

Synthetic Equity Exposure

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Synthetic Equity Exposure

- Rather than purchasing the physical assets (i.e. stock portfolio), investors can achieve full beta exposure through the use of derivative instruments.
 - Two of the most commonly used instruments are **futures** and **swaps**, both of which provide market exposure to a variety of benchmarks with little or no upfront cash commitment.
 - In Canada, this was first used as a technique to circumvent the foreign content rule.
- There are two significant factors driving the growth of the synthetic equity market today.

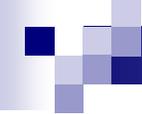
Factor 1: Passive Index exposure

- Over the last decade, there has been a significant move to passive equity exposure especially in large cap North American market
 - Investors still seem to have faith in managers' ability to generate alpha in the EAFE, emerging markets and small cap space
- Passive beta returns are cheap (2 to 10 bps for most large cap international indices and up to 20 bps for emerging and small cap indices) and can be obtained through a number of vehicles
 - These include both the physical and synthetic markets.
- What makes beta so cheap?
 - Readily available
 - Capacity
 - Creates inventory for stock lending



Factor 2: Overlay strategies

- Overlays are investment strategies that use derivative instruments either to obtain, offset or substitute for certain portfolio exposures beyond those provided by the physical investment portfolio.
 - There has been phenomenal growth in this segment of the market over recent years.
- For most pension plans, these are strategies that are taken at the plan level
- Used to address specific risks that cannot effectively be addressed through asset allocation process.
 - Generally aim to keep portfolio in line with investment objectives (policy) or to capture specific opportunities (portable alpha)



Why use overlay strategies

- To effectively and efficiently manage risk.
- To create potential value-added opportunities that might not be available when constraining the portfolio to physical holdings.
- To offset some level of undesired exposures, or to augment desired exposures in the existing physical portfolio without disrupting an existing particular strategy.

Synthetic equity exposure

- The contemporaneous growth of equity indexing and overlays/portable alpha has led to an increased demand for synthetic indexing
 - In order to accommodate overlay strategies, pension plans and other institutional investors increasingly use derivatives to replicate the performance of equity indices.
- Synthetic indexing has become more attractive for two reasons.
 - Plan sponsors (and portfolio managers) have found new and interesting ways of using this technique to increase their returns by combining them with overlay and portable alpha strategies.
 - Low cost of implementing these synthetic strategies

Synthetic vs. Physical exposure

- No need to transfer notional value of the portfolio to the portfolio manager.
 - In the event of a foreign investment, there is no currency exposure in a synthetic position.
 - No custodial costs or withholding taxes on foreign stocks
- Synthetic exposures require considerably less effort than holding stock portfolio
 - For fully invested portfolio, managers must reinvest dividends, process corporate actions, and adjust the portfolio to reflect changes in market capitalization and index composition.
- Though futures and swaps serve the same purpose of generating beta, they each have their unique trade-offs.



