SGX
SINGAPORE EXCHANGE

Securities

Understanding Structures and Risks of Exchange Traded Funds

SGX The Asian Gateway

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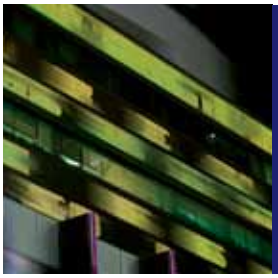

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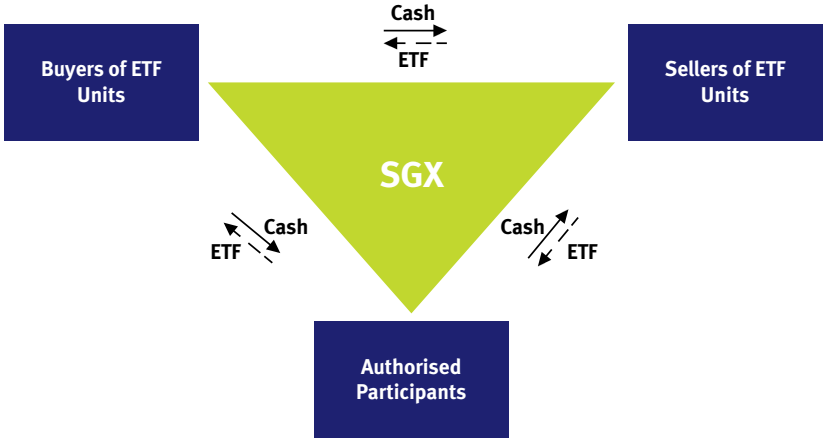
Introduction

In this document, we focus on the recent developments in the Singapore's ETF market, with specific attention paid to potential risks arising from synthetic ETFs[1] and securities lending transactions.

What is an Exchange Traded Fund ("ETF")?

An ETF is an open-ended investment fund[2] that aims to replicate the performance of a published market index. It is listed and traded on a stock exchange, and investors may buy or sell ETF units to participate in the performance of the underlying index which tracks equities, fixed income, commodities or money market instruments. Investors typically use ETF to gain exposure to all the constituents of the index, thereby diversifying their portfolio without having to purchase individual assets underlying the index.



Investors may refer to the SGX website at www.sgx.com for the full list of SGX Listed ETFs.

Generally, investors rely on the net asset value ("**NAV**") of an ETF to estimate the fair value of an ETF, which is calculated once at the end of each trading day. The NAV is published on the issuer's website or SGXNET daily with a time delay.

It is important to note that the NAV of an ETF differs from the price at which it is traded. As an ETF trades like a stock, it is quoted at bid and ask prices on the stock exchange. It could be traded at a price higher than its NAV (at a premium) or below the NAV (at a discount).

[1] Refer to the section titled "Replication Methodologies" for a further discussion on synthetic ETFs.

[2] Open-endedness of an ETF implies that the ETF units in the market are not fixed and subject to market demand where new units can be created/ redeemed from time to time. This is unlike shares which generally have fixed amount of units in the market.

