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Should we be afraid of the dark? Dark trading and market quality☆

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ABSTRACT

We exploit a unique natural experiment—recent restrictions of dark trading in Canada and Australia—and proprietary trade-level data to analyze the effects of dark trading. Disaggregating two types of dark trading, we find that dark limit order markets are beneficial to market quality, reducing quoted, effective, and realized spreads and increasing informational efficiency. In contrast, we do not find consistent evidence that dark midpoint crossing systems significantly affect market quality. Our results support recent theory that dark limit order markets encourage aggressive competition in liquidity provision. We discuss implications for the regulation of dark trading and tick sizes.

1. Introduction

While trading without pre-trade transparency has long been a feature of equity markets in the form of upstairs block trading, the recent emergence of automated dark pools for smaller sized non-transparent orders has attracted the attention of regulators worldwide. Dark pools have been very successful in attracting order flow; they account for approximately 15% of US consolidated volume, 10% in Europe, 14% in Australia, and 10% in Canada.[1]

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[1] The US estimate is from Rosenblatt Securities for April 2013. The Europe estimate is for July 2013 using Thomson Reuters data

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Proponents argue dark pools offer several advantages such as the ability to avoid large orders being front run, reduced information leakage, and lower market impact costs.

The rapid growth in dark trading has caused considerable concern, especially among market regulators. For example, the US Securities and Exchange Commission (SEC) Chairman in a recent speech said "transparency has long been a hallmark of the US securities markets, and I am concerned by the lack of it in these dark venues."[2] Many regulators and policymakers including the SEC, the Financial Industry Regulatory Authority (FINRA), the Committee of European Securities Regulators (CESR), and the European Commission have made proposals and conducted public consultations regarding dark trading, but have been hesitant in introducing new regulations. Their hesitance reflects the scarcity of evidence on the costs and benefits of dark pools and how the costs/benefits are distributed between market participants. This study aims to address this problem by empirically analyzing the impact of dark trading on market quality.

We exploit the unique natural experiment created by the introduction of minimum price improvement rules for dark trading in Canada in October 2012 (the first such regulation in the world) and Australia in May 2013. The rules require that dark trades provide one full tick of price improvement (or half a tick if the spread is constrained at one tick). When the rules came into effect, dark trading fell by over one-third in both countries, literally overnight. Using the regulation as our main source of exogenous variation in dark trading, and proprietary trade-level data from dark trading venues, we analyze the causal impact of dark trading on liquidity and informational efficiency. Our empirical design overcomes the endogeneity issues that have thus far hindered the empirical analysis of dark trading and market quality.

We disaggregate dark trading into two types that theory suggests should have different effects. The first is dark trading at a single price such as the midpoint of the national best bid and offer (NBBO). We refer to this type of dark trading as 'one-sided' because at any point in time dark liquidity can only exist on either the buy- or the sell-side, but not both. One-sided dark trading is characterized by a relatively low execution probability (particularly for traders that tend to cluster on one side of the market, such as informed traders), the absence of profitable dark market making strategies due to the zero dark spread, and imperfect concealment of trading intentions because probing orders can infer the direction of the dark order imbalance. The second type, 'two-sided' dark trading is when dark liquidity can co-exist at different prices on both the buy- and sell-sides of the market, and more closely resembles a dark limit order market. In contrast to one-sided dark trading, traders in a two-sided dark market can instantly execute both buys and sells as long as dark liquidity exists, can profit from dark liquidity provision strategies, and can better conceal their trading intentions.

Our main finding is that two-sided dark trading, in moderate levels, is beneficial to liquidity and informational efficiency. It tends to lower quoted, effective, and realized spreads, reduces price impact measures of illiquidity, and makes prices closer to the random walk that is expected under informational efficiency. The magnitudes of these effects are economically meaningful and qualitatively similar in both Canada and Australia. Two-sided dark trading is associated with lower lit market depth in Canada, although this effect is small compared to the effects on spreads and is not present in the Australian data where we find that two-sided dark trading increases depth. We show that the reduction in Canadian lit market depth is consistent with the notion that when trading activity is split across multiple venues, so too is depth, without necessarily decreasing the total depth across all venues.

In contrast to the beneficial effects of two-sided dark trading, we do not find consistent evidence that one-sided (midpoint) dark trading has a significant effect on market quality. While it may benefit some aspects of market quality, it can be harmful to others.

Aggregating across the two types of dark trading, our results suggest that dark trading is more likely to benefit market quality the greater the proportion of two-sided dark trading. Furthermore, changes in the composition of dark trading can impact market quality even if the aggregate level remains unchanged. An increase in two-sided dark trading relative to the level of one-sided dark trading is likely to benefit market quality. Our results are robust to a range of alternative specifications, fixed effects, subperiod tests, a variety of control variables including matching stocks in a control market, and are qualitatively similar for both the largest and smallest stocks, with stronger effects in smaller stocks. The similarity of the main results in Canada and Australia provides evidence on the robustness of the effects of dark trading.

Our results have support in the theoretical literature. The positive effect of two-sided dark trading (dark limit order markets) on market quality is consistent with a number of models that analyze pre-trade transparency in limit order markets. For example, Boulatov and George (2013) find that dark limit order markets encourage informed traders to supply liquidity because they can profit from doing so without revealing their private information. Transparency makes them reluctant to supply liquidity because other traders gain an informational advantage by observing the limit order schedules before deciding how to trade. Boulatov and George (2013) show that opacity in limit order markets not only increases liquidity but also leads to more aggressive informed trading, which improves informational efficiency. Our results suggest that strong competition in providing dark liquidity has positive spillover effects on the lit market, where liquidity providers are forced to narrow spreads to compete with dark liquidity.

In contrast, theory identifies reasons why one-sided (midpoint) dark trading can have less favorable effects on

as reported by the *Wall Street Journal* (http://online.wsj.com/article/BT-CO-20130812-701291.html). The Australian estimate is from the Australian Securities and Investments Commission Report 331 for the September quarter 2012 and includes some internalization. The Canadian estimate combines statistics from the Investment Industry Regulatory Organization of Canada and proprietary data obtained for this study and corresponds to the period August-December 2012.

[2] See *Wall Street Journal*, June 6, 2014 (http://online.wsj.com/articles/sec-chairman-unveils-sweeping-proposals-to-improve-markets-1401986097).

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