

IDENTIFICATION OF OPTIMAL CURRENCY AREAS IN EAST  
ASIA: A CLUSTERING APPROACH

QUAH, CHEE HEONG

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## Abstract

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Today, a number of the fastest growing and largest economies in the world are located in East Asia. The theme of a monetary union in East Asia which had been in the limelight for years following the 1997–98 Asian crisis has recently revived due to the global economic crisis. Viewed in this light, this study attempts to assess the appropriateness of monetary integration among the East Asian economies according to the theory of optimum currency areas (OCA) criteria, operationalized through the use of cluster analysis. Besides the OCA criteria, the convergence criteria of the Maastricht Treaty are also examined. The cluster analysis methods demonstrated are hierarchical, fuzzy, and model-based cluster analysis methods. Five potential monetary anchors, the US dollar, a currency basket, the Japanese yen, the euro, and the Chinese yuan are alternatively investigated. To infer the levels of preparedness for monetary unification amongst the countries, dollarized and euroized countries are utilized as benchmarks. As the Asian turmoil is likely to affect the findings, the analysis is carried out for pre-crisis, crisis, and post-crisis periods. Various findings are obtained. Based on OCA criteria, in general a weighted currency basket of dollar, yen, and euro appears to be a more appropriate monetary anchor in relation to other anchor alternatives considered. In particular, certain groups of countries are indicated to be comparatively feasible for monetary integration by certain monetary anchor. Interesting observations pertaining to economies with prevailing fixed exchange rate regimes are also detected.

## Abstrak

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Kajian ini menilai kesesuaian kesatuan kewangan antara ekonomi-ekonomi Asia Timur, menurut kriteria teori “optimum currency areas” (OCA) atau kawasan mata wang optimum, diukur dengan menggunakan analisis kluster. Selain kriteria OCA, kriteria Perjanjian Maastricht turut diselidik. Analisis kulster didemonstrasikan termasuk hirarkikal, “fuzzy”, dan berasaskan model. Lima sauh kewangan potensi, dolar US, basket wang, yen Jepun, euro, dan yuan China dikaji ikut turutan. Untuk menilai takat kesediaan untuk kesatuan kewangan antara negara-negara tersebut, negara didolarkan and dieurokan digunakan sebagai contoh. Analisis turut dijalankan untuk jangka prakrisis, krisis Asia, dan pascakrisis. Pelbagai keputusan diperoleh. Menurut kriteria OCA, keseluruhannya basket wang muncul sebagai lebih sesuai sebagai sauh kewangan. Khususnya, beberapa kumpulan negara diindikasikan lebih sesuai untuk kesatuan mata wang. Dapatan menarik berkaitan dengan ekonomi dengan kadar tukar wang tetap turut diperoleh.

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Quah, Chee Heong

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## Works of Author

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The following works by the present author are related to this study. The works on the Great Depression are related in the sense that the recent global economic and financial crisis has revived and intensified efforts in fostering multilateral cooperation in the Asia Pacific region. The rest of the papers are directly linked to the present research.

### Journal Publications

- Quah, C. H., & Crowley, P. M. (2010). Monetary integration in East Asia: A hierarchical clustering approach. *International Finance* 13:2, 283–309. (ISI-cited)
- Quah, C. H., Crowley, P. M., & Ismail, M. N. (2010). Monetary anchor for East Asia: Japan or United States? *African Journal of Business and Management*, 4 (6), (forthcoming). (ISI-cited)
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- Crowley, P. M., & Quah, C. H. (2009, April). A single currency for Asia? Evaluation and comparison using hierarchical and model-based cluster analysis. In Frank Schimmelfennig (Ed.), *EUSA 11th Biennial International Conference*. Marina Del Rey, California: European Union Studies Association.
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# List of Abbreviations

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'-'	Not available
n.a.	Not applicable
ACU	Asian Currency Unit
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
AMCM	Monetary Authority of Macau
AMF	Asian Monetary Fund
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of Southeast Asia Nations
B-E	Bayoumi-Eichengreen
BIC	Bayesian Information Criterion
BUS	Real business cycle synchronization
CACM	Central American Common Market
CBA	Currency board arrangement
CBS	Currency basket system
CEMAC	Economic and Monetary Community of Central Africa
CEPT	Common Effective Preferential Tariff
CHI	Calinski-Harabasz Index
CI	Certificates of Indebtedness
CMI	Chiang Mai Initiative
CPI	Consumer price index
DEB	External indebtedness
DEF	Government budget deficit as percent of GDP
DPC	Dunn's Partition Coefficient
EAGA	East ASEAN Growth Area
EF	Exchange Fund
EM	Expectation-Maximization
EMEAP	Executives' Meeting of East Asia and Pacific Central Banks
EMS	European Monetary System
EMU	European Economic and Monetary Union
ERM	Exchange Rate Mechanism
EPL	Employment protection legislation
EXP	Export diversification
FCM	Fuzzy C-means clustering method
G3	The group of US, Japan, and Germany/EMU.
GPPP	Generalized purchasing power parity
GT	Growth Triangle
HCM	Hierarchical clustering method
H-P	Hodrick-Prescott
IMF	International Monetary Fund
IMS-GT	Indonesia-Malaysia-Singapore GT
INF	Inflation convergence
INT	Real interest rate cycle synchronization/interest rate differential
LAB	Labor market flexibility
LDA	Linear discriminant analysis
MAS	Monetary Authority of Singapore
MBC	Model-based clustering method
MFG	Manila Framework Group
MNC	Multinational corporation
MUBS	Monetary Union of Brunei and Singapore
NER	Nominal exchange rate
OCA	Optimum currency area
OECD	Organization for Economic Cooperation and Development
OECS	Organization of Eastern Caribbean States
PCA	Principal component analysis
PPP	Purchasing power parity
REMU	Regional Economic Monitoring Unit
RER	Real exchange rate volatility
SIJORI	Singapore-Johor-Riau GT
SITC	United Nation's Standard International Trade Classification
SVAR	Structural vector autoregression
SW	Silhouette width
TRA	Trade openness
UEMOA	West African Economic and Monetary Union
WB	World Bank
XBI	Xie and Beni's index