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How to discard non-satiation and free-disposal with paper money

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Abstract

It is well known that a competitive equilibrium may fail to exist when preferences are possibly satiated. We show that this non-existence problem does not arise if one of the commodities is paper money. Moreover, an equilibrium is weakly Pareto efficient in the economy with money. This paper therefore gives an economic solution to the classical problem of non-existence of competitive equilibria caused by satiation.

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1. Introduction

It is well known that when some agents' preferences over goods are satiated and it is costly to dispose resources, a competitive equilibrium may fail to exist. This is because when agents are allowed to choose a consumption bundle inside the budget set, satiated agents may wish to do so, hence the Walras law may not hold. Preferences may naturally be satiated when consumption sets are compact, or when one considers preferences over non-consumption goods, such as financial assets, induced from a standard preference relation over consumption goods.¹

¹ See Nielsen (1989, 1990).

Mas-Colell (1992) tries to overcome this unpleasant fact by showing that, in such a case, there exists an alternative weaker equilibrium called and *equilibrium with slack*, using the technique inspired by Bergstrom (1976).² Roughly speaking, the difference from a standard competitive equilibrium is that the budget constraint of consumers is relaxed by some slack variable that can be interpreted as extra income provided by a social planner. The equilibrium with slack is an attractive concept since an equilibrium with slack is weakly Pareto efficient, and it is a competitive equilibrium if consumers' preferences are locally non-satiated. But the extra income seems to be inconsistent with the spirit of decentralized markets, and so the concept of equilibrium with slack does not necessarily give a satisfactory solution to the question of the non-existence of competitive equilibria.

Polemarchakis and Siconolfi (1993) show that a *weak competitive equilibrium* exists when non-satiation or free disposability may fail. The difference from a (strong) equilibrium is that consumers are confined to spend all the income in the weak equilibrium, so the Walras law is restored by construction. One can argue that such a restriction on consumers' choices is reasonable, since no instrument for saving income is explicitly described in standard general equilibrium models. On the other hand, a weak competitive equilibrium may be inefficient exactly because consumers are forced to spend their income; a Pareto improvement may be possible if extra income can be transferred, or even abandoned. So there seems to be a dilemma; a competitive equilibrium may not exist but it weakly efficient if it does exist, whereas a weak equilibrium always exists but it may be inefficient.

In this paper, we will show that in economies where satiation is possible and disposal of goods is costly, if fiat (or paper) money is allocated to consumers, then a competitive equilibrium exists and it is weakly efficient. More specifically, we consider a standard exchange economy with finitely many agents and commodities without transactions costs. One of the commodities, called *money*, is useless in the sense that each consumer's welfare level is independent of his money holding. Each consumer is allocated a positive amount of money, hence money is in positive net supply. Preferences may be satiated at some consumption bundle. Moreover, we do not assume transitivity or completeness of preferences. Therefore, our result indicates that it is the existence of money that is crucial for the existence and efficiency of equilibria, whereas the assumptions of non-satiation, transitivity, or completeness of preferences are dispensable. It should be emphasized that this is not a simple exercise of regarding income that is not spent as money saving; such an exercise would give, at best, an equilibrium with free disposability. On the other hand, the markets clear strictly in our model as no free disposability is assumed.

² Hart and Kuhn (1975) and Bergstrom (1976) show that a competitive equilibrium exists without free disposability assumption, but non-satiation of preferences is assumed. Shafer (1976) shows that transitivity and completeness of preferences are dispensable in addition to free disposability. Mas-Colell's (1992) result generalizes these results.

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