Solidum Market Comment:

Are Cat Bond Index Tracker ETFs possible in today's market environment?

Basic assumption for the question

We start from the following considerations: The basic idea of an ETF is to track a defined market or sub-market through a passively managed portfolio. The mapped market is represented by an index, which the portfolio should follow as closely as possible. The passive management approach results in cost efficiencies, as the costs for research etc. are eliminated. Trading is typically daily, with a bank or prime broker acting as a warehouse and selling or buying fund units with a small spread.

This is to be distinguished from endeavours to make insurance event risks (e.g. in fund form) more liquid, although they might not be more liquid. We do not go into the fact that it is always possible to trade a fund on the stock exchange.

In the case of a hypothetical cat bond ETF, there are possible indices as representatives of the cat bond market. The best known is the Swiss Re Cat Bond Index with its sub-variants, but some capital market units of global reinsurance brokers also calculate the performance of the cat bond market.

Considerations

Nevertheless, in our view a cat bond ETF is not yet feasible. The reasons for this are:

1. *Market liquidity prevents the dynamic replication of an index:*

The cat bond market currently consists of around 350 positions with a nominal value of just under USD 50bn. There is a secondary market with a certain amount of liquidity, but the majority of players act as 'buy & hold' investors and not as 'traders'. ILS and cat bond funds adjust their portfolios in order to manage inflows and outflows, to reinvest maturing securities or, for example, to tactically position a portfolio with regard to estimations about the severity of the next hurricane season. However, only a small proportion of issued bonds are traded on the secondary market at any given time. For a large group of bonds, there are no entries in the Financial Industry Regulatory Authority's (FINRA) "Trace" system for their entire term, which suggests that these securities will never be traded.

2. *Minimum trading denominations prevent the dynamic replication of an index:*

Most cat bonds are issued to qualified investors under the SEC's 144A rule. To ensure that only institutional investors are in the market, the prospectuses for most bonds specify a minimum trading size of USD 250,000 par value. This means that even if all bonds were available on the secondary market at all times, it would not be possible to precisely align a portfolio with the index.

3. *An allocation at initial issue in proportion to portfolio size cannot be granted:*

The minimum trading volumes described under 2. also apply to the initial issue. In market practice, allocations are made in steps of USD 250'000.--. In addition, new issues are often oversubscribed, so

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that allocations are lower than what is demanded by the investor. Since, as described in points 1 and 2, a correction after the initial issue is difficult - if possible at all - this means that a tracking error to the index is likely shortly after a new issue.

Due to the factors mentioned in points 1 - 3, replicating the index by means of dynamic adjustment is not feasible in practice. A tracking error becomes large very quickly and, depending on the wording of the prospectus, can lead to passive or even active breaches of predefined ETF limits.

4. *No automation of trading:*

The cat bond secondary market is a telephone market (or in practice an email market). Transactions are brokered between buyers and sellers by a few specialized brokerage houses, sometimes with repeated adjustments of bid and ask prices until the transaction is concluded. The brokerage houses do not permanently hold the securities on their own balance sheets, but act solely as intermediaries between buyers and sellers. It is therefore not possible to automate the trading process.

In practice, this means that a tracking of the portfolio would require considerable resources for the trading process, even if the limitations of the market described under 1-3 are disregarded. The product would therefore not be "actively managed" in terms of security selection, but would have a very strong component of active, discretionary trading. The provision of the necessary resources (i.e. trading desk for cat bonds) suggests that such a product would ultimately lead to higher costs and therefore is expected to be more expensive than implied by the notation 'ETF'.

5. *The availability of external market prices only on a weekly basis avoids a dynamic pricing:*

The liquidity of the secondary market for cat bonds is significantly lower than in many other markets. For closed transactions, there are only a few price points available. In practice, some relevant brokerage houses publish indicative prices on a weekly, two-weekly or even monthly basis. The available indices, such as the Swiss Re Cat Bond Index, take this characteristic into account by only calculating the index value on a weekly basis. A valuation of the portfolio on a daily basis can therefore not be based on "objective", i.e. external price information, but requires an internal valuation by the manager or market maker. This becomes problematic if a market-changing event is imminent, e.g. a hurricane is in the water, or has already occurred, such as a major earthquake in California. In such cases, it can be assumed that a potential market maker will react to the valuation uncertainty by massively widening the bid/ask spread for share trading. A historical analogue would be the CS Iris certificate, which was set to a spread of 50/100 by the issuer after hurricanes Harvey, Irma and Maria in 2017 emerged. Buying or selling fund units before/after such an event therefore result in rather irrational pricings, because of enormeous spreads and the general illiquidity of the market. As a conclusion, daily tradability is not available when it is most needed.

6. *No market maker or warehouse:*

In an ETF, investors do not trade their shares on the stock exchange among themselves, but against a market maker. Prime brokers or investment banks assume this function in the case of typical asset classes. This is possible because markets with very high liquidity exist for typical asset classes, so that

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market risks can be managed dynamically by adding fund units to one's own balance sheet - either through countertrades of the underlying securities or in a synthetic manner. In the case of cat bonds, the possibility of such countertrades does not exist. If the market maker adds a California earthquake bond to its balance sheet, it is exposed to the occurrence of this event. Hedging is not possible, as this would actually require the purchase of reinsurance (which corresponds to the premium of the cat bond).

This leaves the large reinsurance companies, for which the inclusion of such risks on their balance sheet is part of their business model, as potential market makers or as warehouses. However, these companies are already acting as sponsors for cat bonds because they want to outsource the corresponding risks. From their perspective, it would only make sense to take the risks back onto the balance sheet if the fees achievable for this service are so high that they yield more than the alternative of keeping the risks on the own balance sheet. In other words, the costs for the service will be significantly higher than for market making for 'normal' ETFs and must be above the risk spreads earned on the part of the ETF that is on the reinsurer's balance sheet.

Summary

- Due to the market structure, dynamic tracking of a cat bond index is not possible. Tracking errors will occur from the beginning and quickly become very relevant.
- The trading practice of cat bonds in the secondary market makes trading automation impossible. Costs for trading activities would probably be significantly higher than savings in research.
- In practice, daily trading would only be possible "as long as the sun shines". Immediately before/after events, market makers would have to set prohibitive bid/ask spreads for share trading in the absence of current market prices for the portfolio, which would prevent trading.
- The market makers mentioned in the previous point do not even exist, as the nature of the underlying risk makes dynamic market risk management impossible.

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