IMI CORPORATE & INVESTMENT BANKING

INTESA SANPAOLO

MEET THE PRACTITIONERS

Andrea Bugin

Head of Financial Engineering

TOR VERGATA 17 March 2021

Agenda

A. My Education and Experience

B. Mission and Team

C. Develpment cycle and Deliverables

D. Model Evolution: an example

E. PDGLab

My Education

Università Commerciale 'Luigi Bocconi'
Economics, Monetary and Financial Economics, 110/110 summa cum laude with recommendation for publication
1989 – 1994

Courses included: Advanced Statistics, Theory of Finance, Mathematics of Finance, Econometrics, Information and Capital Markets, Game theory, Monetary Policy Analysis.

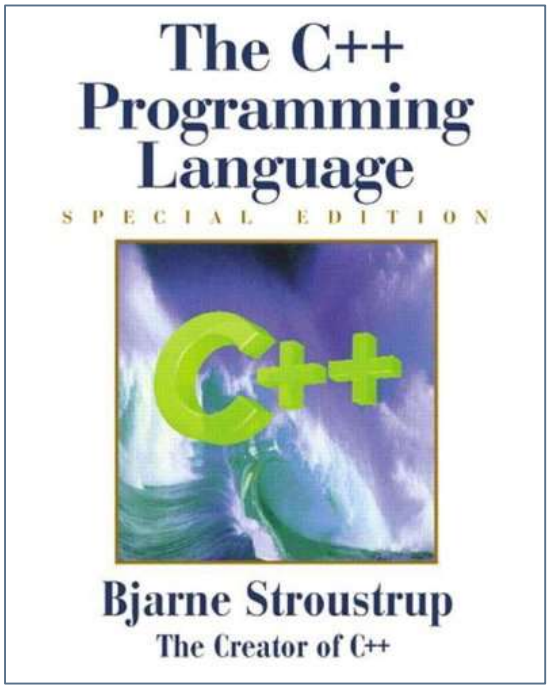
Università Commerciale 'Luigi Bocconi'
Master of Science (MSc), Economics, Master degree "with distinction".
1996 – 1997

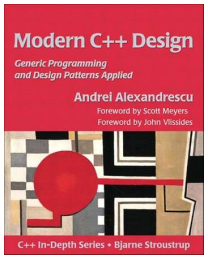
Courses included: Macroeconomics, Microeconomics, Advanced Econometrics, Advanced Statistics, Theory of Finance, Monetary Economics, International Monetary Economics

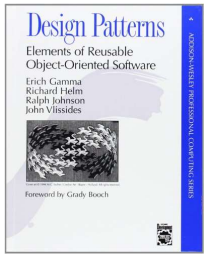
Università Commerciale 'Luigi Bocconi'
Master of Science (MSc), Financial Mathematics
1997 – 1998

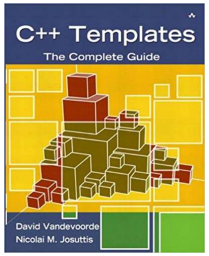
Courses included: Fixed Income, Asset Management, Corporate Finance, Stochastic Calculus, Options and Futures and Financial Engineering

My continuous self-training









Chartered Financial Analyst (CFA)
CFA Institute
Issued Sep 2016 · No Expiration Date

Deep Learning Specialization
Coursera
Issued Mar 2018 · No Expiration Date
Credential ID UKWZSS473BAF

See credential

Applied Data Science with Python Specialization
Coursera
Issued Dec 2017 · No Expiration Date
Credential ID EMPGMVDZMZPN