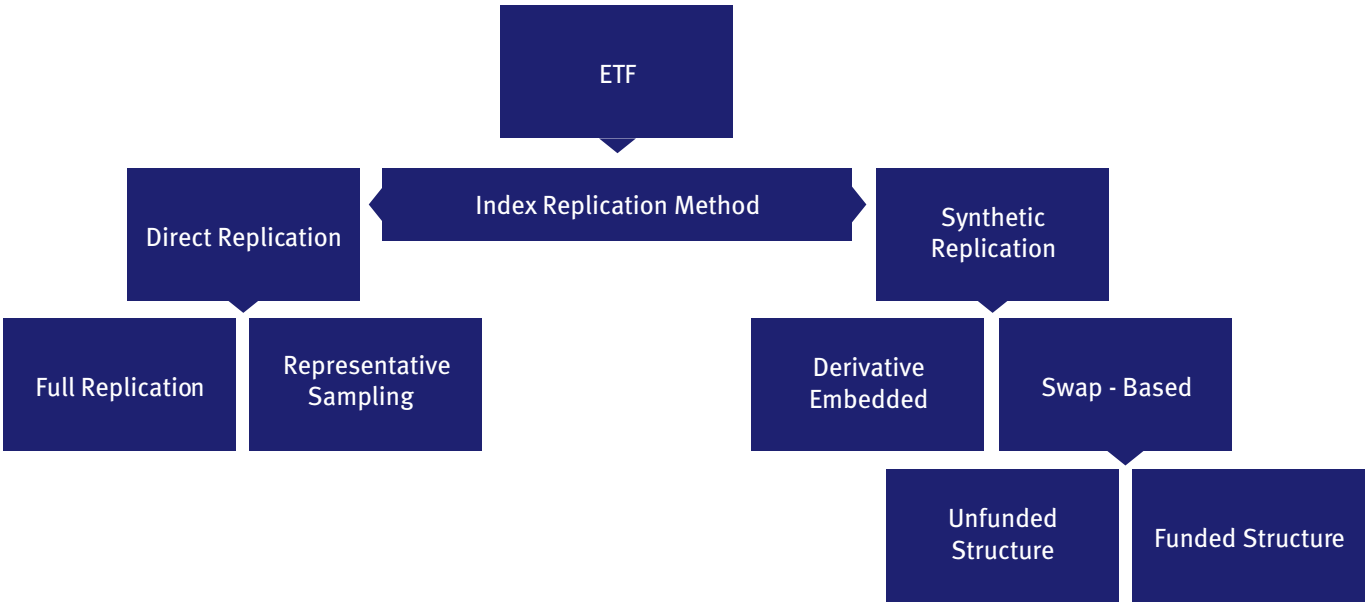
Replication Methodologies

There are two common types of index replication method, namely direct replication and synthetic replication.

The more commonly known replication method, the direct replication method, replicates the performance of an index by investing in the index's constituents. It is also known as cash based ETF or physically replicated ETF. Direct replication comes in two different forms, namely: (a) the full replication, where an ETF would hold all assets underlying an index in the exact proportion with the index; and (b) the representative sampling method, where an ETF will invest in a subset of index constituents, usually the more dominant underlying, to reduce number of securities held while tracking the index as closely as possible. The representative sampling method is generally used when some of the components of the index tracked are not liquid or easily available.

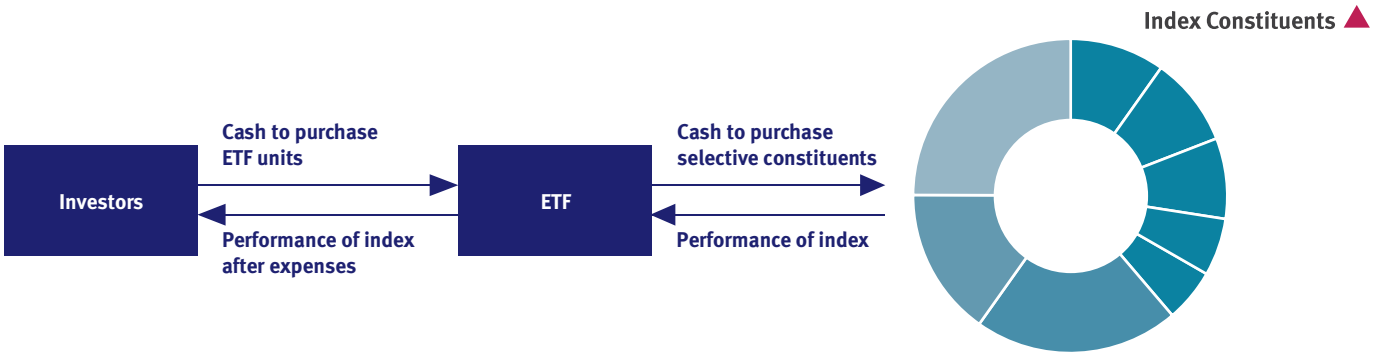
An ETF that uses synthetic replication utilises derivative instruments and/or OTC transactions to replicate the index's performance without directly holding the underlying assets. They further branch into two forms: (a) the derivative embedded ETF that purchases derivative instruments from other counterparty(ies) in exchange for the index performance; and (b) the swap-based ETF that pays a fee or the collateral performance to a third counterparty(ies) in exchange for the index's performance.

For the ease of identification, SGX has required the counter names for all synthetic ETFs to be marked with the symbol "X".



