## Structured Products <br> Research Report

## Structured Product Details

Name ELKS linked to CBS Corp.

| Issue Size | \$17.50 million |
| :---: | :---: |
| Issue Price | \$10 |
| Term | 6 Months |
| Annualized Coupon | 8.50\% |
| Pricing Date | May 24, 2011 |
| Issue Date | May 27, 2011 |
| Valuation Date | November 18, 2011 |
| Maturity Date | November 23, 2011 |
| Issuer | Morgan Stanley |
| CDS Rate | 40.14 bps |
| Swap Rate | 0.39\% |
| Reference Asset | CBS Corp.'s stock |
| Initial Level | \$26.36 |
| Conversion Price | \$24.78 |
| Trigger Price | \$21.09 |
| Dividend Rate | 0.76\% |
| Implied Volatility | y 34.54\% |
| Delta ${ }^{1}$ | 0.45 |
| Fair Price at Issue | \$9.58 |
| Realized Return | -3.76\% |
| CUSIP | 61760E648 |
| SEC Link did | www.sec.gov/Archives/edgar/ data/895421/000095010311002048/ dp22800_424b2-ps763.htm |

Related Research

## Research Papers:

www.slcg.com/research.php

- "Are Structured Products Suitable for Retail Investors?" December 2006.
- "Structured Products in the Aftermath of Lehman Brothers," November 2009.
- "What TiVo and JP Morgan Teach Us about Reverse Convertibles," June 2010.


## ELKS linked to CBS Corp.

## Description

Morgan Stanley issued $\$ 17.50$ million of ELKS linked to CBS Corp. on May 27, 2011 at \$10 per note.

These notes are Morgan Stanley-branded reverse convertibles. These notes pay periodic interest coupons and at maturity convert into shares of CBS Corp.'s stock, if the closing price of CBS Corp.'s stock was ever below $\$ 21.09$ during the term of the notes. Similar securities are issued by other companies under different brand names.

These 6-month notes pay monthly coupons at an annualized rate of $8.50 \%$. In addition to the monthly coupons, at maturity on November 23, 2011 investors will receive the market value of 0.38 share of CBS Corp.'s stock if during the term of the notes CBS Corp.'s stock ever closed at or below $\$ 21.09$ - $80 \%$ of CBS Corp.'s stock's $\$ 26.36$ closing price on May 24, 2011. Otherwise, investors will receive the $\$ 10$ face value per note. In either case, investors receive the final coupon payment at maturity.

## Valuation

This Morgan Stanley ELKS linked to CBS Corp. can be valued as a combination of a note from Morgan Stanley, a short down-and-in at-the-money put option, and a long down-and-in at-the-money call option on CBS Corp.'s stock. For reasonable valuation inputs this note was worth $\$ 9.58$ per $\$ 10$ when issued on May 27,2011 because investors were effectively being paid only $\$ 0.38$ for giving Citigroup options which were worth $\$ 0.80$.

There is no active secondary market for most structured products. Structured products, including this note, therefore are much less liquid than simple stocks, bonds, notes and mutual funds. Investors are likely to receive less than the structured product's estimated market value if they try to sell the structured product prior to maturity. Our valuations do not incorporate this relative lack of liquidity and therefore should be considered an upper bound on the value of the structured product.

Payoff Curve at Maturity


The payoff diagram shows the final payoff of this note given CBS Corp.'s stock price (borizontal axis). For comparison, the dashed line shows the payoff if you invested in CBS Corp.'s stock directly.

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## Principal Payback Table

| CBS Corp.'s <br> Stock | Converted <br> Note Payoff | Non-Con- <br> verted Note <br> Payoff |
| :---: | :---: | :---: |
| $\$ 0.00$ | $\$ 0.00$ |  |
| $\$ 2.64$ | $\$ 1.00$ |  |
| $\$ 5.27$ | $\$ 2.00$ |  |
| $\$ 7.91$ | $\$ 3.00$ |  |
| $\$ 10.54$ | $\$ 4.00$ |  |
| $\$ 13.18$ | $\$ 5.00$ |  |
| $\$ 15.82$ | $\$ 6.00$ |  |
| $\$ 18.45$ | $\$ 7.00$ |  |
| $\$ 21.09$ | $\$ 8.00$ | $\$ 10.00$ |
| $\$ 23.72$ | $\$ 9.00$ | $\$ 10.00$ |
| $\$ 26.36$ | $\$ 10.00$ | $\$ 10.00$ |
| $\$ 29.00$ | $\$ 11.00$ | $\$ 10.00$ |
| $\$ 31.63$ | $\$ 12.00$ | $\$ 10.00$ |
| $\$ 34.27$ | $\$ 13.00$ | $\$ 10.00$ |
| $\$ 36.90$ | $\$ 14.00$ | $\$ 10.00$ |
| $\$ 39.54$ | $\$ 15.00$ | $\$ 10.00$ |

