



Dark trading and price discovery[☆]

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ABSTRACT

Regulators globally are concerned that dark trading harms price discovery. We show that dark trades are less informed than lit trades. High levels of dark trading increase adverse selection risk on the lit exchange by increasing the concentration of informed traders. Using both high- and low-frequency measures of informational efficiency we find that low levels of non-block dark trading are benign or even beneficial for informational efficiency, but high levels are harmful. In contrast, we find no evidence that block trades in the dark impede price discovery.

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1. Introduction

Technology has transformed trading and new trading venues, known as dark pools, have emerged. Although the term “dark trading” is new, the concept is not. Dark trading of old includes block orders managed by upstairs brokers and orders in the pockets of floor brokers not yet revealed to the market. Today’s dark pools systematically match orders without providing any pre-trade transparency. Technology has facilitated rapid growth in dark trading around the world. For example, dark trading’s share of US consolidated volume has grown from 17% in July 2008 to 37% in June 2014 (Rosenblatt Securities). Technology has also changed the nature of dark trading, with block executions becoming less significant than non-block dark executions, due to market participants’ increasing use of algorithms to execute dark trades.¹

¹ Seppi (1990) reports that block trades accounted for roughly half of the NYSE trading volume in 1989, compared with current NYSE statistics which report that blocks account for 25% of volume. Tuttle (2013) shows that during May 2012, the distribution of trade sizes executed in dark Alternative Trading Systems is very similar to that of exchanges.

Many regulators and stock exchanges have expressed concern that excessive growth in dark trading can harm price discovery. For example, in a recent speech, Securities and Exchange Commission (SEC) Chairman White states “...we must continue to examine whether dark trading volume is approaching a level that risks seriously undermining the quality of price discovery provided by lit venues.” Over the last five years, many regulators have undertaken public consultations or proposed new regulations on dark trading. However, to date, only the Canadian and Australian regulators have implemented new rules.² The extensive consultation and subsequent lack of action by regulators reflects the uncertainty about the real costs and benefits of dark trading and the competing interests of the different participants in the market. In many cases this uncertainty is compounded by an inability to accurately identify and measure dark trading, making it difficult to assess its impact. This has also limited academic research on dark trading.

This paper is the first to focus empirically on the effect of dark/block trading on price discovery. This focus is consistent with the intense global regulatory concern about the impact of dark/block trading on price discovery. Our analysis overcomes the issues in accurately observing and measuring dark trading in US and other markets by using highly granular equities data from the Australian Securities Exchange (ASX). Our data enable us to precisely identify and measure all dark and block trading over a long time-series for a broad cross-section of stocks. All orders and trades are time-stamped to the millisecond and the time-stamps are consistent across the different trading mechanisms. The data also enable us to distinguish between different types of trades, allowing us to assess differences between the traditional ‘upstairs’ block trades and smaller dark trades executed without negotiation. This distinction is important because in most markets regulators apply different rules to the two types of dark trading, which are thought to have different impacts. For the remainder of the paper we refer to non-block dark trading as ‘dark’ trading, and block dark trading as ‘block’ trading.

We address three questions. First, where are informed and uninformed trades typically executed and thus, how informative are lit, dark, and block trades? Second, how does the level of dark and block trading impact adverse selection risk on the lit exchange? Third, what is the association between dark/block trading and price discovery? Given that regulators are typically only concerned about high levels of dark/block trading, we examine whether the association between dark/block trading and price discovery is nonlinear and whether there is a

threshold or ‘tipping point’ above which dark/block trading is harmful.³

Our empirical work is guided by two recent theoretical models of how dark trading impacts price discovery (Ye, 2012; Zhu, 2014). These models reach conflicting conclusions, with Ye predicting a negative association, and Zhu a positive association between price discovery and dark trading. Using theory to predict the effects of dark trading is difficult because it concurrently affects: (i) the degree of transparency; (ii) the extent of segmentation of informed and uninformed traders; and (iii) fragmentation of trading, which changes the way traders submit orders. Each of these three characteristics can be benign, beneficial, or detrimental to price discovery, depending on the circumstances. Our empirical analysis helps resolve the conflicting theory and understand which of the possible mechanisms dominates.

Our results support the hypothesis that dark trading leads to partial segmentation of informed and uninformed traders, as predicted by Zhu (2014). We find that orders executed in the dark tend to be less informed than orders executed in the lit market, consistent with informed traders facing lower execution probabilities in the dark than uninformed traders. By disproportionately reducing the number of uninformed trades in the lit market, high levels of dark trading increase adverse selection risk in the lit market, leading to wider bid-ask spreads, consistent with Zhu (2014). The reduction in uninformed traders in the lit market, accompanied by wider spreads, reduces incentives for costly information acquisition given that informed traders are less able to trade in the dark than uninformed traders. Therefore, dark trading could decrease the aggregate amount of information produced about fundamental values.

We also find that as dark trading increases, order book quotes take on a more important role in impounding new information compared to trade prices, consistent with liquidity providers in the lit market becoming increasingly informed. This result is consistent with the notion that high levels of dark trading increase adverse selection risks in the lit market and informed traders have a comparative advantage in providing liquidity when adverse selection risks are high, due to their informational advantage. We also find that dark trades play a greater role in price discovery as the level of dark trading increases. However, the dark market’s share of price discovery increases at a slower rate than its increase in market share, providing further evidence that dark trades tend to be less informed than lit trades.

Finally, our results show that dark and block trades have different impacts on informational efficiency. Low levels of dark trading are either benign or beneficial, but high levels are harmful to informational efficiency. The deterioration in informational efficiency begins to occur when dark trading in a given stock exceeds approximately

² For example, in November 2009, the US SEC proposed rules on the “Regulation of Non-Public Trading Interest” but to date, no rule changes have been made in the US. In Europe, Markets in Financial Instruments Directive II (MiFID II) proposes the introduction of a double cap on dark trading with a 4% cap on trading in a single dark venue and an 8% cap on total dark trading across all venues. The Canadian and Australian securities regulators imposed price improvement requirements for non-block dark trades on October 15, 2012 and May 27, 2013, respectively.

³ For example, in testimony before the Senate Banking, Housing and Urban Affairs Committee, Nasdaq OMX Chief Economist, Frank Hatheway, states that based on Nasdaq’s empirical analysis “execution quality begins to deteriorate when stocks experience dark trading in excess of 40% of total volume.”

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