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The evolution of dark pools from the traditional equity market to the cryptocurrency market

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Executive summary

In recent years, technology and regulation have rapidly transformed the landscape of investment trading. New trading venues and new types of traders have emerged, affecting the costs of trading for different participants. The growth of dark pools, trading venues where information about orders is not displayed before execution, has been one aspect of these structural developments. Dark pools have less transparency than "lit" exchanges, which display aggregated volumes of current orders to buy or sell at different prices.

A central focus of this paper is the landscape of dark pools in both the traditional equity market and the digital asset market.

Key takeaways

- Dark pools are private exchanges for trading that are not accessible by public investors.
- Dark pools emerged in the late 1980s, in order to facilitate block trading by institutional investors who did not wish to impact the markets with their large orders and obtain adverse prices for their trades
- Similar to the traditional market, crypto dark pools enable institutions to trade in size off the public market and therefore avoid causing extreme price volatility.
- Compared with regular dark pools, cryptocurrency dark pools offer the advantage of better digital verification techniques and the associated protocols help facilitate a fair market price for all participants by eliminating the possibility of price manipulation.
- sFOX allows traders to trade strictly in a dark pool environment or have orders routed across the largest crypto exchanges, and OTC providers – in a single order – to get the best price.

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An introduction to dark pools

Dark pools have existed in the traditional investing sphere for a long time. Dark pools refer to private venues that operate outside the standard exchanges such as NASDAQ and NYSE. They differ from a public exchange in that there is no visible order book and trades are not visible or only become visible after they have been executed.

Before dark pools were created near the end of the 1980s, institutional investors and high-net-worth individuals had limited options for selling large amounts of shares — all of which involved splitting the entire sale into multiple orders of varying sizes in an effort to mitigate the on-exchange price impact of a stock. However, mitigating the impact was nearly impossible on the exchanges, where the intentions of the sellers were difficult to hide.

The primary advantage of dark pool trading is that institutional investors making large trades can do so without publicly revealing their intention first. This prevents heavy price devaluation, which would otherwise occur. If it were public knowledge, for example, that an investment bank was trying to sell 500,000 shares of a security, the security would almost certainly have decreased in value by the time the bank found buyers for all of its shares.

Types of dark pools

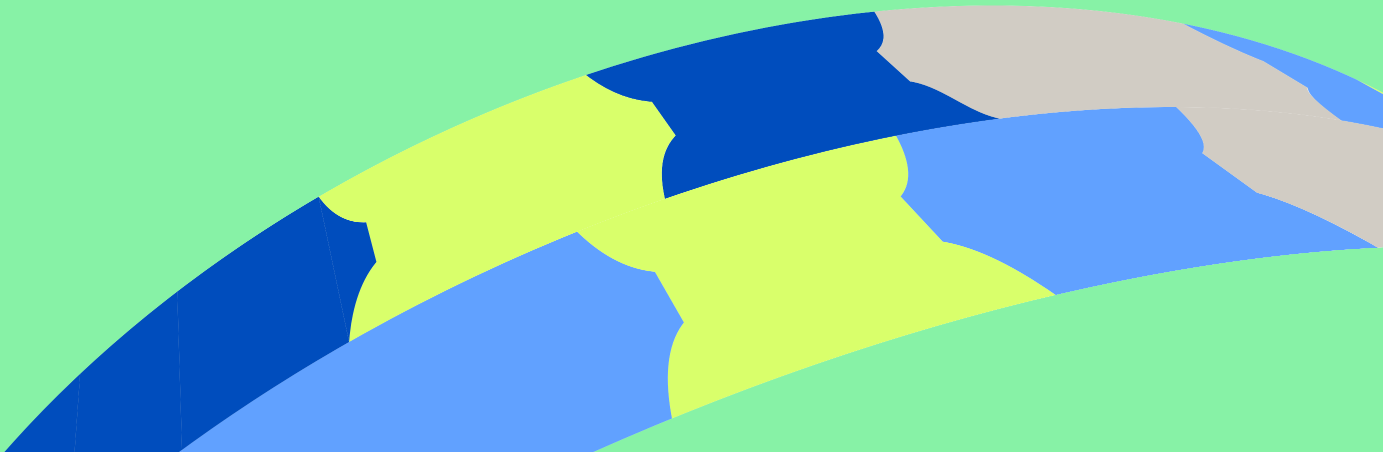
As of February 2022, there were more than 60 dark pools registered with the Securities and Exchange Commission (SEC).

