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The Dark Pool Debate

Market Commentary

22 August 2013

Key Points

- Dark pools have been targeted quite a bit by the media for harming market quality.
- Behind much of this is a false representation of off-exchange volumes.
- In this report, we explain the data discrepancy and shed light on other misconceptions about dark pools, such as:
 - Exchange volume is both dark and lit.
 - Off-exchange volume is both dark and lit.
 - Dark pools are only a subset of off-exchange volume (<40%).
 - Many people often cite a large number of ATS's in criticizing fragmentation. But only a portion of them actively trade. Also recall that there are 13 exchanges.

Shrouded in Mystery

By their very name, Dark Pools seem to imply shady practices and sinister intent. In reality dark pools are so-called because they mask the actions of their participants (which makes it harder for faster day traders to take advantage of large investors – a good thing, no?). But consider some recent headlines in a variety of sources:

- “As Market Heats Up, Trading Slips into Shadows”
- “Dark Pool Growth Hurts Investors, NYSE, Nasdaq Tell Senate”
- “Dark Pools Threaten Wall Street”
- “Dark Pools Pick Up Stock-Trading Share”

While these headlines claim that dark pools are commanding an increasing share of US equity volume, to the detriment of market quality, there are several flaws in this storyline (see box on page 2).

In this report, we seek to shed some light on the dark pool debate and dispel many widely held misconceptions. The facts about dark pools may surprise you.

The Truth about Dark Pools

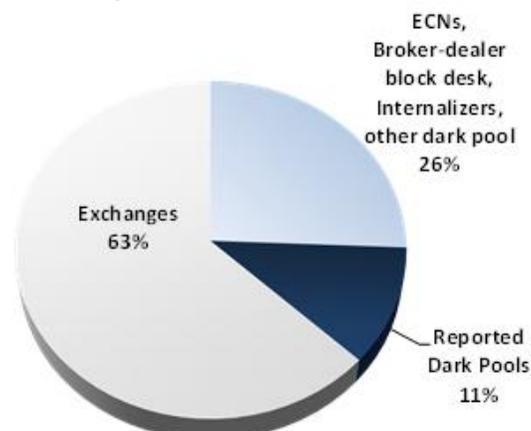
Dark vs lit ≠ exchange vs off-exchange

Probably the biggest misconception related to dark pools is that all off-exchange volume (“TRF volume” – see page 4) is dark. However, dark vs lit liquidity is a separate concept from exchange trading venues vs off-exchange/alternative venues. Key concepts:

- Dark volume may apply to all trading venues, including exchanges.
- Lit volume can appear both on and off-exchange as well.
- TRF volume includes “upstairs” prints (broker internalization). Dark pools are estimated to make up less than 50% of TRF prints.

The main differences and sources of confusion between the terms are summarized in the table on page 4.

**Exhibit 1: Breakdown of Off-Exchange Volume
only a fraction is dark pools**



Source: TABB Group, July 2013

The confusion over dark volumes

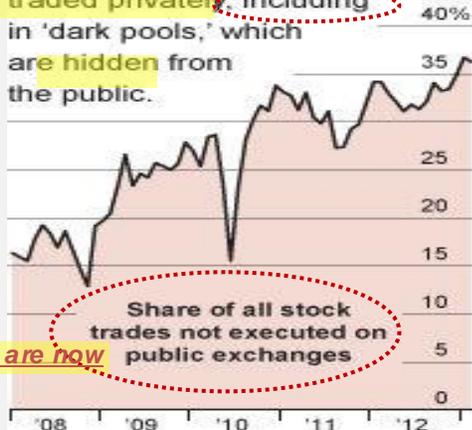
The chart on the left below was published by the [NY Times](#) and is frequently used to show (and criticize) the rise of off-exchange volume under the erroneous suggestion that off-exchange = dark. Yet the data show that off-exchange volume has actually remained fairly stable over time.

Why do these pictures tell different stories? Below we highlight a number of terms used in the NYT chart that may be technically correct, but are quite misleading. And, as we'll see, one statement is factually wrong (point #4 below).