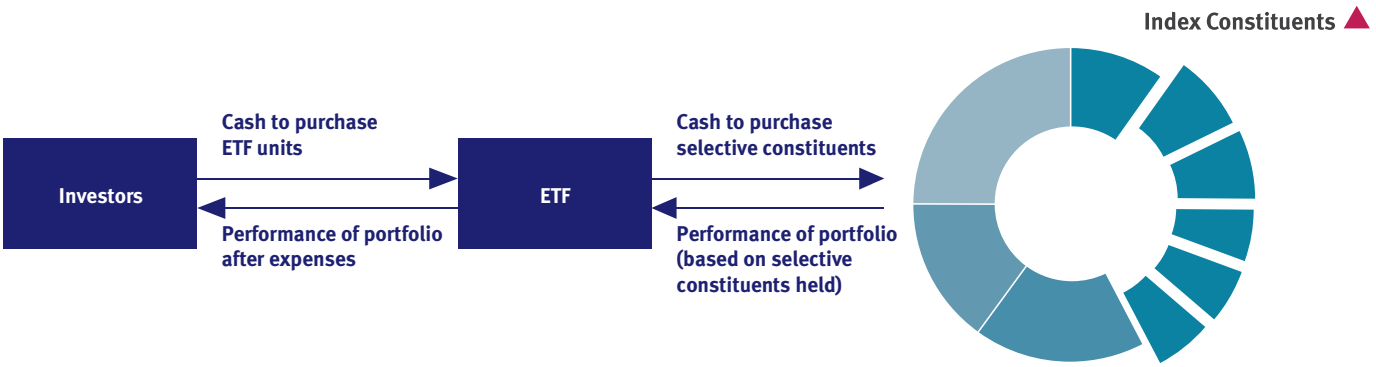
Direct Replication

Full Replication



ETF will directly hold all constituents within the index to replicate the performance of an index. The returns of the ETF's portfolio, after expenses, will be passed on to investors in accordance with the number of ETF units held.

Representative Sampling



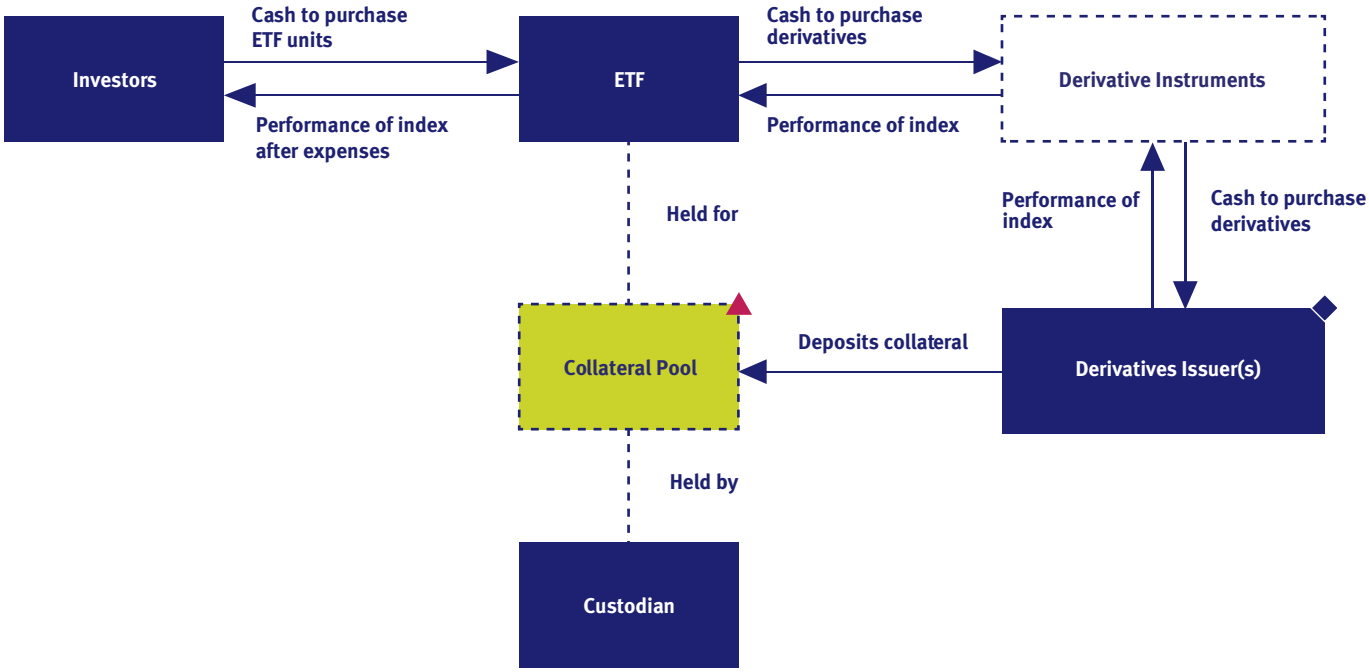
ETF will hold a subset of the constituents of the index to replicate the performance of an index as closely as possible. The returns of the ETF's portfolio, after expenses, will be passed on to investors in accordance to the number of ETF units held.