SYNTHETIC INDEXING USING EQUITY INDEX FUTURES

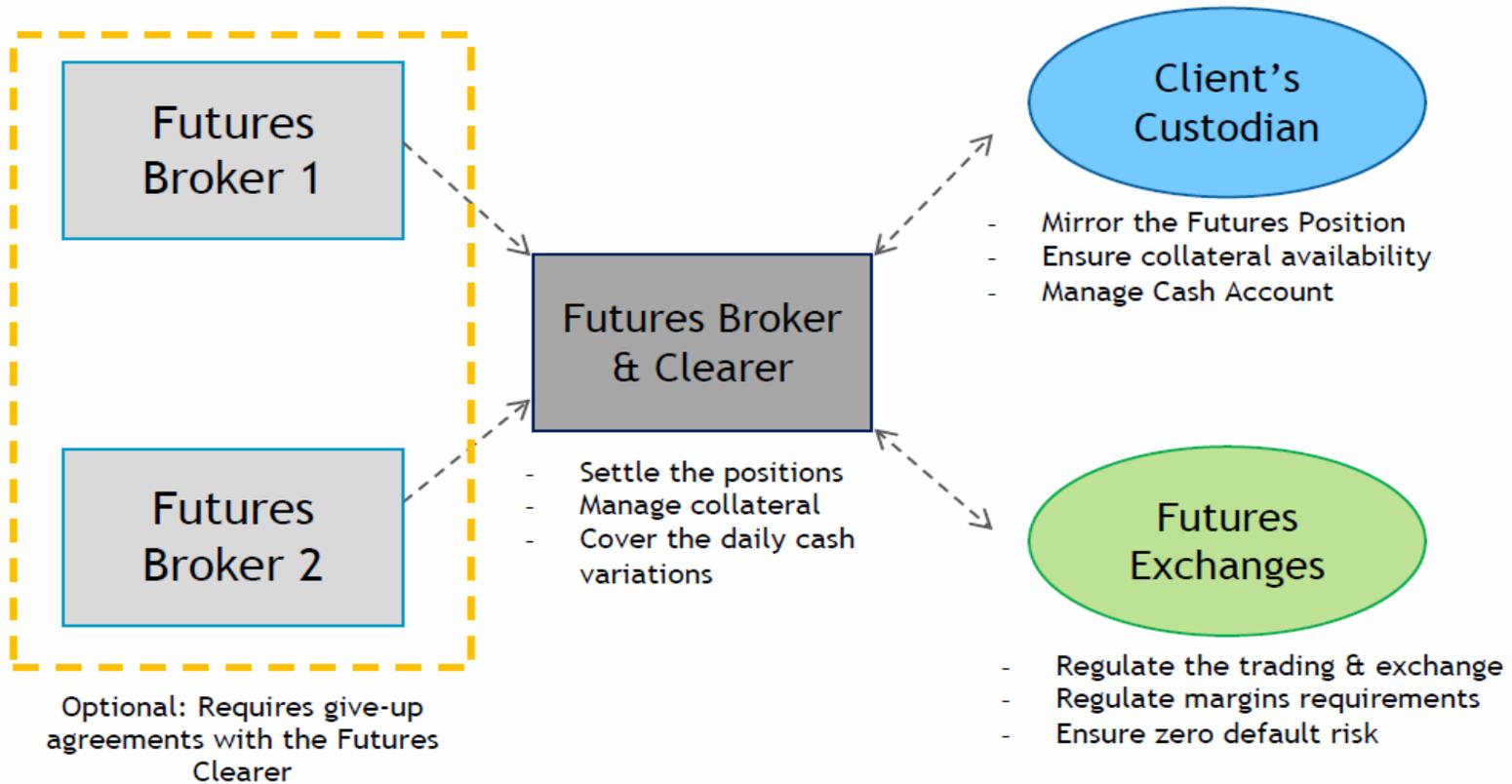
Equity Index Futures

- Futures are standardized contracts to buy or sell an underlying instrument at a certain date in the future, at a specified price.
- Futures are traded on an exchange, and therefore, offer minimal counterparty risk.
 - As such, they allow investors to easily achieve desired market exposure without much diligence or paperwork

Steps for equitizing portfolio

- Step 1: Identify the futures contract that best tracks your reference index/benchmark;
- Step 2: Post the margin requirement with your clearing broker and invest the remaining cash in money market instruments;
 - The return on the futures position will produce the index return less the financing cost.
- Step 3: The returns generated from the futures position and the money market account will replicate the index value;
- Step 4: Roll the position if needed

Typical setup of accounts



Margin requirements

- A futures position requires the posting of an initial margin to initiate a position
 - Initial margin requirements are defined by the clearing house and are specific to each Futures contract.
 - Initial margins are expressed as a fixed amount per contract in the local currency of the selected Futures contract.
- Futures contracts are marked to market on a daily basis.

Tax Advantages of Equitization

- One of the most important advantages of synthetic indexing using futures contracts relates to the taxation of dividends.
- Index futures do not pay dividends and therefore are not subject to the withholding taxes that most governments levy on foreign investors.
 - Investors who purchase index futures receive the dividends indirectly because the price takes into account the future value of all dividends expected to be paid over the life of the contract.
 - In contrast, investors holding foreign stocks generally receive domestic income tax credits for taxes paid on those stocks, but they often are not able to recover the entire amount.
 - Avoiding this cost is a major advantage of using synthetic positions.
 - Index futures are not subject to the stamp duty applied to the purchase of equity securities in countries like the U.K.

