

DERIVATIVES LIBRARY

A Bloomberg Professional Service Offering

# DERIVATIVES. THE NEXT STEP.

Bloomberg



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# BE IN CONTROL

Tap into a powerful, independent platform for creating, pricing, analyzing and sharing derivatives and structured products with the Bloomberg Derivatives Library.

# FROM SIMPLE VANILLA TO EXOTIC PAYOFFS

The Bloomberg Derivatives Library, DLIB <GO>, is a comprehensive platform for pricing and analyzing derivatives, structured products and dynamic strategies.

DLIB <GO> enhances the coverage offered by Bloomberg's derivative-pricing tools by supporting even the most exotic payoffs. DLIB <GO> provides tools for every step of your workflow, including sophisticated models that capture the full range of market risks.



# THE BLOOMBERG ADVANTAGE

DLIB <GO> is ideal for participants in the structured product market who need an independent and sophisticated platform capable of creating, pricing and analyzing all of their deals. Participants include:

- » Buyers and sellers of structured notes
- » Risk managers, valuation and treasury groups
- » Investment advisors

## CUTTING-EDGE TECHNOLOGY

DLIB <GO> leverages the latest technology to provide:

- » Advanced models and calibration analytics for equity, FX and rates that cover single assets and hybrid structures
- » Flexibility in contract creation using BLAN, our simplified Bloomberg scripting language
- » Desktop and server API supporting Excel integration

## EFFICIENT & TRANSPARENT WORKFLOW

DLIB <GO> streamlines your workflow from end to end with:

- » Transparent market data, calibration and models
- » Minimal operational risk, leveraging life-cycle automatic generation
- » Pricing outputs, including implied probabilities and projected cash flows

## FULLY INTEGRATED

As part of the Bloomberg Professional® service platform, DLIB <GO> is fully integrated with:

- » All Bloomberg market data
- » Desktop and server API
- » Excel®
- » Multi-Asset Risk System, MARS <GO>
- » Independent valuation service for portfolios
- » Distribution of trades and ideas on the Bloomberg Terminal

91) Actions		92) Products		93) Data & Settings		Derivatives Library	
40) Solver (Price (%))		41) Save		42) Load		43) Send	
44) Book		45) Trade		Cpty		ShareUser	
10) Deal		11) LifeCycle		12) Pricing		13) Market Data	
31) Range Shift		32) Shoc Shift		16) Calibration		17) Scenario	
21) Backtesting		Scenario 1		Scenario 2		Scenario 3	
Market Shifts (SHOC)		No Change		Russian Crisis and L		Lehman Default 2008	
Time Shift		Today		Today		Today	
Dividend		SPX Index		SPX Index		SPX Index	
Equity Price		Absolute		Absolute		Absolute	
SPX Index		+0.00		+0.00		+0.00	
Equity Vol		Absolute		Percent		Percent	
SPX Index		+0.00		-18.21		-16.32	
Swap Curve		Percent		Percent		Percent	
USD,23		+113.33		+57.45		+69.30	
1) Calculate		Price (%) Std		Price		Price Std	
		0.16		106.73		0.16	
		0.36		85.77		0.36	
		0.31		92.49		0.31	
		94.38		95.00		93.63	
Zero Coupon (%)		94.38		95.00		93.63	
Delta Money (%)		SPX Index		SPX Index		SPX Index	
		0.05		0.23		0.33	
Gamma Money (%)		SPX Index		SPX Index		SPX Index	
		0.03		0.08		0.09	
Vega		SPX Index		SPX Index		SPX Index	
		-0.54		-0.30		-0.45	

**Scenario analysis stress testing** – Users can build custom stress scenarios with SHOC <GO>, then apply them seamlessly to any deal. Bloomberg stress-testing scenarios are also available.

# IDEA GENERATION

**DLIB <GO> offers multiple tools to support a full range of user ideas — from market-data analysis to the structuring and pricing of new products.**

These convenient, sophisticated tools enable users to analyze the risk of new products by running fully customized scenarios and stress analyses, calculating sensitivities and performing historical price analyses.

