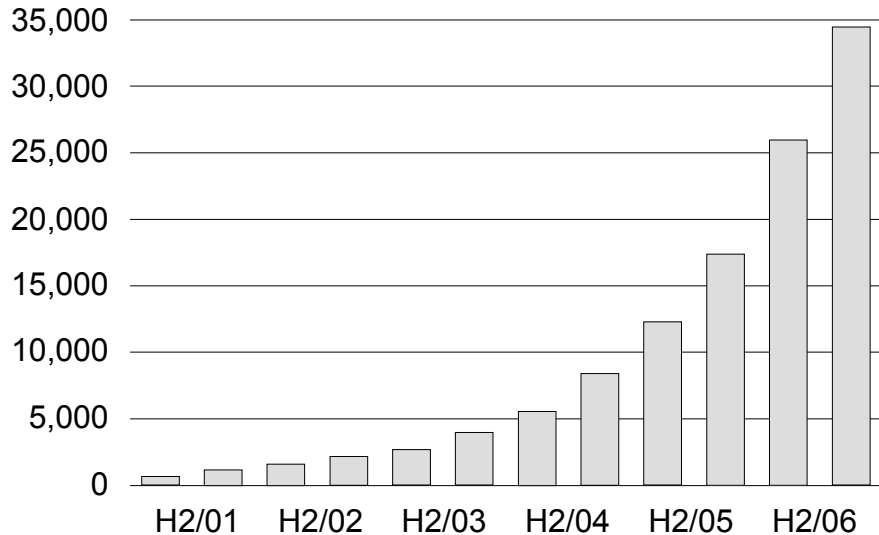


**Structured Credit  
Conference  
SCI, London  
July 2007**

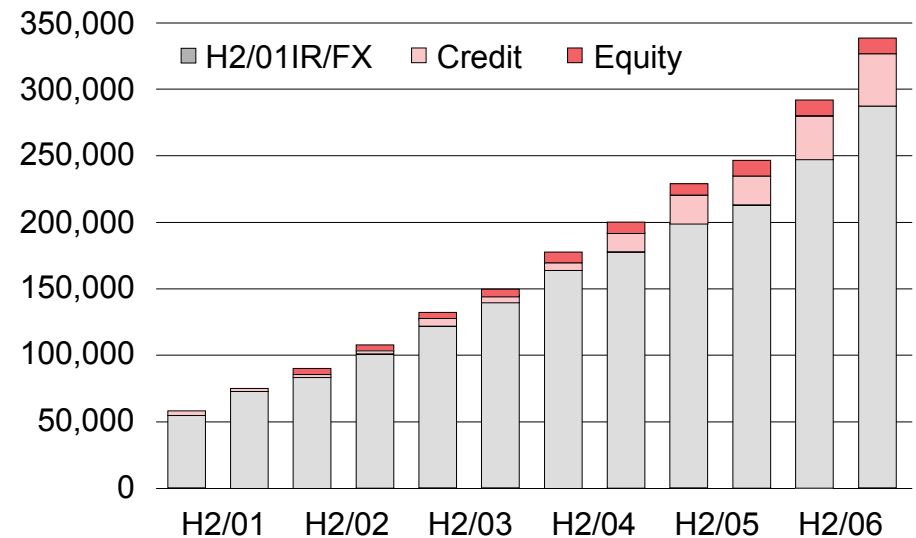
**CDO Technology &  
Alternative Assets**