The NYTimes's representation

Trading Places

Stocks have been increasingly traded privately, including in 'dark pools,' which are hidden from the public.

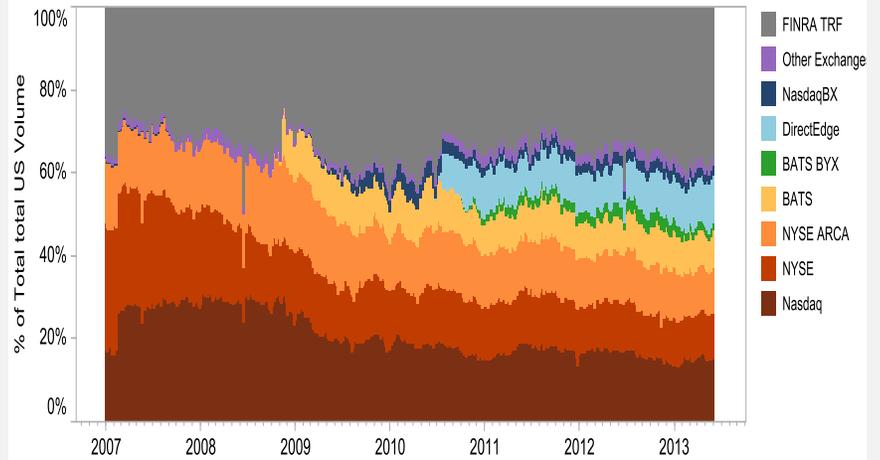


Sources: Rosenblatt Securities; Arcavision; BATS; Direct Edge

THE NEW YORK TIMES

Actual data

Exchange Market Share Over Time



Source: Reuters TAO data

Confusion #1: What is "private" trading?

"Private" trading is implied by the NYTimes to be any trading not on an exchange. The NYTimes is correct in saying that this *includes* dark pools. But many interpret this "off-exchange" or "TRF" volume as *only* representing dark pools, which is not correct. As we show later, less than 50% of "private" volume comes from dark pools.

Confusion #2: What is "hidden" from the public?

The statement that dark pool trades "are hidden from the public" is also problematic. Dark pools do not display quotes (pre-trade), but all trades are indeed printed publicly (post-trade).

Confusion #3: Is "private trading" really increasing?

It is true that dark pool share has been increasing. But the increase is from about 8% at the beginning of 2008 to around 15% today, not the full amount of all "private trading", shown at 37% above.

The difference (between 15% and 37%) is broker block trading and other internalizers, as well as ECNs, which *do* quote one the publicly-available quote feed.

Off-exchange ("private") volume has actually remained fairly stable over time, at around 35%.

Confusion #4: Is "share of all stock trades not executed on public exchanges" the same as the TRF share?

These *should* be the same. The issue is that this is not actually what is shown in the NYT chart. Here's the difference:

BATS was first created as an ECN, but, recognizing the advantages to being an exchange, converted to an official exchange in November 2008. As an ATS, they reported their trades to the TRF. Once they were granted exchange status, they could report under their own unique code. The platform was unchanged and business operated in exactly the same way, but officially, trades went from happening off-exchange to occurring on an exchange.

The same thing happened with DirectEdge. The trading venue began life as an ECN and achieved exchange status in March 2010.

The NYTimes's chart (and others like it) does not include data from the days when BATS and DirectEdge were still ECNs – even though it fits their definition of "private" trading.

Understanding Off-Exchange Volume

The type of trading venue (exchange vs ATS or dark pool) has nothing to do with the type of volume (lit or dark). As the name implies, Alternative Trading Systems (ATS's) are an alternative place to trade from the exchanges. Dark pools are therefore classified as an ATS so they do represent off-exchange volume... but some *lit* venues are also ATS's. And, as we'll see on the next page, *exchanges* have *dark* volume too.

Trading goes "off-exchange"

How did we get to this point of having so many different trading venues anyway? And how did dark liquidity emerge in the first place?

The spark really came in 1999 with the passage of Reg ATS. Prior to then, trading was dominated almost entirely (92% of the market) by just two exchanges, the NYSE and Nasdaq (see [Too Much Complexity? You Asked For It!](#) for a full study of our market's evolution).

