

Embedded Financing: The Unsung Virtue of Derivatives

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Derivatives: For and Against

- Arguments in favor of derivatives
 - Users can hedge their non-core business risks.
- Arguments against derivatives
 - Facilitate excess leverage;
 - Permit accounting, regulatory, and ratings arbitrage;
 - Oligopolistic dealers win at the expense of end users;
 - Abuse bankruptcy safe harbors.

The Regulatory Landscape

- The current regulatory framework may significantly discourage the use of derivatives.
 - Increased initial margin for cleared derivatives.
 - Potentially punitive initial margin for non-cleared derivatives.
 - Pristine collateral requirements.
 - Encouraging competition and transparency may backfire and reduce liquidity.

Embedded Financing

The debate surrounding derivatives has ignored the virtues of embedded financing.

Outline

- How do positions in swap differ from positions in bonds?
 - What is embedded financing?
 - How does this reduce financing risk?
- A new definition of derivatives
 - Illustrations using other derivatives
- Implications for the debate surrounding derivatives

How do Positions in Swap Differ from Positions in Bonds?

\$100mm .5% 2-yr Interest Rate Swap

Date	LIBOR	Fixed Payment	Floating Payment
4/13/13	.25%		
7/13/13	.25%		\$62,500
10/13/13	.25%	\$250,000	\$62,500
1/13/14	.25%		\$62,500
4/13/14	1%	\$250,000	\$62,500
7/13/14	1%		\$250,000
10/13/14	1%	\$250,000	\$250,000
1/13/15	1%		\$250,000
4/13/15		\$250,000	\$250,000

Receiving Fixed vs. Bond Purchase

\$100mm .5% 2-Yr Swap

Date	LIBOR	Fixed	Float
4/13/13	.25%		
7/13/13	.25%		\$62,500
10/13/13	.25%	\$250,000	\$62,500
1/13/14	.25%		\$62,500
4/13/14	1%	\$250,000	\$62,500
7/13/14	1%		\$250,000
10/13/14	1%	\$250,000	\$250,000
1/13/15	1%		\$250,000
4/13/15		\$250,000	\$250,000

\$100mm .5% 2-Yr Bond

Date	Coupon	Principal
4/13/13		-\$100,000,000
7/13/13		
10/13/13	\$250,000	
1/13/14		
4/13/14	\$250,000	
7/13/14		
10/13/14	\$250,000	
1/13/15		
4/13/15	\$250,000	\$100,000,000

Rec Fixed = Levered Bond Purchase!

Receive Fixed on \$100mm 5% 2-Yr Swap

Date	LIBOR	Fixed	Float
4/13/13	.25%		
7/13/13	.25%		\$62,500
10/13/13	.25%	\$250,000	\$62,500
1/13/14	.25%		\$62,500
4/13/14	1%	\$250,000	\$62,500
7/13/14	1%		\$250,000
10/13/14	1%	\$250,000	\$250,000
1/13/15	1%		\$250,000
4/13/15		\$250,000	\$250,000

Levered Purchase \$100mm 5% 2-Yr Bond

Date	Repo	Coupon	Funding
4/13/13	.25%		
7/13/13	.25%		\$62,500
10/13/13	.25%	\$250,000	\$62,500
1/13/14	.25%		\$62,500
4/13/14	1%	\$250,000	\$62,500
7/13/14	1%		\$250,000
10/13/14	1%	\$250,000	\$250,000
1/13/15	1%		\$250,000
4/13/15		\$250,000	\$250,000

A Description of the Swap Position

- The fixed receiver / floating payer
 - buys a 2-year .5% “bond” at par, and
 - funds that purchase for 2 years at LIBOR.
- The fixed payer / floating receiver
 - shorts a 2-year .5% “bond” at par, and
 - Borrows that bond for 2 years at LIBOR.
- Swap counterparties trade the bond and agree to finance that bond over the life of the contract.

Financing Risk of Swaps vs. Bonds

- Given leverage, the swap and bond positions are qualitatively identical.
- An interest rate swap finances a “bond” at LIBOR over the life of the contract.
- Bond positions cannot be financed long term.
- Swaps have less financing risk than levered bond positions!