# Unbreakable: Growth Trend Of Credit Derivatives

## Global Credit Default Swaps



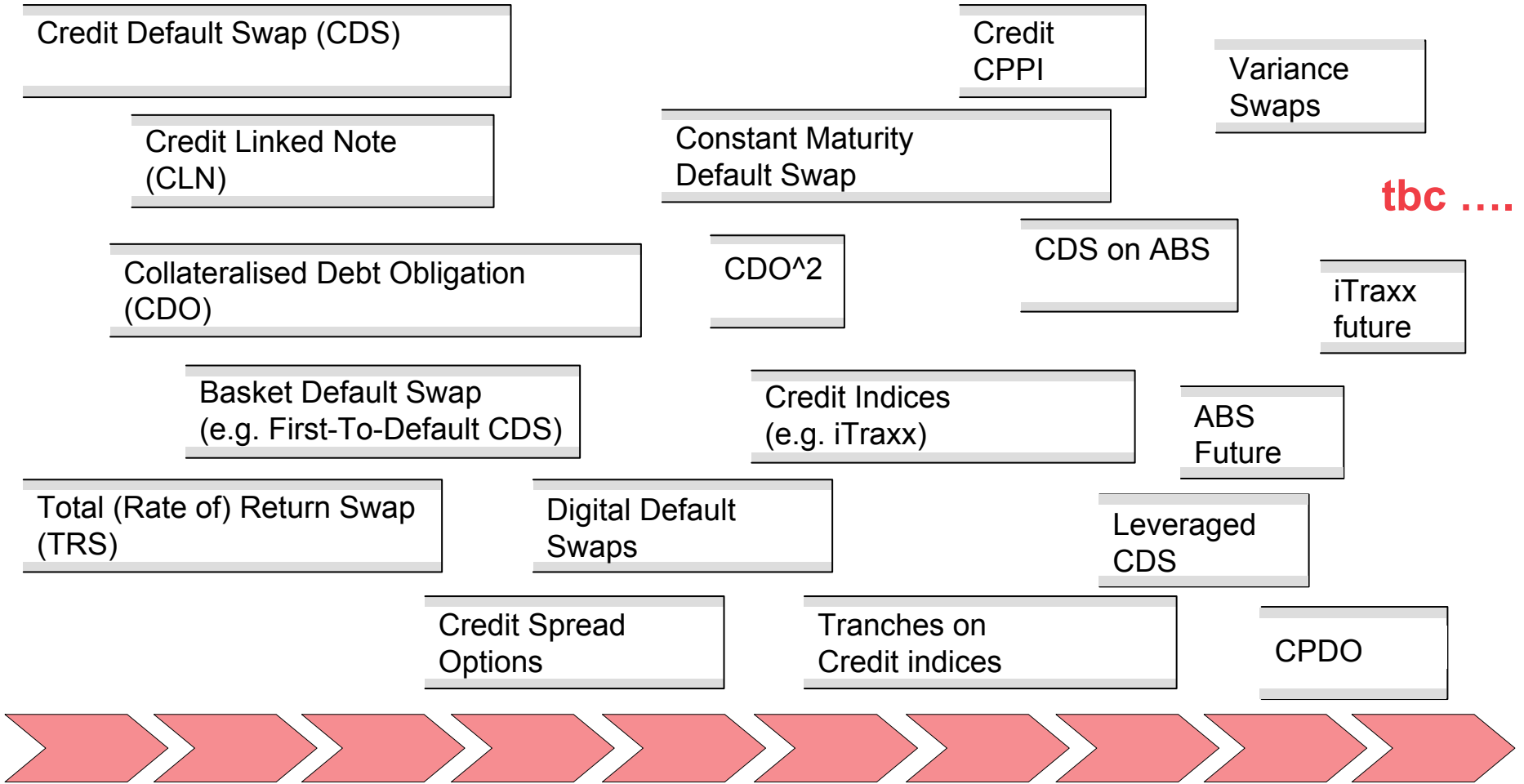
Source: Global Research (HVB)



● The major trends in respect to the structural development of the markets are:

1. A rising number of players are entering the derivatives universe.
2. Geographical diversification, especially in the CDO universe, argues for ongoing integration of market segments
3. The ongoing development of new innovative products will continue.
4. Instruments out of the FI and equity universe will be imposed on credits while credit derivatives technology will be imposed on other asset classes.
5. The more common use of CFO structures, which will finally replace our current view on risk-return efficient portfolios.