Reg ATS was designed to promote competition with the incumbent exchanges by streamlining the registration process for ATS's (hence the ATS in Reg ATS). These ATS's are platforms for trading the same US securities as on exchanges, but, being smaller, are allowed to register as broker-dealers and are subject to different regulations.

Reg ATS has been quite effective (some may argue *too* effective) – today we have 13 exchanges and around 20 ATS's that trade actively (around 50 are believed to be registered, but the majority of those are not operational).

Who is responsible for all the fragmentation?

Dark pools are often blamed for the fragmentation of the market (which is then used to argue that dark pools are affecting price discovery – despite the fact that they post all trades to the tape immediately).

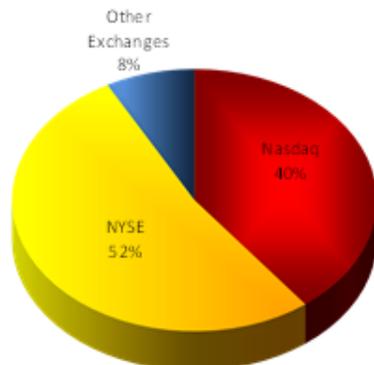
But much of this fragmentation is due to a proliferation of exchanges – in fact, we've added 6 exchanges in only the past 5 years.

The increased fragmentation that is so colorfully illustrated below only shows *exchanges*, not ATS's (which are all lumped together under Dark Pools and Other TRF). Furthermore, 10 of the exchanges are the product of just 4 exchange groups. Each exchange group has created multiple venues with different rules and cost structures to suit the needs of different investors.

<u>NYSE</u>	<u>Nasdaq</u>	<u>BATS</u>	<u>DirectEdge</u>
NYSE	Nasdaq	BATS	EdgeA
NYSE Arca	NasdaqBX	BATS BYX	EdgeX
NYSE Amex	NasdaqPSX		

It seems that even exchanges realize the benefits of choice for investors.

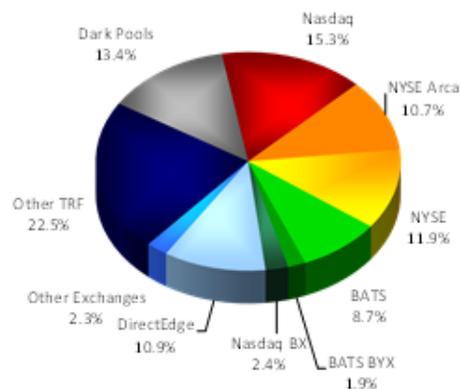
1998 US Equity Market Share Breakdown



"Other Exchanges" includes Amex, Arca, B.SX, CB.SX, Chicago, ISE, National and PHLX

Source: Credit Suisse Trading Strategy

2013 US Equity Market Share Breakdown



"Other TRF" includes broker capital commitments and internalizations

"Other Exchanges" includes NYSE Amex, CB.SX, Chicago, National and P.SX

More dark pool disclosures coming

FINRA is expected to file a proposed rule with the SEC imminently that would require ATS's (of which dark pools are a subset) to report aggregate volume statistics to FINRA by security. FINRA would then post this information publicly on their website with a further 1-2 week lag. The rule would not apply to dark volume on exchanges, though they acknowledge the interest in such a disclosure. Once filed, the rule would then be open to public comment and would have to be formally approved by the SEC.

This is not the first time dark pools have been scrutinized by regulators. In 2009, the SEC filed a rule proposal ("Regulation of Non-Public Trading Interest") that would:

- A) Eliminate actionable IOIs
- B) Lower the threshold at which ATSs must publicly disclose quotes
- C) Require real-time reporting for dark pools.

The Commission has not taken any action since submitting the proposal for public comment.

