

Moody's Corporation & NYU Stern School of Business
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Recovery Risk

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Outline

- What is Recovery and associated risks ?
- How does Recovery Risk occur in a trading book ?
- Recovery Products: How to hedge / trade Recovery Risk ?
- Conclusion

What is Recovery ?

- How many “cents on the dollar” do you get back post default ?

- Quebecor 41.25 %
- Dura Senior 24.125 %
- Dura Sub 3.50 %
- Dana 75.00 %
- Calpine 19.125 %
- Delphi 63.375 %
- Delta Airlines 18.00 %
- Northwest Airlines 28.00 %
- Collins and Aikman 43.625 %

(source: Creditfixings.com)

Credit Spread and Recovery

Simple formula for 1 yr probability of default is:

$$\begin{aligned}\text{Spread} &= P_{\text{def}} * (1 - \text{Recovery}) \\ &= P_{\text{def}} * \text{LGD}\end{aligned}$$

As a Seller of Protection:

Higher the Recovery -> Lower is the LGD -> Smaller Payout

As a Buyer of Protection:

Lower the Recovery -> Higher is the LGD -> Higher Receipt

Given, constant spreads

Higher the Recovery

Higher is the Pdef

Lower the Recovery

Lower is the Pdef

Auction Process for Credit Events

- Physical settlement became increasingly impractical and market participants created standardized settlement procedures or “Protocols”
- Protocol is a standardized valuation procedure to determine the post-default price through a dealer auction.
- Used for single name CDS, CDX Indices and other CDS trades to ensure uniform settlement prices for all contract holders.
- Created by the CDS dealer community in conjunction with ISDA and Creditex/MarkitPartners
- Why settle through a market-wide auction?
 - Alleviates need to physically settle, avoiding technical short squeeze (e.g. Delphi); Minimized Deliverability Issues (e.g. Calpine uncertainty)
 - Less Admin Strain: Avoid Operational Burden

What is Recovery Risk ?

- The risk that post default, recovery is lower / higher than expected and hence the realized loss given default is higher / lower.

However, it is not limited to the above ONLY, and

- It ***ALSO INCLUDES*** the change in the MTM of the portfolio due to changes in the Market Recovery given all other things (such as credit spreads) remaining constant.

Where does Recovery Risk come from ?

1. CDS Trades with an off-market coupon
2. Structured tranche trades with fixed recovery
3. Recovery Products

Market Recovery changes will impact the valuation of any credit derivative transaction due to change in implied default probabilities and / or expected loss given defaults.

Recovery Risk: CDS Trades

e.g. Bank does the following trades:

1. Buys 10MM of protection at 100bps to June 2013
and on spread widening
2. Sells 10MM of protection at 600bps to June 2013

- Credit Event:

Both CDS are triggered, resulting in zero profit or loss irrespective of the Recovery Rates. LGD cancels out.

- No Credit Event:

Bank is exposed to a risky stream of future cash flows. Risky annuity of 500bps p.a. or 500,000\$ p.a.

Value of Annuity = Present Value of Risky Cash Flows

Higher the Recovery -> Higher the Implied Pdef -> Lower is the Risky Duration -> Riskier are the Cash Flows -> Lower is the PV.

Recovery Goes Up -> You loose money -> SHORT Recovery.

Recovery Risk: Fixed vs. Floating CSO Tranches

Floating Recovery – Loss on 100 Name Portfolio

	1 st Default	2 nd Default	3 rd Default	4 th Default
Recovery	30%	40%	10%	50%
Cumulative Subordination Loss	0.70%	1.30%	2.20%	2.70%

Fixed Recovery – Loss on 100 Name Portfolio

	1 st Default	2 nd Default	3 rd Default	4 th Default
Recovery	50%	50%	50%	50%
Cumulative Subordination Loss	0.50%	1.00%	1.50%	2.00%

- Fixed Recovery eliminates recovery volatility in a CSO portfolio, allowing for a more predictable trend in subordination loss

Recovery Products

- Recovery Lock
- Fixed Recovery CDS
- Recovery Swap

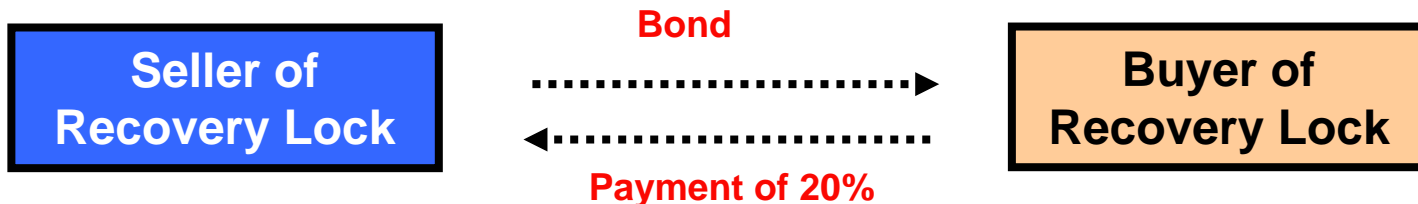
Recovery Locks are the market standard for trading recovery.