# The Product Pipeline Is Full

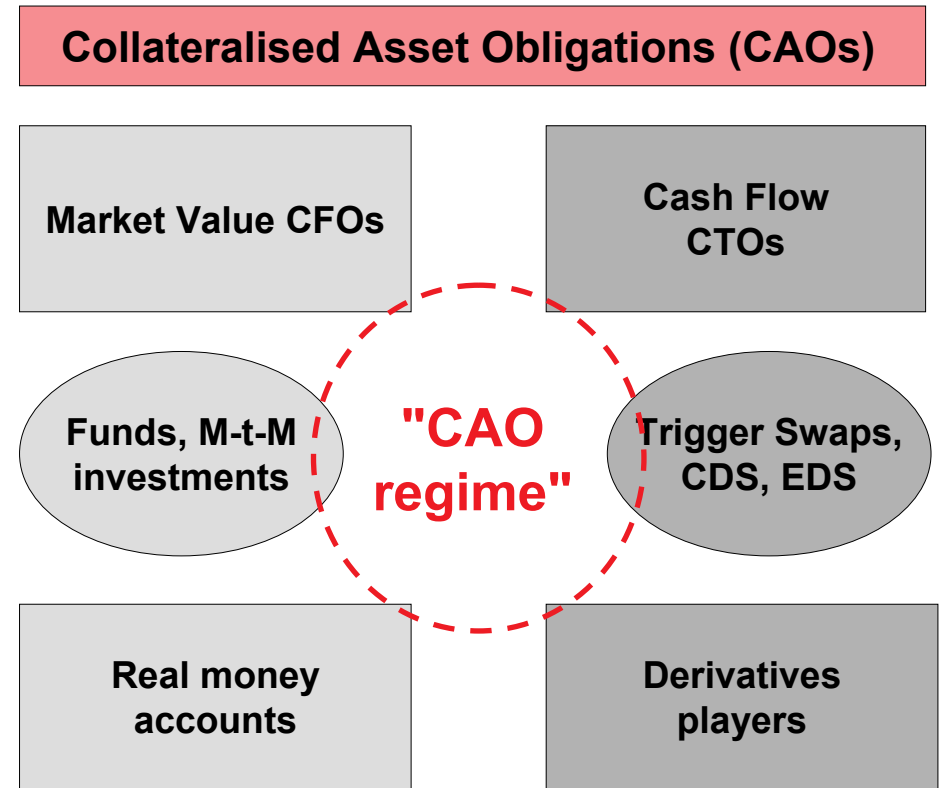


# The Credit Derivatives Hype Will Continue ...

- Two major trends in the credit market emerged during the last two years
  - Imposing the technology from the interest rate & equity derivatives side on credit-risky instruments
  - Imposing credit derivatives technology on other asset classes
- Derivatives based on credit-risky instruments
  - The early days ... CMS CDS, CMD STCDO in 2004/2005
  - Range Accruals on bespoke CDOs
  - Plain-vanilla and exotic credit default swaptions (look back)
  - However, this is only a different way to trade credit risk
- Credit Derivatives Technology imposed on other asset classes
  - Multi-Asset CDOs
  - CDOs on EDS
  - CVOs (Collateralized Volatility Obligations)
  - Commodity swap CDOs
  - Foreign exchange CDOs (CFXOs)
  - Commercial Real Estate CDOs (CRE CDOs)
  - ... to be continued (the sky is the limit!)
  - These instruments change the risk & return profile of a credit investment significantly ...
  - ... not only a different way to trade these asset classes!
- More and more credit players implement a "Capital Structure Arbitrage View" on their trading position given the accelerating development of innovative instruments which are "completing" the capital structure: Subordinated Bonds, LCDS, PIK Notes, etc.

# The Wonderful World Of CAOs

- Credit portfolio management: on the edge! The current trend in credit portfolio management can be described as a revolution rather than an evolution against the background of the innovative power of the market, the low yield environment accompanied by the trend towards passive management, as well as the changing market structure towards a dominance of structured credit players.
- CAO – more than just another abbreviation! A major trend in respect to product development is to impose credit derivatives technology on other asset classes. We think that this will be a lasting trend rather than a short-lived one. In the long term, this so-called CAO-regime is expected to replace old-fashioned risk-return optimization.
- Structural features of a CTO: From the perspective of portfolio diversification, we prefer CTOs, which offer the opportunity to tap the market for event risk. Tail events are the major risks in such a structure, while the structural features, as well as the unfunded nature of such transactions are similar to the synthetic bespoke CDO market.