Off-Exchange = TRF Volume

In addition to hearing about off-exchange volume, we also hear references to "TRF volume", which is yet another way to refer to the same volume. Here's where that term comes from:

By law, every trade in the US must be reported to a Consolidated Tape, regardless of where it was transacted. Reported trade details include volume, price, various sale condition codes, and an exchange code. However, ATS's are not allowed to print directly to the tape so they report to one of the Trade Reporting Facilities (TRF). Internalizers also report their crossed trades to a TRF. The TRFs then print all off-exchange trades to the consolidated tape under a single code.

Dark pools are a subset of alternative trading systems

The consequence is that we know that a trade with the TRF code happened "off-exchange", but we don't know whether it occurred on an ATS or at an internalizer. And if it occurred on an ATS, we don't know which one (*though this may change – see box at left*).

As explained in the table below, a TRF print may represent a trade in:

- a dark pool
- an Electronic Communication Network (ECN)
- a wholesaler or internalizer (broker block desk)

Importantly, ECN volume – while designated as off-exchange - is lit.

Comparing Exchanges with Alternative Trading Systems (ATS)		
	Exchanges	Alternative Trading Systems (ATSs)
Who can access?	All Broker-Dealers	Below volume thresholds, may restrict participants. Above threshold, open to all BDs
Regulatory obligations	Self Regulatory Organization (SRO), with official exchange license granted by the SEC	Registered as a broker-dealer; regulated under Regulation ATS
Benefits	<ul style="list-style-type: none"> • Earn significant revenue from unique right to sell market data • Limited liability • As an SRO, has regulatory powers over competitors (ATSs) • No clearing fees, no net capital requirements 	Flexibility: <ul style="list-style-type: none"> • can create new order types without preapproval from the SEC • below volume thresholds, can vary pricing for different participants
Is volume lit or dark?	both	both
Print to the tape?	All trades are immediately printed to the tape	All trades are immediately printed to the tape
Number of venues	13	~15 actively trade (approx 50 have been registered, but most are now defunct)
Market share of US volume (2013 H1 Avg)	65	exact amount unknown

What is "Off-Exchange" Volume?		
Alternative Trading Systems (ATSs) <i>officially, a "marketplace for bringing together purchasers and sellers of securities"</i>		Internalizers
Electronic Communication Networks (ECNs)	Dark Pools	
<ul style="list-style-type: none"> • Behave very similar to exchanges, including posting bids and offers, but are still registered as broker-dealers rather than exchanges. • Although ECNs <u>do</u> post bids/offers, since the Alternative Display Facility (ADF) is not currently operational*, ECNs are forced to post their quotes through an affiliated exchange. • ECNs cannot host stock listings (nor can any other ATS). 	<ul style="list-style-type: none"> • Cross buyers and sellers electronically • Bids/offers are not displayed, but all trades are reported to the consolidated tape. 	<ul style="list-style-type: none"> • Broker-dealers or wholesalers who can match buyers and sellers internally from their own inventory.
Lit volume	Dark volume	Dark volume

*note: the ADF is for BDs to be able to display protected bids/offers. The ADF has not been running for the past few years. FINRA recently proposed a rule to bring it back.

Could alternatives take over? Not yet...

Even if alternative trading venues do become more popular, there are a couple of market rules and practices that keep exchanges safe:

1. **Listings:** Currently, only exchanges can host stock listings. Almost all stocks are listed on the NYSE or Nasdaq, though BATS hosts a few as well.
2. **Benchmark prices:** Index providers, futures markets and fund managers all rely on a stock's official open/close print for critical transactions, and these are determined by the stock's listing exchange. This results in an exchange monopoly on the MOO/MOC volume. In fact, as we showed in [Volumes and Venues: Where to Trade, When, and Why](#), around 20% of NYSE volume is devoted to the MOC print alone, accounting for almost 4% of all US consolidated volume.

We saw an interesting example of the role of the listing exchange in the close on November 12, 2012. Around 140 NYSE stocks failed to close on NYSE because of an exchange outage, accounting for 5% of the S&P500. In that instance index providers agreed to use the consolidated tape to determine a "last price" for each stock. While that solves the "benchmark price" problem, it failed to provide a large liquidity point where all trades could find a clearing MOC price.