Type of dark pool	Description	Examples
Broker-Dealer-Owned Dark Pool	These dark pools are set up by large broker-dealers (usually investment banks) for their clients and may also include their own proprietary traders. These pools are involved in price discovery through NBBO (National Best .(Bid Offer	• Credit Suisse's CrossFinder • Goldman Sachs' Sigma X • Citibank's Citi-Match • Morgan Stanley's MS Poo
Agency Broker or Exchange-Owned Dark Pool	Exchange-owned dark pools allow retail traders to participate in off-exchange trading. They primarily act as agents and not principals. As prices are derived from exchanges, price discovery .has no scope	• Instinet • Liquidnet • ITG Posit • BATS Trading • NYSE Euronext
Electronic Market Makers Dark Pool	Electronic Market Makers are professional traders acting as proprietors engaged in trading strategies. These dark pools are offered by independent operators. They do not offer price discovery as their transaction prices are not calculated from the NBBO	• Getco • Knight

The advantages and controversies around dark pools

Dark pools have grown in response to investors' demands for protection against information leakage in a rapidly changing trading environment and they've become a real competitor and alternative to traditional stock exchanges.

> Dark pools have taken the U.S. by storm, capturing over 40% of average daily market share and reaching as high as 50% on some days in the U.S., while in countries like Canada, they amount for only 7% largely due to a higher standard of regulation.
>
> \- Nasdaq



Benefits

Dark pools offer many advantages to institutional investors.

Limited Market Impact
When an institutional trader places a massive order in public exchange, there is a possibility of enormous change in the market price of the financial instrument. Therefore, a large buy-order can push the price through the roof before the order is filled. The biggest benefit of dark pools is the market impact being significantly lower for large orders.

Lower Cost Infrastructure
Limited reporting and disclosure obligations, no exchange fees, and lesser intermediaries allow transactions to take place with a significant cost advantage.

Better Price discovery
The benefit of price discovery is primarily offered by the Broker-Dealer-Operated or the Electronic Market-marker dark pools. The matching of trades is often done based on the average of the best available bid and ask price. In such cases, both the buyer and the seller get a more favorable trade than they could on the open market.

No slippage
Since most of the dark pool trading is done in block trades at predetermined prices, traders can be sure that they will be able to execute their entire trade at the intended price.

Tradeoff

Dark pools for some asset classes are regulated by the SEC. However, the effect of dark pools on the integrity and stability of financial markets is still being debated. When dark pools first emerged, regulators and financial authorities expressed concern about two mechanisms through which dark trading could have negative effects on market stability.

Lack of transparency
First, trading in dark pools reduces the information available for the price discovery process, which relies on visible information about supply and demand volumes contained in order books. Price discovery is a public good that benefits all traders; without sufficient information, prices may become more volatile and uncertain, reducing market stability and hindering the ability of participants to identify trading opportunities.

Liquidity Fragmentation
The second area of concern resulting from the growing number of dark pools is the potential for liquidity fragmentation, which can increase search costs and reduce market efficiency.

Institutional Crypto Adoption and the role of dark pools

For years, the idea that traditional financial institutions would invest in Bitcoin (BTC) was debatable. However, the growth in the crypto lending market has been extraordinary over the past year, and 2020 and 2021 have seen billions of dollars from institutions being deployed in the lending market.

Earlier this year, PWC released its 4th Annual Global Crypto Hedge Fund Report, which highlights statistics and general cryptocurrency sentiment from hedge funds and institutional investors. In general, investing in cryptocurrencies is gaining more acceptance among institutional investors, and hedge funds that are currently investing are looking to increase their investments.