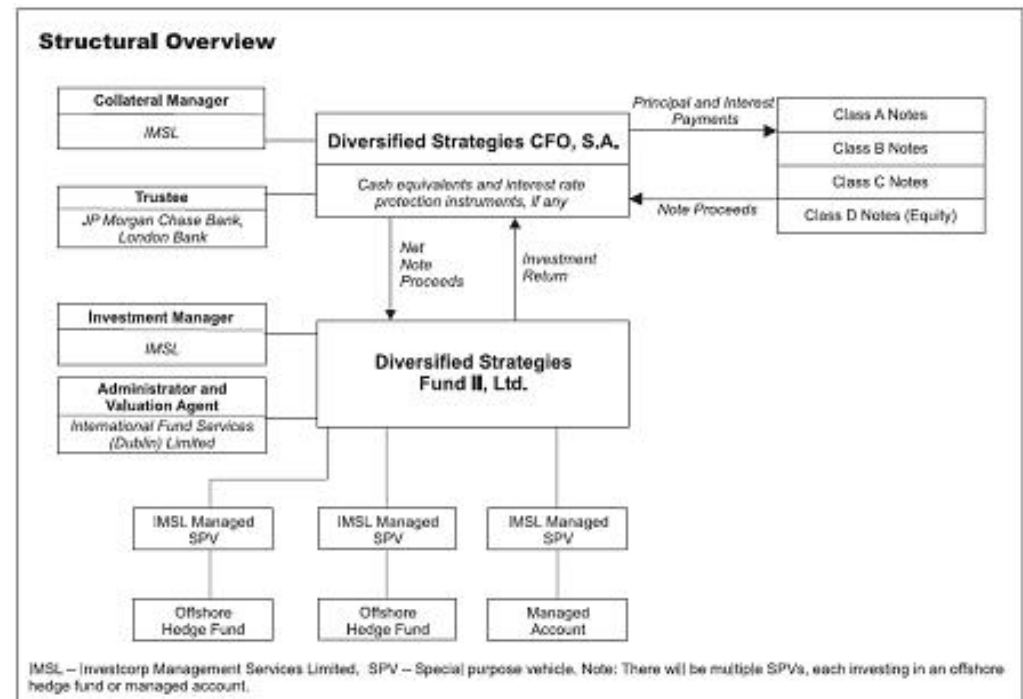


# Credit Portfolio Management: On The Edge!

- The major trends in credit markets argue for the need of new management technologies on a portfolio level to reflect both a change in the structure of the market and an appropriate way to generate value in a market which is characterized by rising complexity.
    - The development of passively-managed products
      - Credit ETFs
      - Credit Futures
      - Certificates referring to credits
    - The low spread environment:
      - Moving down the quality curve or increasing leverage
      - Traditional fixed income management with corporate bonds is losing in attractiveness
      - The effect of active management is less important when spread volatility and default rates are low
    - Innovative instruments allow investors to build up positions which refer to specific parts of credit risk
      - Know your sensitivities!
  - The future of credit portfolio management is not a Markowitz-like risk/return optimization
    - Cash bonds will lose in importance, with new products providing more attractive risk & return profiles
    - Latest product developments offer the opportunity to implement modern portfolio management methods core-satellite strategies, overlay structures with futures, and portable alpha strategies.
  - The combination of structured products and new management methods justifies a management fee
- The future of credit PM is bright. But only for those who implement innovative methods and instruments

# Structural Features Of A CFO

- Traditional CFOs (or market value CDOs) were introduced in the early 90ies
  - In 2000/2001, CFOs experienced another hype, with Hedge Fund investments being included
  - The idea was to use a technology which generates benefits from a combination of highly-volatile and un-correlated trading strategies
- 
- According to S&P, securitizing hedge fund investments can provide the following benefits (S&P):
    - Attractive financing terms
    - Transferability of existing portfolios of fund investments
    - Diversification of the investor base by providing fixed income investors with market exposure linked to hedge fund returns
    - New opportunities for investors seeking leveraged returns in this asset class.
    - Example: DSF Diversified Strategies



