

# **Derivatives Master Class**

An assisted e-learning course

"The emergence of e-learning has been a game changer for self-motivated learners. It gives you the flexibility of learning at your own pace. You control the time when you learn and you chose the topics that you want to emphasize."

#### Derivatives Master Class How the derivatives markets really work

The Derivatives Mater class (DMC) has been developed and applied over many years to train derivative traders and derivative sales of a large investment bank. It is now available online to a broader audience. Participants will learn more about how derivatives are used in the different markets and by various clients, how they are risk managed by banks, modelled, and priced in the academic world and in real life. The course is intended for market professionals that have ongoing interaction with futures and options markets. It is assumed that participants are already familiar with the fundamentals of derivatives before they start the Derivative Master Class.

#### **Course Structure**

The Derivative Master Class is an intensive assisted self-learning program. We suggest that you should plan about 10 weeks to complete the course alongside your daily work. In a 10-week schedule, you start with a self-test to identify areas you need to review. Over the next 7 weeks you will work through 7 online modules. You should plan 6-8 hours of work per week / module. Experienced coaches will guide you through the class and answer your questions. The Derivative Master Class ends with an online test and certification from the Swiss Exchange SIX.

#### 10-week timeline:

	Week 1	Weeks 2-9	Certification
Self-Study	<b>Online self-test</b> To help you set your level and judge whether you are ready for the DMC we have created this short online quiz. It will help you identify the areas that you will need to review before you start the online course.	<b>Online Modules 1-7</b> Work through the 7 highly structured and focused online modules (see table below). Plan to spend 6–8 hours in order to go through each module. Each one contains exercises and homework.	<b>Online final exam</b> Apply what you have learned in a final online exam. Receive a certification from the Swiss Stock Exchange and SAQ credited ongoing education credits.
Coached	Assisted E-Learning Send your questions to our experienced coaches at anytime over the duration of the course.	Webinars: Coaching Hours You are not alone. Bi-weekly webinar reviews with our coaches allow you to ask questions and discuss any topic which is unclear to you.	Webinar: Exam Preparation Before you go through the final online exam, our coaches are here to help you clarify and review any issues you may have regarding the course curriculum.

# **Module 1: Derivatives Toolkit**

Complete your derivatives toolkit and develop your intuition. This module reinforces your base knowledge and sharpens the tools needed to uncover the secrets behind options.

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Futures and Forwards	The instruments			
Derivatives with a symmetric	A review of the why and what of fut	ures and forwards.		
payoff profile are the most	Arbitrage pricing			
fundamental derivatives.	In most cases, underlying security and forwards/futures are closely			
Understanding how they are	related through arbitrage.			
valued and used is the first step to	Forward curves			
understand derivatives.	The price of futures when arbitrage	is not possible. An example.		
	Derivatives and value			
	A guide of how to simplify and straighten your thinking about			
Value Drivers	derivatives.			
Several key factors influence the		Anchor points		
value of an option. Understanding		Options with extreme strikes		
the why and how behind these	Simple facts	can provide us with "anchor		
drivers is central to understanding	Apply your knowledge about	points" when thinking about		
ontions	value drivers	option values.		
		Arbitrage or not?		
		A simple market situation. What		
		will you do?		
	The facts			
	A short and concise review of the different formulations of put-call			
	parity.			
Relative Value	The trades			
Put call-parity is the most	A reminder of how to trade and harvest put-call parity violations			
important relationship between	An experience			
calls and puts. It has far reaching	A detailed worked example. We star	rt with some market prices and		
consequences not only for	check whether there is any arbitrag	e opportunity.		
European options.	More practice	Equity Example		
	You search for arbitrage			
	opportunities and harvest	Index Future Example		
	mispricings.			
	Delta hedging			
	We are watching a trader hedge he	r position.		
Risk Measures and the Greeks	Facts about Greeks			
An option's value is the result of a	A summary of how to calculate and	think about risk measures.		
complex interplay between several		More anchor points		
market factors. Risk measures		Risk measures provide us with		
break this interplay into simple	More practice	additional anchor points to		
components.	Apply your knowledge	decipher options.		
		Option portfolios & Greeks		
		Risk measures are additive.		
	The risk and the view behind			
Option Strategies	A comparison of the risks and the implied views of popular option			
Investors use options to precisely	strategies.			
implement market forecasts and	Strategies and Greeks			
tailor the risk-return profile of	How risk measures can help you to understand your strategy.			
their portfolio. We investigate the	Smooth lines and hockey sticks			
views and risk profiles of the most	Option strategies change their behavior over time.			
popular option strategies.	More practice			
	Time for you to draw some graphs.			
Test your toolkit				
A set of questions to help you test your toolkit. Some of the questions are very easy, others need a bit more				
thinking.				