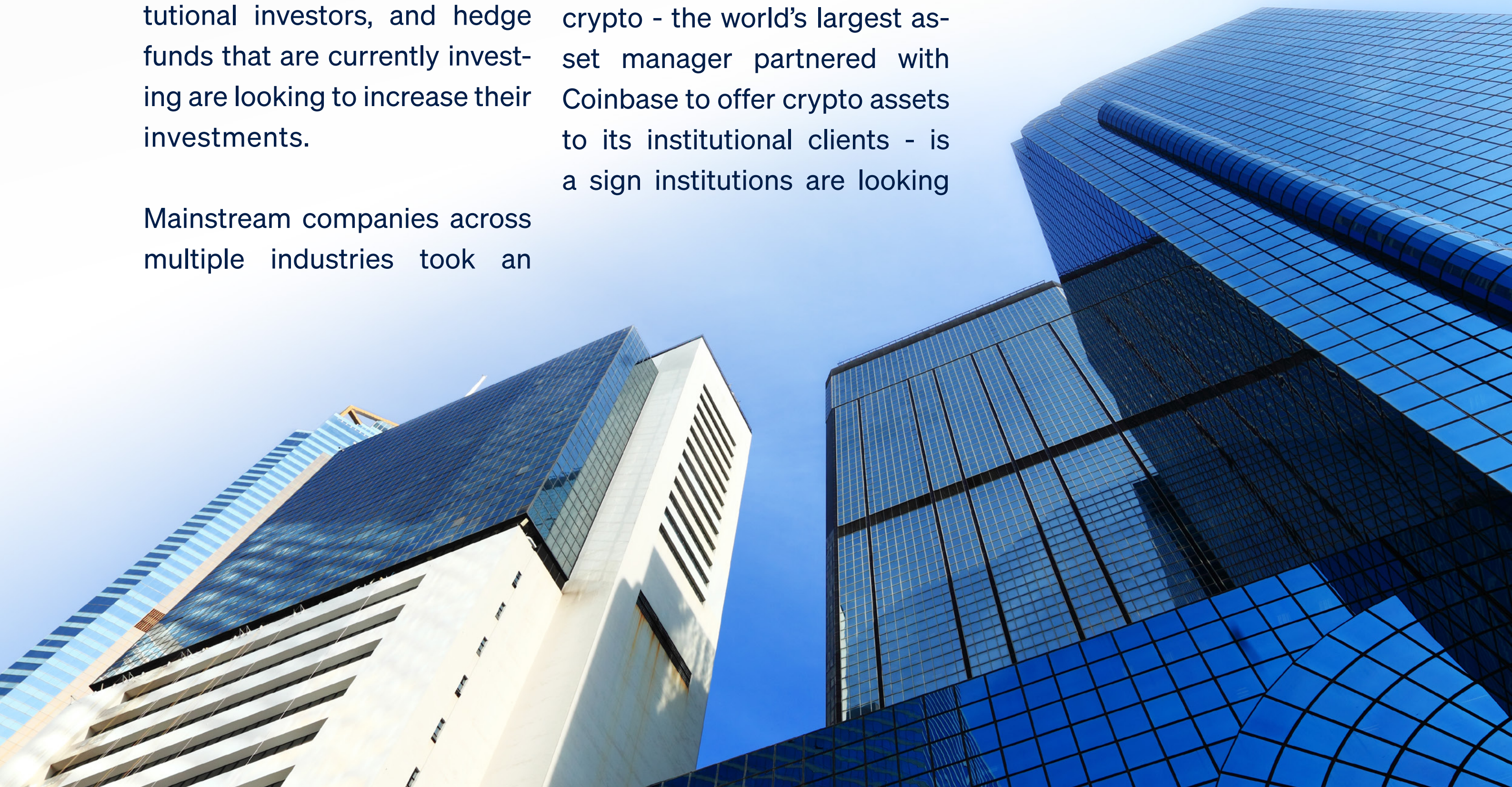
Mainstream companies across multiple industries took an interest. AMC, for example, announced last year it would accept Bitcoin payments. Fintech companies like PayPal and Square are also betting on crypto by allowing users to buy on their platforms. Tesla accepts Dogecoin payments and continues to go back and forth on its acceptance of bitcoin payments, though the company holds billions in crypto assets.

Fidelity formed Fidelity Digital Assets — a platform offering crypto custody and trade execution to institutional investors.

Blackrock's jump deeper into crypto - the world's largest asset manager partnered with Coinbase to offer crypto assets to its institutional clients - is a sign institutions are looking beyond widespread volatility, increasing the prospect of traditional finance competitors following suit.

These market participants need to trade through structures that are regulatory compliant, and that cater to greater sensitivities around security and liquidity.

Here is where crypto dark pools come to play a role. Similar to the traditional market, crypto dark pools enable institutions to trade in size off the public market and therefore avoid causing extreme price volatility.



Do crypto dark pools differ from traditional dark pools?

There are two ways in which cryptocurrency dark pools differ from standard dark pools. Firstly, the former requires cross-chain transactions or transactions between multiple blockchains of cryptocurrencies.
Secondly, the execution of dark pool orders usually differs. Rather than directly matching buy and sell orders, a Matching Engine using multiparty computation (MPC) protocol is used. A large order is broken down into a number of smaller orders which are then connected to buyers and are then reconstructed using identifying information. Breaking down orders in this way ensures security and anonymity.

Compared with regular dark pools, cryptocurrency dark pools offer the advantage of better digital verification techniques and the associated protocols help facilitate a fair market price for all participants by eliminating the possibility of price manipulation. In addition, future developments in innovative cryptographic verification methods - such as zero-knowledge proofs- will make the process of using dark pools even safer with the use of an open-source protocol that can verifiably maintain the same rules for each participant.

