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Competition, interlisting and market structure in options trading

Nabil Khoury [a,*], Stylianos Perrakis [b], Marko Savor [c]

[a] Department of Finance and Desjardins Chair in the Management of Derivative Products, University of Quebec, Montreal, Canada
[b] Department of Finance, Concordia University, Montreal, Canada
[c] Department of Finance, University of Quebec, Montreal, Canada

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ABSTRACT

This paper applies a game theory approach to examine the effects of a market structure change in options trading from a monopoly to a Cournot-type oligopoly that occurred in two successive periods on the Montreal exchange. We analyze the intra-day behaviour of option bid-ask spreads and find that cross-listing has a differential impact on spreads, affecting quoted but not effective spreads under oligopoly. We also find that the impact of the change in structure on effective spreads comes mostly from an increase in limit orders and is consistent with a switch from Cournot to Bertrand-type strategic behaviour for such orders. We conclude that market structure effects within an options exchange are enough to realize most of the benefits of inter-market competition even in the context of market thinness.

1. Introduction

This paper examines the effect of inter-market and intra-market competition on both quoted and effective spreads for options listed in the Montreal Exchange (ME), the only options market operating in Canada. We take advantage of a change in market structure in the ME that took place at the end of 2001, when it switched from monopolistic to oligopolistic market making, in order to disaggregate the effects of intra-market and inter-market competition on quoted and effective spreads. We assess inter-market competition by focusing on an important feature that characterizes the Montreal options market, namely the extensive cross-listing of several of its traded options on US exchanges. We use intraday transactions data to investigate the impact of competition in that venue for both cross-listed and non cross-listed options, under both monopoly and oligopoly market structures. We find that efficiency is enhanced in a more competitive market. We also find that licensing multiple market makers is enough to realize most of the benefits of competition, and that further competition through cross-listing conveys few additional advantages, affecting quoted but not effective spreads.

Market efficiency and liquidity are often measured by the size of the bid-ask spread, and several studies have examined the role of competition in determining that size for various types of markets, including both stocks and options. As in our study, such competition can come from changes in a given market structure or from the cross-listing of options in two different markets. Although it would appear that competition in market making through cross-listing or through competitive market making would be a priori more efficient, there are several arguments in favour of specialist market making.[1] While a competitive structure increases the depth of the market, by minimizing the ability of large orders to affect price, such a structure also raises the costs of market making because of diseconomies of scale, in the form of higher inventory and opportunity costs that must be recovered by a wider spread. The specialist market making is also better able to deal with informed trading. The theoretical analysis predicts that at low trading volumes the diseconomies of scale prevail and a monopolistic market-making structure would have tighter spreads, but that the difference between the two structures diminishes at higher volumes.

The role of market structure is documented in early studies by, among others, Stoll and Whaley (1990) for stocks. More recently Bessembinder and Kaufman (1997) and Huang and Stoll (2001) examine the role of competition within a specialist market structure by focusing on the differential information with respect to

* Corresponding author. Tel.: +1 514 987 3000/6717; fax: +1 514 987 3060.
E-mail addresses: nabilkhoury@sympatico.ca (N. Khoury), sperrakis@jmsb.concordia.ca (S. Perrakis), savor.marko@uqam.ca (M. Savor).

[1] See, for instance, Grossman and Miller (1988). On the other hand a recent paper by Dumitrescu (2010) shows that strategic behaviour by the specialist worsens market performance in certain markets.

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limit orders available to investors in specialist and dealer markets. All these studies find that increased competition improves the efficiency of the market. The impact of cross-listing on stock spreads, on the other hand, was examined by Noronha et al. (1996) and Foerster and Karolyi (1998). This latter study finds a large increase in trade volume following the cross-listing event and abnormal returns before and after the cross-listing date, as well as a reduction in both quoted and effective spreads in stocks that experience a significant post-cross-listing shift in trading volume to the US.[2] In options markets, Vijh (1990) and Neal (1992) find results consistent with the advantage of the competitive over the monopolistic market structure predictions, but the data that they use raises questions about the robustness of their conclusions.[3] In our case, by contrast, the data is tantamount to a controlled experiment, since the same options trade in the same exchange under different regimes during two time periods close to each other. As regards the impact of cross-listing of options on market efficiency measured by either their quoted or their effective spreads Neal (1987, 1992) and Khoury and Fischer (2002) show that quoted spreads tend in general to decrease as a result of cross-listing, but that the size of this reduction is affected by the volume of the transaction. More recent option market studies confirm the beneficial effects of competition. Mayhew (2002) analyzes the impact of market structure and competition on quoted and effective option spreads for the period 1986–1997 and finds that both quoted and effective spreads are smaller for cross-listed options. De Fontenouvelle et al. (2003) focus on the impact of the listing event on the spreads and find smaller quoted and effective spreads for cross-listed options, with an insignificant reversion effect even after one year from their initial listing. Furthermore, they confirm that this reduction in spreads can only be explained by increased competition. In the same vein, Battalio et al. (2004) analyse option quotes across US markets from June 2000 to January 2002. They find evidence of an evolution towards an integrated market system and report that differences between option markets have markedly declined in that regard during the 2000–2002 period.

