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Financial Convergence of the Asia Pacific Developing Economies

Juliana Ibrahim[a*]
Singapore

Muzafar Shah Habibullah[b]
Universiti Putra Malaysia

Abstract: The financial markets of the Asia Pacific have remained resilient despite the lacklustre performance of the global economy in recent years. These markets have embarked on various initiatives that include regional monetary and financial developments by promoting closer monetary and financial cooperation. The purpose of this study is to measure the degree of financial convergence in the Asia Pacific especially relating to developing countries, from the financial development perspective, as a result of the cooperation. By applying panel data in financial terms, the hierarchical cluster results suggest the existence of convergence clubs among the Asia Pacific countries. Those countries that are relatively well-developed financially are found to have converged, forming the richer-countries club. Meanwhile, those countries that are relatively under-developed financially are less likely to converge. In this respect, the Asia Pacific countries should continue promoting regional financial cooperation for sustainable economic growth. The countries with relatively under-developed financial systems need to pursue efforts towards financial services on a larger scale while the countries with relatively well-developed financial systems should allow their financial services to be shared more broadly within the region over the coming years.

Key words: Asia Pacific developing countries, convergence, financial sector, hierarchical cluster analysis, panel data,
JEL classification: O18, O47, R11, R58

1. Introduction

Initiatives towards greater cooperation have expanded geographically within the region, especially after the experience of the financial crisis in 1997, particularly in the Asia Pacific region which has remained resilient despite the global economic turmoil. According to World Bank's Chief Economist for East Asia and Pacific, Bert Hofman, the Asia Pacific economy is expected to contribute almost 40 per cent to global growth in 2012; moreover, sustained high growth rates[1], will see poverty continue to decline. This has made the Asia Pacific region increasingly important to the world economy. In order to ensure its growth maintains a sustainable momentum, the region has embarked on various initiatives which include regional monetary and financial perspectives. It has sought to promote closer monetary and financial cooperation by way of conducting an economic review and policy

* [a]540, Choa Chu Kang St 52, #10-24, Singapore 680540. Email: *julianaibrahim@gmail.com* (corresponding author).
[b] Faculty of Economics and Management, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
[1] The World Bank's East Asia and Pacific Economic Update projects the region to grow at 7.5% in 2012, lower than the 8.3% in 2011, and 7.9% in 2013. Refer to link: *http://www.worldbank.org/en/news/press-release/2012/12/19/east-asia-pacific-remains-bright-spot-difficult-global-landscape.*

dialogue. Nevertheless, in order to ensure effective and credible transmission of policy impulses, it is vital to ensure that their financial market are well developed and integrated.

Empirical evidence shows that financial integration is significant to economic growth. It benefits through risk-sharing, that is, through portfolio diversification, allows the sharing of idiosyncratic risks across countries which facilitate the insurance of income against country-specific shocks thereby smoothing consumption over time leading to allocation efficiency, that is, by facilitating the allocation of capital to its most productive uses with its consequent effect on economic growth (Rogoff *et al*. 2006).[2] Meanwhile, financial development promotes economic growth by improving the efficiency, stability, and accessibility of the financial system. The higher the degree of financial development, the greater the availability of financial services that allows 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 with economic growth in the developing economies (Habibullah and Eng 2006).

Among the major initiatives towards regional and sub-regional financial cooperation in Asia include the ASEAN+3, Chiang Mai Initiative, Executives' Meeting of East Asia-Pacific Central Banks (EMEAP), Asian Bond Market Initiative, Asian Bond Fund and the ASEAN Swap Arrangement (ASA). The benefits that the region gains through financial market cooperation are several: (1) It serves as a conduit for authorities to transmit important price signals; (2) With efficiency, it constitutes an important vehicle to promote domestic savings, investment and consequently economic growth; (3) It fosters the necessary condition for a country's financial sector to emerge as an international or regional financial centre; (4) By enhancing competition and efficiency of intermediaries in their operations and allocation of resources, it contributes to financial stability; (5) It leads to innovations and cost effective intermediation, thereby improving access to financial services for members of the public, institutions and companies alike; (6) It induces market discipline and informational efficiency; (7) It promotes the adoption of modern technology and payment systems to achieve cost effective financial intermediation services.

