



ETF Liquidity & Trading

Agenda

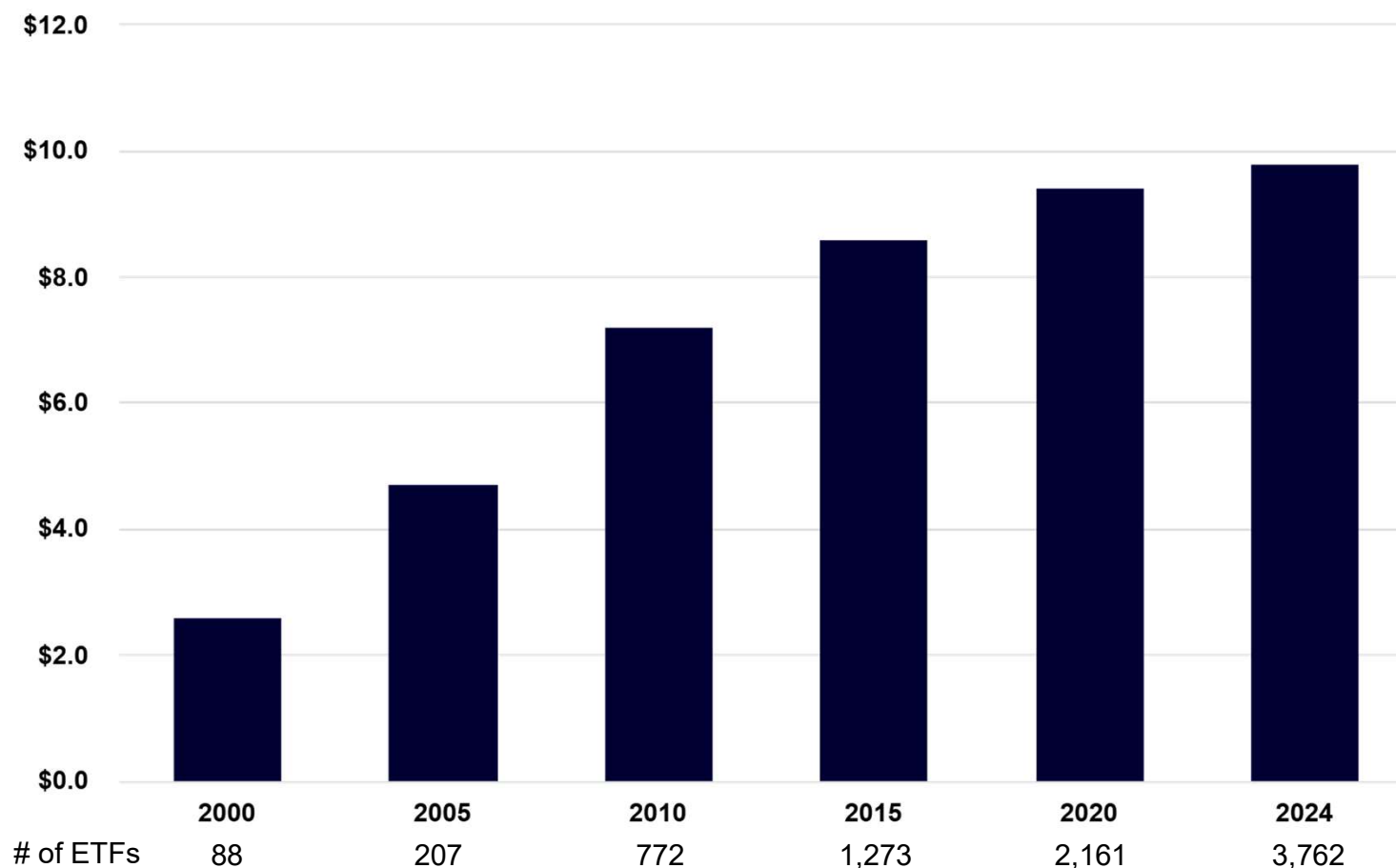
01	Current ETF Marketplace	07	Spread and Premium Discounts
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05	Three levels of Liquidity	11	Good Trading Habits
06	ETF Trading Decision Tree		

Current ETF Marketplace



I Total Net Assets and Number of ETFs Rose in 2024

Trillions of dollars, year-end



Source: Morningstar Direct as of September 3, 2024

ETFs vs Mutual Funds



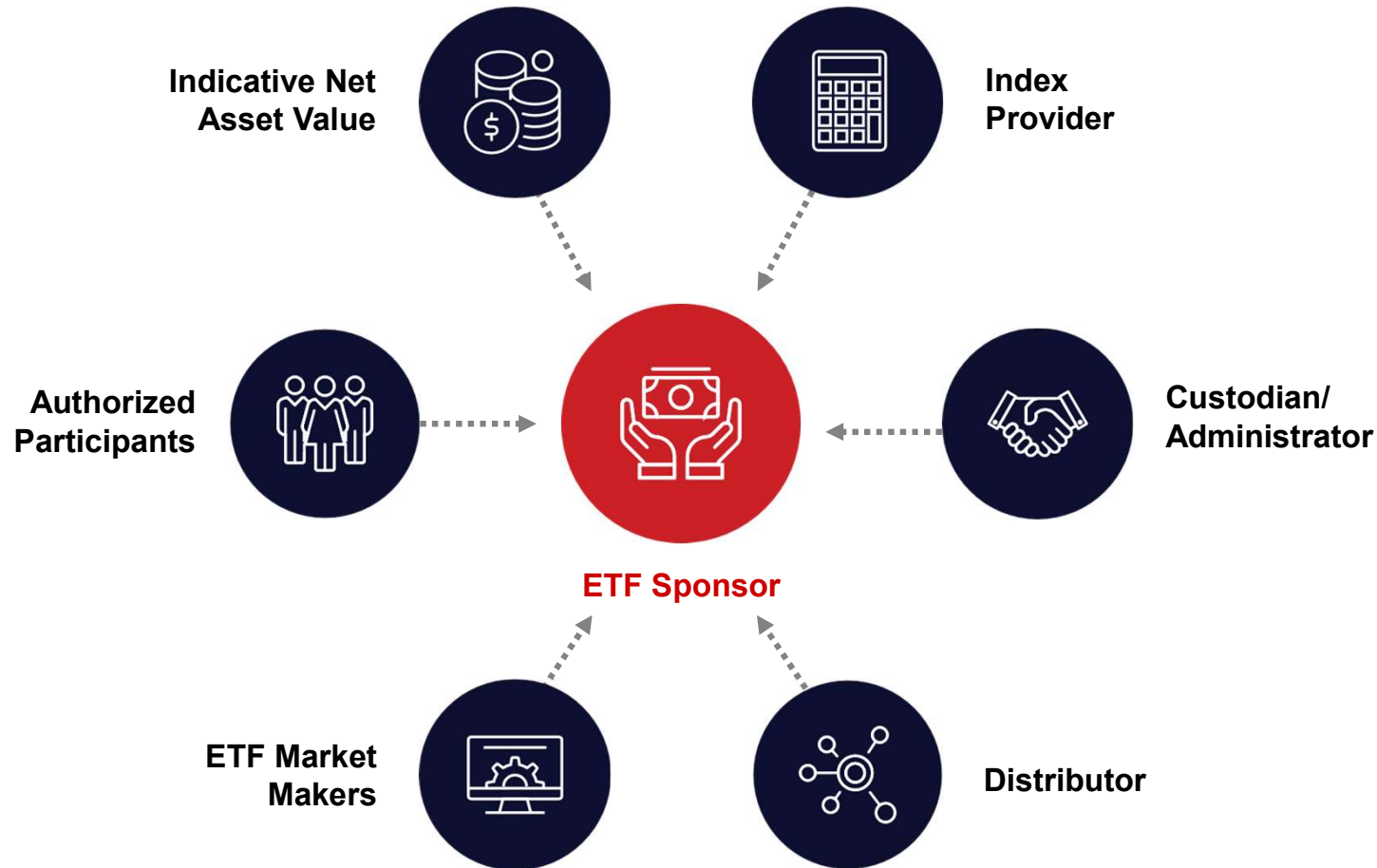
A World of Differences		
	Mutual Funds	ETFs
Purchases & Sales	Buyer may purchase directly from the fund company or through a brokerage firm.	Traded on an exchange; cleared through a broker.
Pricing	Priced once per day at the end of the day; price based on NAV of fund's holdings.	Priced continuously throughout the day while financial markets are open; may be priced at a premium or discount to NAV.
Capital Gains Taxes	May require manager to buy or sell underlying holdings to accommodate inflows and outflows or to reallocate assets, which creates potential capital gains liabilities.	Shares of individual securities exchanged in-kind for ETF shares to accommodate inflows and outflows generally does not create taxable capital gains.
Transaction Costs	No transaction costs for no-load funds (fees may apply when buying or selling through a brokerage platform).	Brokerage commission and bid/ask spread applies on each purchase or sale.
Client Services	Services provided by the fund company or advisor .	Services provided by the selling advisor or brokerage firm; fund sponsor not involved in servicing accounts.

