

Deloitte.

La gestion des risques et le rôle de l'ingénieur financier suite à la crise du crédit et des liquidités.

Journée conférence du LABIFUL



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What do accountants/auditors know about commodity risk management?

Global Energy Markets(GEMS)

- Commodity specialized and focused consulting practice within Deloitte
- Commodity transacting specialists in Calgary
 - Risk Strategy & Policy Development
 - Risk Management – Market, Credit, Operational
 - Compliance – Controls, Regulatory
 - Quantitative – Financial Engineering and Modeling
 - Technology – Commodity Trading & Risk Management (CTRM) Systems, System Integration
 - Energy Risk Assurance and Advisory
 - Transaction Infrastructure (Front, Middle and Back Office)
 - Wholesales and Retail Markets
 - Regional Transmission
- Commodities: Crude, Natural Gas, Power, Coal, etc.
- Work in tandem with GEM specialists in Toronto, Houston, New York, Chicago, Denver and Los Angeles

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Financial Engineers (“Quants”) at Deloitte

Financial Services Industry (FSI)

Deloitte Consulting's Financial Services Industry Practice offers a broad range of advisory services including strategic, regulatory, mergers and acquisitions, risk management and management consulting to clients in many financial industries.

45 FSI Quants in the Pricing Center

- Derivative Valuation
- Model Validation
- Risk Modeling (VaR, CVaR, PFE etc)
- Complex Accounting (Hedge Effectiveness, etc.)

Typical Clients

- Large Investment Banks
- Financial Institutions
- Insurance and Re-Insurance Companies
- Hedge Funds

Global Energy Markets (GEM)

Deloitte offers a full range of specialized services to help energy clients develop their risk management infrastructures. GEMs' core business is to assist clients assess, design and implement energy risk management solutions in wholesale and retail sectors.

15 Quants in GEMs group

- Business Modeling & Portfolio Optimization
- Hedging Strategies
- Risk Modeling (EaR, GMaR, CVaR, PFE etc)
- Software Development

Typical Clients

- Energy and Commodity Exchanges
- Commodity Producers and Marketers, Utilities
- Investment Banks and Trading Operations
- Transportation Companies

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The Global Financial Crisis & Financial Engineers at Deloitte

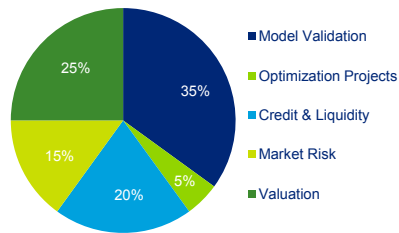
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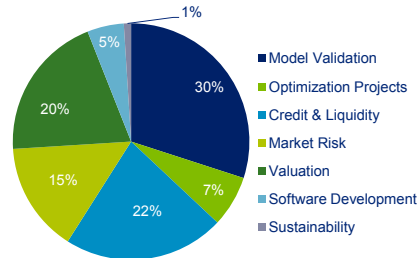
Impact of the Financial Crisis – Project Types

Deloitte's leadership and market observers predicted that client demand for credit and liquidity related services was going to increase significantly in 2009 and 2010. Although there was a slightly higher demand for this type of service, the aftermaths of the crisis show somewhat unexpected results.

Project Distribution before the Crisis



Project Distribution after the Crisis



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Impact of the Financial Crisis – Project Types