See credential

My Experience

Head of Financial Engineering
Intesa Sanpaolo
Jul 2020 – Present · 9 mos

Banca IMI
21 yrs 11 mos

Head of Financial Engineering
Feb 2008 – Jul 2020 · 12 yrs 6 mos

Head of Product Development
Oct 2000 – Feb 2008 · 7 yrs 5 mos

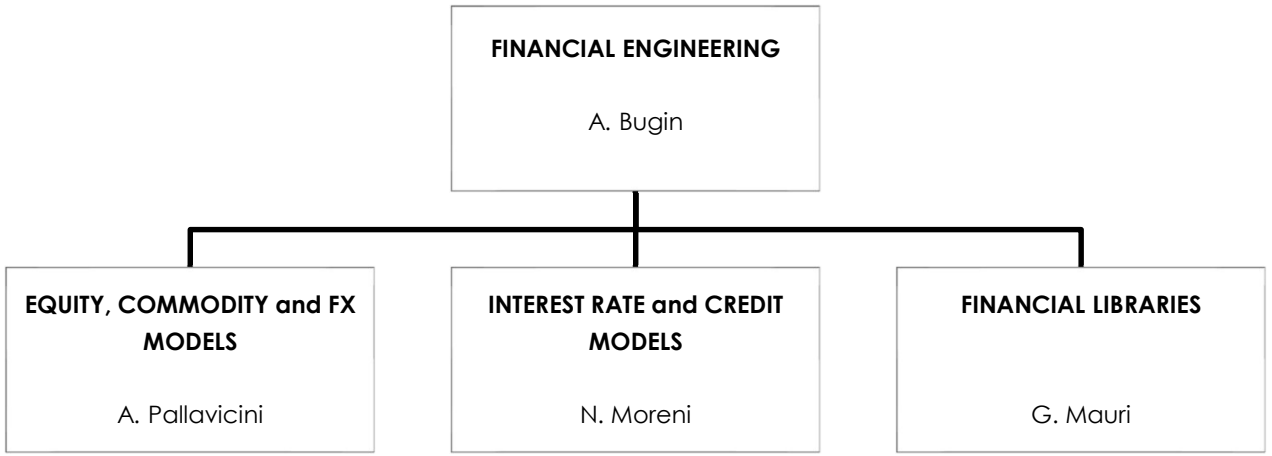
Quantitative Developer
Sep 1998 – Oct 2000 · 2 yrs 2 mos

Risk Management
UniCredit
Sep 1997 – Oct 1998 · 1 yr 2 mos
Milan Area, Italy

Mission

- Develop mathematical finance models and libraries related to the valuation of complex financial instruments on equity, interest rate, inflation, exchange rate, commodities, credit markets
- Manage, in coordination with the Risk Management Department, the definition of the financial models and the integration of the proprietary library with the Bank's Front Office systems
- Provide support in the use of models and in the structuring and pricing activities, with particular focus on the more exotic and bespoke transactions, which needs advanced quantitative tools
- Maintain relations with the international academic and scientific world, in order to guarantee continuous updating in the field of financial engineering and the achievement of feedback and tests on the validity of the proprietary models used for the Bank's business

Team


FINANCIAL ENGINEERING
A. Bugin
EQUITY, COMMODITY and FX MODELS
A. Pallavicini
INTEREST RATE and CREDIT MODELS
N. Moreni
FINANCIAL LIBRARIES
G. Mauri

Model Development

- The **development cycle of a model** is an articulated activity that involves, in addition to *Financial Engineering*, at least three other subjects: the *Operating Desks*, the *IT Department* and the *Risk Management*.

1. The *Operational Desk* expresses the need (mainly in the periodic meeting), tests the prototypes, uses the model
2. *Financial Engineering* ***modeling teams*** develop the model and implement the first prototypes ans submit it to the Operational Desk
3. The *Operational Desk* tests the prototypes, and validates it
4. *Financial Engineering* ***modeling teams*** develop the industrialized version of the model
5. the **Financial Libraries** team of *Financial Engineering*, integrates the model on the front office systems
6. *IT Department* performs the robustness and non-regression tests
7. *Risk Management* validates the models and independently implements the risk measurement procedures
8. *IT Department* deploy the solution in the production environment

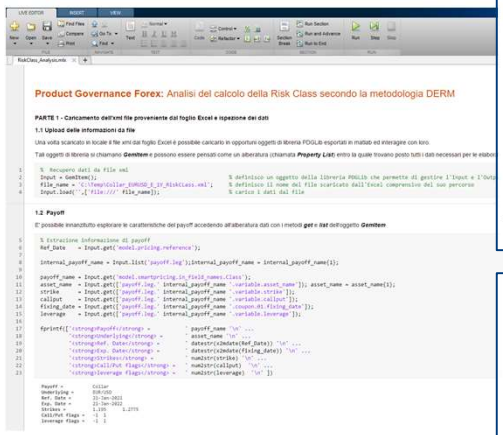
Deliverables

1. Prototypes
2. Marking tools
3. Pricing Models
4. Portfolio Hedging Analytics
5. Real world risk measures (for asset allocation)