Although the majority of empirical evidence points to the beneficial effects of competition with respect to market efficiency, there are some studies that show that either a specialist market structure is better from the point of view of market efficiency, or that introducing competition does not improve efficiency. Studies that support this view had appeared mostly earlier on, but more recently, Noronha et al. (1996) show that international cross-listing of NYSE/AMEX stocks did not improve their liquidity, contrary to expectations, while Frino et al. (2008) show that in the Italian Bourse a switch to a specialist from an auction market improved liquidity.

Market thinness, unlike cross-listing, has not been a factor in market microstructure studies, neither in equities nor in options. Yet thin trading is a fact of life for most of the traded securities in Canadian financial markets or, we suspect, in most financial markets outside North America. To our knowledge, thinness has been recognized as an important factor only in risk and return estimation in equities markets.[4] Market thinness' effects on microstructure are likely to be complex, but the net effect is expected to be clearly negative on the quality of trading. By definition, thinness is associated with infrequency of transactions and, hence, with the illiquidity of the instrument. Similarly, thinly traded instruments attract little interest from financial analysts. As a result, most trading in them is probably dominated by informed traders, implying that this component of the bid-ask spread will be higher for thinly traded stocks. On the other hand, these effects will be difficult to isolate from the volume effect, which is also low for illiquid stocks and tends to increase the spreads as well. On the key issue of the differential effect of thinness on cross-listed versus non-cross-listed options, increased competition is clearly expected to reduce quoted spreads. It also may impact the effective spread, since liquidity increases as a result of cross-listing, given the availability of more potential market makers for any prospective investor. Consequently, we expect thinness to be a significant determinant of both quoted and effective spreads only for non-cross-listed options.

In this paper we model the ME in the post-2001 period as a Cournot oligopoly with a competitive fringe for quoted spreads, but we argue that the market mechanism changes when it comes to limit orders, with the market then becoming competitive even under its oligopoly structure when Bertrand competition replaces the Cournot model. We find that under the 2000–2001 monopoly structure, competition from US cross-listing reduces both quoted and effective spreads, but that under the post 2001 period oligopoly structure cross-listing affects quoted spreads but not effective spreads. This latter result implies that the market is in fact fully competitive for all options, whether cross-listed or not, consistent with our hypothesized Bertrand model, with limit orders now comprising the overwhelming majority of trades. Market thinness, on the other hand, seems to have only a marginal impact on the quality of the market as measured by the size of the spreads. We use intraday data to document the evolution of the spreads and their determinants throughout the trading day under alternative assumptions about the traders' correct anticipation of end-of-day prices and for varying volumes of transactions. We distinguish three different intraday time periods and take into account transactions volume by including separate variables for each volume cluster. Last, we measure informed trading and report the detailed evidence for non-cross-listed and cross-listed options, with our results showing relatively little effect of such trading on the quality of the market.

The paper is organized as follows. The next two sections describe the methodology and the data used in the analysis. This is followed by the empirical results on quoted and effective spreads for exogenous cross-listing indicators in the context of thin markets under the specialist and oligopoly structures of the 2000–2001 and the 2002–2004 periods, respectively. We verify the validity of our conclusions about the effects of market structure by adopting several alternative specifications of our empirical work. The last section draws the conclusions of the study.

2. Methodology

Until the end of 1999, trading in Canadian derivatives was dispersed among three Canadian exchanges located in Toronto, Montreal and Vancouver, with the option clearing corporation jointly owned by the three exchanges. Following a 1999 agreement, the three exchanges restructured their markets along the lines of market specialization. Since then large cap equities have been trading exclusively on the Toronto Stock Exchange (TSX) and derivatives have been trading exclusively on the Montreal Exchange (ME).[5] Both TSX and ME face competition from several US exchanges for most, but not all, firm equities and derivatives, which have eroded the market shares of both Canadian exchanges to a major degree,

[2] Other Canada–US cross-listing studies that did not, however, examine market efficiency were Kryzanowski and Zhang (2002) and Eun and Sabherwal (2003).

[3] Vijh compares the spreads for options to those for stocks and attributes the differences to their respective market structures. The Neal study compares two samples of options on *different* underlying stocks trading in two different exchanges that operate under monopolistic and competitive conditions.

[4] Examples of such studies include Wang and Jones (2005) for 53 UK investment trust companies, and Brooks et al. (2005) for the Canadian context.

[5] The Vancouver Stock Exchange was initially assigned the small cap firms and became the Canadian Ventures Exchange, but this was bought out in 2001 by TSX.