

# Structured Product Details

	Reverse Exchangeable Notes linked to CF Industries Holdings, Inc.	
Issue Size	\$5,000	
Issue Price	\$1,000	
Term	6 Months	
Annualized Coupo	10.50%	
Pricing Date	April 13, 2012	
Issue Date	April 18, 2012	
Valuation Date	October 15, 2012	
Maturity Date	October 18, 2012	
Issuer	Bank of Montreal	
CDS Rate	144.88 bps	
Swap Rate	0.73%	
Reference Asset Initial Level Trigger Price Conversion Pricc Dividend Rate Implied Volatilit Delta <sup>1</sup>	0.70%	
Fair Price at Issue	\$944.34	
Realized Return	10.99%	
CUSIP SEC Link	06366Q6G7 www.sec.gov/Archives/edgar/ data/927971/000121465912001719/ f416122424b2.htm	

Structured Products Research Report

Report Prepared On: 01/29/13

# Reverse Exchangeable Notes linked to CF Industries Holdings, Inc.

# Description

Bank of Montreal issued \$5,000 of Reverse Exchangeable Notes linked to CF Industries Holdings, Inc. on April 18, 2012 at \$1,000 per note.

These notes are Bank of Montreal-branded reverse convertibles. Reverse convertibles pay periodic interest coupons and at maturity convert into shares of the reference security if the price of the reference stock at the notes' maturity is below its price when the notes were issued and had closed below a specified "trigger" during the term of the notes.

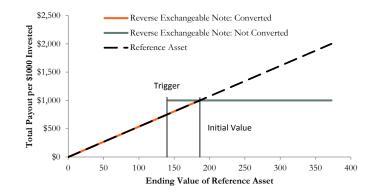
These 6-month notes pay monthly coupons at an annualized rate of 10.50%. In addition to the monthly coupons, at maturity on October 18, 2012 investors will receive the market value of 5.37 shares of CF Industries Holdings, Inc.'s stock if on October 15, 2012 CF Industries Holdings, Inc.'s stock price closes below \$186.25 (CF Industries Holdings, Inc.'s stock price on April 13, 2012) and had ever closed at or below \$139.69 during the term of the notes. Otherwise, investors will receive the \$1,000 face value per note.

# Valuation

This Bank of Montreal reverse convertible linked to CF Industries Holdings, Inc.'s stock can be valued as a combination of a note from Bank of Montreal and a short down-andin, at-the-money put option on CF Industries Holdings, Inc.'s stock. For reasonable valuation inputs this note was worth \$944.34 per \$1,000 when it was issued on April 18, 2012 because investors were effectively being paid only \$41.21 for giving Bank of Montreal an option which was worth \$96.88.

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 CF Industries Holdings, Inc.'s stock price (horizontal axis). For comparison, the dashed line shows the payoff if you invested in CF Industries Holdings, Inc.'s stock directly.

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# **Related Research**

# **Research Papers:**

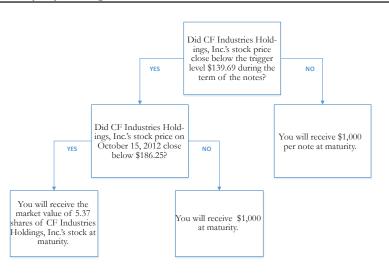
www.slcg.com/research.php

- "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.

# Principal Payback Table

CF Indus- tries Hold- ings, Inc.'s Stock	Converted Note Payoff	Non-Con- verted Note Payoff
\$0.00	\$0.00	
\$18.63	\$100.00	
\$37.25	\$200.00	
\$55.88	\$300.00	
\$74.50	\$400.00	
\$93.13	\$500.00	
\$111.75	\$600.00	
\$130.38	\$700.00	
\$149.00	\$800.00	\$1,000.00
\$167.63	\$900.00	\$1,000.00
\$186.25	\$1,000.00	\$1,000.00
\$204.88	\$1,000.00	\$1,000.00
\$223.50	\$1,000.00	\$1,000.00
\$242.13	\$1,000.00	\$1,000.00
\$260.75	\$1,000.00	\$1,000.00
\$279.38	\$1,000.00	\$1,000.00

## Maturity Payoff Diagram



The contingent payoffs of this Reverse Exchangeable Note.