Note

▲ Please refer to "Securities Lending Risks" in the Risks Section for further details.

Synthetic Replication

Derivative Embedded



A derivative embedded ETF purchases derivative instruments from a third party and these instruments are contractual obligations that binds the issuer(s) to deliver the index performance to the fund. Investors are therefore relying on the creditworthiness of the derivative issuer(s) to deliver the performance of the index to the fund.

A derivative embedded ETF must comply with the net counterparty exposure requirement under the Collective Investment Scheme ("CIS") or the Undertakings for Collective Investment in Transferrable Securities ("UCITS"), where only a maximum of 10% net counterparty exposure is allowed.

With this maximum net counterparty exposure, investors will risk losing only up to 10% of the value of the fund in the event of a counterparty default. Typically, the derivative issuer will deposit collateral for the balance 90% with a third counterparty custodian, and the collateral will be owned by the trustee of the ETF.

Note

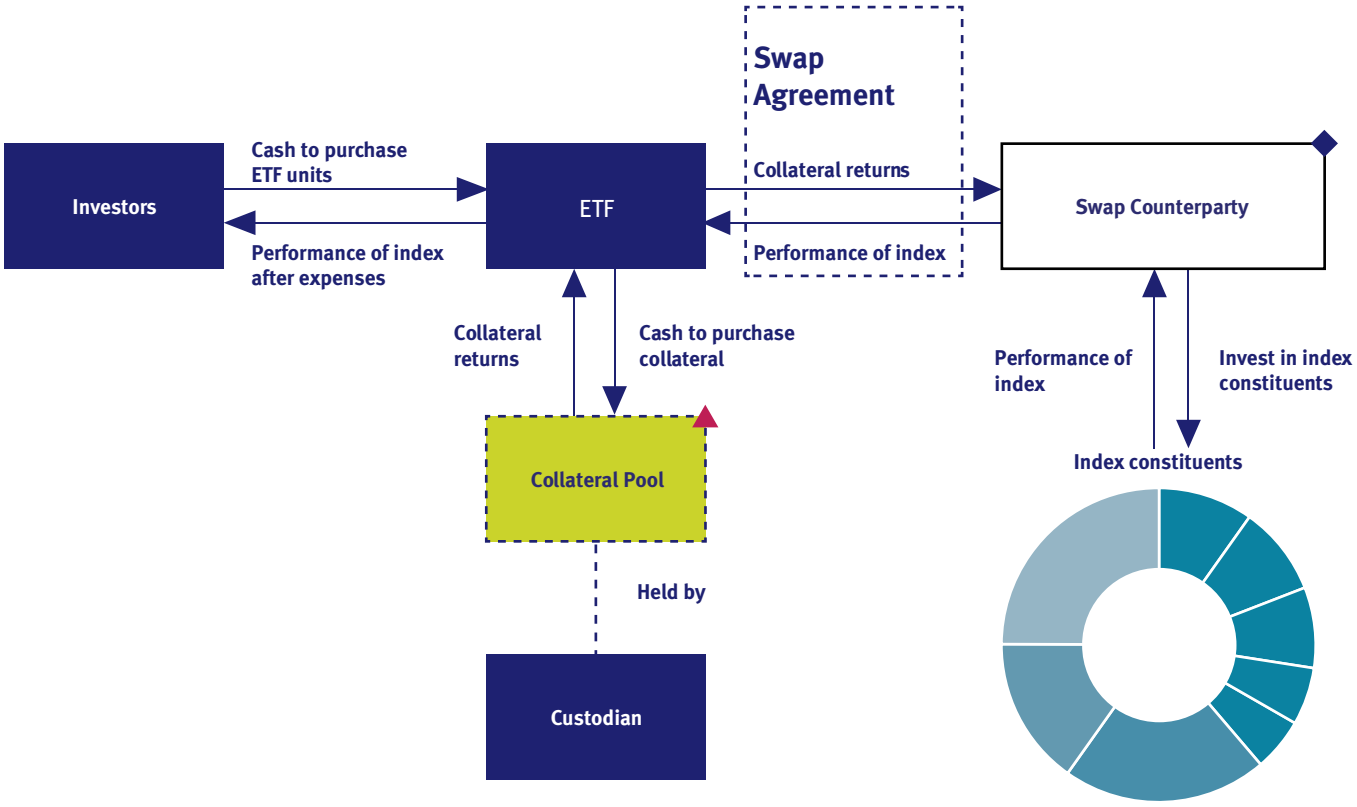
▲ Refer to "Securities Lending Risks" in the Risks Section for further details.