Exchange-Traded Products



	ETF	ETN	ETC	ETV
Structure	<ul style="list-style-type: none"> • Open-ended fund • Registered under 33' and 40' Act • Cash dividend reinvestment • In-kind or cash purchase and redemption 	<ul style="list-style-type: none"> • Unsecured debt of a corporation or bank • Registered under Securities Act of 1933 • No voting rights • Cash purchase and redemption 	<ul style="list-style-type: none"> • Pooled commodity vehicles • Registered under Securities Act of 1933 Commodity Pool • Limited voting rights • Cash purchase and redemption • Contingent redemption rights 	<ul style="list-style-type: none"> • Typically, a Granter Trust Registered under Securities Act of 1933 • In-kind purchase and redemptions • No voting rights • Contingent redemption rights
Investment	<ul style="list-style-type: none"> • May replicate or sample an index; may be managed actively May invest in derivatives • Equities, fixed-income, financial futures, swaps, options • Securities lending available 	<ul style="list-style-type: none"> • Tracks an index • Implies investment as well as credit risk of the underlying issuer • No securities lending 	<ul style="list-style-type: none"> • Exchange-Traded and Over-the-Counter (OTC) commodity futures, forward contracts, options, swaps • Equities, fixed income, financial futures, commodities and commodity futures, swaps, options currencies • No securities lending 	<ul style="list-style-type: none"> • Physically held metals and foreign currencies (with interest) • No securities lending
Tax Treatment	<ul style="list-style-type: none"> • Conduit treatment of realized gains and income via form 1099-DIV 	<ul style="list-style-type: none"> • Capital gains realized by note holders on sales or redemption of notes • Uncertain tax status 	<ul style="list-style-type: none"> • Reporting on Schedule K-1 	<ul style="list-style-type: none"> • Granter trust passthrough treatment of the trust's gains, income, losses and expenses: variable tax consequences under Internal Revenue Code rulings
Asset Custody	<ul style="list-style-type: none"> • Segregated custody account 	<ul style="list-style-type: none"> • Uncollateralized obligation 	<ul style="list-style-type: none"> • Segregated custody account 	<ul style="list-style-type: none"> • Potential credit exposure through depository accounts

Who are the Outside Service Providers & What Do They Provide?



Who are the Outside Service Providers

& What Do They Provide?