Non-taxable U.S. investors

- Non-taxable U.S. investors such as pension funds and endowments have an even greater incentive to use synthetic positions, since they cannot deduct withholding tax payments from their domestic tax bill.
 - Using a rough estimate of 200 basis points for the dividend yield on the MSCI EAFE and 15 percent for the foreign withholding taxes, a U.S. pension fund would receive an extra **30 basis points** of return by using futures rather than stocks to replicate this index.

The Problem of Tracking Error

- For many portfolio managers, the main drawback to synthetic indexing is the potential tracking error relative to their benchmarks. Tracking errors in synthetic index positions arise from two sources.
- First, the futures position may underperform the underlying index.
 - This can happen for a variety of reasons, including changes in roll costs, dividend yields and interest rates.
 - Futures contracts must be rolled on a quarterly basis, which incurs commissions and spread costs
- Second, there may be a divergence between the investor's benchmark and the index on which the futures contract is based, especially when multiple markets or countries are involved.
 - For example, a portfolio manager seeking to replicate the MSCI EAFE index typically will use a relatively large basket of index futures.

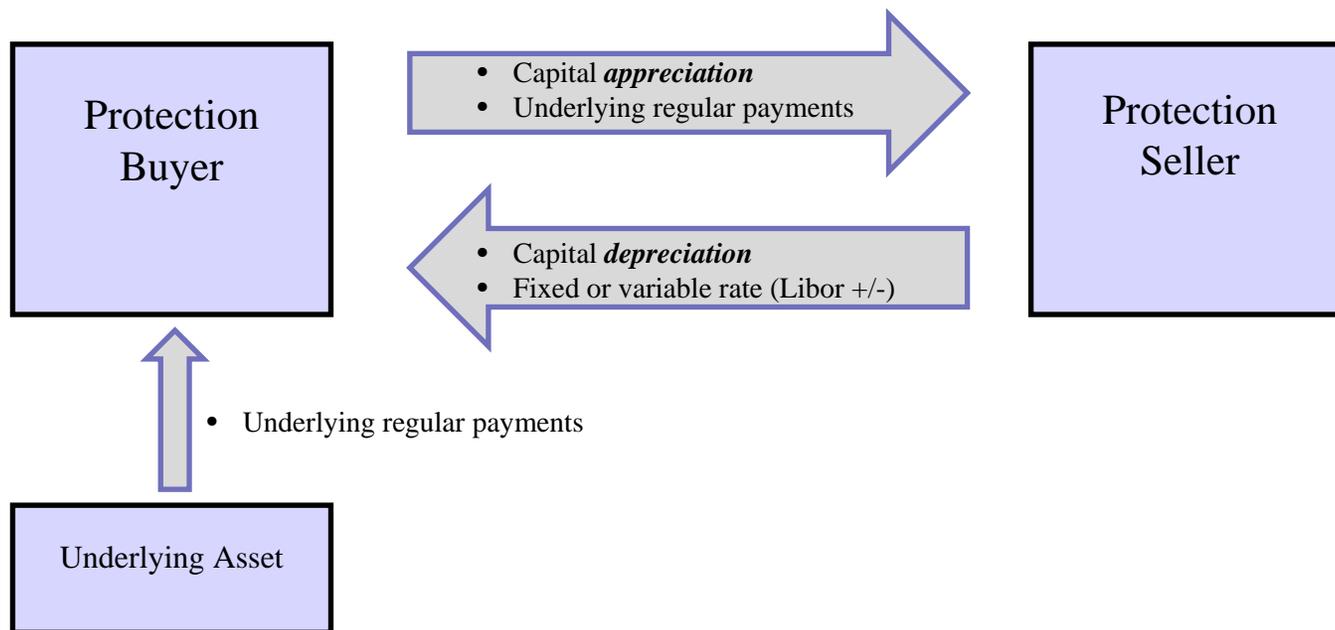


SYNTHETIC INDEXING USING TOTAL RETURN SWAPS

Total return equity swaps

- Swaps are agreements between two counterparties to exchange one stream of cash flows against another stream.
 - Essentially any beta exposure achieved through futures can also be obtained through swaps
- The main advantage of swaps is that they are highly customizable.
 - The notional amount, payment dates, settlement procedures, and tenor can be tailored to the needs of the counterparties.
- Swaps generally do not require an upfront capital commitment, meaning that 100% of the swap value can be committed elsewhere.
 - However, swaps do require periodic payments at predetermined reset dates; hence, some form of cash must be committed to meet these payments.
- The largest drawback of swaps is that they are direct agreements between two parties
 - This significantly decreases their liquidity, adds counterparty risk, and creates additional paperwork and diligence associated with structuring, pricing, and assessing counterparty's creditworthiness.

Total return swap



Comparison of TRS and Futures

