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Journal of Economic Theory 158 (2015) 371–406

JOURNAL OF Economic Theory

www.elsevier.com/locate/jet

# Government interventions in a dynamic market with adverse selection ☆

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Received 27 May 2014; final version received 23 April 2015; accepted 30 April 2015

Available online 12 May 2015

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## Abstract

We study government interventions in a dynamic market with asymmetric information. We show that restricting trading opportunities after an initial round of trade is always optimal. Under a sufficient condition it is optimal to subsidize trades only at time zero while imposing prohibitively high taxes afterwards. If interventions are required to generate a Pareto improvement over laissez-faire then trade is only restricted for a short amount of time. If additional sellers can arrive later, the optimal policy entails asset purchases and price controls. Subsidies can greatly enhance welfare but can be detrimental if provided with delay.
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*JEL classification:* D02; D82; D86; E58; E60; G01

*Keywords:* Adverse selection; Market freeze; Optimal policy; Dynamics; Liquidity

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☆ This paper is closely related to our previous working paper: "Costs and Benefits of Dynamic Trading in a Lemons Market."

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[1] We thank Ilan Kremer, Mikhail Panov, Christine Parlour, Aniko Öry, Brett Green, Marina Halac, Johanna He, Hugo Hopenhayn, Alessandro Pavan, Jean Tirole, Felipe Varas, Robert Wilson, Pavel Zryumov, and participants of seminars and conferences for comments and suggestions. We also gratefully acknowledge support from the National Science Foundation grants #1260853 and #1260890.

http://dx.doi.org/10.1016/j.jet.2015.04.009
0022-0531/© 2015 Published by Elsevier Inc.

## 1. Introduction

During times of financial distress, such as those experienced in 2008 after the demise of Lehman Brothers, asset sales are an important source of funds for financial institutions such as banks and insurance companies. Unfortunately, the big gains from trade between those that are liquidity constrained and those that are not may be difficult to realize due to asymmetric information. As in the classic Akerlof (1970) market for lemons, if buyers were to pay the price corresponding to the average quality of the assets in the market, sellers holding the best assets might not wish to trade. Realizing this, buyers would then reduce their offers and end up trading with a small fraction of the sellers or none at all. Absent government intervention, trade either completely stops or slows down. In the latter case, over time prices gradually rise as better and better assets are traded in the market.

The main questions we seek to answer in this paper are whether and how should the government intervene in these situations, even if it has a binding budget constraint. We answer them in a model of a dynamic competitive market in which liquidity-constrained sellers have private information about their assets and homogeneous, liquidity-abundant buyers compete to buy those assets.

Several recent papers document how different financial markets had drastic reductions in volume in the aftermath of Lehman Brothers' collapse in 2008. Among others, Heider et al. (2009) discuss the collapse of the interbank market, McCabe (2010) discusses the money market funds and Duffie (2010) discusses the OTC and repo markets. These contractions were largely driven by the uncertainty over the counterparty's ability to meet its obligations and the disagreement over the value of securities that could be used as collateral. This was clearly reflected in the OTC market where the types of securities acceptable as collateral significantly changed. Information sensitive securities were largely replaced by cash. Similarly, the assets under management of money market funds saw a big compositional change at the time of Lehman's collapse with a pronounced drop in the amount of asset-backed commercial paper and a large increase of government securities. These recent events motivate our interest in dynamic markets with asymmetric information and the impact of government interventions on such markets.

We first characterize the laissez-faire equilibrium (Proposition 1). Assuming a continuum of seller types, competitive buyers, and continuous time, leads to a very tractable equilibrium. It is characterized by a smooth flow of trade where worst assets are sold first and both the quality of traded assets and price gradually increase over time.

Our first policy result (Lemma 1) is that introducing high taxes for an interval of time, $\Delta > 0$, after an initial round of potentially subsidized trade, is always a part of an optimal policy. By taxing future trades, the government creates more incentives to trade in the early tax-exempt period. In particular, holders of higher quality assets that would delay trade absent the government policy now prefer to trade earlier in order to avoid the taxes or excessive delay. As the quality of the pool of assets sold early improves, market price increases as well. Higher prices in turn induce even more trade creating a virtuous cycle.

Our second policy result (Theorem 1) shows that under a sufficient regularity condition on the shape of the gains from trade and the distribution of asset values, it is optimal to allow only one (potentially subsidized) round of trade at time zero while imposing prohibitively high taxes afterwards (i.e. setting $\Delta = \infty$). Intuitively, the regularity condition implies that the ratio of the marginal gains from trade to the marginal information rents of the sellers is decreasing in the asset quality. Under this condition, the solution to the optimization problem has a bang-bang

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