Maturity Payoff Diagram


The contingent payoffs of this ELKS.

## Analysis

The $8.50 \%$ annualized coupon rate is higher than the yield Morgan Stanley paid on its straight debt but, in addition to Morgan Stanley's credit risk, investors bear the risk that, at maturity, they will receive shares of CBS Corp.'s stock at precisely the time when these shares are worth substantially less than the face value of the note.

Investors purchasing ELKS effectively sell down-and-in put options to Morgan Stanley, buy down-and-in call option, and post the note's issue price as collateral to secure satisfaction of the investors' obligations under the option contracts. Investors are compensated by Morgan Stanley through "coupon" payments that represent partial payment for the premium difference of put and call options as well as interest on the investors' posted collateral. This ELKS is fairly priced if and only if the excess of the reverse convertible's "coupon rate" above the interest Morgan Stanley pays on its straight debt equals the net value of the put and call options investors are exchanging with Morgan Stanley. Whether the purchase of this ELKS is suitable or not is identically equivalent to whether selling put options on the reference asset at the option premium being paid by the brokerage firm was suitable for the investor in question.

## Morgan Stanley's Stock Price



The graph above shows the adjusted closing price of the issuer Morgan Stanley for the past several years. The stock price of the issuer is an indication of the financial strength of Morgan Stanley. The adjusted price shown above incorporates any stock split, reverse stock split, etc.

## Morgan Stanley's CDS Rate



Credit default swap (CDS) rates are the market price that investors require to bear credit risk of an issuer such as Morgan Stanley. CDS rates are usually given in basis points (bps). One basis point equals $0.01 \%$. Higher CDS rates reflect bigher perceived credit risk, higher required yields, and therefore lower markeet value of Morgan Stanley's debt, including outstanding ELKS. Fluctuations in Morgan Stanley's CDS rate impact the market value of the notes in the secondary market.

## CBS Corp.'s Stock Price



The graph above shows the historical levels of CBS Corp.'s stock for the past several years. The final payoff of this note is determined by CBS Corp.'s stock price at maturity. Higher fluctuations in CBS Corp.'s stock price correspond to a greater uncertainty in the final payout of this ELKS.

## Realized Payoff

This note matured on November 23, 2011 and investors received $\$ 9.40$ per note (or equal to the value of 0.38 share of CBS Corp. stock's closing price on November 18, 2011).

## Reference Asset CBS Corp.'s Stock's Implied Volatility



The annualized implied volatility of CBS Cor力.'s stock on May 24, 2011 was $34.54 \%$, meaning that options contracts on CBS Corp.'s stock. were trading at prices that reflect an expected annual volatility of $34.54 \%$. The higher the implied volatility, the larger the expected fluctuations of CBS Corp.'s stock, price and of the Note's market value during the life of the Notes.

## Decomposition of this ELKS



This note can be decomposed into different components, and each component can be valued separately. The chart above shows the value of each component of this ELKS.

1. Delta measures the sensitivity of the price of the note to the CBS Corp.'s stock price on May 24, 2011.
2. CDS rates can be considered a measure of the probability that an issuer will default over a certain period of time and the likely loss given a default. The lower the CDS rate, the lower the default probability. CDS rate is given in basis points ( 1 basis point equals $0.01 \%$ ), and is considered as a market premium, on top of the risk-free rate, that investors require to insure against a potential default.
3. Fair price evaluation is based on the Black-Scholes model of the CBS Corp.'s stock on May 24, 2011.
4. Calculated payout at maturity is only an approximation, and may differ from actual payouts at maturity.
5. Our evaluation does not include any transaction fees, broker commissions, or liquidity discounts on the notes.
