Projekt 21:

21 Strategic Behavior on Financial Markets

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We exhibit the model of an exchange economy with money and credit as a non-cooperative game.

This model can be characterized as follows.

1. There exists money, serving both as a mean of exchange and as a store of value;
2. agents are price makers (and not just price takers);
3. there exists a central bank who issues money, accepts deposits, and lends;
4. bankruptcy is not ruled out, but is penalized;
5. yet the bank tries to keep the number of bankrupt firms as small as possible.

Our model includes elements of the above items. There is a finite set of agents involved in trade of a Shapley-Shubik type ([3], [4]), along with a central bank able to issue money, distribute it as loans, and accept deposits. The central bank has the authority to determine the various interest rates. Agents would derive a negative utility from being bankrupt, whereas positive cash holdings at the end of the period have positive utility, the latter presumably deriving from subsequent use of money at a later period.

Each agent is endowed with positive amounts of a consumer nondurable commodity and money. Agents issue bids in terms of money towards purchasing a quantity of the consumption good. (Agents cannot consume directly their commodity endowment in whole or parts.) Agents may exceed their endowment (and thus take a loan from the bank), or else they may bid less than
their endowment, their money surplus going to the bank as a deposit. There is a central bank in the market which controls the interest rates for deposits and loans and increases the total amount of money, if the books cannot be balanced otherwise. As soon as bids are announced, the price of the commodity is given by the ratio of the aggregate bid to the aggregate supply of the good. Each agent then receives for consumption the good bought by his bid and the money proceeds of the selling of his commodity endowment. In addition, our agent receives returns from her bank deposit or has to pay the loan (with interest).

At the end of the day, each agent has 1) consumed an amount of the commodity (deriving from it a positive amount of utility), 2) is unable to repay his loan with the prescribed interest, so that he is bankrupt and derives a negative utility from this fact, or else 3) has a positive amount of cash left, from which she derives positive utility.

The bank announces a policy concerning interest rates on deposits and loans. Formally, this policy is a (vector-valued) function of the agents’ bids. The agents, in turn, may take into account the bank’s policy. In this manner a well defined game (the financial market game) is specified. Hence, bids play the role of strategies. The bank may try to achieve certain objectives through its policies. E.g., the wish to eliminate unnecessary bankruptcies the desire to combat inflation could be such objectives. We exhibit a policy which leads to certain desirable outcomes.

We establish the existence of a Nash equilibrium for the financial market game. (An essential element of the proof is the construction of a compact set of strategies which is mapped into itself by the best response correspondence.) Under certain regularity conditions we demonstrate the existence of a (Nash) equilibrium in mixed strategies. For a specific policy we prove existence of an equilibrium in pure strategies.

Our goal is to put forward a multi-period model where the utility for holding cash reserves at the end of the $j$-th period is derived from the utility of having this reserve as an endowment for the $j + 1$-st period, and obtaining (using backward induction) a subgame-perfect equilibrium in pure strategies. We plan to achieve this goal in a sequel to this paper.

See page 4 for some literature.
Projekt 21:

21 Strategisches Verhalten auf Finanzmärkten

Gemwinsames Projekt mit Yakar Kannai, Faculty of Mathematics and Computer Science, Weizmann Institute, Rehovot, Israel.


Einige Literatur:

References