Understanding Dark Volumes

Exchanges have dark volume too

While some NYSE and Nasdaq officials have [attacked](#) dark pools for "the evaporating transparency of our equity markets" and "undermining confidence in markets", they have failed to mention that they also offer dark and hidden order types, and have done so ever since Reg ATS was passed in 1999. Functionally, these are equivalent to orders in dark pools.

Exchange dark order types

It is difficult to know definitively how much of the exchanges' volume is dark. Their own disclosures online (see left) show that around 6-7% of executions are using dark order types. In addition, NYSE Arca used to run the ad below left, boasting of trading "over 500 million shares of dark liquidity, daily". The fine print says the data was from March-August 2008. During that period, Arca averaged 1.34 billion shares per day, meaning over 37% of their volume was dark.

Exchange dark pools

It's also interesting to point out that NYSE rolled out a [Retail Liquidity Program](#) in July 2012 that [mimics dark pools](#) by offering executions within the posted bid-ask and not displaying its own orders (*note that other exchanges followed the NYSE with similar programs of their own*).

This is why the discussion of dark vs lit volume is quite different from exchange vs off-exchange. Any scrutiny of dark pools' dark volume should also extend to exchanges and their own dark volume.

NASDAQ OMX EQUITY ORDER TYPE USAGE

	% OF ORDER COUNT			% OF EXECUTED ORDERS		
	ISO	NONISO	TOTAL	ISO	NONISO	TOTAL
IMMEDIATE OR CANCEL	1.9%	5.2%	7.1%	20.9%	17.1%	38.1%
DISPLAY LIMIT - PRICE TO COMPLY	2.4%	19.0%	21.4%	6.2%	21.6%	27.8%
DISPLAYED LIMIT - POST ONLY	5.8%	32.2%	37.9%	4.4%	16.7%	21.2%
NON-DISPLAY LIMIT POST (INCL MIDPOINT)	0.2%	27.9%	28.0%	0.2%	6.0%	6.2%
DISPLAYED LIMIT ATTRIBUTABLE (FOR MKT MAKER COMPLIANCE)	0.0%	2.9%	2.9%	0.1%	0.4%	0.5%
OTHER (INCLUDING MIDPOINT POST ONLY'S SUPPLEMENTAL)	0.2%	2.5%	2.6%	0.3%	5.9%	6.3%
TOTAL	10.4%	89.6%	100.0%	32.2%	67.8%	100.0%

Source: Nasdaq

FACTS YOU CAN TRADE ON:
NYSE ARCA TRADES OVER 500 MILLION SHARES OF DARK LIQUIDITY, DAILY.

We make other dark pools look like puddles. By providing both traditional and non-traditional ways to bring hidden and displayed orders together, NYSE Arca provides new opportunities to access dark liquidity. A wide array of reserve order types and new innovative order types, such as our Passive Liquidity (PL) order, offer innovative features to find your way in the dark. Our MidPoint Passive Liquidity (MPL) order, an on-displayed limit order offering price improvement by executing at the mid-point of the NBBO, provides another way to navigate our ever-deepening pools of dark liquidity. When you know the facts, you know NYSE Euronext's got you covered.

NYSE.com/equities NYSE Euronext

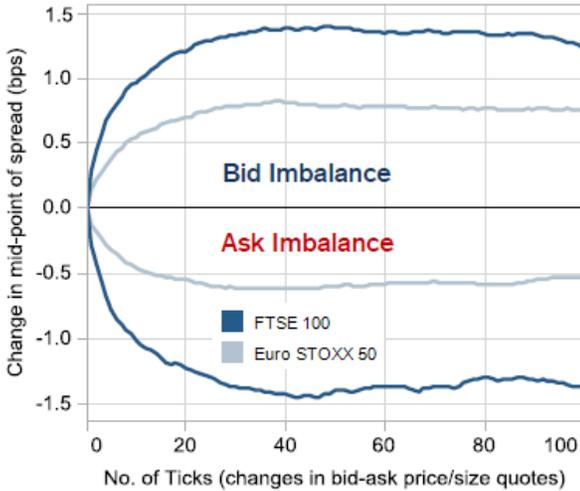
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Source: NYSE

Dark trading was created to protect large traders

Criticism that “Dark Pools Hurt Investors” is interesting, considering that dark pools were designed specifically with the needs of the large investor in mind. Their growing popularity over the past few years is evidence that investors do indeed value dark liquidity. There are good reasons for this:

Exhibit 2: Signaling costs in European stocks



Source: Credit Suisse Trading Strategy, Nov 22, 2010 – Dec 17, 2010.

