 2011). OPE has a significantly positive effect to financial development. As the demand for intra-regional trade rises, the demand for trade-related financial services will also increase (Eichengreen and Park, 2004). In addition, an increase in trade openness is also a prolog to financial openness, hence to financial development in the Asian countries (Ito and Chinn, 2005). POP will be used as demographic indicator in our control variable. The higher the population rate, the lower the costs per customer of making the financial services available (World Economic Forum, 2010). Meanwhile, GDPC is also a

major determinant of financial depth hence positively related to financial development (Greenwood and Jovanovic, 1990).

In an agglomerative hierarchical cluster analysis, clusters are formed by grouping cases into bigger and bigger clusters until all cases are members of a single cluster. Before analysis begins, all cases are considered as separate clusters. At the first step, two of the cases are combined into a single cluster, merging the largest similarity. At the second step, either a third case is added to the cluster already containing two cases, or two other cases are merged into a new cluster. Once a cluster is formed, it cannot be separated, it can only be combined with other clusters (Forina et al., 2002). Next, the clustering procedure to be applied will be decided, based on the number of cases and types of variables to be used in forming the clusters. The Euclidean distance metric is employed throughout the cluster analysis as other distance measures did not generally reveal any significant difference (Artis, 2003). The Ward's-linkage method will be applied for this study. Ward's linkage clustering – the increase in “error sum of squares” (ESS) after fusing two clusters into single cluster. The ESS of a set  $X$  of  $N_X$  values is the sum of squares of the deviations from the mean value of the mean vector (centroid). For a set  $X$  the ESS is described by the following expression:

$$ESS(X) = \sum_{i=1}^{N_X} \left| x_i - \frac{1}{N_X} \sum_{j=1}^{N_X} x_j \right|^2 \quad (2)$$

where

- $|\cdot|$  is the absolute value of a scalar value or the norm (the ‘length’) of a vector;
- $N_X$  and is the number of objects in clusters  $X$ .

Mathematically the linkage function – the distance between clusters  $X$  and  $Y$  – is described by the following expression

$$D(X,Y) = ESS(XY) - [ESS(X) + ESS(Y)]$$

- $XY$  is the combined cluster resulting from fusion clusters  $X$  and  $Y$ ;
- $ESS(\cdot)$  is the error sum of squares describe above.

The number of clusters is determined by looking at how similar clusters are when creating additional clusters or collapsing existing ones<sup>5</sup>. The ‘leading’ countries and the ‘followers’, i.e. who will have the opportunity to ‘catch-up’, will then be determined based on the clubs emerged from the clustering technique, following the empirical research by Abramovitz (1986) and Groeneveld et al. (1998).

## EMPIRICAL RESULTS

Taking into account the heterogeneity of the Asia Pacific's economy since the countries range from highly-advanced and richer countries to lower-income countries, hierarchical cluster analysis is employed to investigate any existence of club convergence among the Asia Pacific countries. This is particularly important for APEC in order to implement their actions and initiatives onto the sub-countries (clubs) so as to efficiently reflect a symmetrical developments for a smoother centralised regional policy approach in the future.

Table 2 represents the convergence patterns for each country throughout the period of 1980 to 2009, based on Ward's-linkage dynamic hierarchical cluster technique. The patterns show how each country converges, or even diverges; forming one club or few clubs, either as a leader or followers for Asia Pacific. The countries in the table are ranked based on their average income per capita throughout the studied period. There are three separate convergence club formed at the beginning and ending of the studied period, based on the Private Credit to GDP ratio in Table 2. In 1980, there are only six countries that formed Group 1 (richer countries), which are mainly from the GCC group. Group 1 gets larger in number in 2009 as Israel, Korea, Cyprus, Saudi Arabia, Oman, Malaysia and Thailand converged into the club. Most of the countries in Group 2 have converged into Group 3 (less richer countries), with the exception of Pakistan, India, Nepal and Bangladesh, which have a relatively under-developed financial sector.

<sup>5</sup> Refer [www.norusis.com/pdf/SPC\\_v13](http://www.norusis.com/pdf/SPC_v13).

Figure 2 illustrates the countries' convergence clubs based on their group number derived in year 2009. The 'leading' countries and the 'followers', i.e. who will have the opportunity to 'catch-up', are determined based on the clubs emerged from the clustering technique process.

## CONCLUSION

The formation of APEC aims to achieve a successful economic integration and cooperation in the Asia Pacific. Various initiatives have been implemented including right regulatory frameworks, robust financial markets, and managing risks in order to provide sound and credible policies through regional macroeconomic and financial developments on domestic and region.