#### Module 2: Models & valuation

Option valuation models are more than just calculators to determine an option's value. They are insightful tools that "break" options into simpler components. Studying the methodology behind a model not only helps to judge the model's usefulness and limitations, but it also opens up new perspectives on how to think about options.

Risk-neutral valuation	Trading vs. investing	
For the investor, the value of an option depends on	All the facts and ideas behind the principles of	
their view and risk aversion. The price the trader	option valuation.	
quotes is driven by the costs to risk manage the	More practice	
option. It is important to understand this dual world	You revalue an option under changed market	
and its implications.	conditions.	
Binomial model	From one to many	
The Binomial model is like a mechanical clock. Every	The inner workings of the binomial model.	
time the clock ticks, the spot price moves to one of	From many to Black-Scholes	
two values. Being able to see and control all the	Black-Scholes is like a many-step binomial model.	
moving parts makes the binomial model versatile	More practice	
and easily adaptable.	You calculate the value and delta of an option.	
	A Formula conquers the world	
Black-Scholes	The Black-Scholes Formula and the equation behind	
The Black-Scholes pricing model (1973) changed the	it.	
world of finance. Ontions were no longer just bets	How to read Black-Scholes	
but invostment objects with an explainable price	Black-Scholes is more than a tool to calculate prices.	
behavior. This was the birth of more efficient risk	Black-Scholes and put-call parity	
penavior. This was the birth of more enicient risk	Models must comply with the laws.	
management.	More practice	
	X-raying an option with Black-Scholes.	
From normal and lognormal	Implied distribution	
Every option model implies a distribution of future	The distribution behind Black-Scholes.	
spot prices. To judge the value of a model we need	Black-Scholes model calibration	
to understand to what extent that distribution his	A note for experts.	
reality.	A farmanla ta talea harra	
How to get to an option value	A formula to take nome	
Even once you fully understand all facets of Black-	A handy approximation for European ATM forward	
scholes, it is still quite a calculation to get to the	options.	
actual call and put values. Our brain is just not	The Black Cabalas calculates	
Manage for this.	The Black-Scholes calculator	
we need a special calculator of at least a Way to	Time to use your new black-scholes calculator.	
approximate option values. We give you both!		
In the final homework you will price and rick manage a currency option		
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## Module 3: Volatility & volatility markets

The relationship between volatility and option valuation is central and very subtle. Volatility measures the price fluctuation of the underlying. This volatility then gives value to an option. "Implied" volatility on the other hand is a proxy for option prices and leads to the so-called volatility smile.

	Volatility 101
	Volatility? What are we talking about?
Volatility basics	The calculations
	Volatility is the annualized standard deviation of
The nuts and bolts about volatility, variance and	continuous returns. The details.
standard deviation.	Volatility and time
	A simple example to illustrate why risk is not linear.
	Biased & unbiased estimators
	For experts - A note about statistics
	Realized volatility
Realized volatility	How to capture the past.
Historic or realized volatility is typically the	Experience equity volatility
first idea that comes to mind when we think or	100 years of Dow Jones fluctuations.
speak about volatility.	Experience FX volatility
	40 years of GBPUSD uncertainty.
	How to capture uncertainty
	Risk is more than volatility. We start with market
Unaversity 0 distributions	prices and end with a description of the risk.
Uncertainty & distributions	Market distributions
The statistical properties of uncertainty.	Another market, another risk.
	Normal & lognormal
	How Black-Scholes describes uncertainty.
	Implied volatility
	A shorthand for option prices.
Implied velatility	Smile, skew, and term
Implied volatility	The structure of the volatility markets.
Realized volatility is specific to an underlying,	Behind a smile
implied volatility is specific to an option.	What causes an option market to smile or skew?
	Trading implied volatility
	About straddles, butterflies and risk reversals.
Implied ve veoliged veletility	Trading realized volatility
Implied vs. realized volatility	Long gamma, short gamma, and statistical
Options can be used to narvest future realized	arbitrage.
volatility. You pay the current implied volatility to	Gamma scalping
earn the future realized volatility.	A race between movement and time.
Homework	
True or false? 15 challenging questions.	

# **Module 4: Option Graphs**

Option models describe the relationship between market parameters and option value. But their formulaic language is not the brain's preferred way to absorb information. That is why we study option graphs. Graphs help us visualize option behavior.