◆ Refer to "Swap Counterparty Risks" in the Risks Section for further details.

Swap Based

Swap Based ETFs listed on SGX must also comply with the 10% net counterparty exposure requirement under either the CIS or the UCITS. In order to comply with the requirement, the swap counterparty must collateralise the ETF, which could be done through two methods - the fully funded structure or the unfunded structure.

Unfunded Swap Based ETF



The unfunded swap based ETF enters into a swap agreement with swap counterparty to obtain the performance of the index. Under the swap agreement, the ETF will be using the proceeds from the sale of units, to purchase and hold a pool of collateral placed with a third party custodian. The returns generated by the collateral held by the ETF, will then be exchanged with the swap counterparty in return for the performance of the index.

Due to the limit imposed on net counterparty exposure, the daily value of the collateral pool must be rebalanced on a daily basis to ensure that its value is at least 90% of the NAV of the ETF. In the event of a default, the ETF may choose to liquidate this pool of collateral to repay its investors.

Note

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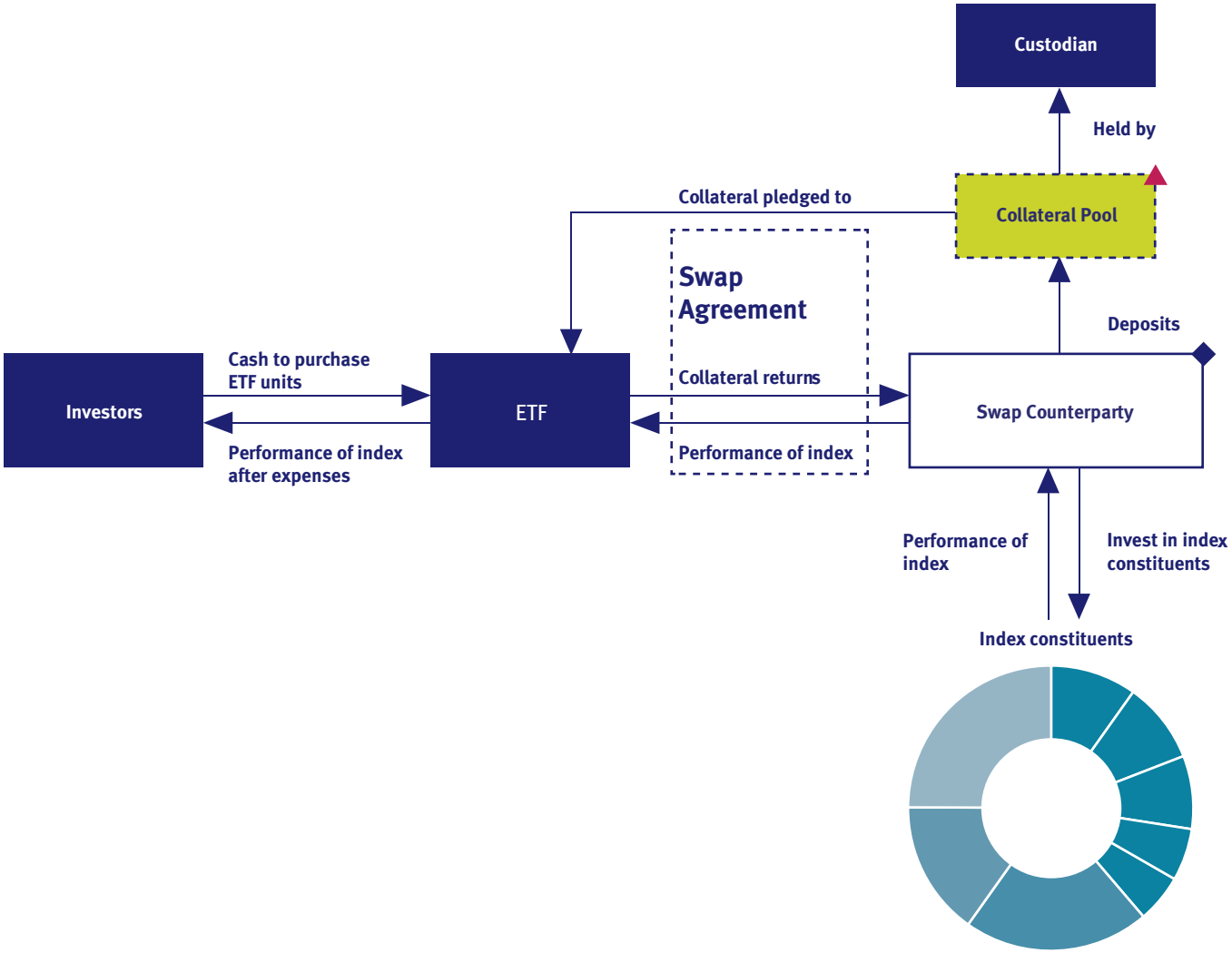
◆ Refer to "Swap Counterparty Risks" in the Risks Section for further details.