The objective of the present study is to find the convergence patterns in Asia Pacific from its financial development perspective. Upon employing the hierarchical cluster convergence analysis using Private Sector Credit as a percentage to GDP, it is found that Malaysia, with a relatively well-developed financial system, has converged, as a follower, into a richer-income country. Generally, our results suggest that the Asia Pacific region has formed club convergence with countries with relatively well-developed financial sector have converged into the richer club while the relatively under-developed countries are less likely to converge. This supports the centre-periphery model whereby the intra-regional differences has persisted or even widen over time. It could be due to agglomeration effects driven by maybe low financial sector's costs and strong economies of scale (increasing returns) in the richer Asia Pacific countries which might be due to geographical, political or other related factors.

From the results obtained, it indicates that in order to support financial development with a shared commitment to the Asia Pacific region, the national leaders are to separately implement their actions and initiatives onto the sub-group (clubs) of countries at this stage since there is no absolute convergence of the financial development in the Asia Pacific as a whole identified. The countries with relatively under-developed banking financial system are expected to relieve the existing of their credit constraints. Meanwhile, the challenge for Malaysia and other countries with relatively well-developed financial system lie in making their financial services more available to the region over the coming years. This is particularly important in order to efficiently reflect a symmetrical development of the banking financial services for a smoother centralised regional policy approach in the future.

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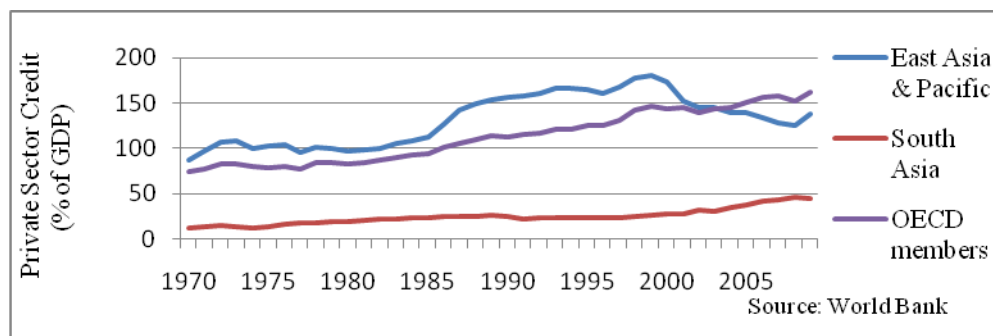


FIGURE 1: Trend in Private Credit in Asia Pacific

TABLE 1: List of selected Asia and the Pacific countries (29 countries)

