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**Quantifying price improvement
delivered by dark pools**

Japanese asset managers are increasingly using dark pools in pursuit of price improvement. However, analysis of trades executed by dark pools reveals wide variations in price improvement, reflecting differences in dark pool business models.

Dark pools deliver price improvement on discretionary orders

Trading on dark pools, which began in Japan around 2007, has recently been growing. A dark pool is an internal order-matching system that is operated by a securities broker¹⁾ and does not publicly display price quotes²⁾. In Japan, dark pools are mainly offered by foreign securities brokerages as a service to institutional investors.

When asset managers use dark pools, they rarely route the order directly to the dark pool themselves. In most cases, they access dark pools by placing orders that grant their broker discretion as to the timing and venue of the order's execution. With such discretionary orders, the asset manager needs to merely consent in advance to the order being routed to a dark pool as an execution venue. This arrangement makes dark pools convenient for asset managers to use by obviating the need for them to decide whether to execute a trade on a dark pool or to do anything special to access a dark pool.

Brokers emphasize price improvement as the advantage of using dark pools with discretionary orders. For example, if a client places a market buy order, the broker would first check prices within its dark pool. The order would be executable on the dark pool at the mid-price of the best bid-ask spread available on an exchange. Alternatively, if there are any sell limit orders in the dark pool's order queue that are priced at a tick size smaller than exchanges' minimum tick size³⁾, the buy order would be executable at that limit price if it is below the price at which a market buy order would be executed on an exchange at that point in time (Exhibit 1). If a price meeting either of these conditions is available within the dark pool, the broker would execute the buy order by crossing it with the corresponding sell order(s).

If no such execution opportunities exist within the dark

pool, the broker would route the buy order to an exchange for execution at market. Dark pool users are consequently assured of order execution at prices equivalent to or better than on-exchange prices.

By virtue of thus being able to obtain price improvement without much trouble, asset managers have increasingly been using dark pools. Because dark pools are set up to enable trade executions at or near the bid-ask mid-price, many asset managers expect price improvement of around 10 basis points⁴⁾ (bps), equivalent to half of the average bid-ask spread⁵⁾ for highly liquid stocks. This price advantage is by no means trivial, given that the average brokerage commission paid by asset managers is currently around 10bps.

Exhibit 1. Price improvement on dark pools



Price improvement varies widely among dark pools

To meet compliance requirements, asset managers obtain data from their brokers on on-exchange price quotes at the time of order execution on a dark pool, but they have yet to make much use of such data to quantitatively analyze price improvement. In-depth analysis has been hindered by the huge volume of market data required

and differences in the format of trade data provided by brokers. Recently, however, certain leading-edge asset management companies have resolved this difficulty by teaming up with third-party vendors to analyze the data.

Exhibit 2 plots three dark pools' respective price improvement margins⁶⁾ and trade execution shares⁷⁾ based on analysis of asset management companies' actual trade execution data. First, price improvement margins differ substantially among the dark pools, ranging from more than 10bps at Dark Pool A (DPA) to around 3bps at Dark Pool C (DPC). The price improvement provided by DPC falls short of the level that asset managers typically expect.

However, good prices are meaningless if they are not available for trade executions. DPA, which has the highest price improvement margin, has the lowest trade execution share. Conversely, DPC's trade execution share is very high. The data indicate that although DPC delivers little price improvement per trade, the price improvement is distributed over a broad range of discretionary orders.

There is thus generally a trade-off between price improvement margin and trade execution share. Their ratio to each other depends on the individual dark pool's business model. Some brokerages have adopted a dark pool business model of aggressively matching customer orders in-house if they can do so at a price equivalent to or better than the on-exchange price. The rationale behind this model may be to maximize the dark pool's liquidity or reduce fees paid to exchanges and pass on the savings

to clients. In contrast, other dark pools have adopted a business model of maximizing their price improvement margin, even at the cost of sacrificing trade execution share, in the aim of enhancing their price appeal.

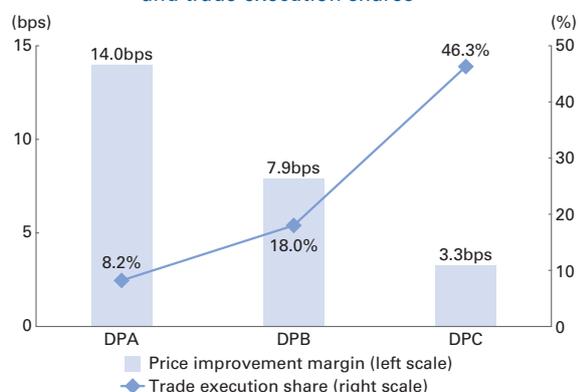
Understanding dark pools through execution analysis

Aside from facilitating detailed analysis of dark pools, such data analysis by third-party vendors has two other advantages.

The first is neutrality. Some asset managers may want to use dark pools but are unable to do so because reports based solely on broker-provided trade data are insufficient to meet their compliance requirements. They can resolve this problem by obtaining a neutral assessment from a third-party vendor. The second advantage is access to data that include trades of other asset management companies also. Increasing the size of the data sample not only enables more accurate analysis, it also allows asset managers to learn about the performance characteristics of dark pools that they have never used themselves. Such information is valuable for determining which dark pools to henceforth use.

If asset managers ascertain dark pools' individual performance through such analysis, they should be able to further improve their order executions by selectively routing orders directly to specific dark pools based on order size, ticker symbol, or other such particulars. As a first step toward this end, it is important to gain understanding of dark pools' actual performance through analysis.

Exhibit 2. Dark pool price improvement margins and trade execution shares



Source: NRI



Note

- 1) Dark pools operated by securities brokerages are sometimes called "broker dark pools" to distinguish them from dark pools operated by non-brokers, but they are uniformly referred to herein as "dark pools."
- 2) While the US Securities and Exchange Commission has expressed an understanding of the role of anonymity in limiting large orders' market impact, it is currently considering regulations to increase dark pools' transparency with respect to small orders.
- 3) Minimum tick size is the minimum price gradation at which a stock can be traded.
- 4) A basis point is one one-hundredth of a percentage point.
- 5) The bid-ask spread is the differential between the lowest ask price and highest bid price.
- 6) Calculated based on dark pool executions only.
- 7) Trade execution share is the dark pool's trading volume expressed as a percentage of total trading volume, including on-exchange trading volume, all in value terms. Trade execution shares were calculated based on the universe of stocks traded on dark pools in any quantity, even only one share.

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