Types of crypto dark pools

There are two types of crypto dark pools: centralized and decentralized.

Type of dark pool	Description	Examples
Centralized dark pools	These dark pools exist as “special features” of crypto exchanges or other types of trading platforms. To explore a dark pool, one must pass verification and create a separate PRO or Business-type account. While trading, the platform can offer you to choose the destination of your order - a public order book or a dark pool.	• sFOX • Kraken Dark Pool (currently not available)
Decentralized dark pool	A decentralized crypto dark pool is a DEX (decentralized exchange) but with the difference that it is tailored for large-scale players and enables anonymous trading.	• Ren

How top institutional investors are trading on sFOX Dark Pool

Since 2014, sFOX has been providing sophisticated crypto traders with a platform that gets them the best price on all trades with minimal slippage by connecting them to all major crypto trading venues from one account. On its mission to build the nexus of global liquidity, sFOX allows traders to trade strictly in a dark pool environment or have orders routed across the largest crypto exchanges, OTC providers, and a dark pool – in a single order – to get the best price.

sFOX traders have access to even deeper liquidity and the ability to trade large amounts of BTC and other cryptocurrencies in a completely undetected environment.

As mentioned, dark pools can be useful in illiquid cryptocurrency markets, as they allow traders to execute larger trades without slippage. While a large order could have a considerable effect on an illiquid market, the same trade can be executed in a dark pool with no slippage.

A large buy or sell order - say, 500 BTC - risks moving the market against itself. If that kind of quantity suddenly appears on an order book, it has the potential to constitute a buy or sell wall all on its own, pressuring the price of the asset in the opposite direction as other market participants place maker orders closer to the top of the order book than the wall in order to stand a chance of actually getting filled.

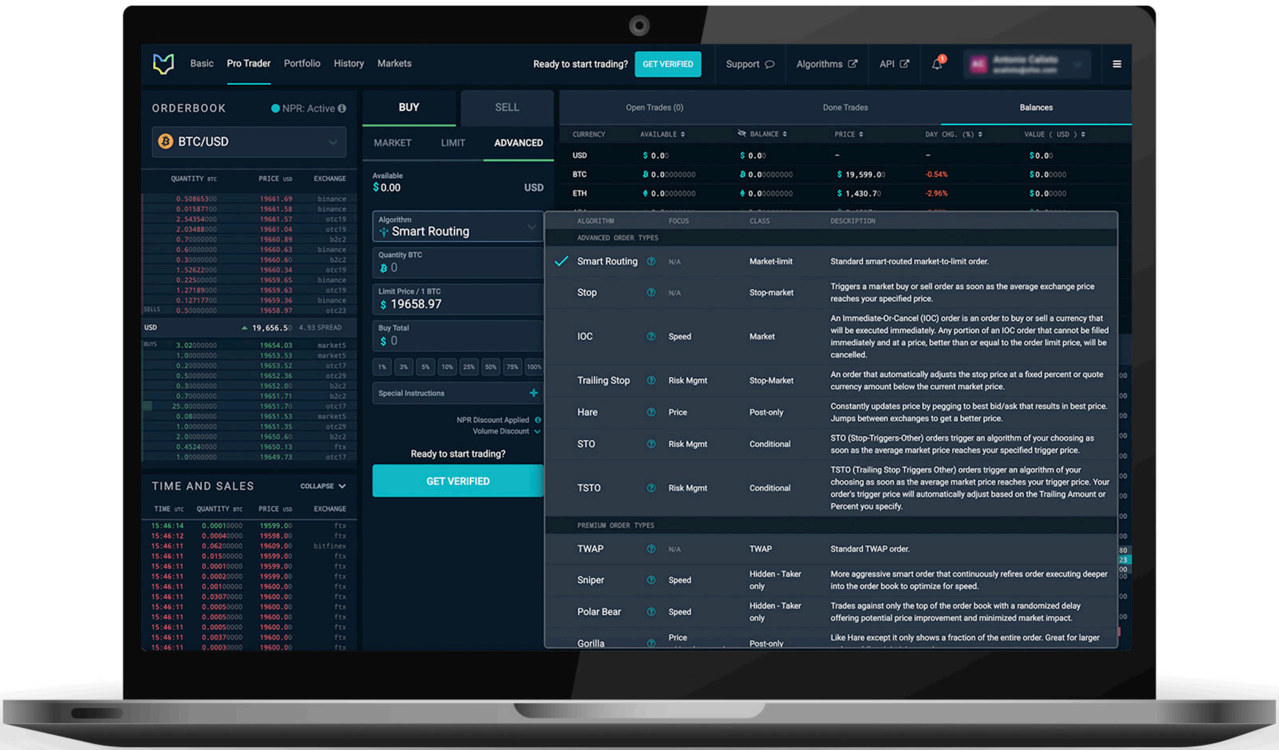
Illustration of BTC sell-wall: The large sell volume for BTC around $12461 in this image could theoretically pressure the price downward, functioning as a "sell wall." Source: sFOX trading UI.