	How to draw a TV graph
	An option graph is more than a freehand drawing.
	Very highly vols
The TV graph	At a very low volatility, the TV graph of an option
You will be surprised how much the common	reduces to a kinked line. What about the other
theoretical value (TV) graph tells us.	extreme?
	TV graphs and risk measures
	The greeks interpreted as graphical attributes of
	the TV graph.
	Hedging instruments
Hedging the delta risk of your option	Know your hedging instruments.
The subtle differences between spot delta, forward	Delta, which delta?
delta, and future delta.	How to synchronize hedge ratio and hedging
	instrument.
	Delta vs. spot
Graphing the greeks	Volatility and the 50-delta question.
Once you zoom out and look at the entire spot	Gamma vs. spot
range, the behavior of risk measures becomes much	When is gamma big? A surprising answer.
more comprehensible.	Vega vs. spot
	The vega graph and how it changes with volatility.
	Vanna
	Why the correlation between the spot and the
Hedging volatility risk	option market leads to a more pronounced
The flow trader's costs to stay vega neutral.	volatility skew.
	Vomma
	Why the volatility of volatility leads to a more
	pronounced volatility smile.
	Get your pen and paper out
Homework	Graph your own option spreads.
Option strategies and graphs.	
	i ne mixed-up graphs

## Module 5: American options and early exercise

Equity options are typically American style. But what is the point is of an American option? Why does anyone want the additional flexibility to exercise prior to expiry? How can we decide whether and when to exercise an option early? And how much more valuable is an American option than its European counterpart? In this module we will discuss all these questions around the why and the when to early exercise an option.

American basics The basic framework for deciding whether and when to exercise		
American equity options American style options are attractive in equities because they allow investors to own shares in time	<b>Call early exercise</b> Whether and when to early exercise an American call option.	
to capture the next dividend. That is why nearly all single stock options are American style.	<b>Put early exercise</b> Whether and when to early exercise an American put option.	
	<b>A model for American options</b> How can we reflect discrete dividend payments in a spot tree? How can we "weave" the right to early exercise into an option tree?	
<b>Model DIY workshop</b> The valuation of American options is a bit more sophisticated because the early exercise decision is path dependent. We need to adapt the basic	<b>Model insights: American calls</b> We investigate how the value, delta, and expected life of an American call change when we change the market parameters.	
binomial model to value American options.	<b>Model insights: American puts</b> We investigate how the value, delta, and expected life of an American put change when we change the market parameters.	
<b>American vs. European</b> Most of the time an American options behaves much like its European counterpart. But in some market situations the right to exercise early becomes an important value driver.	<b>Call options &amp; dividends: A worked example</b> We investigate how European and American calls react differently to a change in the dividend.	
	Put-call parity & conversions Put-call parity only holds for European options. Is there an American equivalent?	
American options: The graphs An American option is a European option plus the right to early exercise. How is this "plus" reflected in the		

An American option is a European option plus the right to early exercise. How is this "plus" reflected in the graphs?

#### Homework

12 multiple choice questions for you to test your skills and gain further insights. Some questions are very easy, while others are more subtle and need more thinking. You will need to carry out some calculation, so get you calculator ready

#### **Module 6: Investor strategies**

Many investment strategies embed options to tailor the risk/return profile to the investor's needs. We discuss the most typical strategies and the rationale behind them. How will the use of derivatives change the risk and return profile of an investment? How can we describe and measure the benefits of such asymmetric return structures?

	Decision making in traditional finance
	In traditional finance an investment is characterized
	by its risk and return. An idealized setup that helps
	us understand rational decision making.
	Traditional versus behavioral finance
Travester	A rational investor or a human caught in emotions?
Investor	What drives an investor's preference?
Everything starts with the investor. To select the	Risk-return trade-offs
right investment strategy, we first need to	How much return, risk, and income would an
understand the investor's needs and preferences.	investor ideally want to have? Unfortunately it is not
We then assess the available trade-offs between	a free choice - it is a trade-off. Options help you to
risk and return.	fine-tune that trade-off.
	Friend or foe?
	The market maker provides liquidity whenever the
	investor wants to trade. But what does this imply
	about the relationship between investors and
	market makers?
	One price of risk
	An investor can either directly buy the underlying
	and have a symmetric risk exposure, or could use
Investment characteristics	and have a symmetric fisk exposure, or could use
Most primary investments like bonds and shares have a return distribution that is nearly normal and	strategy is the best shelps if we use Sharpe Datie to
	strategy is the best choice if we use sharpe Ratio to
	The asure the enclency of an investment?
theory symmetric. If you can only choose among	Thinking in distributions
unese kinds of investments, expected return and	initiking in distributions reveals the power of
volatility is all you have to think about. But now can	options when managing risk.
different and any memory distributions?	Strategy dashboard
different and asymmetric distributions?	Deciding between investments with different risk
	profiles is difficult. The goal of this session is to
	compile a "strategy dashboard" describing the
	exposure, risk, and return aspects of a strategy.
	Yield enhancement
	In traditional finance you balance your risk-return
Yield enhancement and optimization	profile by investing part of your money in bonds and
Yield enhancement and optimization is for investors	part of your money in shares. The use of options is
who can tolerate some risk. The strategies aim to	another way to find the right balance between risk
optimize the return structure for the investor. They	and return.
either trade potential future capital gains against a	Optimization
known cash income, or leverage some potential	Optimization strategies use premium neutral option
returns and cap others.	overlays to change the return structure of an
	investment. We will discuss speeder, collar, and
	participating range forward structures.
	Build your first capital protection strategy
Capital protection: Worked examples	What is under the hood of a capital protection
You have an exciting underlying with the potential	strategy?
to generate a high capital return. But this potential	Refine your capital protection strategy
upside comes with a high degree of downside risk.	Capital protection strategies can have many
How can you reduce the downside, while keeping	different characteristics. The most important are the
as much of the upside as possible?	level of protection and the rate at which we
	participate in the underlying performance.
Homework: Build your own "Reverse convertible"	

