Network Topology for the Danish Payment System Kronos

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1. ABSTRACT

In recent years the development of a good measure of financial stability has come into focus. One of the challenges is the lack of a consistent dataset containing all activities in the financial market. It’s not possible to measure the size of the interbank exposures unless the participants of the financial system is requested to report these to the authorities, cf. Upper (2007). Therefore, payment systems data have been used for estimating the matrices of interbank exposures, i.e. the financial structure, cf. Upper et al. (2004). Payment systems data are detailed and consistent data showing the transactions from one bank to another, although payment system activities only make up a fraction of the total activity in financial markets.

Payment systems data can also reveal some aspects of the financial structure, which cannot be extracted from bank’s balance sheets. This could be banks using the payment system network much more intensively than the balance sheet data show or banks which are more exposed towards financial disturbances than others, i.e. a banks location in a network (center or periphery) determines how hard the bank is hurt by financial distress. From a theoretical point of view, Allen et al. (2000) and Freixas et al. (1998, 2000) point out that contagion effects depend on the degree to which banks are interconnected with each other in a network.

In this paper we take an empirical approach to evaluate the Danish financial structure. We use data from the Danish real time gross settlement system Kronos² along with physical theories for networks (so called network topology) to analyze the financial structure. This methodology has also been used by Lublóy (2007) and Soramäki et al. (2007) to analyze the network topologies of the hungarian and the US real time gross settlement systems.

Results show that, although only more than half of the members of the network are active in the network on a daily basis, a small number of banks are responsible for most of the activity in the payment system. These most intensive users are located in the center of the network, which suggest that it might be useful to focus on a limited number of banks when evaluating possible systemic contagion risk in Denmark.

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²Real time gross settlement is a payment system with continous settlement of single payments during the day. This type of system is widely used across countries.
REFERENCES