Recovery Lock

- Recovery Lock is like a contingent forward contract.
- There is no upfront or running payments. It allows purchase or sale of underlying bonds at a predetermined price, if a credit event occurs or the equivalent cash settlement using auction recovery.

Recovery Lock

- Before Credit Event
 - No upfront or running payments.
- After Credit Event
 - Physical Settlement
 - Buyer of recovery lock gets the bonds at the predetermined level, say 20% i.e. the Trade Fixed recovery.



- Cash Settlement
 - If the actual Auction Recovery is 30%, buyer of recovery receives:
(30%-20%)*Notional
 - If the actual Auction Recovery is 5%, buyer of recovery pays:
(20%-5%)*Notional
- Recovery Goes Up -> You make money -> LONG Recovery.

Recovery Lock Replication

- Buying Recovery Lock =
 Buying Protection on Fixed Recovery CDS
 +
 Selling Protection on a Standard (Floating) Recovery CDS
- Premium on the two CDS cancel out during the tenor of the contract and the payoff in case of a credit event is similar to the Recovery Lock :
 (Actual – Fixed Recovery)* Notional.

Recovery Lock: Example

Bank has bought protection at 100bps and sold protection at 600bps on 10MM, is exposed to a risky annuity of 500bps.

Value of Annuity = Present Value of Risky Cash Flows

Higher the Recovery -> Higher the Implied Pdef -> Lower is the Risky Duration -> Riskier are the Cash Flows -> Lower is the PV.

Recovery Goes Up -> You loose money -> SHORT Recovery.

How will you hedge this Recovery Risk ?

Buy Recovery Lock

Recovery Goes Up -> You make money -> LONG Recovery.

MTM of a Recovery Lock

- If you buy recovery at 40% (Trade Fixed Recovery) and the Market Recovery moves out to 50%, the value of the recovery lock V is equal to (ignoring discounting)

$$V = (50\% - 40\%) * Pdef_T * \text{Notional}$$

Exact formula is: $V = (50\% - 40\%) * POND_T * \text{Notional}$,
where Payment-On-Default-Term is:

$$POND_T = \int_0^T p_t \cdot d(Pdef_t)$$

p_t are the interest rate discount factors

$Pdef_T$ is calculated using the Market Recovery and CDS Spread Curve.

Recovery Lock Strategies

1. Trade outright: take view on the post default level of recovery.
2. Limit downside on a short recovery position by buying recovery.
3. Outlet to trade recovery risk generated from structured trades.
4. Manage JTD Exposure.

Conclusion

- Recovery risk can now be disaggregated and traded separately.
- Market participants beginning to actively trade recovery risk.
- Should be a big growth area.

CDS Market: Issues and Themes

Credit Markets: Current State

- Market dislocation caused by developments in the sub-prime market spread into corporate credit market.
- Spread Widening and Unusual Spread Volatility including intraday volatility.
 - Investment Grade index widened by > 300% since the beginning of last year.
 - IG index curve from 3yr – 10yr inverted.
- Shift in Tranche Value
 - Value shift from equity to senior mezzanine tranches.
- Tranche Convexity hedging a big concern for structured desks.
- Massive Index vs. Single name basis, as investors used index to macro hedge credit risk.
- Mark Downs in CDOs especially ABS CDOs.
- CDO / CLO issuance has dropped dramatically, down >75% YoY.
- Uncertainty in the credit market -> investor confidence remains low; preventing a recovery.

Credit Markets: Going Forward

- Focus on counterparty and operational risks. Clearing Corporation regulated by CFTC for clearing trades. Allows for mitigating counterparty risks and operational efficiency by netting trades.
- Move away from complex products such as CDO² and LSS to simple securitization products such as fixed recovery tranches.
- Focus shift from systemic to idiosyncratic risk.
- Not all CDOs are bad. ABS CDOs vs. Corporate CDS CDOs. Rating downgrades have been manageable so far. Potential buying opportunity of a decade, especially with the forced selling at current discounted prices.
- Credit dislocation will hopefully create investment opportunities for the market to rebound !