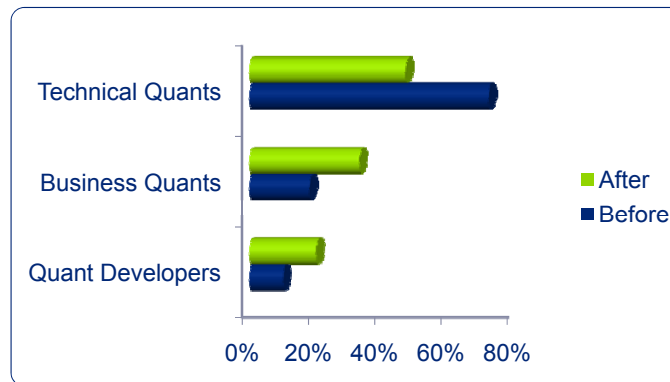
Project Category	Key Observations
Model Validation	Some clients (largely financial institutions and insurers) have a reduced appetite for derivatives on commodities as they are focusing more on the financial side of their business.
Optimization Projects	It became more difficult for commodity traders to optimize their portfolio in recent years due to higher price volatility. On a number of occasions, some markets shifted momentarily creating arbitrage (real option) opportunities some market participants failed to capitalize on. There is a higher demand for the following: Crude and Natural Gas Optimization, Transportation Models, GMaR – Dispatching Models.
Credit & liquidity	Deloitte assisted some clients gaining a better understanding of potential increase or decrease in cash margin requirements. Treasury groups had difficulties forecasting required level of liquidity reserve required to face changes in margin requirements.
Valuation of Physical Commodity Investments	Merger and acquisition activities slowed down after the crisis.
Software Development	Growing client appetite for stable production version of highly customized quant models.

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Impact of the Financial Crisis – Employment Level

The overall number of Deloitte Quants remained relatively stable throughout the financial crisis. The crisis accelerated an already existing trend to hire Quants with business experience. Deploying resources able to bridge the gap between quantitative modeling and the realities of the financial and the physical commodity markets is key to successful client engagements.



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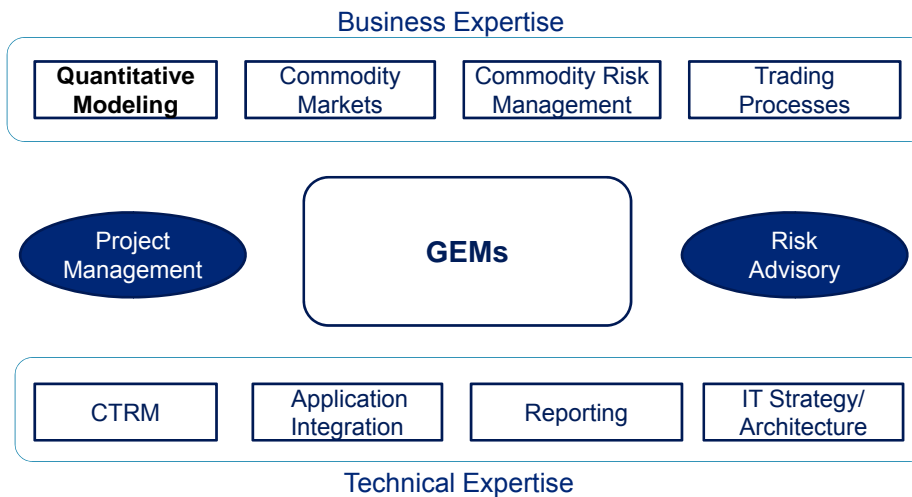
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Impact of the Financial Crisis - Role of Financial Engineers

Evolution of Quants in Time

Analysts	Rocket Scientists	Technical Quants	Business Quants
1970s - Present	1980s-Present	1990s - Present	2007 - Present
Education <ul style="list-style-type: none"> Undergraduates <ul style="list-style-type: none"> Mathematics/Statistic Finance/Economics 	Education <ul style="list-style-type: none"> PhDs <ul style="list-style-type: none"> Physics Mathematics Engineering 	Education <ul style="list-style-type: none"> Masters of Quantitative Finance 	Education <ul style="list-style-type: none"> Master of Quantitative Finance Master degree from engineering or business schools
Experience <ul style="list-style-type: none"> None or very limited 	Experience <ul style="list-style-type: none"> Scientific background Not business related 	Experience <ul style="list-style-type: none"> None or very limited 	Experience <ul style="list-style-type: none"> Business experience in the financial or commodity industries
Contribution <ul style="list-style-type: none"> Applied some basic and fundamental quantitative concepts to solve simple technical problems. 	Contribution <ul style="list-style-type: none"> Introduced highly quantitative concepts into the financial industry. Major advancements. 	Contribution <ul style="list-style-type: none"> Development of new financial products. Attempt to introduce quantitative tools to solving business problems. 	Contribution <ul style="list-style-type: none"> To bridge the gap between quantitative modeling and the realities of the financial and/or commodity industry.