- » Solve for trade parameters and target price
- » Generate back-test payoffs and strategies
- » Price products using past market data
- » Analyze portfolios, your own or your clients', to generate new trade ideas
- » DLIB <GO> scenario analysis and stress testing is integrated with the cross-asset scenario manager, SHOC <GO>
- » Create their own products using our flexible, simplified scripting language, BLAN

## DLIB HELPS BRING IDEAS TO LIFE

Idea generation can be a hit-or-miss process. Typically, an investor with a view on market direction has to search for relevant structures within the set of derivatives available to him to monetize his view.

Many investors lack the tools that allow them to cover products beyond vanillas. Therefore, if a client is interested in structured or exotic products, she has to ask the sell side to find suitable ideas. This can be time-consuming, with success depending on the continuing cooperation of the seller through an iterative process.

DLIB <GO> streamlines idea creation by providing direct access to price discovery and an idea-generation mechanism for all products, including exotic payoffs and dynamic strategies. Life-cycling and back-testing tools improve understanding of the payoff and support better trading decisions. DLIB <GO> is also available in Excel, offering a flexible workflow where, for instance, many underlyings can be tried simultaneously. DLIB <GO> in Excel can be used for total return analysis on investment products and matrix pricing.

In addition to saving time and improving results, DLIB <GO> can enhance the buyer's relationship with his sell side — whom he contacts only when he is closer to trading and more educated about the product.

```
1 [*] *****
2 Upside capped twin win on worst performer
3 If worst performer > 100%
4 Upside Leverage * Max(Final Cap, worst performance - 100%)
5 If worst performer < 100% and > Final Barrier
6 Twin Win Leverage * -1 * Worst Performance
7 If worst performer < Final Barrier
8 Put Option on worst performer with strike of final barrier
9 *****
10
11 [*] Templated Variables
12 let notional = 100.0 in
13 let strike_date = 2015-09-15 in
14 let expiry_date = 2015-09-15 in
15 let currency = "USD" in
16 let final_barrier = 65.00% in
17 let final_cap = 30% in
18 let leverage_upside = 100% in
19 let leverage_twin_win = 100% in
20 let fixing_cal = ("70P") in
21 let pay_delay = 2 in
22 *)
23
24 let maturity_date = add_business_days(fixing_cal, expiry_date, pay_delay) in
25 let basket_tickers = basket of tickers (linked_tickers, strike_date) in
```

BLAN, our easy-to-use scripting language, offers full flexibility for idea generation and structuring of products. Only a handful of key words need to be learned to enable you to create most of the products in the market.

# PRICING TRANSPARENCY

**DLIB <GO> provides high-quality pricing using industry-standard pricing models for each asset class and product type.**

Take control with sophisticated pricing and verification tools that include:

- » Independent pre-trade pricing of structured products
- » Independent post-trade calculation of mark-to-market throughout the life cycle of the product
- » Pricing outputs such as implied probabilities and projected cash flows
- » Transparent models and market data
- » Scenario analysis — Stress testing, including reproducing past events such as market crises

## DLIB <GO> MAKES DERIVATIVES MORE TRANSPARENT

Buy-side clients trading structured products greatly benefit from having an independent tool to verify price. Without one, they have to depend on their sell-side counterparties for price input, mark-to-market and margin-call calculations. This approach takes time and doesn't provide full transparency around the

value of illiquid underlyings. Also, problems can arise if only one party provides a quote or if various parties disagree on the price. By contrast, DLIB <GO> empowers buyers to price, analyze and create derivatives. They can access the components that influence the price and choose the most sophisticated models in each asset class.

