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Index Dividend Swaps – Part 1: Pricing

On June 30, 2008, Eurex launched the Dow Jones EURO STOXX 50® Index Dividend Futures[1]. It is the first exchange-traded derivatives contract that focuses solely on the dividend element of a widely used and traded equity index. In three consecutive articles Xpand will focus on pricing and applications of this promising contract.

The new derivative product allows investors and traders alike to take a view on the gross cumulative cash dividends that are announced and paid by the individual constituents of the Dow Jones EURO STOXX 50® Index during an annual period. The contract is an exchange-traded derivative equivalent of an OTC index dividend swap and will offer a multitude of applications for the institutional investor[2] plus having the benefit of eliminated counterparty risk with a central Clearing House.

What is a Dividend Swap?

In a dividend swap, the dividend buyer receives the actual dividends paid on an equity or an equity index over a pre-specified period, typically a year to December in exchange for a fixed payment.

Example: On March 14, 2008, the quote for the December 2008 Dow Jones EURO STOXX 50® dividend swap was 155.9 index points. Assuming a notional value of EUR 100,000 per index point, the cash flows will be:

Pricing Dow Jones EURO STOXX 50® Index Dividend Swaps Using the Put/Call Parity Equation

The pricing of Dow Jones EURO STOXX 50® Index dividend swaps can be calculated by using Eurex Dow Jones EURO STOXX 50® Index Option prices.

From put/call parity for dividend paying stocks we know that:

$$S - PV(Div) + P = C + PV(Stk)$$

Where:

S = Stock price
PV(Div) = Present value of dividend payment
P = Put price
C = Call price
PV(Stk) = Present value of strike price

[1] See **www.eurexchange.com** for contract specifications

[2] See Eurex paper "Dow Jones EURO STOXX® Index Dividend Futures – Pricing & Applications for the Institutional Investor" at **www.eurexchange.com > Documents > Publications > Article & Survey**.

Solving for PV(Div) gives:

PV(Div) = S + P – C – PV(Stk)

A Dow Jones EURO STOXX 50® Index dividend swap is a contract which represents an annual dividend payout to December each year. Therefore, the present value of the dividend on the Dow Jones EURO STOXX 50® Index derived from index option prices needs to be adjusted for December settlement:

Price of Dow Jones EURO STOXX 50® Index dividend swap = PV(Div) x $(1+r)^T$
Where ^{T} is the number of days to December divided by 360.

For example, on March 14, 2008, dividend index swaps for the Dow Jones EURO STOXX 50® Index dividend swap were:

Year	Dow Jones EURO STOXX 50® Index Dividend Swap
2008	155.9
2009	146.1
2010	146.95
2011	147.95

Source: Barclays Capital

On the same day, Eurex Dow Jones EURO STOXX 50® Index Option prices were:

Maturity	Strike	Call or Put	Price
December 2008	3,600	Call	290.60
December 2008	3,600	Put	349.40

Source: Eurex

Underlying Dow Jones EURO STOXX 50® Index: 3,566.59.
Risk-free rate to December 2008 (day count is actual days/360 that is 0.778): 4.6 percent.

Solving for $PV(Div)_{2008}$:

$$\mathbf{PV(Div)_{2008} = 3{,}566.59 + 349.40 - 290.60 - 3{,}600\,/\,(1.046)^{0.778} = 149.14}$$

This implies a Dow Jones EURO STOXX 50® Index dividend swap price for December 2008 of 154.48 that is $PV(Div)_{2008} \times (1.046)^{0.778}$ which is very close to the market quote of 155.9.

The described approach generates an implied dividend index swap price using options, alternatively many firms and analysts provide a “bottom up” valuation of index dividend swaps.

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