

# Performance Analysis of Credit-Linked CPPI Portfolios

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# **Executive Summary:**

## **Performance Analysis of Credit-Linked CPPI Portfolios**

### **Portfolios**

A new generation of these credit-linked instruments that claims to provide principal protection is the credit-linked constant proportion portfolio insurance (CPPI) product. It offers a return linked to the performance of an underlying credit portfolio while guaranteeing a specified percentage of principal redemption at maturity date. In a credit CPPI structure, the exposure to a credit portfolio is managed to either increase or decrease leverage along with the performance of the underlying credit portfolio. The purpose of this paper is to investigate how the characteristics of the risky credit exposures along with the features of the CPPI will affect the performance of a principal-protected credit-linked CPPI investment portfolio.

Constant proportion portfolio insurance (CPPI) is a rule-based portfolio insurance strategy. The rationale of a portfolio insurance strategy is to preserve a minimum guaranteed value through investing in risk-free assets, while allocating some resources in risky assets. The basic idea underlying the credit CPPI structure is just a highly leveraged trade on credit portfolios. Assume an investor wants protection of a prespecified percentage of his initial investment at maturity date  $T$ . To allow repayments of guaranteed principal, part of the notional is allocated to risk-free assets to ensure that the value of the insured portfolio will not fall below a specified value. The amount to be allocated to the risk-free assets is called floor. In order to generate higher returns, the remaining amount to be invested in risky assets is kept as a multiple of the reserve, which is defined as the difference between the whole portfolio value and the floor level. That is, an investor's notional is levered up by a leverage factor and invested in a set of eligible credit products in a credit CPPI structure. The sale of credit protection on a notional portfolio of credit indices via leveraged exposure constitutes an unfunded risky strategy because the risk is synthetically transferred through credit derivatives like CDOs.

For a better understanding of the mechanism of the credit-linked CPPI strategy, we

first use an iTraxx equity tranche as the risky investment within a CPPI strategy to illustrate how the adjustment of the risky exposure varies with the spread movements of the equity tranche. Then we construct a set of investment rules to demonstrate how a credit-linked CPPI portfolio switches the investment mix dynamically between risk-free and risky credit assets. Finally, to grasp the potential of a credit CPPI strategy as a capital protection method, we use the proposed investment rules to study the performance of monthly-rebalanced CPPI portfolios with risky exposures on different standard iTraxx tranches.

Our empirical findings are as follows:

(1) The higher the multiplier, the larger the net asset value of a CPPI portfolio, but also the higher the incidence of lower net asset value in the period of financial market turmoil beginning in June 2007. This is because the greater the multiplier is, the larger the amount invested in the risky asset is. Therefore, the probability of a larger change in the net asset value of a credit portfolio also increases. This explains why a CPPI portfolio with greater multiplier has higher risk and expected return.

(2) The equity and mezzanine tranches can themselves be viewed as leveraged exposures to the underlying reference portfolio. Therefore, apart from multiplier, a credit CPPI portfolio can seek additional leverage via its investment on iTraxx tranches, the already leveraged financial products. The risky investment on an equity tranche tends to increase the upside to a CPPI portfolio but also results in more frequent underperformance than its mezzanine counterpart during the period of underlying spread widening.

(3) The performance of a CPPI strategy is also driven by the volatility of the underlying index spread. When the spread volatility increases, the performance of a CPPI portfolio with risky investment on an iTraxx HiVol tranche drops. In general, a CPPI strategy performs poorly in highly volatile markets.

(4) If the value of the risky asset falls sharply due to credit spread widening before the portfolio can be rebalanced, the value of a CPPI portfolio may fall below the bond floor.