Fully Funded Swap Based ETF



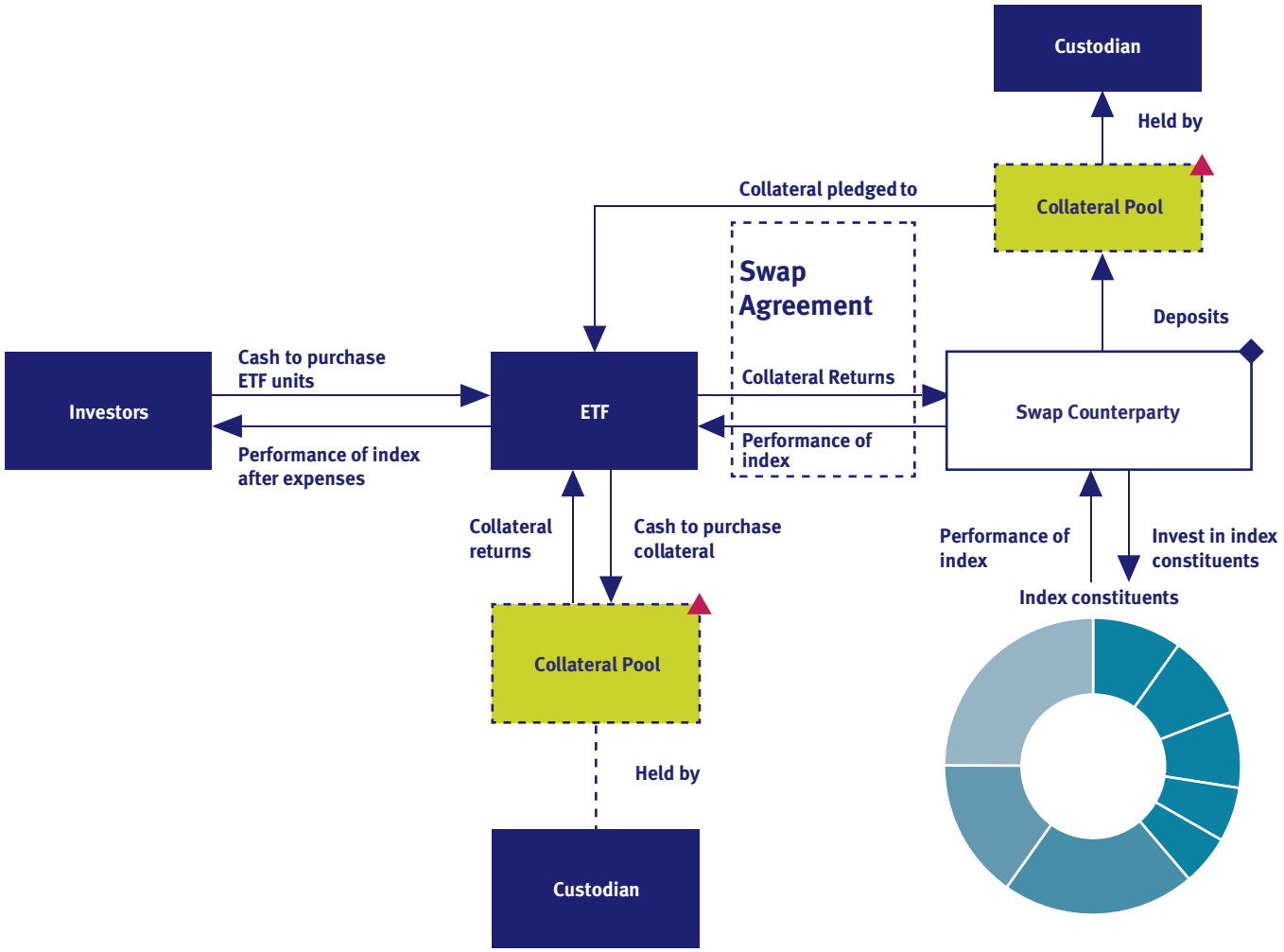
Similar to the unfunded structure, the fully funded swap ETF will be required to deliver performance of the collateral it holds to the swap counterparty in exchange for the performance of the index. However, in this structure, the ETF will be transferring its sale proceeds to the swap counterparty that will purchase a pool of collateral to be placed with a third party custodian. This pool of collateral will also be pledged in favour of the ETF, to be liquidated in the event of a default.