DLIB <GO> helps the seller educate the buyer about the various embedded risks in the product and highlight hedging assumptions and reserves. In addition, model risk can be assessed in DLIB <GO> as well as the impact of funding assumptions. DLIB <GO> also shows calibration error and back-testing results. All of these might be included in calculating the final trading price. User can also customize outputs that help explain the price. By providing the sophistication that only few Tier One banks have, DLIB <GO> brings the buy side and the sell side closer together because of the transparency it provides.

91) Actions		92) Products		93) Data & Settings				Derivatives Library	
41) Save		42) Load		43) Send				44) Book	
Basket Option		Cpty		Share		User		SPDL	
10) Deal	11) LifeCycle	12) Pricing	13) Market Data	15) Correlation	16) Calibration	17) Scenario	21) Backtesting		
Type	Historical		EURUSD Curn	AAPL US Equi	C US Equity	FB US Equity	IBM US Equit	MSFT US Equi	
Settings	Custom		1.0000	0.1277	0.0744	0.1264	0.1666	0.0949	
Method	Rolling window		AAPL US Equi	1.0000	0.1533	0.0508	0.2331	0.1520	
Price Using	Percentile		C US Equity	0.0744	1.0000	0.1600	0.2942	0.3798	
Return Type	Logarithmic		FB US Equity	0.1264	0.0508	0.1600	1.0000	0.0185	0.0536
Return Freq.	Weekly		IBM US Equit	0.1666	0.2331	0.2942	0.0185	1.0000	0.3474
Period	5 Years		MSFT US Equi	0.0949	0.1520	0.3798	0.0536	0.3474	1.0000
11/30/10	11/30/15								
Window Length	1 Year								
Window Shift	1								
Percentile	50								
Show Details									
Parallel Bump	0.00								
Exponential Bump	1.00								
Set All									
Valuation									
11/30/2015									
Market Data									
11/30/2015									
Valuation									
1) Calculate									
Price (%)									
Model									
Local Volatility									
Paths									
20000									
Funding Spread									
0.00 bp									
Price (%)									
Price									
USD									

**Correlation-rolling windows** – DLIB <GO> is fully integrated with market data; price intra-day or by using custom data or snapshots. DLIB <GO> provides several methods to compute correlation in its models.

# COMMUNICATION

**DLIB <GO> enables users at all levels — manufacturer, distributor and buyer — to save and share deals, portfolios and trade ideas on the Bloomberg platform.**

Share common analytical tools for pre-trade analysis, pricing and risk. DLIB <GO> enables users to examine all aspects of a deal together on screen — testing assumptions and often reaching agreement more quickly.

DLIB <GO> has a flexible document-generation technology that can be customized. Currently, it is used to create trade sheets in the pdf format that can be sent by email.

## DLIB SIMPLIFIES COMMUNICATION

DLIB <GO> offers a streamlined alternative to conventional communications. A common way for a buyer to get a price from the seller is to send an email with a term sheet or to contact the seller by phone. The seller often needs time to understand and verify the terms and make sure that they agree on the interpretation of the payoff.

Now, a client can experiment with a structure in DLIB <GO>, then save and share the deal with the seller. Both sides view the same deal on their Bloomberg Terminals, so no confusion arises about terms such as

“inputs,” “life-cycling events” and “cash flows.” This makes the negotiation and agreement phases faster and more efficient and minimizes the potential for misunderstanding.

DLIB <GO> can also be used for two-way customization of a deal. Clients can incorporate their own market data, as well as underlying models, and use the DLIB platform as a trade distribution and sharing mechanism incorporated into the workflow.

## DLIB ASSISTS THE PRICE-RECONCILIATION PROCESS

Sometimes an investor doesn't fully understand the pricing methodology that the seller offers. Before an agreement can be reached, the seller often has to explain the various components that led to the price. This may require a time-consuming conference call to review terms and clarify relevant concepts.

Structuring desks can use DLIB <GO> to share deals with the buyer right on the Terminal and demonstrate how the price was reached in an efficient and transparent manner.