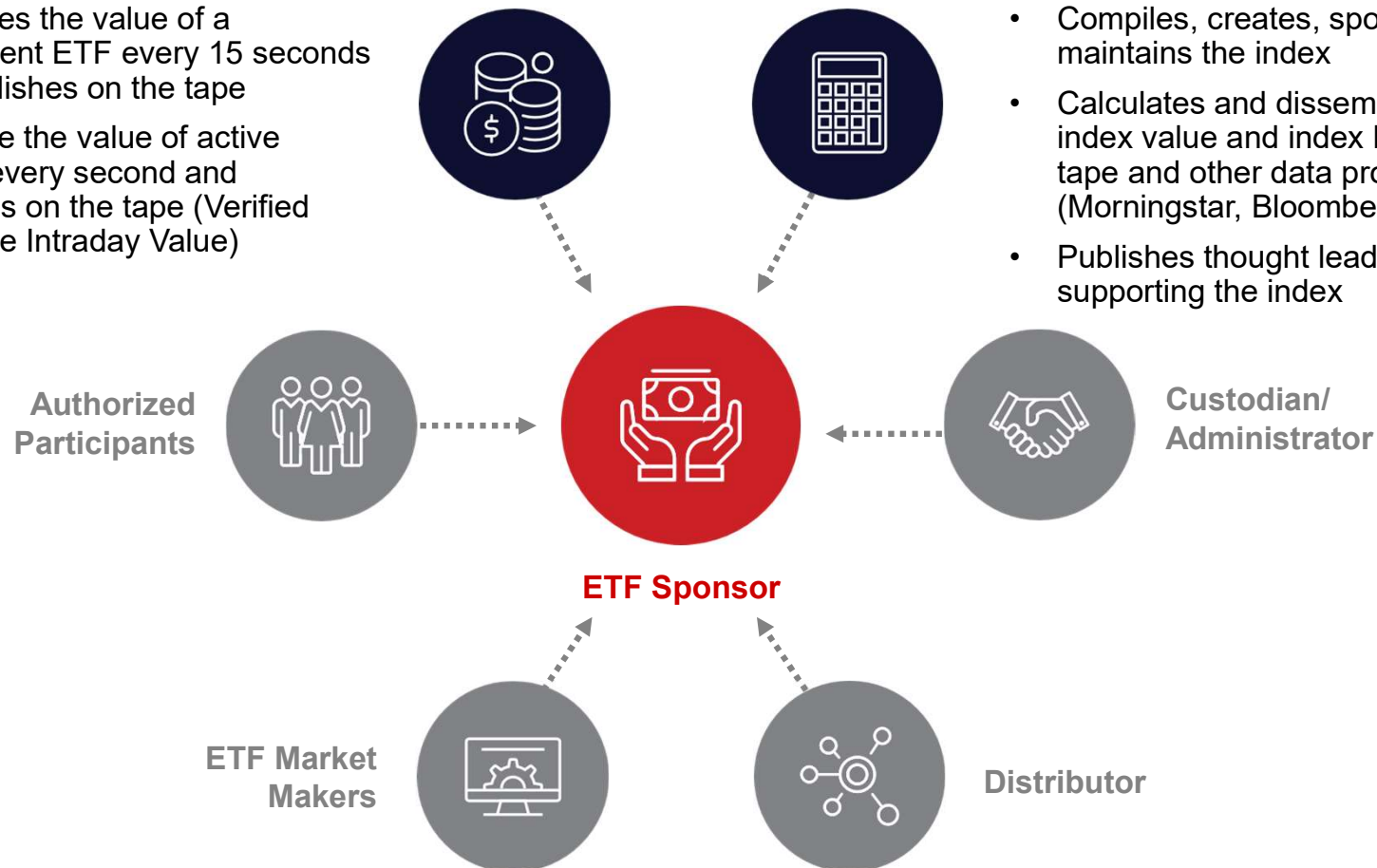


Indicative Net Asset Value

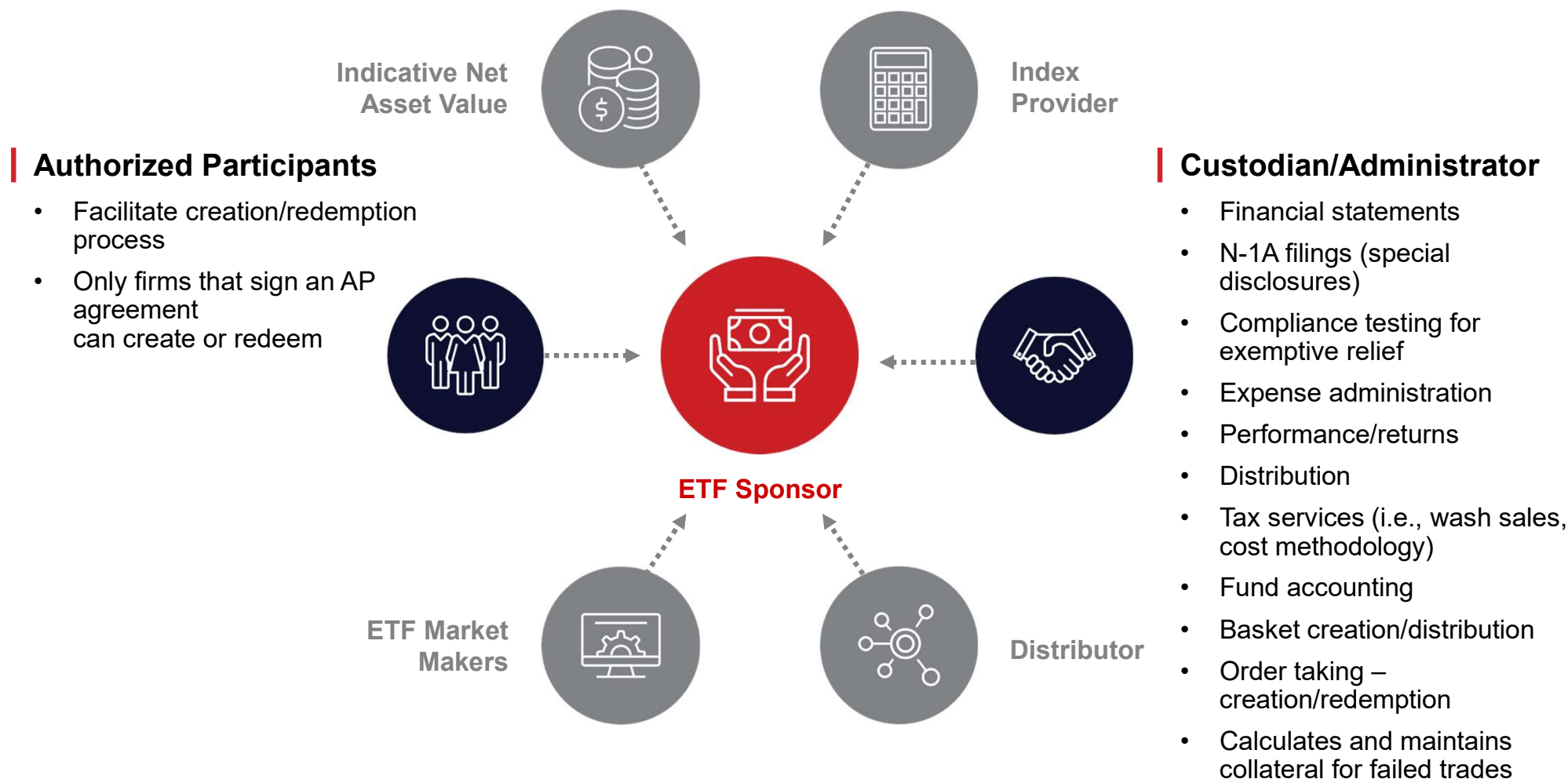
- Calculates the value of a transparent ETF every 15 seconds and publishes on the tape
- Calculate the value of active shares every second and publishes on the tape (Verified Indicative Intraday Value)

Index Provider

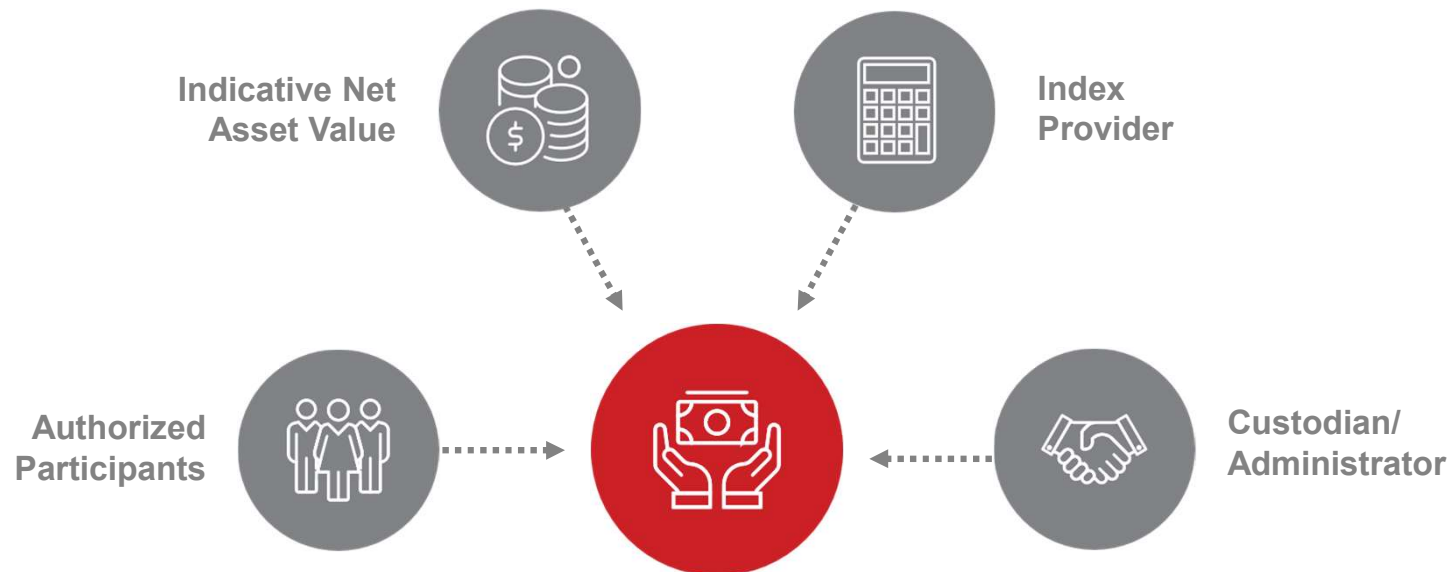
- Compiles, creates, sponsors and maintains the index
- Calculates and disseminates the index value and index history to the tape and other data providers (Morningstar, Bloomberg, etc.)
- Publishes thought leadership supporting the index