sFOX's advanced order types have always mitigated this issue by breaking up large orders into smaller pieces and routing those to the trading venue with the most competitive pricing, but even this kind of algorithmic smart-routing has its limits.

The sFOX platform has been shown to incur virtually zero slippage on orders of 100 BTC or less, and we strive to provide that level of excellence with orders of all sizes. However, even if the order is spread across multiple trading venues, an order that is hundreds of BTC in size may attract the attention of other market participants.

Historically, traders moving large quantities of BTC and other assets have tried to ameliorate this problem by trading OTC - but OTC desks carry their own risks that can move the market against one's order if one isn't careful.

Especially if a trader is expecting a significant move in the market, this is unacceptable: there needs to be a way to take a position of all of one's capital at once without undermining one's position in the process.



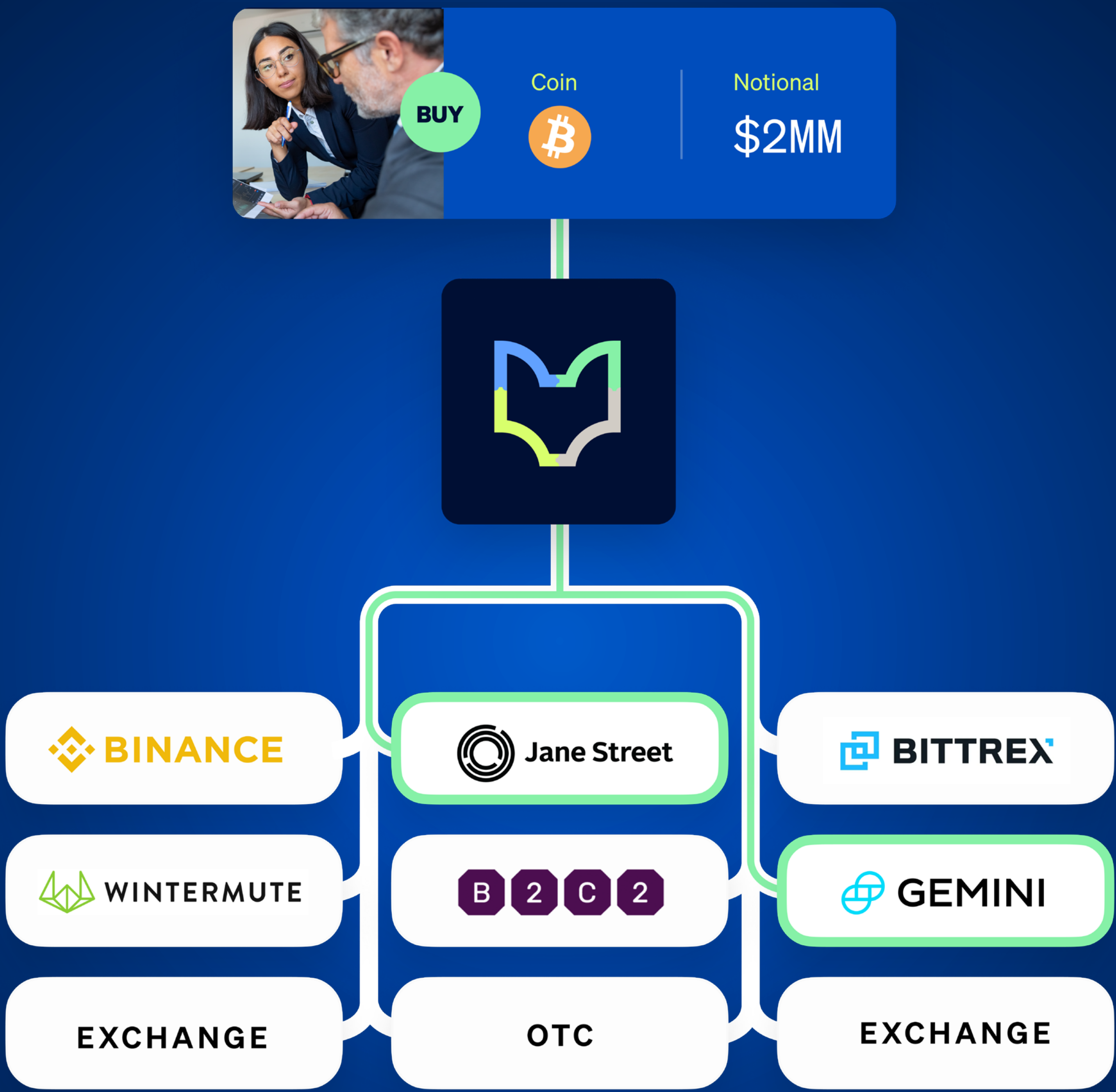
Fully Hidden Orders on the sFOX Crypto Dark Pool

