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# Matching markets with adverse selection <sup>☆</sup>

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## Abstract

This paper considers a market with adverse selection in the spirit of Rothschild and Stiglitz (Quart. J. Econ. 90 (1976) 629). The major departure from existing approaches is that we model a decentralized market that is open-ended and constantly refilled by new participants, e.g., by new workers and firms in the case of a labor market. The major novelty of this approach is that the distribution of types in the market becomes an endogenous variable, which is jointly determined with equilibrium contracts. As frictions become small, we show that the least-cost separating contracts are always supported as an equilibrium outcome, regardless of the distribution of types among entrants. Moreover, we derive conditions under which this outcome is also unique.

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## 1. Introduction

In the standard model of adverse selection, equilibrium contracts are determined for an exogenously given distribution of types. The underlying picture is that of a

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<sup>☆</sup>The paper benefitted from comments by Patrick Bolton, George Mailath, Benny Moldovanu, Thomas Tröger, and an anonymous referee. A previous version was circulated under the title “Matching Markets with Signaling and Screening” (first version 1997).

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market of fixed size that clears instantaneously. In many markets, however, new market participants arrive continuously, replacing those who have traded successfully. In such a setting, the composition of the market must be treated as an endogenous variable and must be determined jointly with equilibrium contracts.

To capture these features, this paper considers a decentralized market that is constantly refilled by new entrants. There are two groups of entrants: agents with private information about their type and principals. Agents and principals negotiate pairwise over a transfer and an additional variable that satisfies a standard sorting (or single-crossing) condition with respect to the agent's type. Negotiations are modeled by allowing either side to make an offer with positive probability. This setting could, for instance, capture a labor market where workers are privately informed about their ability. Specifying production quotas, overtime hours, or training requirements may be a way to separate between more and less able workers.<sup>1</sup>

Our model stands in sharp contrast to the standard model of adverse selection. There, the market clears in one period, in which a fixed number of principals competes by publicly making offers to a fixed number of agents. If an equilibrium in pure strategies exists, it is unique and separating, leading to the least-cost separating (or "Rothschild–Stiglitz") contracts. However, an equilibrium in pure strategies typically does not exist if the fraction of low types is sufficiently small, in which case high types would prefer to be pooled with low types.<sup>2</sup> In contrast, our model of a decentralized and ongoing market supports the Rothschild–Stiglitz contracts for *any* proportion of types entering the market. The key difference to the standard model is that the distribution of types in the market is endogenous and determined jointly with equilibrium contracts.

For an illustration of the key mechanism in this paper, take the case where the fraction of low types in each new cohort is small. In equilibrium, low types will circulate longer than high types. Consequently, the fraction of low types in the market exceeds that in each new cohort of entrants. Low types circulate longer as, in equilibrium, principals find it optimal to (also) offer contracts that are only acceptable to high types. As market frictions vanish, we can support the Rothschild–Stiglitz contracts as a limit outcome. What is more, we show that this is also the unique outcome if either of the following two conditions applies. First, it is sufficient that the Rothschild–Stiglitz contracts are interim efficient given the distribution of types among entrants. Second, the Rothschild–Stiglitz outcome is also unique if the probability with which an agent can make an offer is sufficiently small. Hence, the Rothschild–Stiglitz contracts are the unique outcome if we only deviate "marginally" from the standard model in that it is almost always principals who make offers.<sup>3</sup>

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<sup>1</sup> For an application of adverse selection models to labour markets see, for instance, the case of law firms and working hours in [14].

<sup>2</sup> An alternative approach are signaling games in which agents propose contracts (see [13]). Signaling games support a wide range of equilibrium outcomes, including pooling contracts.

<sup>3</sup> I thank the referee for suggesting this interpretation.

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