Note

▲ Refer to "Securities Lending Risks" in the Risks Section for further details.

◆ Refer to "Swap Counterparty Risks" in the Risks Section for further details.

Funded and Unfunded Swap Based ETF



The structure is a combination of both funded and unfunded swap arrangements. The ETF enters into a swap agreement with a third party to obtain the performance of the index. The swap will then be collateralised through the adoption of both kinds of swap arrangements, (a) the unfunded swap, where the manager would use proceeds from the sale of ETF units to purchase collateral which will be pledged to the ETF; and (b) the funded swap, where the swap counterparty would deposit collateral with a third party custodian, and pledge the collateral in favour of the ETF. Both methodologies aim to limit the ETF's overall exposure to the swap counterparty to 10% of the ETF's NAV.

Note

▲ Refer to "Securities Lending Risks" in the Risks Section for further details.

◆ Refer to "Swap Counterparty Risks" in the Risks Section for further details.

Risks of an ETF?

Fundamental Risks

Bid-Ask Spreads

In the creation and redemption process, an ETF will be required to acquire or dispose of underlying index securities in order to mimic the performance of the index. If the underlying index securities are illiquid and thinly traded, the availability of underlying will decrease, causing the bid-ask spread[3] of the underlying to widen. The failure of the creation and redemption will cause ETF units to be traded at a premium or discount, and consequently, the tracking error will increase.

Tracking Error

Tracking error is a measure of how the value of the ETF may deviate from the value of the underlying which it tracks. Tracking error arises from various circumstances, such as:

I. **Transaction costs** – the cost of buying and selling of securities, or fees of swap transactions within the portfolio will be charged to the ETF, thereby causing a reduction in performance from its underlying.

II. **Portfolio holdings** – if the assets held in the portfolio are different from the underlying assets tracked, the replicated performance may not be the same as the underlying.

III. **Replication methodology** – synthetic replication will improve an ETF's ability to track, as it is the swap counterparty's obligation to deliver the performance of the underlying, subject to a small fee for the swap arrangement. However, this will expose the ETF to the swap counterparty's default risk.

IV. **Types of investments** – an ETF that buys into futures contracts will be required to roll them repeatedly (where the ETF must sell an expiring contract to buy the next contract at a different price). If price of the next contract is higher, also known as a contango effect, a loss is recorded. If the price of the next contract is lower, a backwardation effect, again is recorded. The gains and losses will affect the performance of the ETF, causing tracking error.

V. **Cash holdings** – such as dividends from the securities held by an ETF, may be held as cash in the ETF until the payout date, and investors will lose out on the possible gain from reinvesting or the interest payment of the holdings.

VI. **Additional features** – an ETF that conducts currency hedging may incur hedging costs in a volatile market, leading to a reduction in the ETF's performance.

Market Risks

As with other securities, the underlying which ETF tracks is susceptible to market volatility. Change of market condition will affect the price of the underlying, which constitutes the NAV of the ETF, leading to a change in price of the ETF.

Foreign Exchange Risks

Foreign exchange risks could arise when (i) the currency of the actual assets held by the ETF differs from the denomination currency of the ETF or (ii) when the trading currency of the ETF differs from the denomination currency of the ETF. Fluctuation of the foreign exchange may affect the price and the realised gain of an ETF.

Liquidity Risks

Active trading of the ETF will not be maintained when the authorised participants or market maker cease to perform its obligations to provide continuous quote in the ETF. The result of this is that the buyer may not be able to buy or sell an ETF on a timely manner at a fair price.

Most of the ETFs are collateralised or backed by a pool of assets, providing investors some safeguards to their investments in the event of a default. It is important to note that some of these assets or collateral may not be liquid, and it may be difficult to dispose them quickly, leading to a potential erosion of the value that investors were initially entitled to. Various rules have been put in place to ensure that collateral posted comply with liquidity requirements laid out by the regulatory authorities, but there is no guarantee to the realisable value of the collateral. Participatory-notes, for example, may not have a secondary market for trading purpose.

[3] Bid-ask spread is determined by the difference of the price that a buyer is willing to pay for an asset and the price that a seller is willing to sell.

