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Competing market makers, liquidity provision, and bid–ask spreads[☆]

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Abstract

This paper develops a dynamic market microstructure model of liquidity provision in which M strategic market makers compete in price schedules for order flow from informed and uninformed traders. In equilibrium, market makers post price schedules that are steeper than efficient ones, and the market bid–ask spreads can be decomposed into two components, one due to adverse selection and the other due to imperfect competition. At any time, the two components are proportional to each other with a coefficient of proportionality depending on M . Several testable hypothesis are derived regarding the time-series and cross-sectional properties of prices and the bid–ask spreads. In particular, a new empirical measure of market competitiveness is proposed which can be estimated from the history of transaction prices and trading volumes. Finally, the properties of continuous market are also investigated. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

In securities markets liquidity plays a fundamental role because it facilitates efficient risk sharing and encourages the collection of costly information. Many financial markets rely on dealers, or market makers, for the provision of liquidity. The trading behavior of market makers affects the short-term dynamics of securities prices and, therefore, it is of great interest to traders, regulators, and researchers.

Earlier market microstructure papers have often considered market makers' trading behavior as perfectly competitive. The classic models of asymmetric information (see Kyle, 1985; Glosten and Milgrom, 1985; Easley and O'Hara, 1987) focus on the role of adverse selection created by the presence of better informed traders on price formation, but they do not deal with the strategic aspects of market makers' behavior. In these models, market makers are simply assumed to be perfect competitors who provide liquidity at prices that earn them a zero profit. The zero-profit assumption is a convenient abstraction which greatly simplifies the game-theoretical analysis of the models, but it is often at odds with the empirical facts about securities markets. These facts indicate that market makers often post rather noncompetitive prices and that they do earn positive profits.¹ Furthermore, the standard competitive models cannot explain how market makers may be able to cover substantial fixed costs associated with making a market in a security.

Recently, there has been a rapidly growing literature to investigate the strategic trading behavior of market makers in securities markets under adverse selection. Glosten (1989) studies properties of a monopolistic specialist system as opposed to a competitive specialist system. Kavajecz (1998) extends Glosten by allowing the specialist to choose quantities of trades as well as their prices. Glosten (1994) examines the limiting case where the number of liquidity providers approaches infinity. Dennert (1993), Bernhardt and Hughson (1997), and Biais et al. (2000) analyze price competition among market makers, when informed and uninformed traders are allowed to split their orders between markets.² All of the above, however, analyze market makers' trading behavior in a *static* framework, at a point in time, and do not address the effects of such a behavior on transaction prices over time.

In contrast, the present paper studies trading behavior of market makers in a *dynamic* microstructure model with asymmetric information. In this model we extend the Kyle (1985) sequential market to allow imperfect competition of M

¹For example, Christie and Schultz (1994) and Christie et al. (1994) find empirical evidence of noncompetitive behavior of the Nasdaq dealers. Hasbrouck and Sofianos (1993) and Sofianos (1995) report on profitability of the NYSE specialists.

²See Seppi (1997), Bondarenko and Sung (2000) for single auction models of a strategic specialist facing competition from the limit order book.

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