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Interactions of International Portfolio Flows: an Empirical Study Based on Network Analysis

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Abstract

As the progress of economic globalization and financial integration, the interconnectedness among different economies has been increasingly strong since the 1990s. International portfolio flows are one of the most important channels for this linkage. In this research, we innovatively employ network analysis to investigate the interactions of international portfolio flows among countries. Employing the data for 55 countries from 1990Q1 to 2015Q4, we construct an International Portfolio Correlation Network and come to the following conclusions. First, large-scale emerging economies have significant correlation with other countries, such as Malaysia, India, Poland, Turkey and South Africa, whereas developed countries tend to play a role of correlation intermediaries, including Canada, Japan, France and New Zealand. These countries are systematically important countries in network and should be closely watched. Second, international portfolio correlation network has been more tightly connected after the Global Financial Crisis. Large-scale emerging markets become more and more important in the network due to their continuing opening and liberalization reform.

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1. Introduction

As the progress of economic globalization and financial integration, the interconnectedness among different economies and different financial institutions has been increasingly strong since the 1990s. As stated by Schweitzer et al. [1], the world economy consists of different players (agents, countries,...), which do not act in isolation but rather are linked via a complex set of interactions. It is widely believed that this interdependence

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will lead to risk contagion, as the recent financial crisis showed [2]. The bailout of Bear Sterns in US diffused rapidly and posed a serious threat to the overall stability of the world economy [3].

Capital flows among different countries are one of the most important channels for this linkage. Capitals tend to flow into or out of different countries simultaneously, resulting in the spread of negative shocks among different countries. The co-movement of capital flows is due to the following reasons. First, the change of global economic environment and the shift of macroeconomic policies in major developed countries will lead to simultaneous capital flow changes in emerging countries. Second, fluctuations of capital flows in country A will spread to country B through trade linkage, credit linkage or regional correlation, resulting in the interactions of capital flows in partner countries. Third, institutional investors' trading behaviour — herding or panic trading — also leads to the co-movement of capital flows. When there are abnormal fluctuations in one country, investors tend to follow other investors' behaviour and adjust their portfolio accordingly. The co-movement of capital flows contributes to risk contagion and aggravates the financial cycles. Compared with long-term capital flows, portfolio flows are more volatile and more susceptible to reversal when investors get new information [4-5]. Consequently, portfolio flows are more interrelated among different countries. They tend to exert stronger spillover effect than FDIs [6] and play an increasingly important role in the transmission of shocks [7-8]. Given these facts, we deem it of high academic and policy relevance to get knowledge of the interactions of international portfolio flows.

Currently, the research on interactions of international portfolio flows is relatively deficient. Froot et al. [9] calculate the correlation of daily portfolio flows among 44 countries from 1st August 1994 to 31st December 1998 and further plot the “heat map” of correlation coefficients. The results reveal that portfolio flow correlations are significantly positive. The correlations are more positive within regions, particularly in Asia and the European developed countries, and somewhat in Latin America. The regional correlations of flows increased substantially over time, especially during crisis. Lee et al. [6] reveals strong and significant contagion effects of capital flows from intra-regional volatilities to emerging economies. These effects are stronger for portfolio investments relative to FDI. In this research, we try to employ network analysis to figure out the interconnectedness of portfolio flows among countries, in which nodes represent countries and links between nodes represent the correlation relationships. In this way, we can describe the network structure and assess how it evolves over time. We can also figure out which countries have the most interconnectedness with others, and label them as systemically important countries.

The application of network analysis in financial field emerged after global financial crisis [10-17]. Generally, nodes represent the different individual agents, which can represent firms, banks, or countries, and links between the nodes represent their mutual interactions, which may be trade, R&D alliances, or credit-debt relationships. For example, Hale [17] build a global banking network of 7938 banking institutions from 141 countries and conclude that recessions and banking crises have negative effects on the formation of new connections. Minoiu and Reyes [18] construct a global banking network on the country level. Employing the data on cross-boarder banking flows for 184 countries from 1978 to 2010, they conclude that the density of global banking network is pro-cyclical. The country connectedness tend to increase before banking and debt crisis and to fall afterwards. Schiavo et al. [19] reveals that international trade network is even more densely connected than international financial network. Developed countries are better linked and tend to form interconnected groups, whereas developing countries are poorly connected and usually connect to central ones and use them as hubs to access to the rest countries. One closely related literature comes from Chinazzi et al. [2]. They build a weighted-directed international financial network and find that the global financial crisis caused a reduction in the amount of securities traded as well as the change of network topology.

Based on these related studies, this paper employ network analysis to investigate the interactions of international portfolio flows. We aim to answer the following questions: (i), Which countries are most strongly related with other countries in portfolio flow movements? (ii), How does the portfolio flow network evolve over time? To answer these questions, we construct an undirected network, namely International Portfolio

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