Concurrently, in recognition of the need for stronger policies to foster stability and development of the financial system, several entities for instance, the Financial Sector Assessment Program (FSAP) developed by the World Bank (WB) and the International Monetary Fund (IMF), attempted to strengthen the financial systems by analysing the linkages between the financial sector and the macro-economy so as to promote harmonisation and international convergence of key financial policy areas.[3, 4] With regard to the above, issues pertaining to the convergence of the financial sector as a result of financial market cooperation have emerged but are yet to be explored for the developing countries especially in Asia. In relation to per capita income convergence, there are several theoretical and

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[2] Refer to Garcia-Herrero *et al*. (2008).

[3] 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.*

[4] *web.worldbank.org* › ... › WBI Learning Programs › Financial Sector.

empirical applications. However, there is neither a theory of financial system convergence, nor an 'optimum financial system' (World Bank 2010). Financial convergence is essential to establish commonality in the region for policy-making, harmonised regulations and supervision towards an efficient financial system. Are the financial sectors of the lower-income countries in the Asia Pacific catching up with the higher-income ones, and, is there a tendency for the financial sectors of the poorer countries to grow more rapidly than the richer countries, and thereby to converge in living standards in the long-run?

Thus, the purpose of this study is to evaluate financial convergence as it is essential for establishing commonality in an economic region, in particular in relation to economic performance, institutions, regulations, access to infrastructure, as well as policy-making and administrative processes. The scope of this study is confined to the development of the financial system by measuring the size of banking financial services in the region in terms of its monetary aggregate and credit perspectives. Due to the heterogeneity of economic factors in the Asia Pacific, a non-parametric hierarchical cluster analysis will be employed to identify the existence of convergence clubs in the region. The extent to which the countries have achieved a certain degree of convergence in financial terms will provide some insights into research questions which are particularly relevant both for theoretical and policy reasons because the developments in the financial sector resulting from regional financial integration may have important implications on achieving the region's mission financially and economically. Hence these developments should be carefully monitored. It is hoped that this study will provide a better understanding of how both developing and advanced economies can identify and rectify areas of weakness in their financial systems so as to ultimately enjoy sustainable economic growth. This paper is structured as follows: The literature review follows in Section 2 while the methodology is found in Section 3; this is followed by the empirical results in Section 4 while the article is concluded in Section 5.

2. Literature Review

Empirical reviews indicate that several non-parametric approaches using hierarchical cluster analysis can be used to measure convergence. For example**,** Castellacci (2006) and Tsangarides and Qureshi (2008) applied Ward's-linkage, as well as single-, complete-, and average-linkage methods in performing clustering techniques. The 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, Groeneveld *et al.* (1998) examined several important macroeconomic key variables for the period 1979-1995 for European monetary systems and real convergence by employing Ward's-linkage, following Mojena (1977). This was largely because Mojena had claimed that Ward's method appeared 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) investigated real convergence for selected Eastern European countries, including Romania, based upon distances and clusters methodology. Both the cluster methods tested, that is, K-means and hierarchical Ward clusters, showed similar results.

On the contrary, when Desarbo *et al*. (1991) applied several hierarchical and partitional cluster analysis after a comparative inspection of the resulting dendrograms on some strategic

groups, different results were produced. They concluded that different clustering methods oftentimes produce different results in terms of cluster structure and membership.

Several researchers have also carried out empirical studies using a combined hierarchical and non-hierarchical method called two-stage. For instance, Sanz and Velazquez (2004) examined the composition of the OECD government expenditure from 1970 to 1997. They performed a two-stage cluster analysis method using hierarchical Ward's method in the first step and k-means non-hierarchical method in the later step. They found that performing the two-stage method minimised the disadvantages of performing the later step by introducing the number of clusters and the centroids obtained from the first step.

3. Methodology

As the Asian economies had based their formal financial system on banking, measures of Asia's financial development have also been focused mostly on banking depth especially in the case of developing countries, many of which still rely on a bank-based system. This is because although the efficient allocation of capital in a financial system generally occurs through bank-based or market-based financial systems, some researchers assert that banks finance growth more effectively and efficiently than market-based systems, particularly in under-developed economies, where non-bank financial intermediaries are generally less sophisticated (World Economic Forum 2012).

Banking depth is generally measured by reference either to deposit resources mobilised by the system or by credit extended. This paper will empirically investigate how the degree of development in the financial market has evolved over time in the Asia Pacific banking financial systems especially in the developing economies using non-financial quantity-based measures through convergence.