Who are the Outside Service Providers & What Do They Provide?



Who are the Outside Service Providers & What Do They Provide?



ETF Market Makers

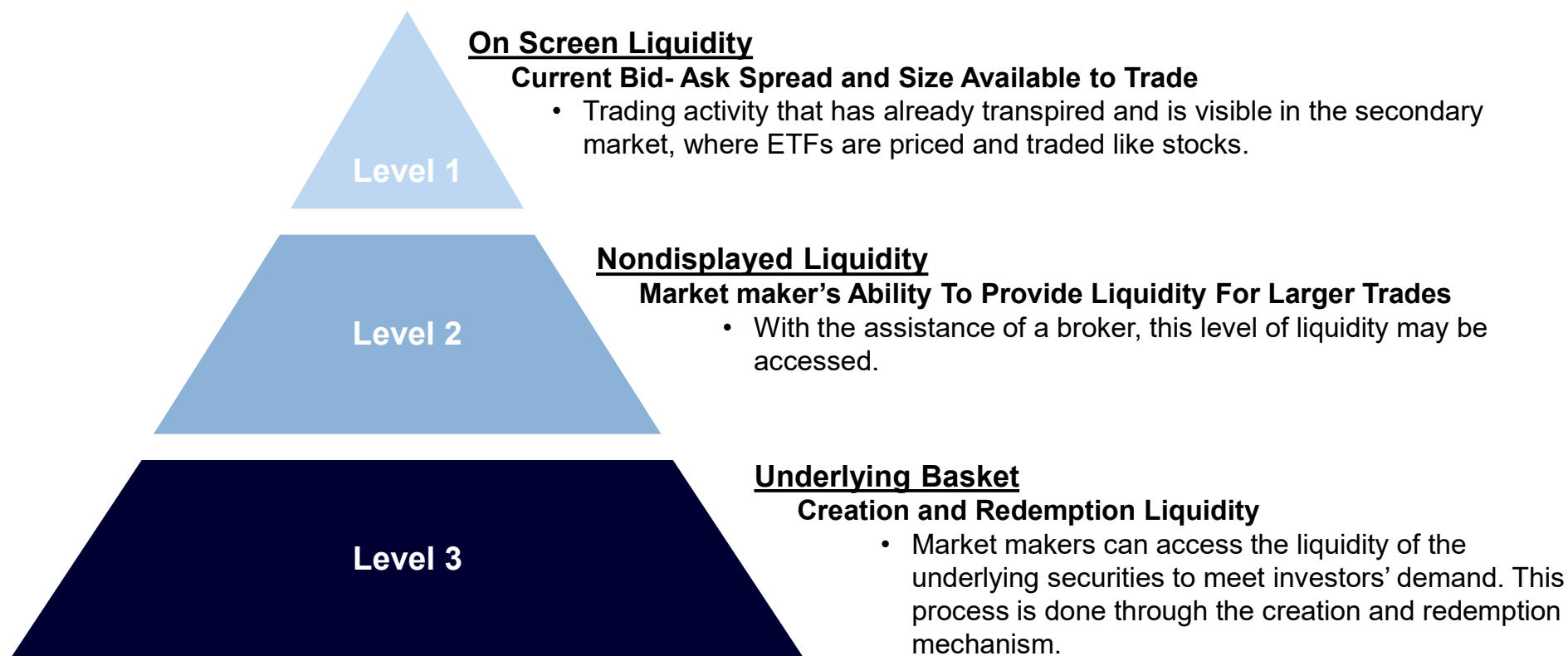
- Provide two-sided quotes throughout the day
- Create liquidity in the secondary market
- Handle principal/agency trading
- Perform trading on screen or block/negotiated

ETF Sponsor

Distributor

- Order approval
- Financial Industry Regulatory Authority (FINRA) compliance
- Broker/Dealer to hold licenses
- Toll-free investor support
- Authorized participant agreements
- Chief Content Officer if needed
- Compliance for the board if needed

ETF's Have Multiple Levels of Liquidity



Level 1 of Liquidity



I Example of Bid / Ask Spread

- Stock Prices are influenced by supply and demand.
- High Demand for a stock usually increases its price because many buyers are competing for limited shares.
- If more share holders want to sell than buy, the stock price typically decreases.
- The simplest stock trade occurs by matching a buyer and seller in the secondary market. The NBBO displays the best public bid and ask prices from market makers on an exchange.
- The NBBO indicates where investors can trade a stock at a given time. Trades larger than the NBBO may cause the stock price to move.
- The difference between the bid and ask, called the spread, is an additional cost to investors, along with trading commissions.

I Bid / Ask Spread

The Foundation of Stock and ETF trading is the bid/ ask spread:

- **Bid:** The highest price that a buyer is willing to pay for a security.
- **Ask (Or Offer):** The lowest price a seller is willing to accept for a security.
- **Bid / Ask Spread:** The difference between the bid and ask prices, which represents the implied cost to trade a security.

Consider the following example for Security A:

BID	\$10.50
ASK	\$10.55
BID/ASK SPREAD	\$0.05

- An investor buying security A at the current market price would pay \$10.55, while a seller would receive \$10.50.
- The market maker earns the bid / ask spread as compensation for the risk of facilitating the trade. Wider spreads often reflect greater risk, whether from holding inventory that may lose value or from potential mispricing of the security.

Level 1 of Liquidity



I Example of Bid / Ask Spread

- Differences in ETF bid-ask spreads can significantly impact trading costs and total returns, so investors should consider them when making decisions.
- A tip on comparing ETF spreads: A wider spread doesn't mean an ETF is more expensive than one with a smaller spread. Here's an example: ETFs A and B have similar exposures and identical attributes.