**Model implied probabilities are generated by DLIB <GO> – DLIB gives clients access to model output such as the implied probability of hitting the barrier and expected payoff when the barrier is hit. This enhances risk management ability as well as provides better understanding of the product.**

# PAYOFF EXPLANATION

**DLIB <GO> minimizes operational risk and time needed to model trades.**

Buyers and sellers both have a strong interest in making sure that every product is well-understood. However, payoffs may not be easy for non-sophisticated clients to comprehend. As a result, clients may have an unrealistic view of risk, and they may be unpleasantly surprised if their investments result in losses.

DLIB <GO> helps clarify for clients the major aspects of the deal, including life-cycle events, probabilities, scenarios and back-testing.

This is not limited to the trades at inception but also includes the secondary market trades. DLIB <GO> has a sophisticated life-cycle mechanism that automatically handles corporate actions. Clients can choose different sources of fixings. DLIB <GO> provides an audit trail for the changes applied to life-cycling events, thus creating transparency and minimizing operational risk.

## **DLIB <GO> HELPS USERS COMPLY WITH RISK REGULATIONS**

DLIB <GO> offers a convenient way to meet increasingly stringent risk regulations in global markets. For example, the buy side might be required to have an independent tool to value its derivatives in order to enter a deal. DLIB <GO>, with its transparent pricing and market data, is an ideal solution.

## **LIFE-CYCLE CASH FLOWS**

DLIB <GO> generates life-cycle events on the fly from trade descriptions. This information is extremely useful for minimizing operational risk and the time needed to model trades.

## **DOCUMENT GENERATION**

Pre-trade regulations such as MiFID II and PRIIPS in Europe require producing a document that explains the product and its risks in addition to other information, e.g., cost.

Date	JPY Amount	USD Amount
03/04/2015	-246,220,000.00	2,000,000.00

**Cashflow Formula**

Pay:  
(if USDJPY Curncy(2016-02-29) < 123.11 then 246220000 else 0) + (if 123.11 < USDJPY Curncy(2016-02-29) then 123110000 else 0)

Close

Date	Event	Frequency	Receive	Pay
12/02/2016	Pay	☑	x	
03/02/2017	Pay	☑		x
06/02/2017	Pay	☑		x
09/05/2017	Pay	☑		x

Valuation: 11/30/2015 Market Data 11/30/2015

Calculate Price (%) Funding Spread 0.00 bp

Model Local Volatility Price (%)

Paths 20000 Price JPY

**Life-cycle cash flows –** Customize the display and information related to life-cycle events. DLIB <GO> displays payment dates, currency and amount; it confirms whether the payment is certain and establishes probabilities of an event.

# PORTFOLIO RISK ANALYSIS

Used together, DLIB <GO> and the Multi-Asset Risk System, MARS <GO>, provide a comprehensive method for applying risk analysis to portfolios containing structured products.

This pairing is ideal for a wide range of market participants, including risk managers in private banks, regional banks and tier two and three banks with portfolios of structured products.

Once a product is created in DLIB <GO> and added to a portfolio in MARS, the user can appraise its incremental impact on the aggregate risk profile.

DLIB <GO> users have access to Bloomberg's powerful risk-management system, including these integrated tools:

- » Mark-to-market
- » Greeks
- » Portfolio scenario analysis and stress testing integrated with cross-asset scenario manager, SHOC <GO>
- » Historical portfolio valuation

## DLIB OFFERS A BETTER WAY TO DEVELOP & EXPLAIN NEW PRODUCTS

A major private bank recently chose DLIB to help it develop and market derivatives and structured products to its clients. DLIB <GO>, used with the Multi-Asset Risk System, MARS <GO>, enables the bank to quickly analyze client portfolios. It then develops new products — or identifies existing products — that suit each client's yield demand or risk profile. DLIB <GO> also provides an independent pricing tool to validate or challenge prices quoted by counterparties.

The bank employs DLIB <GO> to produce client-facing marketing documents that explain the life cycle of the deal, payoff probabilities and potential investment scenarios. All of this is done more conveniently and at a lower cost than if the bank had developed an equivalent set of in-house tools.