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

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

$$DCP = f\{FDI, OPE, \text{POP}, GDPC\} \quad (2)$$

where

LIQ = Liquid Liabilities as a percentage to GDP
DCP = Domestic Private 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 (USD)

Financial sectors' panel data in natural logarithm, from the World Bank databank, spanning from year 1980 to 2009 were employed. The dependent variables were Liquid Liabilities as a percentage of GDP (LIQ) and Domestic Private Credit as a percentage of GDP (DCP). The independent variables were Foreign Direct Investment (FDI), Trade Openness (OPE), GDP per capita (GDPC) and population growth (POP). The study period covered the initial stages of development because the degree of financial liberalisation and integration in the Asia Pacific had significantly increased in the 1980s and 1990s while the later period covered the shocks and financial turbulence of the period globally.

FDI is believed to be one of the most important channels through which financial globalisation benefits the economy (Campos and Kinoshita 2008) through 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 expenditure 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). The higher the FDI, the better the financial system. OPE has a significantly positive effect on 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 prologue to financial openness, hence to financial development in the Asian countries (Ito and Chinn 2005). POP will be used as a demographic indicator of the control variable. The higher the population rate, the lower the costs per customer of making the financial services available (World Economic Forum 2011). Meanwhile, GDPC is also a major determinant of financial depth, hence it is positively related to financial development.[5]

For 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 used in forming the clusters. This paper is restricted to the stability of clustering structures generated by hierarchical clustering algorithms operating on rank-order proximity matrices. The Euclidean distance metric will be employed throughout the cluster analysis as other distance measures did not generally reveal any significant difference (Artis 2003). The Ward's-linkage method was applied for this study. Ward's linkage clustering is the increase in "error sum of squares" (ESS) after fusing two clusters into a 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:

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

where

- $|.|$ is the absolute value of a scalar value or the norm (the 'length') of a vector
- N_X 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:

[5] Refer to Greenwood and Jovanovic (1990).

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

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

The number of clusters is determined by looking at how similar clusters are by creating additional clusters or collapsing existing ones.[6] The 'leading' countries and the 'followers', that is, who will have the opportunity to 'catch-up', will then be determined based on the clubs emerging from the clustering technique, following the empirical research by Groeneveld *et al.* (1998) that applies Ward's-linkage method, and following the framework of Abramovitz (1986) with reconsideration of the concepts of catching-up and social capability.

Twenty-nine countries in the Asia Pacific region were selected for this study namely, China (PRC), Japan and Korea (Republic of) from East Asia; Bahrain, Cyprus[7], Iran, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria, Turkey and United Arab Emirates from the Middle-East and Western Asia; Bangladesh, India, Nepal, Pakistan and Sri Lanka from South Asia; Indonesia, Malaysia, Philippines, Singapore and Thailand from South-east Asia; and, Fiji Islands, Papua New Guinea, Solomon Islands and Vanuatu from the Pacific region. The countries selected ranged from highly advanced to less developed Asia Pacific countries. All the countries selected were categorised as developing countries by the International Monetary Fund's World Economic Outlook Report of April 2012 except for Cyprus, Korea, Singapore and Israel (graduated developing countries) and Japan (developed country).

4. Empirical Results

A range of countries from highly-advanced and richer countries to lower-income countries, had been selected taking into account their heterogeneous economic factors. A hierarchical cluster analysis was employed to investigate the existence of club convergence among the Asia Pacific countries. It is particularly important for national leaders to implement their actions and initiatives onto the sub-countries (clubs) so as to efficiently reflect symmetrical development for a smoother centralised regional policy approach in the future.

Tables 1 to 2 represent the Ward's-linkage dynamic hierarchical cluster technique convergence patterns for each country throughout the period of 1980 to 2009. The patterns show how each country evolved and converged, or even diverged by forming one club or a few clubs, either as a leader or follower for Asia Pacific. The ranking of the countries in the tables are based on their average income per capita throughout the studied period.

Table 1 represents the countries forming four distinctive convergence clubs both at the beginning and ending period of study, based on Liquid Liabilities as a percentage of GDP in the Asia Pacific. The majority of the countries at the top of the table were the high-income countries from Gulf Cooperation Council (GCC), which are the oil-based income countries. In 1980, there were four separate convergence clubs. Only four countries formed Group 1 which consists of Qatar, United Arab Emirates, Singapore and Bahrain. Japan is

[6] Refer *www.norusis.com/pdf/SPC_v13.pdf.*

[7] Cyprus was a Non-aligned Movement(NAM) country. This study includes Cyprus for comparison (as another developed country in West Asia). It only joined the European Union in May, 2004.