	ETF A	ETF B
BID	59.97	24.98
ASK	60.00	25.00
SPREAD	0.03	0.02
COST OF SPREAD	$.03/60.00 = 5 \text{ bps}^*$	$.02/25.00 = 8 \text{ bps}$

I Explanation

- Investors should compare the percentage impact of spreads on share price rather than absolute spreads. Despite a wider spread, ETF A is cheaper to own than ETF B due to equivalent exposures and attributes.
- ETF investors should monitor the NBBO, particularly the size of market offers to buy or sell, to gauge potential price movements.
- To Prevent an order from impacting the ETF price beyond the NBBO, it's recommended to use a limit order.

Level 2 of Liquidity



ETF Market Depth

- NBBO quotations show the liquidity (price and size) from market makers on stock exchanges but do not reflect the full depth of the ETF marketplace.
- Market makers can display multiple quote levels, but average investors might not see this easily. Broker dealers and ETF desks can access market depth, and placing a limit order slightly beyond the NBBO can reveal it.
- The difference beyond the NBBO represents additional costs for market makers providing liquidity.

Liquidity: An alternate Perspective

- In Some ETFs, like high yield bond ETFs, secondary market volume can exceed the on-screen liquidity of the underlying securities.
- While underlying bonds might trade infrequently, their ETF counterparts can be traded widely.
- This shows how an ETF can add an extra layer of liquidity for the underlying securities, inverting the traditional three layers of liquidity.

TXS US Equity									
95 Settings									
Exchanges: <input checked="" type="checkbox"/> US <input checked="" type="checkbox"/> ARCA (All) <input type="checkbox"/> BYX <input type="checkbox"/> EDGA <input type="checkbox"/> EDGX <input type="checkbox"/> BZX <input type="checkbox"/> NYSE American <input type="checkbox"/> NYSE Oper									
1 Price Book 2 Order Book 3 Broker Book 4 Dual Book									
E	Time	Total	Mmkr	Size	Bid	Ask	Size	Mmkr	Total
P	10:40	28	ARCX	28	30.39	30.46	3	ARCX	3
Z	10:39	53	BATS	25	30.39	30.46	7	MEMX	10
Y	10:39	78	BYXX	25	30.39	30.47	25	ARCX	35
C	10:39	103	CINN	25	30.39	30.47	25	BATS	60
K	10:39	128	EDGX	25	30.39	30.47	25	BYXX	85
G	10:39	153	MEMX	25	30.39	30.47	25	CINN	110
B	10:39	178	NQBX	25	30.39	30.47	25	EDGX	135
T	10:39	203	NSDQ	25	30.39	30.47	25	NQBX	160
N	10:39	228	NYSE	25	30.39	30.47	25	NSDQ	185
P	10:40	253	ARCX	25	30.38	30.47	25	NYSE	210
P	10:35	278	ARCX	25	30.37	30.62	1	ARCX	211
P	10:31	279	ARCX	1	30.22	30.65	1	ARCX	212
P	10:22	280	ARCX	1	30.19	30.66	36	ARCX	248
P	10:22	347	ARCX	67	30.16	30.67	31	ARCX	279
P	10:31	348	ARCX	1	30.14	30.69	0.01	ARCX	279.01
		437.38		89.38	Under	Over	67.08		346.09
LD 27.32 - Price Limits - LU 33.40									

The NBBO shows 2,500 shares at \$30.39 at the bid and 700 shares at 30.46 at the ask. An additional 20,300 shares can be sold at that bid price and 300 shares at the offer price

2,500 shares can be sold at a penny less (\$30.38): for a penny more, an investor can purchase an additional 2,500 shares at (\$30.47)

Level 2 of Liquidity



I What Matters is What the ETF is Holding

TXS - Top 20 Holdings As of 10/8/24

Symbol	Company Name	Portfolio Weight	Average Volume	Approx. Average \$ Amount*
THC	TENET HEALTHCARE	4.47%	1,186,928	\$182,869,997
TSLA	TESLA INC	4.43%	87,611,360	\$21,118,718,328
DLR	DIGITAL REALTY	3.82%	1,604,390	\$255,306,581
CRWD	CROWDSTRIKE HO-A	3.82%	7,496,964	\$2,236,644,240
SCHW	SCHWAB (CHARLES)	3.60%	9,735,750	\$649,374,525
XOM	EXXON MOBIL CORP	3.59%	14,384,973	\$1,756,261,354
WM	WASTE MANAGEMENT	3.50%	1,524,356	\$323,514,074
MCK	MCKESSON CORP	3.39%	1,022,246	\$513,290,162
CCI	CROWN CASTLE INC	3.37%	2,324,667	\$259,130,630
CBRE	CBRE GROUP INC-A	2.55%	1,619,896	\$195,845,426
ORCL	ORACLE CORP	2.47%	8,377,634	\$1,493,648,366
GME	GAMESTOP CORP-A	2.42%	10,062,979	\$206,291,070
LNG	CHENIERE ENERGY	2.37%	1,449,159	\$276,760,386
DHI	DR HORTON INC	2.29%	2,472,326	\$458,023,115
WING	WINGSTOP INC	2.23%	406,414	\$163,699,495
COP	CONOCOPHILLIPS	2.07%	6,695,593	\$743,009,955
SYU	SYSCO CORP	2.01%	3,210,073	\$239,503,547
PWR	QUANTA SERVICES	1.87%	862,287	\$265,248,104
KMI	KINDER MORGAN IN	1.74%	13,845,729	\$325,097,717
SCI	SERVICE CORP INT	1.74%	973,590	\$71,695,168
TPL	TEXAS PACIFIC LA	1.44%	95,132	\$93,243,630

*Stock Analysis as of October 8, 2024

Holdings are subject to change and do not constitute a recommendation or solicitation to buy or sell a particular security. Current and future portfolio holdings are subject to risk.

Level 3 of Liquidity



I ETF Share Redemption

- The primary market provides ETF liquidity through the creation and redemption mechanism.
- Brokers, dealers, or market makers use underlying securities to meet ETF share demand.
- Authorized Participants (APs) are brokers or dealers authorized to create or redeem ETF shares directly with the fund.
- APs handle the creation or redemption process, typically in batches of 50,000 or 100,000 shares.

I Redemption Process Ensures Liquidity and price Stability

- The creation and redemption process balances supply and demand.
- This mechanism keeps the EETFs price close to the value of its underlying securities.
- It helps the ETF remain liquid and maintain price alignment with its assets.
- For large orders, an ETF block desk can assist investors in accessing all layers of ETF liquidity, including primary markets.