Financial Engineers: Technical or Business Experts?



Impact of the Financial Crisis – Challenges Ahead

Some industry feedbacks:

Working with Quants

Financial Engineers/Quants have a shaky reputation:

- Questionable attitude/Arrogance
- Disregard for budget & delivery
- Lack of clarity
- Lack of leadership

Market Perception

- Quants have been labelled as lumbering robots weighed down by backward looking insights.
- Quants are unable to predict market turns.



Rising Above the Competition

Financial Engineers are facing fierce competition. How can Quants rise above the competition?

- Right level and balance of quantitative, IT and business skills.

Blame

Some market leaders are blaming the quants for the poor performance of their institutions.

- Is the Quant Era over?
- Quants are easy targets to blame!
- Who will defend the quants?

Selected Projects

Selected Project #1

Major Energy Exchanges (January 06 – Present)

1. Designed and implemented new initial margin regimes that satisfied the conservative risk management requirements of the clearing operations, while reducing the amount of over-margining.
2. Integrated and enhanced risk systems and procedures to facilitate mergers of major energy exchanges. It required gaining a sound understanding of risk management practices related to clearing natural gas, crude and power in order to develop an integrated risk platform. A positive response was received from regulators and insurers.
3. Provided technical support to the Client during regulators investigations.
4. Developed energy margin calculators in order to assist existing and potential customers estimate their collateral requirement before executing trades on the exchanges.
5. Developed operations and settlement models to improve data quality.

Client Team

- VP Finance / CFO
- VP Clearing
- Manager Operations
- Risk Analysts

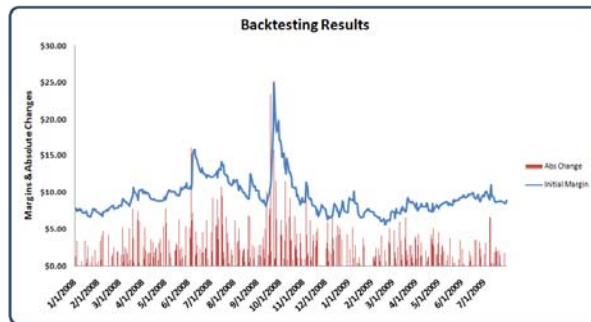


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Selected Project #1 – Successful Implementation

While it is imperative that an Exchange's customers perceive that the collateral requirements are sufficient to ensure performance, the irony is that having to post collateral is also a deterrent to counterparties using the exchange because it consumes capital. To achieve the right balance between risk and overcollateralization, the credit exposure calculation must consider these four attributes:



The risk metrics produced efficient and effective margin/collateral requirements. Margins are responsive to prevailing market conditions making it easier for the Exchanges to market their products. Finally, the methodology does not require a drastic overhaul of Exchanges' current systems infrastructure.

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Selected Project #2

Major Transportation Company (May 08 - August 08)

Developed a Cash Flow at Risk (CFaR) model to help this client gain a better understanding of its residual market risk profile and take an integrated or portfolio approach to managing its market risks. Careful simulation assisted the client in estimating expected business cash flows, hedge payoffs and fuel/mileage surcharges as well as the uncertainty surrounding those expected levels. The CFaR model performs a contribution risk analysis to understand the risk contributions from each market variable (Oil, CAD/USD/EUR exchange rates, etc.) that drive the client's market risk.

Client Team

- Head Treasurer
- Chief Accountant
- Traders
- Marketing



Some Key Concepts

- Cash Flow at Risk (CFaR)
- Spot and forward price modeling (illiquid markets)
- Derivatives to hedge risks at the integrated level

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Selected Project #2 - Residual Market Risk

SOME HIGHLIGHTS

Fuel Recovery Program

Every line of business had specific contractual terms that required weeks of modeling.