Table 1. Dynamic Ward's-linkage cluster analysis results for Asia Pacific (LIQ).

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	1
54.01	48.07	32,947	United Arab Emirates	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	4	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	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
86.02	71.70	16,803	Israel	4	4	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.	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
157.57	140.43	12,426	Cyprus	4	4	4	4	4	4	4	4	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	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1	1	1
29.99	28.36	11,251	Oman	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1	1	1	1	1
114.15	104.19	6,448	Malaysia	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
34.90	19.75	6,312	Turkey	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
48.41	24.45	5,757	Iran, Islamic Rep.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
84.67	94.91	4,638	Thailand	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
105.85	36.57	4,199	Vanuatu	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
111.41	66.83	3,459	Jordan	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
46.21	34.07	3,148	Fiji	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
104.12	91.72	2,796	China	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
61.58	9.78	2,490	Syrian Arab Republic	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
38.71	30.80	2,323	Indonesia	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
41.39	23.43	2,044	Sri Lanka	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
47.96	30.81	1,832	Philippines	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
35.46	20.12	1,762	Papua New Guinea	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	4	4	4	4
44.32	25.39	1,599	Pakistan	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
50.97	28.87	1,504	India	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	4	4	4	4
30.88	18.79	1,277	Solomon Islands	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	4	4	4	4
32.95	21.23	786	Bangladesh	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
42.95	21.60	779	Nepal	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

Note: Number of groupings (4) is based on the characteristics of the clusters at successive steps, with the most reasonable number of fairly homogeneous clusters (IBM SPSS Statistics Guides). LIQ, MQM, DCP and GDPC (as a percentage of GDP) data are averaged from 1980-2009.

Table 2. Dynamic Ward's-linkage cluster analysis results 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	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	1	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	1	1	1	1	1	1
29.99	28.36	11,251	Oman	3	3	3	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
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	1	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	3	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	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	3	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
47.96	30.81	1,832	Philippines	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	3	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
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
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	3	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
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

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). LIQ, MQM, DCP and GDPC (as a percentage of GDP) data are averaged from 1980-2009.

seen to be the only country in Group 2. Meanwhile, the middle- and low-income countries are in Groups 3 and 4. It can be seen that in 2009, throughout the thirty-year study period, more countries converged into Group 1 (richer countries) and Group 4 (less richer countries). The countries that converged into Group 1 were Kuwait, Israel, Korea, Cyprus, Saudi Arabia, Oman and Malaysia. It can be seen that most of them have a relatively well-developed financial sector. Japan's performance is seen to be distinctly separate throughout the financial development stage.[8] The lowest income countries which formed Group 3 are the poorer countries namely Pakistan, Nepal and Bangladesh which had relatively under-developed financial sectors and are seen to be less likely to converge.

Based on the Private Credit to GDP ratio in Table 2, three separate convergence clubs were formed at the beginning and ending of the study period. In 1980, there were only six countries that formed Group 1 (richer countries), which were mainly from the GCC group. Group 1 became 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.

The convergence clubs of the countries based on their group number derived in year 2009 from Tables 1 and 2 are summarised and illustrated in Figures 1 and 2. The 'leading' countries and the 'followers', that is, those who will have the opportunity to 'catch-up', are determined based on the clubs emerging from the clustering technique process. Apparently,