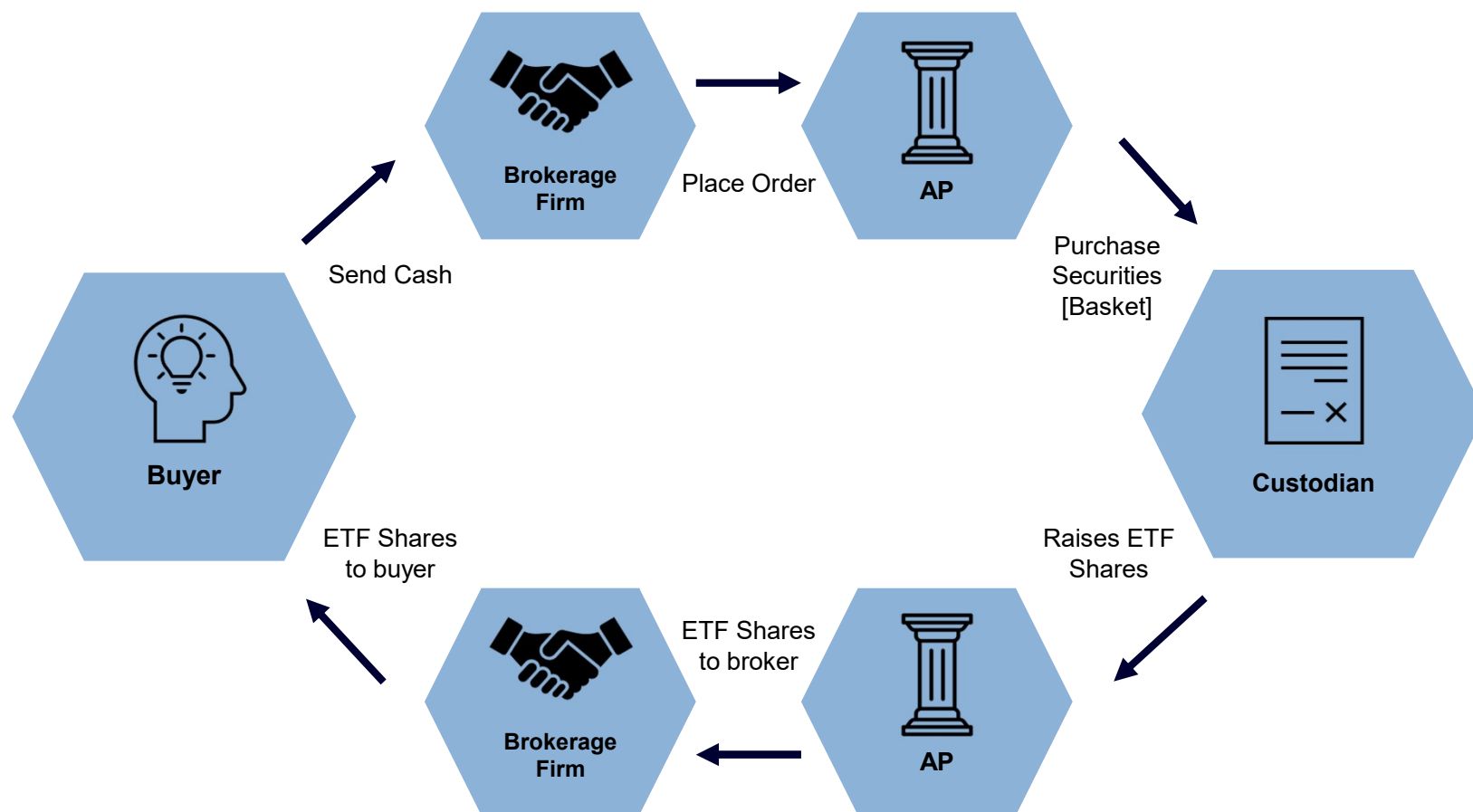
I How does the Creation and Redemption Mechanism Work?

- When demand exceeds supply, ETF share creation starts.
- An Authorized Participant (AP) assembles a portfolio of the ETF's current holdings.
- The value of this portfolio matches the number of ETF shares delivered.
- ETF share redemption reverses the process to remove excess supply from the market.

Level 3 of Liquidity



ETF Creation / Redemption Mechanism



Putting it all together: Trade Execution



ETF Trading Decision Tree Example

Level 1

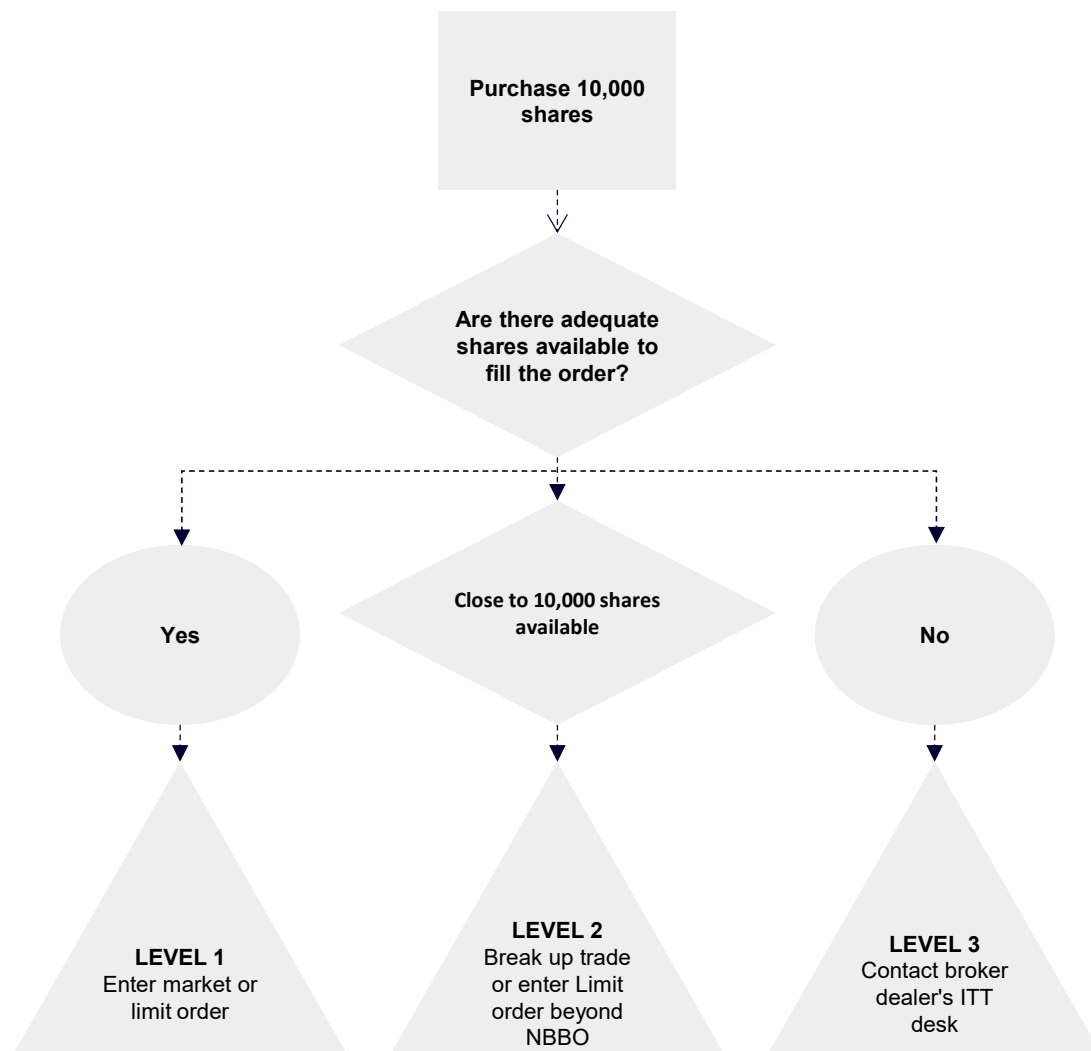
- With 10,000 shares of the ETF available, the investor can place a limit or market order to buy or sell.