sFOX's new crypto dark pool is a fully covert source of liquidity. The orders posted to it aren't discoverable on any order book or API data stream. When traders looking to buy or sell a large amount of BTC or another cryptocurrency post to the crypto dark pool, their order will execute just in case another order in the crypto dark pool matches with it, mitigating the risk of the market moving in response to one's order.

There are five ways sFOX's crypto dark pool gives sFOX traders even more edge in crypto markets:

1. **Strict Privacy and Trade Anonymity.** No one can see into the dark pool. Whether they are a user or liquidity provider, the dark pool is completely hidden.
2. **Zero Slippage.** Trade large block orders without slippage. Keep your objectives private from the public market and execute your entire order at your intended price.
3. **All the upside of dark pools with none of the downsides.** Our advanced orders like Sniper, Polar Bear, and Gorilla will place a portion of your order in the dark pool while simultaneously interacting with the market.
4. **Everyone benefits, even the taker orders.** If you're placing a taker order on sFOX, your order will now automatically look at both sFOX's integrated order book and sFOX's crypto dark pool when finding the best execution opportunities. That means your sFOX account now has access to a new source of liquidity in addition to all leading cryptocurrency exchanges and OTC desks - and this new source, by design, houses some of the largest crypto orders you'll find anywhere.
5. **No additional cost and volume-based fee rebates.** That's right: you don't pay one sat extra for using the dark pool. Makers' fees for Dark Pool benefit from volume-based rebates: the more you trade on Dark Pool the lower your fees will be.

Trade reliably with smart order routing.



sFOX offers unbiased access to the best prices in crypto across 80+ markets to ensure that you execute at the best prices globally.

The ultimate partner for institutional crypto.
Learn more at sFOX.com

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How to Access the sFOX Crypto Dark Pool

You have two options to access sFOX Dark Pool.

1. **Dark Pool Destination option**: When creating your maker order type - Limit, Hare, or Gorilla - you have the ability to choose whether you want to place it on sFOX's integrated order book or on sFOX's crypto dark pool. Just click on the new "Destination" dropdown menu and choose between "Smart" (i.e. the integrated order book) and "Darkpool."

2. **Dark pool access through sFOX's Sniper, Polar Bear, or Gorilla advanced order types.** They automatically work with the dark pool and will route your orders to the best possible exchange. You don't need to do anything special to benefit from the sFOX crypto dark pool: your order will automatically look at the dark pool in addition to all major crypto exchanges and OTC desks in order to find the best execution opportunity.