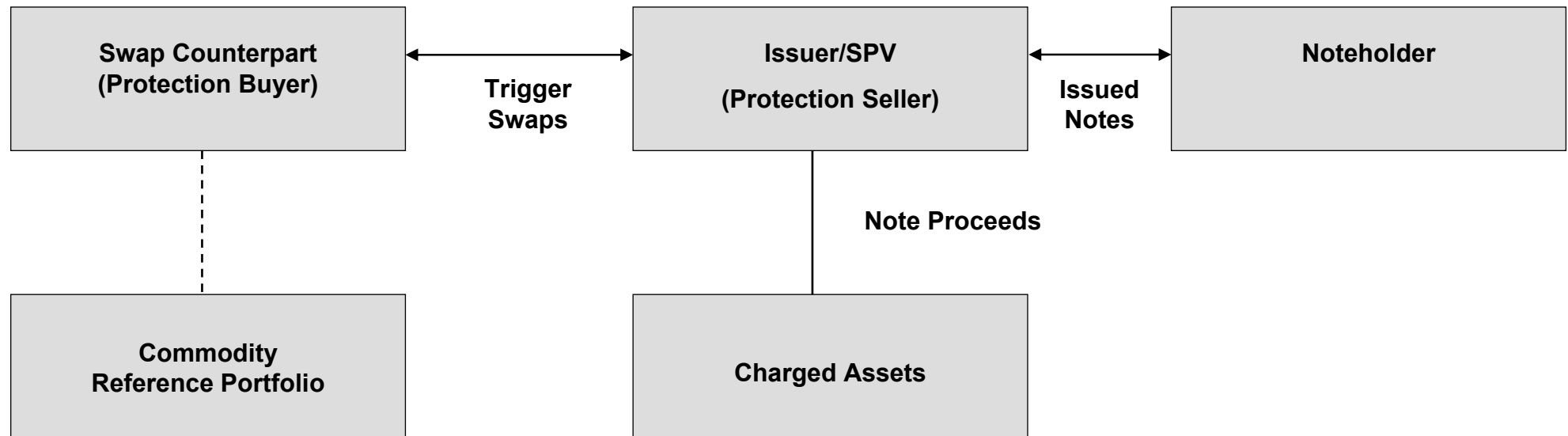
# Structural Features Of A CTO

- We prefer CTOs, which offer the opportunity to tap the market for event risk!
- Structural features, as well as the unfunded nature of such transactions are similar to the synthetic bespoke CDOs
- Major characteristics
  - Unfunded nature; trigger swaps as underlying
  - No waterfall principle; synthetic cash-flow CDO
  - Tail-event risk as the major risk factor
  - Tail-event correlation as a major pricing input
- We view CTOs as a major milestone in financial markets
  - A rising number of investors is currently benefiting from the attractive structural features
  - Tail event risk is not only interesting from a transaction-driven perspective, but also in respect to diversifying "volatility-driven" portfolios
  - We do not share concerns regarding demand/supply patterns, as we think that both demand and supply for tail event risk is immense given the huge variety of players in this market.
  - Traditional tail-event risk driven companies (insurance sector) are probably skewed to selling this kind of risk to players like hedge funds, banks, fund managers, who can implement attractive trading positions, but also optimize multi-asset portfolios.

# Commodity-linked Credit Obligations (CCOs)

- Repacking commodity risk in a credit securitization format
- Using structural features common to synthetic CDOs
- Return linked to the underlying commodities portfolio
- Predefined trigger-levels ~ far-out-of-the-money options
- Credit enhancement
- Typically funded transactions
- Max loss = invested amount

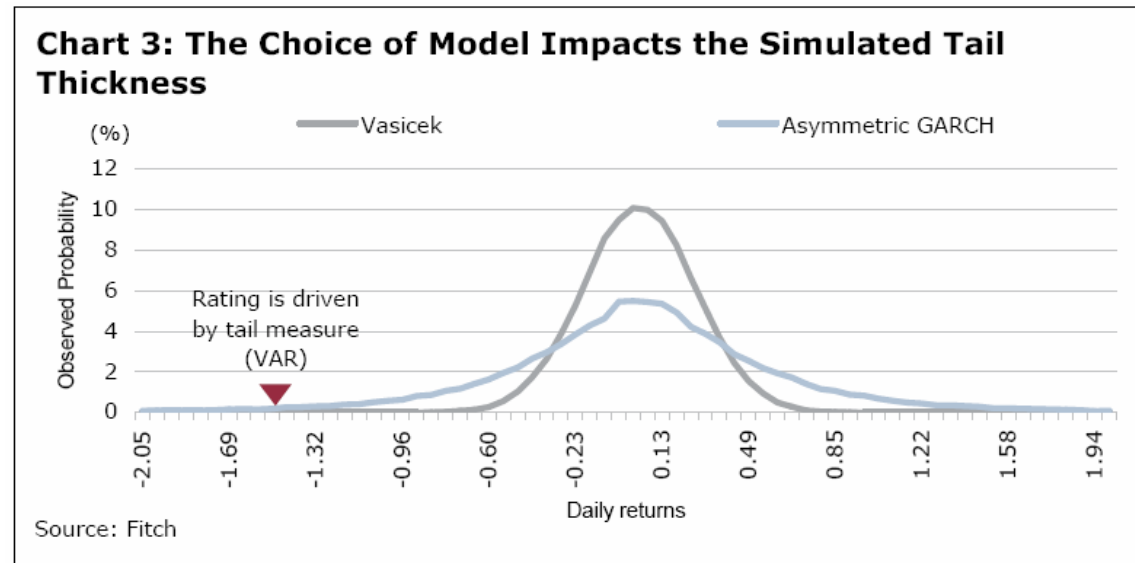
## Generic CCO Structure (funded)