Level 2

- If an investor wants to trade 10,000 shares but only 7,500 are available at the ask, they can either split the trade into multiple orders or place a limit for the full amount slightly below the NBBO. A limit order sets the execution price but doesn't guarantee the trade will be completed at that price.

Level 3

- If there aren't enough shares available, an investor may need to adjust the limit price to attract more market participants. Typically, once the limit price covers the market maker's cost, the order will be filled.



ETF Trading - Spreads



Factors of Spread & Premium/Discounts



Type of Underlying Securities

Domestic, developed, emerging, etc.



News

Includes company-specific news, country/regional news, and government news



Creation Costs

Includes trading fees, liquidity of underlying assets



Spread of Underlying Securities

Includes market demand, trading volume, and volatility of underlying securities



Volume

The higher the volume, the more likely tighter spreads



Market Uncertainty/ Market Volatility

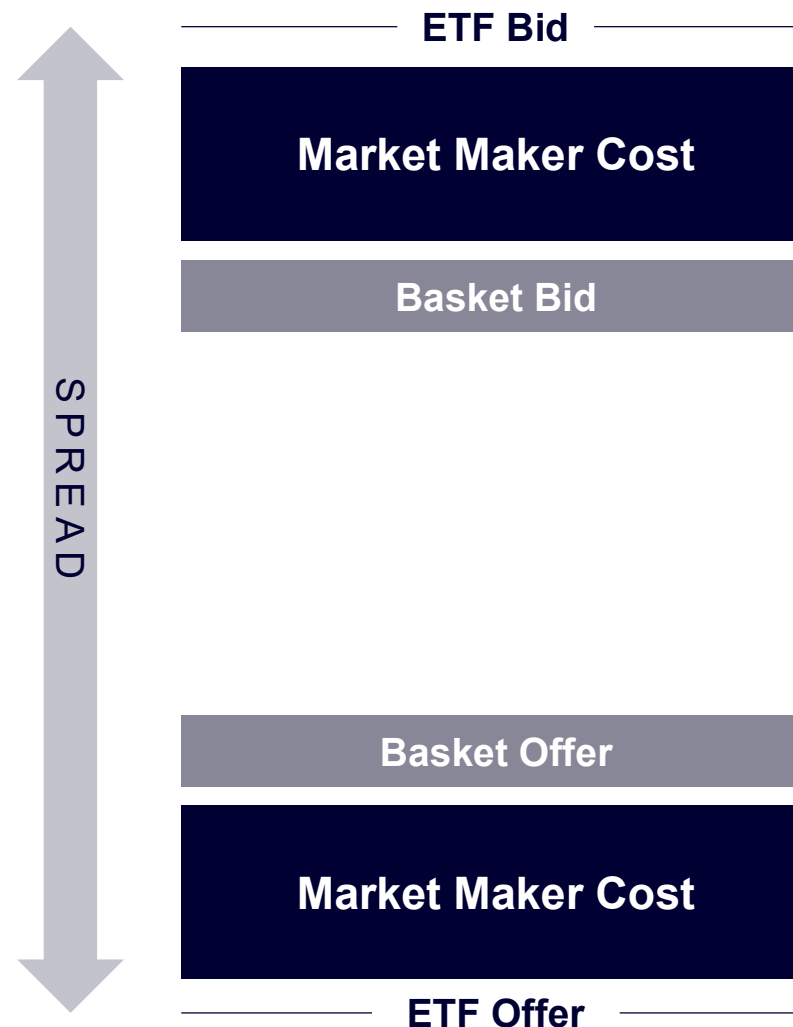
Stem from economic instability and fluctuating investor sentiment

ETF Trading | *Bid-Offer Spread*



ETF Spread

- ETF's price generally moves with the underlying securities values.
- The size of the bid-ask spread of the underlying basket and the ETF is tied to market liquidity.
- The weighted basket spread is the basis of the ETF bid-ask spread.
- **Market maker costs can include:**
 - Operational costs, including commissions, hedging, trading fees.
 - Creation/redemption fees and other miscellaneous fees.