IRS evaluation: an historical perspective

	Before 2007	2007 - 2011	2011 -2013	2013-2016	2016-2020	2020 - 2021	next
Interest Rates Curves							
Forwarding	One Libor Curve Fits All	**A different LIBOR Curve for each tenor**	A different LIBOR Curve for each tenor	A different LIBOR Curve for each tenor	A different LIBOR Curve for each tenor	A different LIBOR Curve for each tenor	**One OIS Curve Fits All**
Discounting	One Libor Curve Fits All	One Libor Curve Fits All	**OIS**	OIS	OIS	**OIS (from EONIA to ESTER)**	**One OIS Curve Fits All**
Valuation Adjustments							
CVA	Add-On	Add-On	**CVA**	CVA	CVA	CVA	CVA
DVA	--			**DVA**	DVA	DVA	DVA
FVA				**FVA**	FVA	FVA	FVA
KVA					**KVA**	KVA	KVA

PDGLab



Product Governance Forex: Analisi del calcolo della Risk Class secondo la metodologia DERM

PARTE 1 - Caricamento dell'xml file proveniente dal foglio Excel e ispezione dei dati

1.1 Upload delle informazioni da file

Una volta scaricato in locale il file xml dal foglio Excel è possibile caricarlo in opportuni oggetti di libreria PDGLab esportati in matlab ed interagire con loro.

Tali oggetti di libreria si chiamano ***GemItem*** e possono essere pensati come un alberatura (chiamata ***Property List***) entro la quale trovano posto tutti i dati necessari per le elabor

```
%  Recupero dati da file xml
Input = GemItem();                                  % definisco un oggetto della libreria PDGLib che permette di gestire l'Input e l'Outp
file_name = 'C:\Temp\Collar_EURUSD_E_1Y_RiskClass.xml';   % definisco il nome del file scaricato dall'Excel comprensivo del suo percorso
Input.load('',['file:///' file_name]);              % carico i dati dal file
```

1.2 Payoff

E' possibile innanzitutto esplorare le caratteristiche del payoff accedendo all'alberatura dati con i metodi ***get*** e ***list*** dell'oggetto ***GemItem***

```
% Estrazione informazione di payoff
Ref_Date    = Input.get('model.pricing.reference');

internal_payoff_name = Input.list('payoff.leg');internal_payoff_name = internal_payoff_name{1};

payoff_name = Input.get('model.smartpricing.in_field_names.Class');
asset_name  = Input.get(['payoff.leg.' internal_payoff_name '.variable.asset_name']); asset_name = asset_name{1};
strike      = Input.get(['payoff.leg.' internal_payoff_name '.variable.strike']);
callput     = Input.get(['payoff.leg.' internal_payoff_name '.variable.callput']);
fixing_date = Input.get(['payoff.leg.' internal_payoff_name '.coupon.01.fixing_date']);
leverage    = Input.get(['payoff.leg.' internal_payoff_name '.variable.leverage']);

fprintf(['<strong>Payoff</strong> =          ' payoff_name '\n' ...
         '<strong>Underlying</strong> =     ' asset_name '\n' ...
         '<strong>Ref. Date</strong> =      ' datestr(x2mdate(Ref_Date)) '\n' ...
         '<strong>Exp. Date</strong> =      ' datestr(x2mdate(fixing_date)) '\n' ...
         '<strong>Strikes</strong> =        ' num2str(strike) '\n' ...
         '<strong>Call/Put flags</strong> = ' num2str(callput) '\n' ...
         '<strong>Leverage flags</strong> = ' num2str(leverage) '\n' ])
```

```
Payoff =          Collar
Underlying =      EUR/USD
Ref. Date =       21-Jan-2021
Exp. Date =       21-Jan-2022
Strikes =         1.1235    1.2775
Call/Put flags =  -1  1
Leverage flags =  -1  1
```