	Total Return Swap	Index Futures
Counterparty Risk	Bank	Clearing Corporation
Cash Management	Monthly (Quarterly) P/L	Initial Margins and daily P/L
Underlying securities	Tailor-made	Most major indices and sub-indices
Financing cost	CDOR + spread	Repo rates
Liquidity	Limited	Very good
Typical Tenure	1- year	3 months
Tracking error	Negligible	Must be managed

Overlay strategies

- Currency
- Interest rate/LDI
- Global Tactical Asset Allocation
- Re-balancing
- Volatility/Tail risk management



GLOBAL TACTICAL ASSET ALLOCATION (GTAA)

What is a GTAA overlay

- GTAA strategies seek to add value by exploiting return differentials across asset classes, countries, sectors, and currencies.
- GTAA strategies take individual long and short positions, and can be net long, short, or market-neutral at the portfolio level.
 - GTAA is a “pure” alpha strategy in that every position in the portfolio reflects an active view on the market.
 - GTAA should exhibit low correlation to most major asset classes and provide good IR
- GTAA strategies typically use derivative instruments (e.g., futures, swaps, and options) to take advantage of their transparency, high liquidity, low transaction costs, and capital efficiency.
 - This is more efficient than implementing TAA decisions by buying and selling physical securities and shifting allocations to and from existing managers.



PORTFOLIO RE-BALANCING

Re-balancing approaches

- Most institutional investors apply some form of optimization to determine portfolio weights.
 - In theory, investors should rebalance their portfolios when the cost of suboptimality exceeds the cost of restoring the optimal weights.
- The two most common methods of rebalancing are:
- **Calendar-based rebalancing**
 - Rebalances portfolios monthly, quarterly or annually.
 - This approach does not account for the unpredictability of portfolio drift
- **Tolerance-band rebalancing**
 - Rebalances portfolios only when they shift away from their optimal targets by a predetermined amount — typically 3 to 5 percent.

Rebalancing based on risk

- Volatility targeting
 - Exposure is managed actively so as to keep the equity portfolio volatility at target (desired) level.
 - Equity exposure is removed if volatility rises above the target level.
 - Equity exposure is increased if volatility falls below the target level.
- This should eliminate fat-tails by ensuring that the drawdowns are consistent with the volatility targets.