Source: Fitch, Global Research MIB

# Commodity-linked Credit Obligations (CCOs)

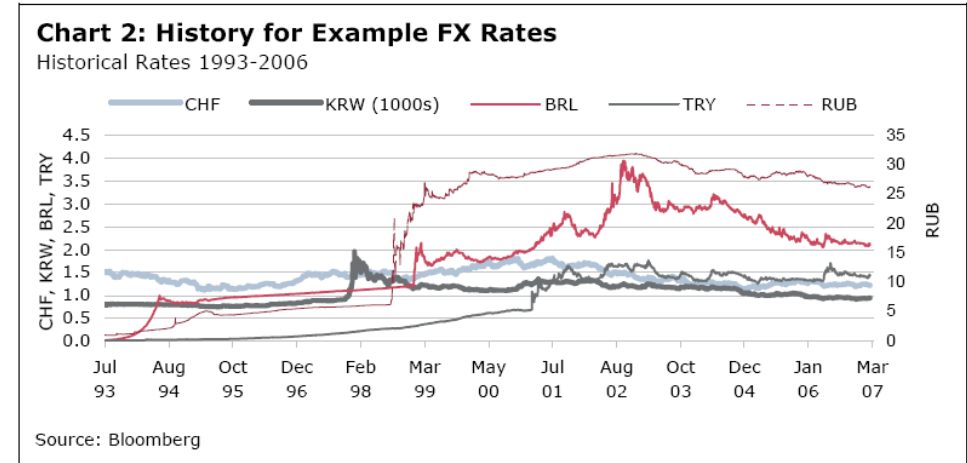
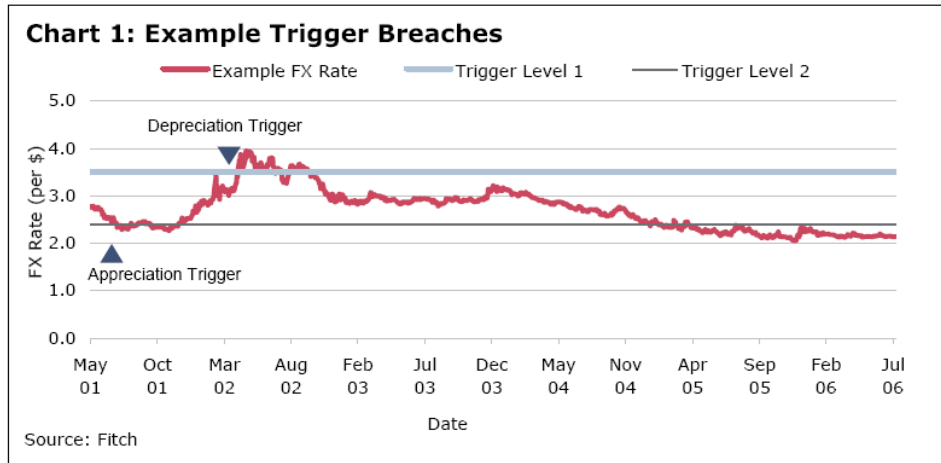
- Major risks included in CCO transactions
  - Asset risks (Monte Carlo)
  - Manager risks (if managed)
- Underlying: liquid commodity instruments like cash, futures, indices
- Long/short positions possible
- Trigger event: the price of a reference commodity will drop below (surge above in case of a short-position) a specific trigger level
- A trigger event generates a pre-defined payoff as is the case with digital options
- Different trigger structures possible
  - # of underlyings: N-t-D or CDO like
  - Impact on Expected Loss
- Choice of the Model => impact on tails



Source: Fitch, Global Research MIB

# Foreign Exchange-linked Credit Obligation (CFXOs)

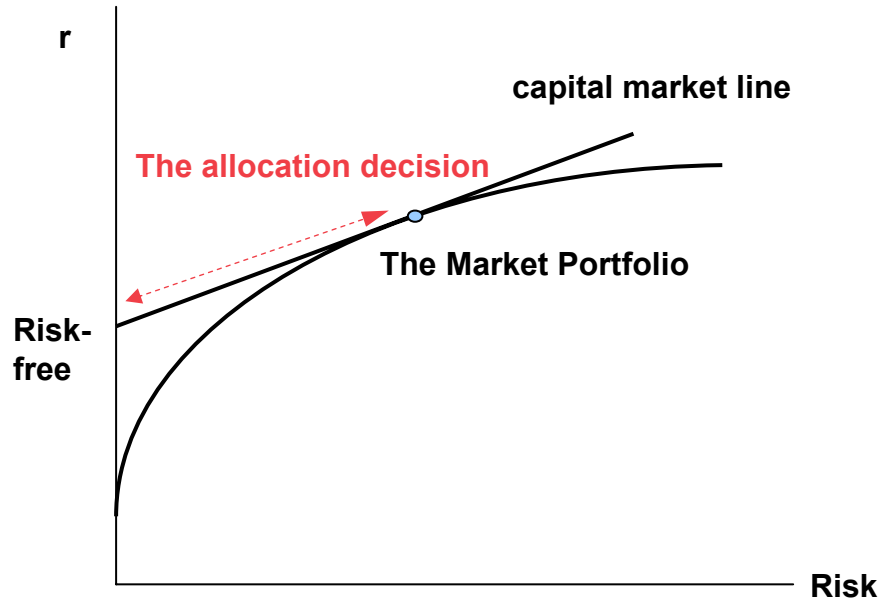
- Collateralized Foreign Exchange Obligation: similar structure to CCOs (synth. CDOs)
- Foreign Exchange Rates as underlying
- Could be linked to appreciation and depreciation of currencies
- Notional Asset Price Trigger Swaps ~ far-out-of-the-money options
- Trigger event: reference FX rate breaches a pre-determined trigger level
- Exotic structures like "double triggers", i.e. combination of depreciation and appreciation triggers
- Correlation to Sovereign CDS?