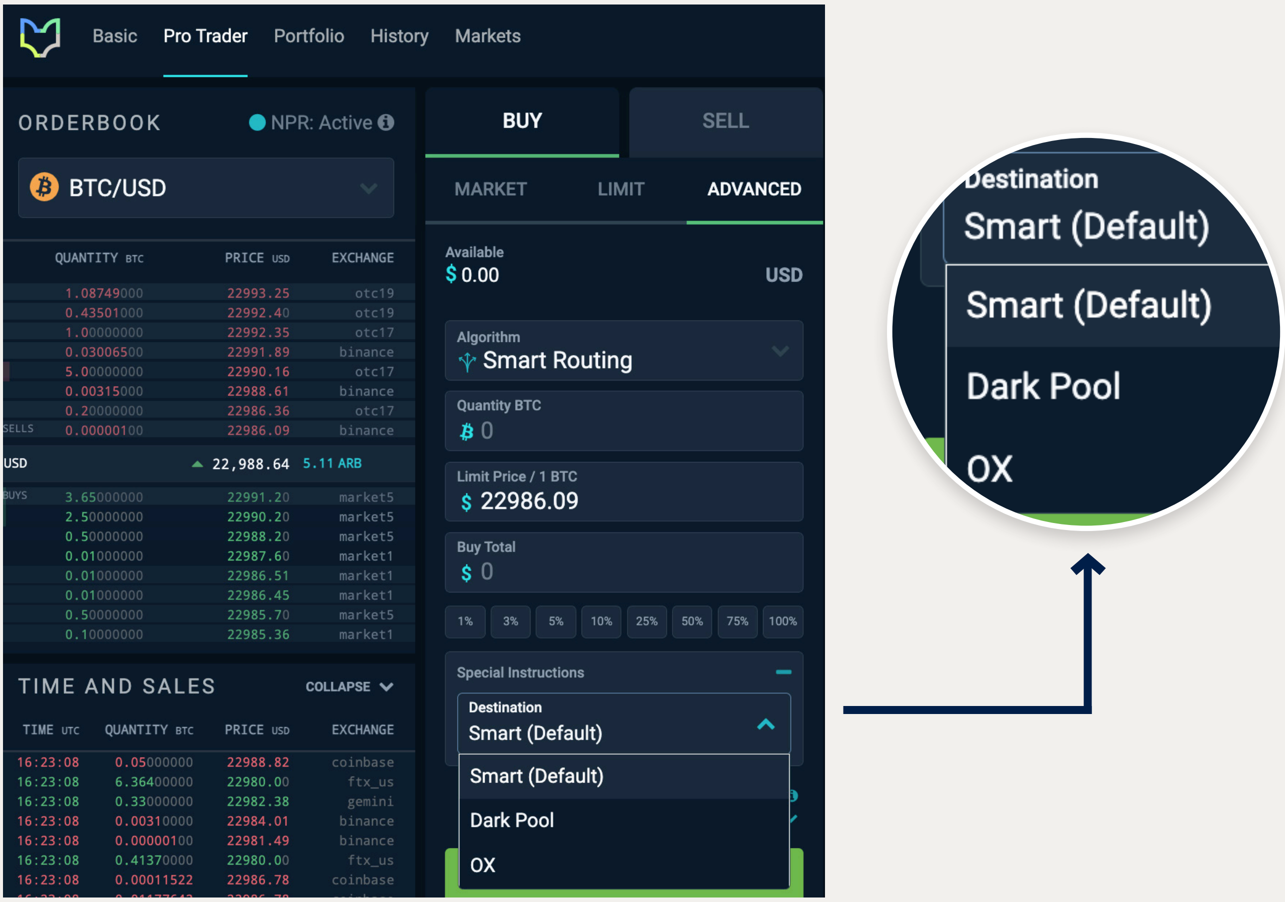


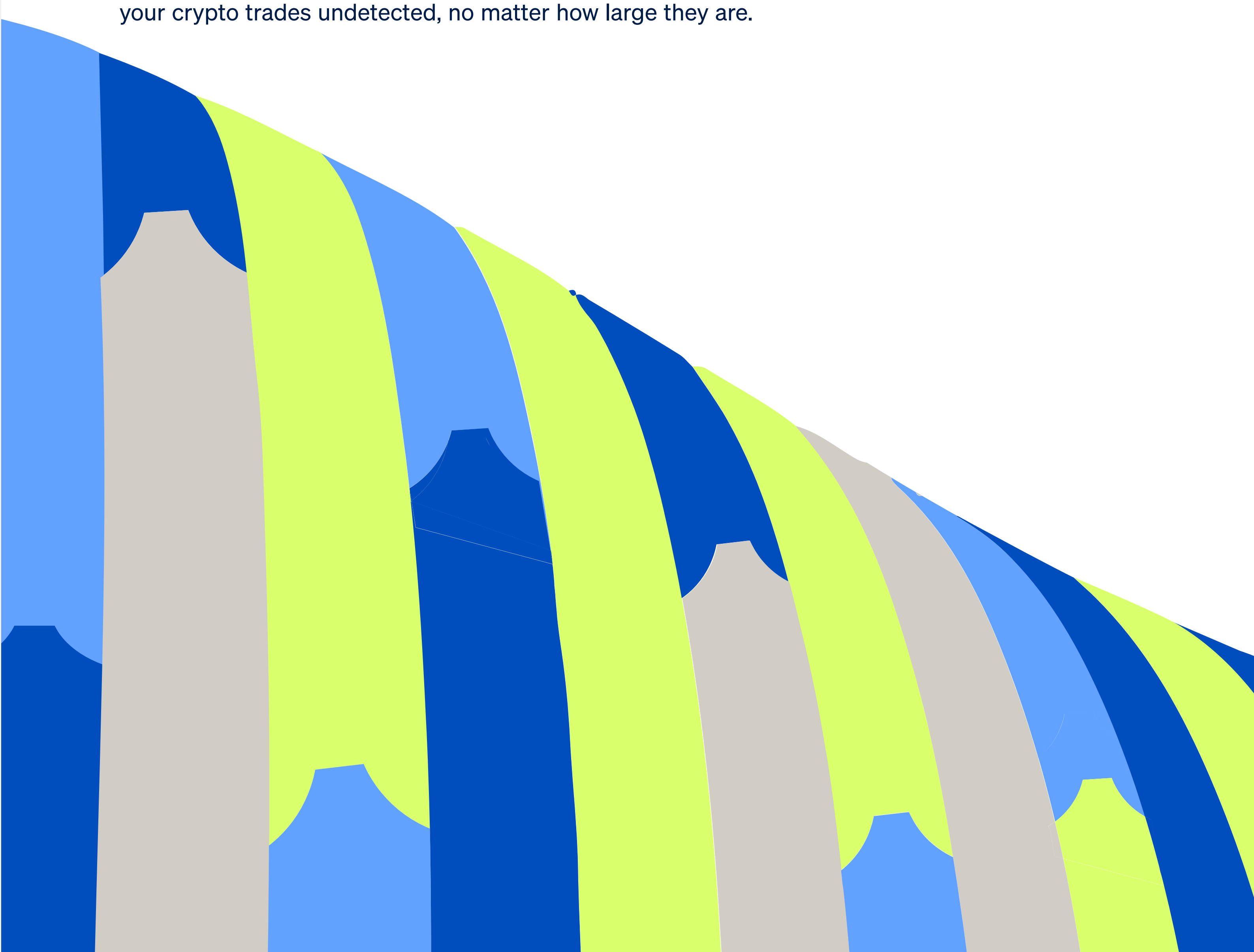
Illustration sFOX UI - Dark Pool Destination