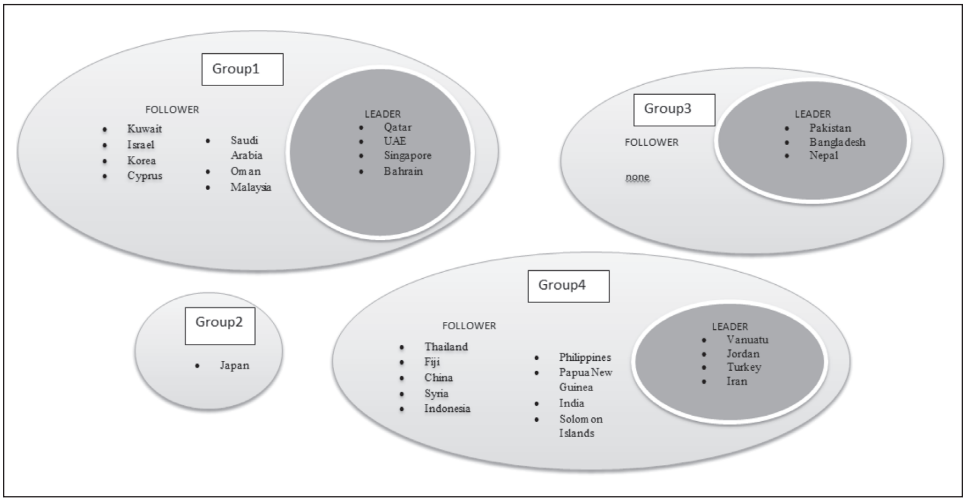

Figure 1. Ward's-linkage dynamic cluster analysis for Asia Pacific (LIQ).

Note: Number of groupings (4) is based on the characteristics of the clusters at successive steps, with the most reasonable number of fairly homogeneous clusters (IBM SPSS Statistics Guides).

[8] Japan showed an outstanding forty-year economic performance until the 1990s; it was once the second largest economy after the United States of America. Its financial sector is categorised as highly efficient. (*http://www.imf.org/external/np/speeches/1998/040898.HTM*)

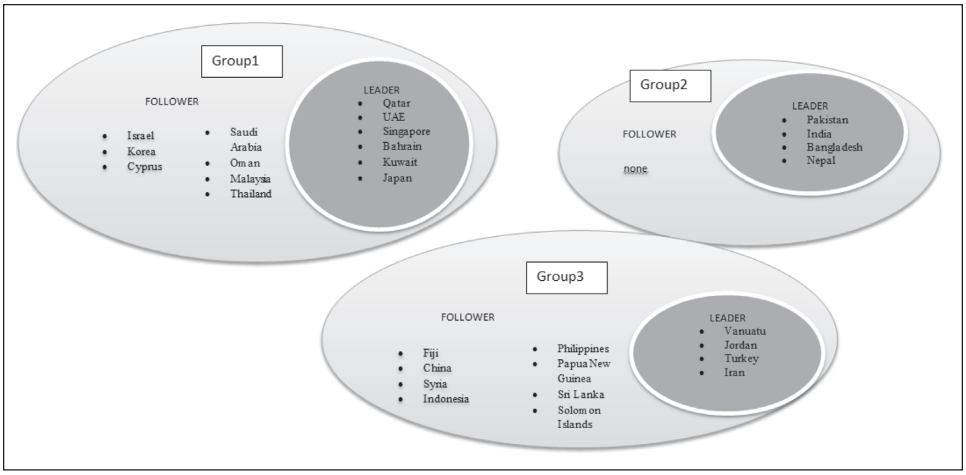

Figure 2. Ward's-linkage dynamic cluster analysis for Asia Pacific (DCP).
Note: Number of groupings (3) is based on the characteristics of the clusters at successive steps, with the most reasonable number of fairly homogeneous clusters (IBM SPSS Statistics Guides).

the developing countries in the Asia Pacific are forming separate convergence clubs based on the degree of development of their financial system.

5. Conclusion

The Asia Pacific's financial markets have remained resilient despite the lacklustre performance of the global economy in recent years. These countries have embarked on various initiatives that include regional monetary and financial perspectives by promoting closer monetary and financial cooperation. The purpose of this study is to measure the degree of financial convergence in the Asia Pacific region especially those of the the developing countries, from the financial development perspective. By applying panel data in financial terms, the hierarchical cluster results suggest the existence of convergence clubs among the Asia Pacific countries. The countries with relatively well-developed financial development are found to be converging and forming the richer-countries club. Meanwhile, those countries with relatively under-developed financial systems are less likely to converge. In this respect, the Asia Pacific countries should continue promoting regional financial cooperation for sustainable economic growth. The countries with relatively under-developed financial systems need to pursue efforts towards greater financial services while the countries with relatively well-developed financial systems should allow their financial services to be shared more broadly within the region.

The objective of the present study is to investigate the convergence patterns in the Asia Pacific region from the financial development perspective as it entails cooperation. Upon employing the hierarchical cluster convergence analysis using Liquid Liabilities and Domestic Private Credit as a percentage of GDP, our results suggest that the developing countries in the Asia Pacific region have converged to form clubs. The countries with a relatively well-developed financial sector have converged into a richer club while the relatively

under-developed countries are less likely to converge. This also supports the centre-periphery model which states that intra-regional differences have persisted or even widened over time. It could be due to agglomeration effects driven perhaps by low financial sector 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.

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

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