Position	Notional	MktVal	Port Ccy	P&L	Port Ccy	Delta	Theta	Gamma	Vega	Rho
[-] Portfolio Totals		8,596,150.15		-36,317.68		659.35			-573.29	-475,402.54
AutoCallable				103.82	103.82		.00		-1.50	-1.75
AUTOCALLABLE - PHOENIX-DOWN IN	1	100.00		103.82	103.82		.00			
SPX Index						.02			-0.01	-1.64
USD										-1.75
BLAN				6,491.40	-3,412.27		-6.66		674.46	1,219.75
BLAN-USD IBM 7y	1k			6,491.40	-3,412.27		-7.27			
IBM US Equity						194.81		3.92	737.03	
USD										1,219.75
BasketOption				502.71	502.71		-1.19		48.50	63.08
BASKET_OPTION - CAP PROT-C 100	100	10,000.00		502.71	502.71		-1.30			
IBM US Equity						23.60		.86	53.00	
USD										63.08
CMS SpreadFloater				8,591,375.76	-103,870.47		136.42		.00	-476,955.93
CMS_SPREAD_FLOATER - CMS SF-10M	1	10,000.00		8,591,375.76	-103,870.47		149.08			
USD										-476,955.93
TARF				-2,323.54	70,358.53		530.77		-1,294.74	272.30
TARF	1			-2,323.54	70,358.53		530.77			
EURUSD Currency						120,453.55		77,074.95	-1,294.74	
USD										272.30
EUR										

Portfolio risk analysis for structured products – DLIB <GO>, coupled with MARS <GO>, offers a powerful platform for analyzing the risks of a portfolio containing structured products.

# BE ON. ANYWHERE.

Gain access to real-time data on every market with remote and mobile access with Bloomberg Anywhere.

When you're away from the office, Bloomberg Anywhere® lets you access your Bloomberg Professional service account from an Internet-ready desktop or laptop. Just log in to find the same reference-quality, real-time data and access to personal files you expect from your primary Bloomberg Terminal. To protect your confidential information, Bloomberg Anywhere requires biometric authentication with the B-Unit, a state-of-the-art portable fingerprint scanner.

Access your account through your smartphone when you're in between meetings, in transit or on the go. Just download the Bloomberg Professional app for iPhone, iPad, Apple Watch, BlackBerry or Android phones. The experience is optimized for mobile, which makes it easy to monitor events and markets, research securities, find your customized alerts and other features, including messaging and IB chat. The result is a seamless, personalized experience that keeps you connected from virtually anywhere with any type of device.



# ABOUT THE BLOOMBERG PROFESSIONAL SERVICE

The founding vision in 1982 was to create an information services, news and media company that provides business and financial professionals with the tools and data they need on a single, all-inclusive platform. The success of Bloomberg is due to the constant innovation of our products, unrivalled dedication to customer service and the unique way in which we constantly adapt to an ever-changing marketplace. The Bloomberg Professional service is a powerful and flexible tool for financial professionals — whatever their needs — in cash and derivatives markets as diverse as equities, currencies, commodities, money markets, government and municipal securities, mortgages, indices, insurance and legal information. The Bloomberg Professional service seamlessly integrates the very best in real-time data, news and analytics.

In addition, Bloomberg users benefit from on-demand multimedia content, extensive electronic trading capabilities and a superior communications platform. Bloomberg customers include influential decision makers in finance, business and government. Business and financial professionals recognize the Bloomberg Professional service as the definitive tool for achieving their goals because it offers unparalleled assistance and functionality on a single platform for a single price.

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**Real Service from Real People When You Need It.**  
Our 24/7 industry-leading customer service teams in 160 countries around the world will help you fully leverage the analytics and data on the Bloomberg Professional service.  
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**For more information about the Derivatives Library,  
contact your regional representative.**



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