Conclusions

While most of the trades happen on centralized and decentralized exchanges, a big share of crypto trades takes place in so-called dark pools. Dark pools are intended to reduce volatility by obscuring large trades. On the open market, large block sales tend to decrease the stock price, by increasing the supply of the security available to trade. Dark pools allow large institutional holders to buy or sell in large volumes, without broadcasting information that could affect the wider market. This concept has been around for decades in traditional markets but is gaining popularity in crypto too.

For the crypto market - a highly volatile and comparatively newer market that is already challenged by issues like massive pumps and dumps and regular FUDs (Fear, Uncertainty, and Doubt) - a concept like dark trading may bring additional benefits.

The last thing a sophisticated crypto trading strategy needs is to accidentally undermine itself by telegraphing its moves across the market. With sFOX's crypto dark pool, you can count on making your crypto trades undetected, no matter how large they are.



Glossary

Sniper (taker only)	**An aggressive, but hidden order with a limit.**	You set a limit and the router keeps looking for ways to execute child orders at that price or better. If parts are unfulfilled, it rests as a maker order in the dark pool (until and unless the router sees another opportunity to take liquidity).	When you want to build or liquidate a large position within certain price parameters, while hiding the overall intent of your order.
Gorilla	**Like a hare order (see above), but optimized for large orders.**	You set a limit and the smart router breaks the order into smaller pieces and places them one at a time on the liquidity provider with a price equal to or better than your price.	When you want to build or liquidate a large position without crossing the bid/ask spread and want to get the best price without signaling the market.
Polar Bear (taker only)	**An order that only takes from the best bid or ask until the order is completely filled.**	You set a limit and the router takes orders from only the top of the book until the order is filled. Unfulfilled parts stay in the sFOX Dark Pool until the top of the book reaches your price.	When you want to open or close a large position without signaling the market to the size of your order.
Limit	**An order to buy or sell at a specific price or better.**	sFOX Limit orders can take or cross the bid/ask spread, if there is an opportunity on the other side of the orderbook at a price equal to or better than this order's limit.	Buying or selling as quickly as possible at a specific price or better.
Hare (taker only)	**An order that keeps you in the most competitive position in the orderbook at the price you want or better.**	You set the price at which you want to execute, and the hare puts your entire order in the most competitive position in the orderbook on the liquidity provider with the highest probability of filling your order at a price better than your limit. If another liquidity provider has a better opportunity, hare jumps you to the most competitive spot on that exchange. And if an order is placed in the queue that would bump yours, the hare jumps you over it to maintain your competitive position up to your limit price.	When you don't want to cross the bid/ask spread and want your order to remain competitive without having to cancel and replace limit orders.

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