

# Modelling an interconnected economy - general equilibrium and matching model approaches

## (Abstract)

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This doctoral dissertation consists of three theoretical articles with a common interest in the creation of interconnections in an economy and the role of these interconnections in spreading bad shocks. The spread of bad shocks has been explored in economics literature mainly in the context of contagious bank runs but the following articles focus on different aspects of economy where the effects of deterioration of an economy's characteristics occur.

Interconnections in economies are often necessary for production or they serve as an insurance tool but they at the same time expose the economy to a possible spread of damage. The mechanism is very simple. A negative shock that hits one agent in the economy can spread through interconnections in the economy, such as financial linkages between banks, supply linkages between firms, or personal linkages, like marriage, between agents.

In the following models I study optimal creation of interconnections in two different types of economy and I also study properties of an interconnected economy in general equilibrium.

In the first article I propose a general equilibrium model of an economy where firms are connected through supply linkages crucial for their production. I study the properties of the proposed model and compare it to a benchmark model without linkages. The model with supply linkages exhibits lower aggregate level of production but in case of increase of individual fluctuations of firms the supply linkages help to boost aggregate production, i.e. the production can be increasing at the margin while it is always decreasing in the benchmark model.

The second and the third article are theoretical matching models. In the second article I construct a model in which agents search for partners to establish a pair interaction that brings them profit. The agents differ in their probabilities

of exit from the economy. The composition of every pair determines its expected lifetime and profits the agents have from the interaction. The model allows for the study of equilibrium properties of the matching market with entry and exit of agents. Optimal individual decisions of accepting or rejecting each particular type of match are analyzed. It is shown that for a certain range of parameters multiple equilibria exist. Social optimality of agents' decisions is assessed and it is shown that for a range of parameters the social planner is able to impose Pareto improving matchings.

The third article is a matching model between firms and workers. Workers do not differ in their productivity but they differ in their probability of leaving the labor force. Firms choose whether to accept a match with workers depending on their type and they also choose whether and when to fire them. A stationary situation of the economy is considered. It is shown that several types of stable matching can be a stable stationary equilibrium of the economy depending on the parameters of the model. Multiplicity of equilibria occurs for some ranges of parameters. Stable matchings chosen by the agents are shown to be almost always socially suboptimal. The planner's solution is never Pareto improving for the agents.