#### Module 7: Currency management & FX derivatives

Currency risk is the inevitable by-product of international trading and investing. We investigate how FX exposure can be managed using forward, vanilla options or more exotic derivatives.

	FX markets and terminology	
	Every profession has its own vocabulary. We need to	
	get familiar with the FX market terms and jargon.	
FX warm-up	FX forwards - Review and summary	
The confusing thing about foreign exchange is the	The forward price is driven by a simple arbitrage	
fact that both goods we exchange are money. Even	relationship. Calculating the costs and benefits of the	
basic facts about derivatives suddenly appear	arbitrage trade is a bit more delicate if the	
complicated. We call this the "FX-confusion". But	underlining is a currency pair.	
once you sit down and think it through, the sky	Spot the arbitrage	
clears and the confusion goes away.	An FX arbitrageur observes option prices, spots	
	arbitrage opportunities, and harvests mispricings.	
	classes, but many find it a bit more confusing. Cood	
	to get some practice	
	Return attribution	
	How much of the performance of a foreign	
	investment is due to currency movements and how	
	much is nure asset return? You cannot make rational	
	investment and bedging decisions before you	
Foreign investments	answer this question	
Any foreign investment carries two exposures –	The impact of hedging	
the performance of the foreign asset and the movement of the foreign currency. The FX	If you don't like the currency exposure that comes	
	with an investment, you just hedge it away. But how	
exposure is often considered to be just a by-	does FX hedging affect your total return and Sharpe	
product of the actual investment decision and its	ratio?	
management neglected. But currency movements	A worked example	
can significantly affect the performance of the	A year ago you invested EUR 1 million into an US	
portfolio.	equity index fund. Now it is time to review the	
	investment performance. How much of the total	
	return was equity related, what was the currency	
	impact? What would have been the impact if you	
	hedged your currency exposure?	
FX Vanilla Options	How to quote an option premium	
FX options behave like options on other asset	In FX the same option premium can be quoted in	
classes. What makes them special is that both	many different ways. Converting between different	
currencies involved can be considered the underlying. The FX world is more symmetric than	premium quotations is not that difficult, but it takes	
	A groat truth	
other asset classes. That can create confusion but	A call is a put a put is a call and every option has at	
also eventually leads to a deeper understanding of	least two deltas. Confused? Not once you work	
options.	through this session	
	Barrier options: Definitions and facts	
	A barrier option is like a vanilla option with a twist.	
Barrier options and corporate hedging	The option might get activated or inactivated if the	
Barrier options are widely used in foreign	underlying spot price hits a predefined barrier.	
exchange. They help to cut down costs for	A corporate hedging example	
investors and hedgers who accept keeping some	We discuss the advantages and limitations of using	
residual risks.	barrier option for an exporter who needs some	
	currency protection but wants to minimize his	
	hedging costs.	
Homework		
A few questions for you to practice your FX knowledge.		

# **Your Educational Partner and Coaches**

Nosco Partners is a Swiss based company with international finance experience, servicing banks, asset managers and institutional investors. The Nosco Partners are all banking professionals with a strong academic background and extensive education experience. They have worked for many years on the business and education side of a large international bank, where client focus and practical relevance is key.

#### Walter Braegger, Ph.D., Partner

Walter is an expert in developing and delivering finance & risk education. For more than 20 years, he has educated finance market professionals around the globe. His expertise includes derivatives, equities, foreign exchange, fixed income and commodities, as well as special topics such as corporate finance, equity & credit analysis, risk management & control, portfolio construction and behavioral finance.

#### Vincent Couson, CFA, CAIA, Partner

Vincent has more than 20 years of financial market experience. Before joining Nosco Partners he was a Senior Member of the UBS Strategic Investment Advisory team developing tailored investment solutions for institutional clients around the globe. His expertise covers portfolio construction & analysis, asset & risk management as well as derivatives and structured products.

#### **Register now**

<u>Register online now.</u> Your contact for training questions on the Swiss Stock Exchange and financial markets: education@six-group.com

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