Source: Fitch, Global Research MIB

# Multi Asset CTOs: The End Of The CAPM Regime!

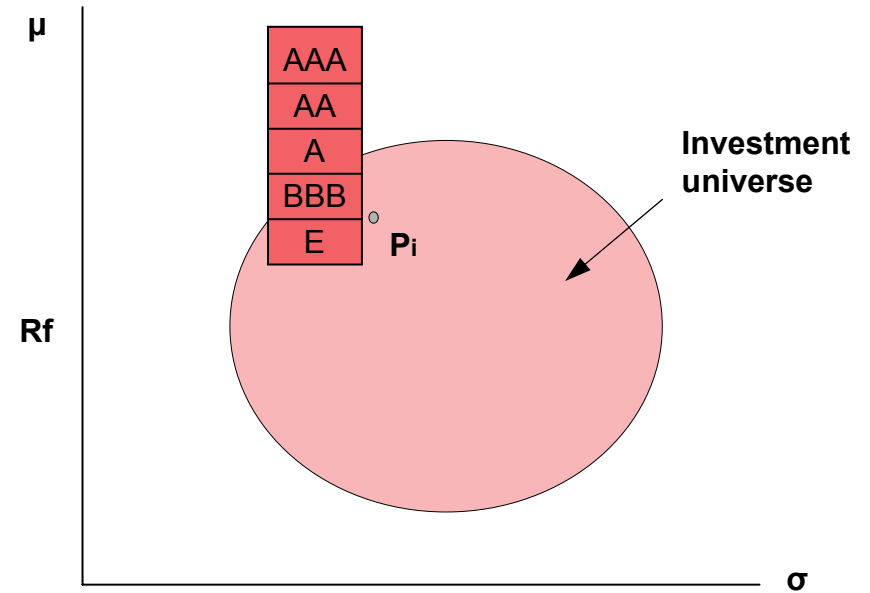
## "Old School"



### The CAPM world:

- The risk/return optimization is already implemented in "M" as
- Correlation is Co-movement of prices (also included in "M")
- Decision: Risk-free or Market Portfolio
- Problem: What is your IDC?

## "New School"



### The CTO (Collateralised Trigger Obligations) world:

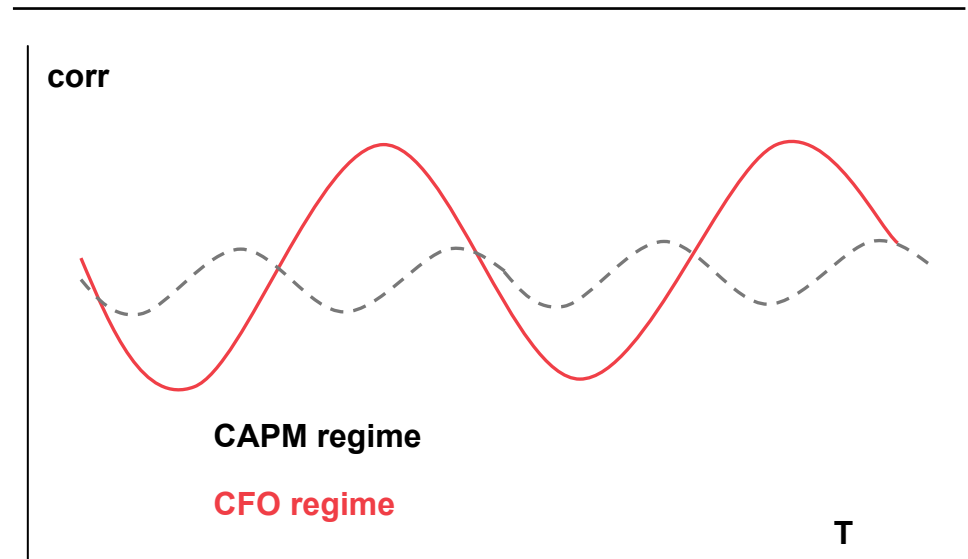
- The Portfolio Pi is not directly  $\mu/\sigma$  – optimized
- Correlation is rather joint default probability
- No investments in  $R_f$
- No IDC ... but a specific tranche investment in line with the individual risk perception!