# Analysis

This reverse convertible's 10.50% coupon rate is higher than the yield Bank of Montreal paid on its straight debt but, in addition to Bank of Montreal's credit risk, investors bear the risk that they will receive shares of CF Industries Holdings, Inc.'s stock when they are worth substantially less than the face value of the note at maturity.

Investors purchasing reverse convertibles effectively sell put options to Bank of Montreal and post the note's issue price as collateral to secure satisfaction of the investors' obligations under the option contracts. Bank of Montreal pays investors a "coupon" that is part payment for the put options and part interest on the investors' posted collateral. This reverse convertible is fairly priced if and only if the excess of the reverse convertible's "coupon rate" above the interest Bank of Montreal pays on its straight debt equals the value of the put option investors are giving to Bank of Montreal. Whether the reverse convertible is suitable or not is equivalent to whether selling put options on the reference stock at the option premium being paid by Bank of Montreal was suitable for the investor.

#### Bank of Montreal's Stock Price



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

# Bank of Montreal's CDS Rate



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

#### \$240 \$190 \$140 \$90 \$40 $$y_{0}$ $$y_{0}$

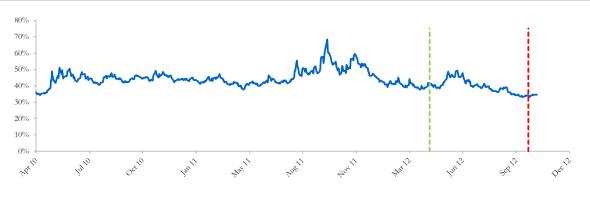
## CF Industries Holdings, Inc.'s Stock Price

The graph above shows the historical levels of CF Industries Holdings, Inc.'s stock for the past several years. The final payoff of this note is determined by CF Industries Holdings, Inc.'s stock price at maturity. Higher fluctuations in CF Industries Holdings, Inc.'s stock price correspond to a greater uncertainty in the final payout of this Reverse Exchangeable Note.

## **Realized Payoff**

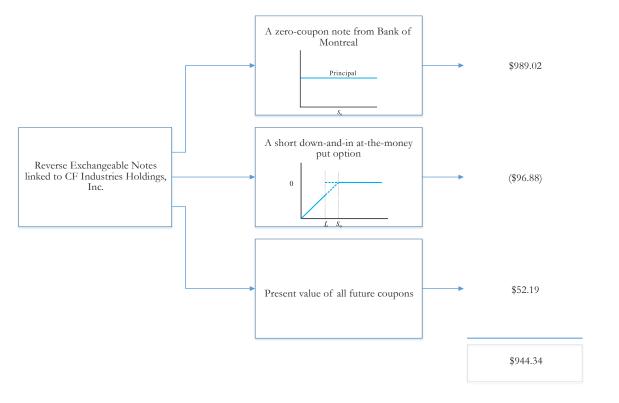
This note matured on October 18, 2012 and investors received \$1,000.00 per note.

# Reference Asset CF Industries Holdings, Inc.'s Stock's Implied Volatility



The annualized implied volatility of CF Industries Holdings, Inc.'s stock on April 13, 2012 was 41.30%, meaning that options contracts on CF Industries Holdings, Inc.'s stock were trading at prices that reflect an expected annual volatility of 41.30%. The higher the implied volatility, the larger the expected fluctuations of CF Industries Holdings, Inc.'s stock price and of the Note's market value during the life of the Notes.

## Decomposition of this Reverse Exchangeable Note



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 Reverse Exchangeable Note.

- Delta measures the sensitivity of the price of the note to the CF Industries Holdings, Inc's stock price on April 13, 2012.
  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 CF Industries Holdings, Inc's stock on April 13, 2012.
  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.

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