*Note: Our approach is to track the movement of the mid-point of the bid-ask spread from the point where the bid-size is greater than 5x the ask size (and vice versa) for 2 consecutive ticks, but the bid/ask size is no more than the average primary market trade size for the stock.

1) Lit pools have signaling costs

In our own study, we find that lit venues can hurt large institutions by displaying their intentions before they even trade, allowing shorter term investors to move markets ahead of large bids and offers (see Exhibit 2, read more in [this](#) report).

Dark pools are therefore useful to protect large orders from potential HFT sniffing, but even well before HFT was relevant, investors had to worry about signaling risk from floor brokers working their order.

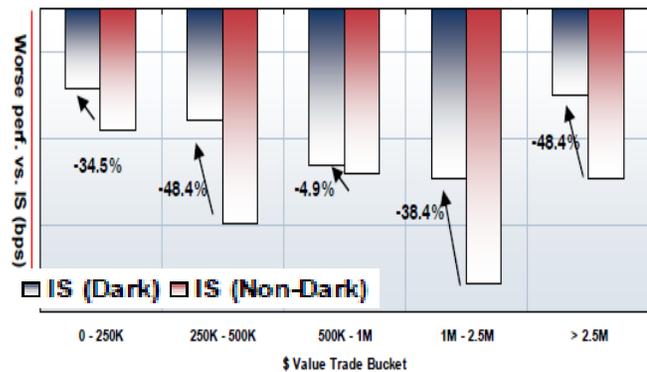
2) Dark pools have lower trading costs

Dark pools can help reduce costs by:

- Crossing inside the spread
- Reducing adverse selection by improving time priority, even when crossing at the touch
- Avoiding routing fees for exchanges (note that even if routing fees are not explicitly passed on to traders, they do create a floor to broker commission rates).

Another one of our studies using real client trades found that clients who specifically excluded dark venues from their routing consistently saw higher trading costs (see Exhibit 3, read more in [this](#) report).

Exhibit 3: Shortfall cost of dark vs non-dark executions by notional



Source: Credit Suisse Trading Strategy

3) Dark pools can exclude “toxic” counterparties

Since dark pools that are below certain volume thresholds are allowed to exclude counterparties, they are able to exclude participants they deem predatory (exchanges argue this is a large competitive advantage for ATS’s). This theoretically creates a pool of like-minded participants, less exposed to predatory types.

Several dark pools now measure flow “toxicity” and can restrict participants accordingly. Exchanges, on the other hand, are public marketplaces. They must allow everyone to have access – including any potential “toxic” flow.

Isn't choice a good thing?

Dark pool debates often refer to “market quality”, but they tend to focus almost exclusively on price transparency and fragmentation. It's important to remember that there are many elements of a “quality market”. Other important factors:

- **Continuously operating markets:** In the US, trading can continue seamlessly even if a single exchange experiences a failure (see [this](#) chart of the day). Compare this to other countries where exchange outages can halt trading, holding up cash flows and price discovery, potentially for days.
- **Minimized signaling costs:** Institutions often have very large trades in single names, which can leave a big footprint in the market. We estimate that institutions spend over \$20bn each year on impact costs. Giving traders with different sized orders choices in how and where to execute should help reduce signaling costs, thereby adding to investor returns.
- **Lower trading costs:** Our [Transaction Cost Index](#) shows that costs have declined substantially over time, thanks to competition among all the different venues.

It's especially interesting to note, as we do in detail in [Too Much Complexity? You Asked For It!](#), that competition was purposely introduced into the market to improve investors' returns. Based on the dramatic cost reductions in the past 15 years, it would seem to have been successful.

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