Additional Risks

▲ Securities Lending Risks

Some ETFs in the market engage in asset or collateral lending. Cash-based ETFs and synthetic ETFs may carry out securities lending transactions to obtain additional returns. A portion of the income from the securities lending transactions could be used to offset costs incurred by the ETFs and to improve returns to the investors. Collateral assets received by the ETF for the securities lending transactions, which were intended to act as safeguards for investors may not be fully recoverable in a timely manner when needed and/or in the event the borrower defaults. The CIS and UCITS require securities lent to be fully collateralised with liquid securities.

If securities lending is conducted it will be expressly stated in the offering document. Investors should look out for information on restrictions in securities lending, and collateral requirements to better understand the safeguards in place to protect their investments.

◆ Counterparty Risks

Swap based synthetic ETFs are also exposed to the default risks of its swap counterparty. In the event of a default, the fund, or the trustee is required to act in the best interest of investors to retrieve the assets or collateral pledged to the fund. Theoretically, investors should obtain at least 90% of the value of the ETF, as prescribed by the net swap-counterparty exposure limit under the CIS requirement. However, the timeline required for the liquidation of the assets or collateral may not be spontaneous, and the delay will cause the valuation of the assets or collateral to vary.

Derivatives-embedded synthetic ETFs such as Participatory-Notes ETFs are exposed to credit risk of the derivative issuer who is contractually bound to deliver the performance of the index. The default or insolvency of such P-notes issuer will substantially affect the ETF's ability to meet any payment obligations to any return to its investors.

Derivative embedded ETFs are also subject to the net counterparty exposure limit of maximum 10%. These ETFs would have to be collateralised, such that in the event of a default, investors may recover the collateral and/or the derivative instruments. It is also important for investors to note that the derivative instruments held by an ETF may not be liquid, which would further deter investors from realising the residual value.

In the event of a counterparty default, the liquidation process of the collateral held for the ETF is not likely to be spontaneous and is subject to various jurisdictions governing the defaulting party. During the liquidation process, the value of the assets or collateral will continue to fluctuate with market's price movements. Therefore, realisable collateral value will also correspond to the upward price movement or downward price movement of the asset pool.

Investors should refer to the **Risks section** of the prospectus prior to investing in any ETF, as risks structures vary across all ETFs.

My ETF Checklist

Questions	Infomation that you should know	Information on the ETF
What type of ETF are you buying?	**Direct Replication** ■ Full Replication ■ Representative Sampling **Synthetic Replication** ■ Funded Swaps ■ Unfunded Swaps ■ Combination of Funded and Unfunded Swaps ■ Derivatives-embedded ETF	
What are the fundamental risks of the ETF?	■ Bid ask spread ■ Tracking error ■ Market risk ■ Foreign exchange risk ■ ETF liquidity risk (Refer to the offer documents for the description of these risks)	
What you should know about the additional features of the ETF.	**Swap Counterparty(ies)** ■ What are their credit ratings and default risk? ■ Are there any conflicts of interest between the manager, the custodian and the counterparty? ■ Do they employ a funded or unfunded swap? ■ What is the level of collateralisation and how often are they measured? ■ What types of collateral will be pledged to you and how are they safeguarded? **Securities Lending** ■ Is the borrower rated? ■ Did the issuer receive collateral for lending out the securities? ■ What kinds of collateral are allowed? ■ Are the collateral liquid? ■ How are the collateral reinvested? ■ What are the issuer's guidelines when selecting borrower/ reinvestment of collateral? ■ What is the level of collateral? Is the ETF under collateralised? ■ How often does the issuer monitor and rebalance the value of collateral to match the ETF value? ■ Has the issuer disclosed the risks relating to securities lending?	

Questions	Infomation that you should know	Information on the ETF
What you should know about the additional features of the ETF.	**Hedging activity** ■ Is the ETF involved in any form of hedging? ■ What are the implications of such activity? ■ Are there any additional costs involved that would affect the performance of the ETF? **Foreign Currencies Exposure** ■ Which aspects of the ETF would expose me to foreign currencies fluctuations? ■ What are the implications? **Other features** ■ What are the additional risks and implications of these features? ■ Are there additional costs incurred and will they affect my returns? ■ Are there additional safeguards to these new features?	
What is my protection	■ What am I entitled to in an event of default? ■ Is there easy access to the assets/collateral held/pledged to the ETF? ■ What types of collateral are pledged? Are they liquid? ■ In the event of a default, what are the procedures to liquidate my investment? ■ What recourse can I seek through my trustee? ■ Approximately how much of my investment value will I be able to recover in the event of a default? ■ Where can I look for more information on the above questions?	

Investors should refer to the introductory document, product highlight sheet and prospectus for more information to answer the above questions. Alternatively, investors can contact the managers of the ETFs for more information.

Notes

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