# What Does This Mean For Investments/Trading?

- The abolition of the CAPM regime by the CAO regime has a significant impact on portfolio management, product development, and on the mainstream view on correlation
- The impact of CAOs on investment strategies
  - CFOs are "smoothing" highly-volatile asset classes
  - The risk-return profile of a tranching investment in equity markets might be favorable compared to an investment in the underlying portfolio.
  - How does a portfolio of far-out-of-the money puts (EDS) behave compared to the underlying stock portfolio?
  - FX & Commodities: Highly volatile markets in which derivatives are continuously gaining in importance
    - Latest hype: FX options baskets & FX CDOs
- CAPM: correlation is co-movement of assets → volatility-driven
- CAO: correlation of tail events → event-risk-driven
- How are tail events correlated?
  - Equity/Debt: the base case assumption of all structural models: In the default leg, the equity is worth zero while bondholders receive the recovery value (reminder: there are more than two legs!)
  - CDOs/ABS: idiosyncratic event risk limited, while tail risk is driven by systematic factors
  - FX CDOs: EM currency options all referring to a single currency ... → single currency risk
  - Commodity CDOs: Macro-economic risk factors
  - Hedge Fund CFOs: Systematic, regulatory & legal risks

# The Economic Rationale Of Correlation Of Tail Events

- Traditional correlation patterns between asset classes are changing in a CAO regime!
- Idiosyncratic risk factors are losing in importance versus systematic risk factors (incl. legal issues)
- The risk & return profile of CAO tranches differs significantly from the risk & return profile of the underlying assets, ... shifting risk away from volatility towards default
- ...while the impact of correlation changes obviously depends on the specific tranche investment
- Example I: A long position in an equity piece of a commodity swap CDO is long in joint probabilities of large price swings in the commodity market
- Example II: A long position in a mezzanine piece of a FX CDO is short in joint probabilities of distortions in the FX market (exposed to currency crisis)
- "Default" correlation between different markets which is swinging through the cycle ...
- ... and CFOs will have an impact on the frequency and the amplitudes of the swing
  - Keeping correlations low in "normal" periods
  - Triggering rising momentum in case of tail events



# The Emergence Of New Market Players: CDPCs Et Al.

- The trend toward such players is also accompanied by a change in the management style: The CTO regime is already gaining in importance! Three vehicles offer easy access to structured products: CDPCs, PCVs, and SIVs
- Credit Derivative Product Company (CDPC): A CDPC is a rated company that buys credit risk via all types of credit derivative instruments, primarily SS-tranches, and sells this risk to investors via preferred shares or subordinated debt. Hence, the vehicle uses super senior risk to create equity risk. The investment strategy is a buy-and-hold approach. CDPC are AAA-rated. The preferred asset classes are predominantly CDS, bespoke synthetic tranches, ABS and all kinds of CDOs. The leverage provided by the vehicle can be in the range of 15-60x, while the return target is typically ~ 15%, paid in the form of dividends.
- Permanent Capital Vehicle (PCV): PCVs invest in equity pieces. The leverage is not implemented in the vehicle itself as it is already given by the underlyings. PCVs are also set up as SPVs and listed on a stock exchange. They use the equity they receive from investors to purchase the assets, while the return on their investment is allocated to the shareholders via dividends. The target return amounts, in general, to around 10%. The share price of the company depends on the net asset value (NAV) of the portfolio and on the expected dividend payments.
- Special Investment Vehicles (SIVs): In general, a SIV invests in the top of the capital structure of structured credits & ABS in line with CDPCs. In addition, SIVs also buy subordinated debt of financial institutions, and the portfolio is marked-to-market. SIVs are leveraged credit investment companies and bankruptcy remote. The vehicle issues typically investment-grade rated commercial paper, MTNs, and capital notes to its investors. The leverage depends on the character of the issued note and the underlying assets, ranging from 3-5 up to 14 (structured credits).
- These vehicles have several impacts on the credit market. First of all, they allow newcomers to tap the structured credit market, obviously supporting the structural bid (spread positive). However, leverage is increasing steadily as all these companies implement leveraged strategies, trying to generate sufficient return to justify themselves. This makes markets more vulnerable to exogenous shocks, especially as there is an overlap in investment strategies.

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## Imprint

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