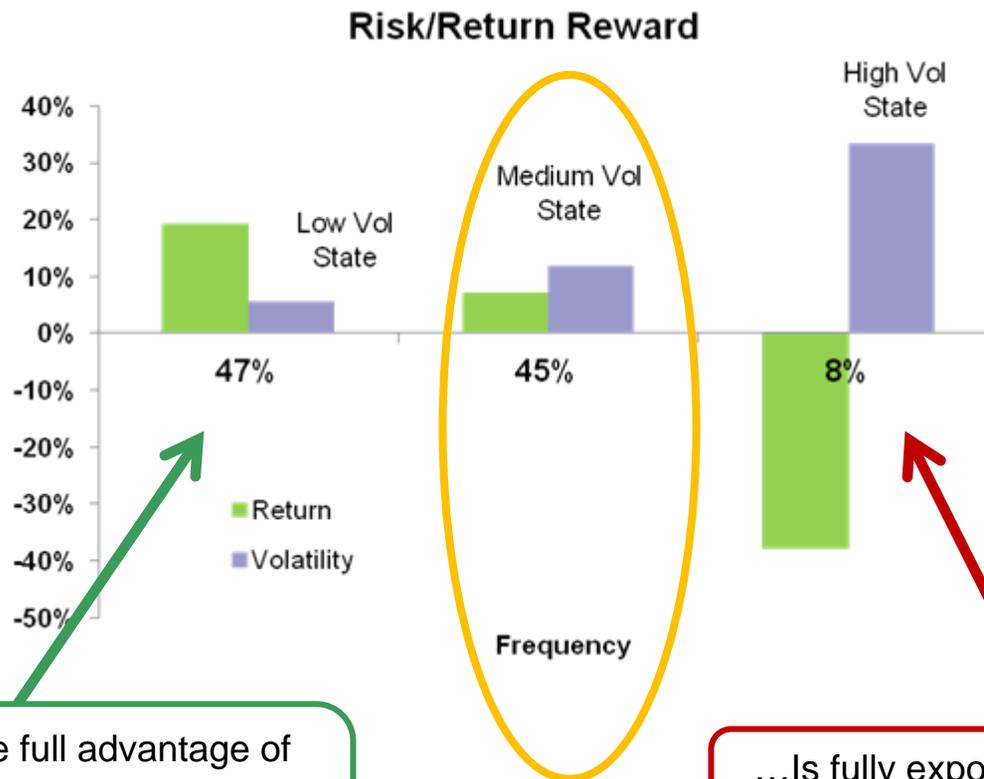
TAIL RISK HEDGING

Tail risk hedging

- The term “tail risk” refers to the probability that a rare event will significantly and adversely affect the value of an asset or portfolio.
- Its name originates from what is commonly known as the “tail” of a distribution of asset returns — the low probability occurrences of large negative deviations.
- The events over the past few years have provided ample evidence that “fat tails” exist in financial market returns, and that these tails can severely affect performance for many years.
 - As investors scramble to reassess their investment portfolios and asset allocations, the concept of “tail risk” hedging has come to the forefront in the investment community.

There are pitfalls to designing a portfolio based on long-term risk/return characteristics

A portfolio designed based on the long-term risk/return characteristics...



...Does not take full advantage of the available risk budget when volatility is low (and risk/return trade-off is most favorable)

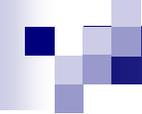
...Is fully exposed to extreme market corrections when these events occur.

Dealing with changing market regimes

- 1. Simply ignore the “bad” regime
 - Accept that diversification will protect an investor most of the time but losses are inevitable.
 - This is essentially the passive approach that most pensions and endowments knowingly or unknowingly take toward market declines like what was experienced over the past year.

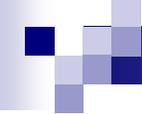
- 2. The “all-weather” approach that seeks to optimize performance over all regimes.
 - Separate distributional assumptions and correlations in the allocation are used to determine optimal portfolios within each regime, which are then combined together based on probability estimates of the likelihood of each regime.
 - The resulting portfolio is actually suboptimal most of the time.
 - In exchange for underperforming during the good times, an investor will outperform during the bad times.

- 3. Implement a “fair-weather” asset allocation while integrating tail risk hedging.
 - Set aside a portion of expected return for the purpose of purchasing hedges that will protect the portfolio from the adverse conditions during a tail event.
 - Intuitively, an investor gives up a small part of the portfolio expected return in exchange for lower portfolio expected volatility and truncated market losses.



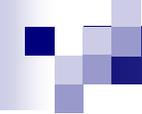
How to hedge tail risk

- How much protection do I need?
 - If I need a lot, I might want to reconsider my asset allocation
- How much should I spend?
- How much upside am I willing to give up?
- OTC vs Exchange traded solutions



What makes a good hedge?

- For a tail risk hedge to be effective it should possess two important characteristics:
 - The hedge must be negatively correlated to asset returns
 - The hedge should exhibit convex behavior to the upside during periods of market stress.



Summary

- Beta is cheap and abundant, and can be acquired at comparable costs through both the physical and synthetic markets.
- The market for synthetic equity exposure will continue to benefit from the move towards index exposure in the long only equity space and the growth of overlay strategies.