



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	<p>Online self-test 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.</p>	<p>Online Modules 1-7 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.</p>	<p>Online final exam Apply what you have learned in a final online exam. Receive a certification from the Swiss Stock Exchange and SAQ credited ongoing education credits.</p>
Coached	<p>Assisted E-Learning Send your questions to our experienced coaches at anytime over the duration of the course.</p>	<p>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.</p>	<p>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.</p>

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.

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

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

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

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

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.

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

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?

<p>Investor Everything starts with the investor. To select the right investment strategy, we first need to understand the investor's needs and preferences. We then assess the available trade-offs between risk and return.</p>	<p>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.</p> <p>Traditional versus behavioral finance A rational investor or a human caught in emotions? What drives an investor's preference?</p> <p>Risk-return trade-offs How much return, risk, and income would an investor ideally want to have? Unfortunately it is not a free choice - it is a trade-off. Options help you to fine-tune that trade-off.</p> <p>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?</p>
<p>Investment characteristics Most primary investments like bonds and shares have a return distribution that is nearly normal and nearly symmetric. If you can only choose among these kinds of investments, expected return and volatility is all you have to think about. But how can we adequately choose between investments with different and asymmetric distributions?</p>	<p>One price of risk An investor can either directly buy the underlying and have a symmetric risk exposure, or could use options to gain an asymmetric exposure. Which strategy is the best choice if we use Sharpe Ratio to measure the efficiency of an investment?</p> <p>Thinking in distributions Thinking in distributions reveals the power of options when managing risk.</p> <p>Strategy dashboard 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.</p>
<p>Yield enhancement and optimization Yield enhancement and optimization is for investors who can tolerate some risk. The strategies aim to optimize the return structure for the investor. They either trade potential future capital gains against a known cash income, or leverage some potential returns and cap others.</p>	<p>Yield enhancement In traditional finance you balance your risk-return profile by investing part of your money in bonds and part of your money in shares. The use of options is another way to find the right balance between risk and return.</p> <p>Optimization Optimization strategies use premium neutral option overlays to change the return structure of an investment. We will discuss speeder, collar, and participating range forward structures.</p>
<p>Capital protection: Worked examples You have an exciting underlying with the potential to generate a high capital return. But this potential upside comes with a high degree of downside risk. How can you reduce the downside, while keeping as much of the upside as possible?</p>	<p>Build your first capital protection strategy What is under the hood of a capital protection strategy?</p> <p>Refine your capital protection strategy Capital protection strategies can have many different characteristics. The most important are the level of protection and the rate at which we participate in the underlying performance.</p>
<p>Homework: Build your own "Reverse convertible"</p>	

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.

<p>FX warm-up</p> <p>The confusing thing about foreign exchange is the fact that both goods we exchange are money. Even basic facts about derivatives suddenly appear complicated. We call this the “FX-confusion”. But once you sit down and think it through, the sky clears and the confusion goes away.</p>	<p>FX markets and terminology</p> <p>Every profession has its own vocabulary. We need to get familiar with the FX market terms and jargon.</p>
	<p>FX forwards - Review and summary</p> <p>The forward price is driven by a simple arbitrage relationship. Calculating the costs and benefits of the arbitrage trade is a bit more delicate if the underlining is a currency pair.</p>
	<p>Spot the arbitrage</p> <p>An FX arbitrageur observes option prices, spots arbitrage opportunities, and harvests mispricings. This is no more complicated than for other asset classes, but many find it a bit more confusing. Good to get some practice.</p>
<p>Foreign investments</p> <p>Any foreign investment carries two exposures – the performance of the foreign asset and the movement of the foreign currency. The FX exposure is often considered to be just a by-product of the actual investment decision and its management neglected. But currency movements can significantly affect the performance of the portfolio.</p>	<p>Return attribution</p> <p>How much of the performance of a foreign investment is due to currency movements, and how much is pure asset return? You cannot make rational investment and hedging decisions before you answer this question.</p>
	<p>The impact of hedging</p> <p>If you don't like the currency exposure that comes with an investment, you just hedge it away. But how does FX hedging affect your total return and Sharpe ratio?</p>
	<p>A worked example</p> <p>A year ago you invested EUR 1 million into an US 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?</p>
<p>FX Vanilla Options</p> <p>FX options behave like options on other asset classes. What makes them special is that both currencies involved can be considered the underlying. The FX world is more symmetric than other asset classes. That can create confusion but also eventually leads to a deeper understanding of options.</p>	<p>How to quote an option premium</p> <p>In FX the same option premium can be quoted in many different ways. Converting between different premium quotations is not that difficult, but it takes some practice to quickly and confidently master it.</p>
	<p>A great truth</p> <p>A call is a put, a put is a call, and every option has at least two deltas. Confused? Not once you work through this session.</p>
<p>Barrier options and corporate hedging</p> <p>Barrier options are widely used in foreign exchange. They help to cut down costs for investors and hedgers who accept keeping some residual risks.</p>	<p>Barrier options: Definitions and facts</p> <p>A barrier option is like a vanilla option with a twist. The option might get activated or inactivated if the underlying spot price hits a predefined barrier.</p>
	<p>A corporate hedging example</p> <p>We discuss the advantages and limitations of using barrier option for an exporter who needs some currency protection but wants to minimize his hedging costs.</p>
<p>Homework</p> <p>A few questions for you to practice your FX knowledge.</p>	

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.

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[Register online now.](#) Your contact for training questions on the Swiss Stock Exchange and financial markets: education@six-group.com


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