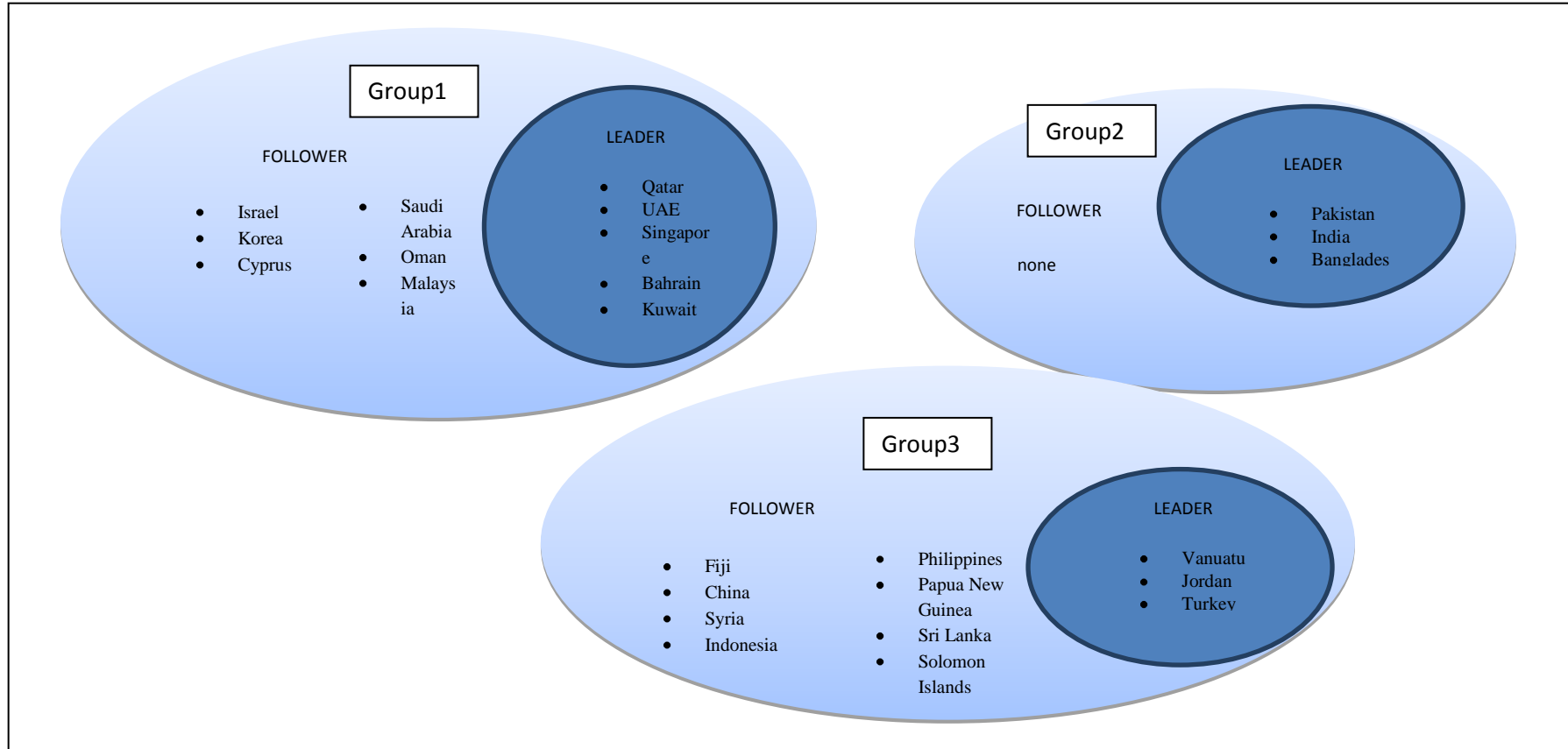
East Asia (3)	China (PRC), Japan, Korea (Republic of)
Middle-East / Western Asia (12)	Bahrain, Cyprus <sup>6</sup> , Iran, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates
South Asia (5)	Bangladesh, India, Nepal, Pakistan, Sri Lanka
Southeast Asia (5)	Indonesia, Malaysia, Philippines, Singapore, Thailand
The Pacific (4)	Fiji Islands, Papua New Guinea, Solomon Islands, Vanuatu

<sup>6</sup> Cyprus was a Non-aligned Movement country. This study includes Cyprus for comparison (as another developed country in West Asia). It only joined European Union starting from May, 2004.

TABLE 2: Dynamic Ward's-linkage cluster analysis result for Asia Pacific (DCP).

LIQ	DCP	GDPC	Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
48.66	35.24	42,301	Qatar	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
54.01	48.07	32,947	United Arab Emira	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
82.77	57.12	27,313	Kuwait	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
113.08	92.37	25,511	Singapore	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
195.34	183.55	23,597	Japan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
86.02	71.70	16,803	Israel	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
66.14	46.24	16,136	Bahrain	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
62.03	65.71	13,417	Korea, Rep.	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
157.57	140.43	12,426	Cyprus	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
44.77	23.48	12,048	Saudi Arabia	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
29.99	28.36	11,251	Oman	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
114.15	104.19	6,448	Malaysia	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
34.90	19.75	6,312	Turkey	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
48.41	24.45	5,757	Iran	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
84.67	94.91	4,638	Thailand	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	
105.85	36.57	4,199	Vanuatu	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
111.41	66.83	3,459	Jordan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
46.21	34.07	3,148	Fiji	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
104.12	91.72	2,796	China	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	
61.58	9.78	2,490	Syrian Arab Repub	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
38.71	30.80	2,323	Indonesia	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3
41.39	23.43	2,044	Sri Lanka	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
47.96	30.81	1,832	Philippines	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
35.46	20.12	1,762	Papua New Guine	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3
44.32	25.39	1,599	Pakistan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
50.97	28.87	1,504	India	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
30.88	18.79	1,277	Solomon Islands	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3
32.95	21.23	786	Bangladesh	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
42.95	21.60	779	Nepal	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Note: Number of groupings (3) is based on the characteristics of the clusters at successive steps, with the most reasonable number of fairly homogeneous clusters (IBM SPSS Statistics Guides).



Note: Number of groupings (3) is based on the characteristics of the clusters at successive steps, with the most reasonable number of fairly homogeneous clusters (IBM SPSS Statistics Guides)

FIGURE 2: Ward's-linkage dynamic cluster analysis for Asia Pacific (DCP).