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Efficiency and imperfect competition with incomplete markets

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Abstract

We deal with the problem of providing incentives for the implementation of constrained optimal outcomes in a two-period economy with incomplete markets. Allowing both for price observation, price-manipulation and a minimal amount of coordination enables to recover (second-best) efficiency at equilibrium, therefore to do better than perfect competition. To make this point, we construct a feasible price-quantity mechanism for two-period economies. In the absence of monitoring between the first and the second period, one gets a full implementation of the (typically inefficient) GEI equilibria via Nash equilibria. By contrast, when actions are observed between the two periods, a large subset of feasible and individually rational allocations can be obtained as strategic equilibria. Furthermore, the correspondence of individually rational, second-best efficient outcomes is implemented *via* undominated Nash equilibria (NE).

JEL classification: C72; D52; D66

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1. Introduction

It is well-known that, when financial markets are incomplete, perfect competition generically leads to constrained suboptimal equilibrium allocations (see Stiglitz (1982), Geanakoplos and Polemarchakis (1986), Geanakoplos et al. (1990), Citanna et al. (1998)). An equivalent formulation consists in saying that a central planner may enforce an effective wealth redistribution policy. This intervention of a central agency, however, raises the problem of information and incentives: as argued by Kajii (1993), Younes (1992), the

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central planner may have imperfect information on individual characteristics, so that an effective policy may be hard to put into practice.[2] One can even safely conjecture from classical works on optimal taxation (cf. e.g. Mirrlees (1972)) that public intervention would lead at most to some *third-best* final outcomes. As a matter of fact, it is known from the theory of mechanism design that the correspondence of constrained efficient allocations *cannot* be fully implemented in terms of Nash equilibria (see Wettstein (1995)). By contrast, the competitive equilibria of GEI-economies, though typically inefficient, turn out to be Maskin-monotonic, hence implementable in terms of Nash equilibria (NE) (see Wettstein *loc.cit.*). Thus, once incentives are taken into account, whether it is possible to outperform the competitive market in GEI-economies remains an open question.

In this paper, we show that, in a decentralized, but *imperfectly* competitive setting, a non-trivial monitoring structure between different periods of trade can help to restore the constrained optimality of markets. As such, it is a first step towards a systematic study of dynamic behavior in strategic market mechanisms with incomplete markets, and of their welfare properties. Furthermore, we show that, when a minimal amount of coordination is added to the non-trivial monitoring and price-manipulation assumptions, then second-best outcomes constitute the sole surviving strategic equilibria. We stress that the set-up of this paper is completely decentralized, and requires no public intervention.

More specifically, we focus on a standard two-period GEI economy endorsed by finitely many households trading purely financial assets. Although most of the papers mentioned above deal with securities delivering in a specified *numéraire*, it is not difficult to see that their inefficiency results extend to the framework of nominal assets. Indeed, it is well-known that fixing the absolute price level in each state is equivalent to transforming financial assets into real assets all of them delivering in the same *numéraire* commodity. We construct a simple trading game that shares the following properties. First, the mechanism is intuitively compelling: players send price-quoting and quantity-setting messages; a rationing rule makes the outcome feasible (even out of equilibrium);[3] players in the red are punished. Secondly, with trivial monitoring between the first and the second period, the Nash equilibria fully implement the set of general equilibria with incomplete markets (GEI hereafter). In addition, the subset of undominated GEI is fully implemented by undominated Nash equilibria (i.e. Nash equilibria that are not Pareto-dominated by any other Nash equilibrium).

These first two implementation results (given in Section 4 below) strengthen in some respect the previous result due to Wettstein (1995), as our assumptions needed on investors' preferences are weaker. Moreover, contrary to Wettstein's mechanism, our game enables players not to satisfy their strategic budget constraints, while non-bankrupt players may trade at different prices.

The two results mentioned above are cast within a setting where players *cannot* condition their second-period behavior on spot markets upon the outcome of the first-period, financial trades. By contrast, we assume in Section 5 of this paper, that players' first-period actions

[2] This manipulability objection is nothing but a game-theoretic reformulation of the standard argument related to the ability, on the part of agents, to perfectly anticipate any public intervention. In the macro-economic literature, this argument often leads to the conclusion that any active policy is ineffective.

[3] For the sake of concreteness, the rationing rule used in the body of the paper is the proportional one, but see comment A of the last section for a generalization.