A New Definition of Derivatives with Illustrative Examples

A New Definition of Derivatives

A derivative contract is an agreement in which

- i) one party purchases and the other party sells a particular asset or set of cash flows at some price;**
- ii) each party agrees to finance the transaction of the other party over the life of the contract.**

Forward/Futures Contract

Contract

Date	Trade	Flow
4/13/13	Buy Fwd @100.054%	0
6/30/13	Buy bond thru Fwd @100.054%	-100,054
	Sell bond @100.5%	100,500
Total		446

Levered Cash

Date	Trade	Flow
4/13/13	Buy Bond @100%	-100,000
	Sell Repo @ .25%	+100,000
Total		0
6/30/13	Repay Loan	-100,054
	Sell Bond @100.5%	100,500
Total		446

Embedded Financing in Forwards

- Buying a forward is equivalent to buying the underlying security and funding the purchase over the life of the forward contract.
- The correct “risk-free rate” for pricing forward contracts is the term financing rate of the underlying security.
- Forwards are safer than levered cash positions with overnight financing.

Credit Default Swaps (simplified)

5-Year CDS on \$100 5% 5-Year Corporate

Date	Trade	Flow
Today	Sell Protection @ 2%	\$0
Interim	\$100 x 2%	\$2
Default		-\$60
Maturity		\$0

Levered Purchase \$100 5% 5-Year Corporate

Date	Trade	Flow
Today	Buy Bond	-100
	Repo @3%	+100
Total		\$0
Interim	\$100(5%-3%)	\$2
Default	Recovery	\$40
	Repay Loan	-\$100
Total		-\$60
Maturity	Principal	\$100
	Repay Loan	-\$100
Total		\$0

Embedded Financing in CDS

- Selling protection = buying a corporate and funding the purchase to maturity.
- The correct “risk-free rate” for pricing CDS is the term financing rate of the underlying bond.
- Since long-term financing for corporates does not exist, CDS have less financing risk than equivalently levered cash positions.

Call Option

- In Black-Scholes (BS) framework, a call option can be replicated by
 - Buying $\Delta(t)$ shares of stock for $\Delta(t)S(t)$
 - Borrow $B(t)$, posting shares as collateral
 - Contribute $\Delta(t)S(t) - B(t)$ in cash/capital
- The “risk-free rate” for the forward stock price in BS is the stock’s financing rate.
- Given leverage, option positions have less financing risk than cash positions.

Synthetic Stock Borrow

	Today	Maturity	
		$S' \geq K$	$S' < K$
Stock Borrow	$-S$	$S(1+r)$	$S(1+r)$
Synthetic Stock Borrow			
Write Call	C	$-(S' - K)$	0
Buy Put	$-P$	0	$K - S'$
Buy Stock	$-S$	S'	S'
Total	$C - P - S = -S$	$K = S(1+r)$	$K = S(1+r)$

- Option prices embed the financing rate of the underlying stock.

Implications for the debate surrounding derivatives

Derivatives Complete Financing Mkts

- There are natural, short-term collateralized borrowers and lenders of cash and securities.
- This does not extend to longer terms.
- The best supplier of long-term funding is the long-term short.
- The best supplier of long-term collateral is the long-term purchaser.
- Hence derivatives complete long-term financing markets.

Financing Risk

Financing Risk	Derivative	Levered Cash
Variation Margin	Yes	Yes
Increases in Initial Margin	Cleared, Yes; OTC, No	Yes
Refusal to Roll	No	Yes
Counterparty Default	Yes	Yes

- Derivative positions have less financing risk than levered cash positions.
- OTC derivatives have less financing risk than cleared derivatives.

Bets on Rollover Financing

- A derivative position against a levered cash position is a bet on rollover financing!
- Negative basis trade during the crisis:
 - Buy corporate bond, funding overnight
 - Buy protection through CDS
 - Bonds looked cheap to CDS when *not* using a long-term funding rate
- As funding conditions deteriorated, the basis widened significantly.

Policy

- Given leverage, derivatives have less financing risk than cash positions. Therefore,
 - overly discouraging derivatives might increase systemic risk;
 - leverage in cash markets is more procyclical than the embedded leverage in derivatives.
- Derivative clearing mandates might increase systemic risk and financing procyclicality.
 - increased cost of derivatives;
 - bilateral margin stickier than clearinghouse margin.