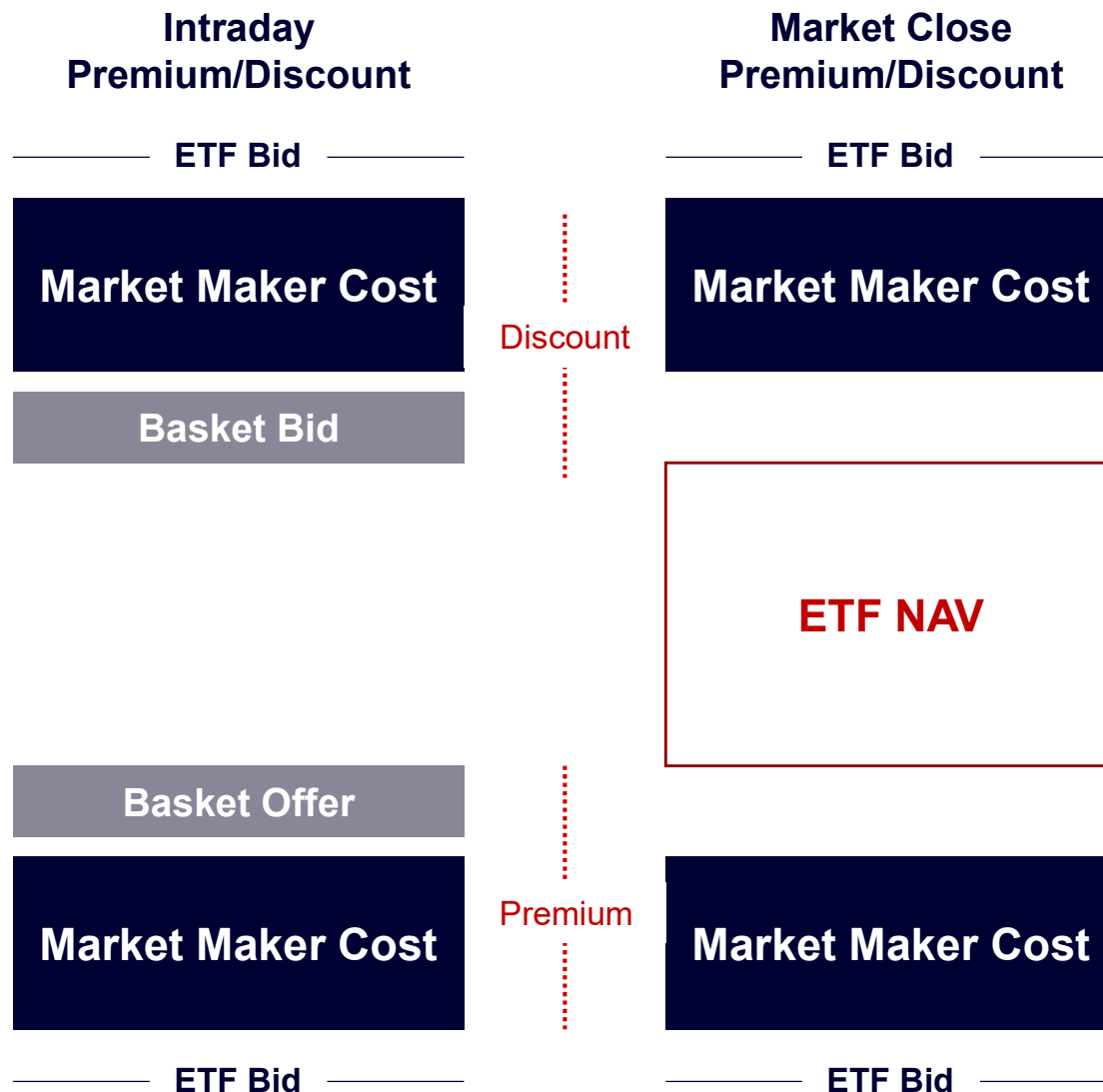


ETF Trading | *Premium & Discount*

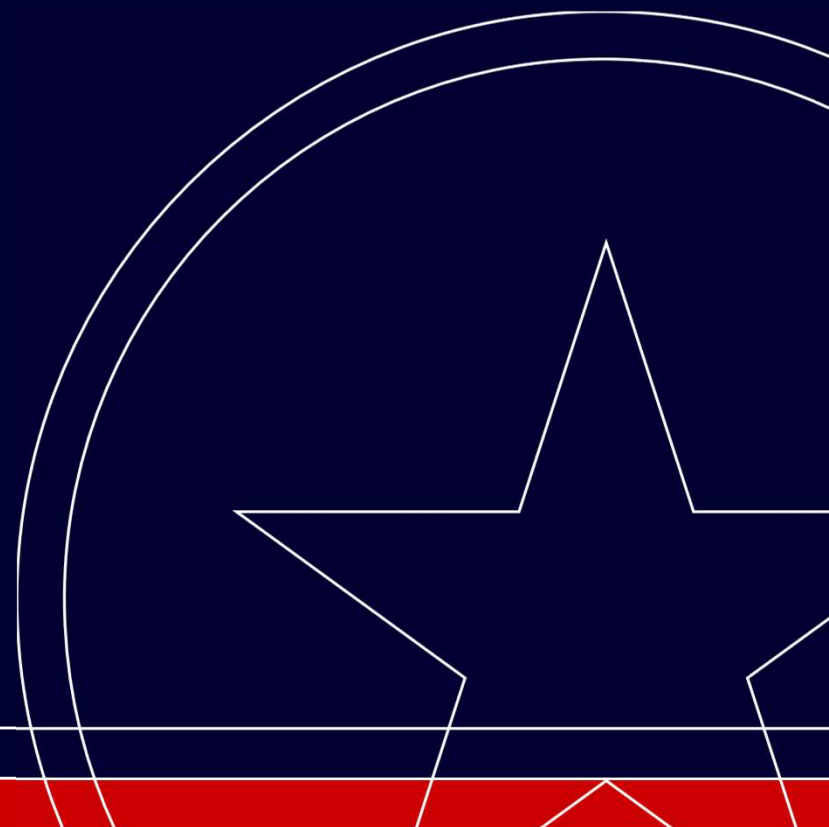


ETF Spread

- Premium and discount represent the difference of the basket bid or offer and the ETF bid or offer during the trading day.
- An end of day premium or discount is the difference between the net asset value and either the ETF closing price or midpoint of the closing bid-ask spread.
- Generally, premiums and discounts occur in the following situations:
 - ETFs that have less liquid portfolio securities.
 - ETFs that have international securities.
 - Pricing delays with the underlying securities.



ETF Trading – Best Practices



Best Practices - Trading Tips and Tactics



	Description	Pricing Control	Execution Control
Market Order	Buy/sell immediately at the best available price	No pricing control; Last listed market price may or may not be the price investor receives	Guarantees execution, not price
Limit Order	Buy or sell at a pre-determined price ["limit price"]	Full pricing control	No guarantee of trade execution
Stop Order	Helps protect gains or minimize losses: if market breaks through stop price, order turns into a market order	Partial pricing control	Partial unless price breaks through stop price due to sudden market drop. When this price is hit, the order goes from a limit to a market order
Stop Limit Order	Help protect gains or minimize losses: If market breaks through stop price, order turns into a limit order, providing investor added protection than a regular stop order	Full pricing control	No guarantee of trade execution

Best Practices - Good Trading Habits



	Consideration	Options To Consider
Avoid trading at market open	In the first few minutes of trading, not all securities included in the ETF basket may have traded yet, leading to pricing inefficiencies and causing spreads to widen.	Its generally best to wait for at least 15 minutes after a market opens to place an ETF trade. This allows time for the underlying securities to open and the buy and sell prices of an ETF to return to normal ranges.
Avoid trading at the end of the day	At the end of the trading day, fewer firms may be available. This can lead to pricing inefficiencies, which in turn can cause spreads to widen and trading costs to increase.	Place trades at least five minutes before market close for better size and depth. Use limit orders to control buy and sell prices but note that not all shares may be executed.
Be aware of exchange hours	U.S. markets are open from 9:30am to 4pm ET. Most European exchanges are closed during US market hours. International ETF trades in the U.S. usually align more closely with their underlying securities' value and have narrower bid-ask spreads when market hours overlap with U.S. trading hours.	For European ETFs, trade while markets are open to allow market makers to price using real-time underlying security prices. For Asia-based ETFs, trade in the afternoon as markets approach their opening to get a clearer view of opening prices.
Be aware of market dynamics	Keep in mind that volatile markets can also spell uncertainty for ETF pricing as prices of the underlying securities move sharply-leading to wider bid/ask spreads.	Always seek to understand what's happening in the broader markets when considering any ETF order. During periods of market volatility, a limit order may be appropriate to help protect against major price swings.

Disclosures



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This material has been prepared for educational purposes only. It is not intended to provide, and should not be relied upon for, investment, accounting, legal or tax advice. Material presented has been derived from industry sources considered to be reliable, but their accuracy and completeness cannot be guaranteed.

The investment return and principal value of an investment will fluctuate so that an investor's shares, when sold, may be worth more or less than their original cost. Unlike mutual funds, shares of ETFs are not individually redeemable directly with the ETF. Shares of ETFs are bought and sold at market price, which may be higher or lower than the net asset value (NAV).

Investors should carefully consider the investment objectives, risks, and charges of the fund before investing. The prospectus contains this information and other information about the fund, and it should be read carefully before investing. Investors can obtain a copy of the prospectus by calling 844.TCB.ETFS (844.822.3837).

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Thank you