Hedging Strategies

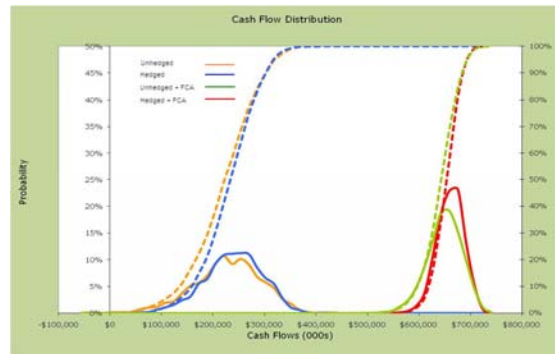
Absolute hedging was not appropriate. Risk contribution analysis was required to design an integrated hedging program.

Downside/Upside Potential

What can go wrong? How effective is the implemented fuel recovery program? Careful modeling allowed management better understand market risk drivers.

Contribution Risk Report / Hedged + FCA - CAD (000s)

Variable Name	Average Cash Flow	Risk Attribution	Absolute Risk
WTI	(105,482)	41,193	41,678
Libor	-	-	-
USD	1,259	(154)	3,574
CS	(72,292)	2,989	8,850
HDFCS	26,787	(637)	3,357
Fixed Cash Flows	801,784	-	-
Total	652,055	43,390	-



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Selected Project #3

Global Marine Fuel Supplier (March 09 – November 09)

Developed a Liquidity Model to help this client gain a better understanding of potential increase or decrease in cash margin requirements based on probable market price fluctuations. This tool intended to assist management by better predicting nearby cash requirements, and to support decisions to effectively utilize counterparty credit.

The model focuses on variation margin required to support existing trade positions. The general scheme is to simulate new forward curves based on the current curves, associated volatilities, correlations and/or customized inputs. All counterparty positions are valued against the new forward curves and the margining rules that the parties have established are applied to the recalculated MtM, current margin holdings and expected invoice settlements. The Liquidity Model generates a margin report linking nearby cash requirements to the underlying price distributions.

Client Team

- Head Treasurer & Risk Manager
- Traders
- Risk Analysts

Some Key Concepts

- Margining Rules and Requirements
- Forward Curve Simulations
- Non-linear Dependencies



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Selected Project #4

Power Generation and Transmission Association (March 10 – December 10)

The client is a wholesale electric power supplier owned by cooperatives that it serves in a four-state service area. The power is generated through a combination of owned baseload and peaking power plants that use coal and natural gas as their primary fuels, supplemented by purchased power, federal hydroelectricity allocations and renewable resource technologies.

The key transfer function converts operating cash flows, sales, interest rates, inflation, investments and fixed cash flows into one or more outputs such as member rates, debt-service, debt coverage ratios, cash flows, depreciation or interest payments. The final component of the framework is the Real Options Analysis which allows management and the Board to discover the value of various strategies and initiatives.

Client Team

- CFO
- Head Treasurer & Risk Manager
- Quants

Some Key Concepts

- Gross Margin at Risk (GMaR)
- Convex Optimization
- Load/Demand Analysis



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Selected Project #4 - Methodology

Power Generation and Transmission Association (January 09 – December 10)

The fundamental objectives of this company's portfolio management group are to understand the likelihood of meeting the earning targets, and to ensure appropriate and effective value protection measures are in place to manage any potential negative impacts to that portfolio. Gross Margin at Risk (GMaR) has been gaining acceptance as an approach to meeting these objectives.

1. Input forward market prices and volatilities;
2. Calibrate forward prices to spot market prices
3. Apply simulated prices within a Monte Carlo engine
4. Dispatch assets against spot prices and calculate real option values using a convex program algorithm
5. Calculate the appropriate hedge and risk metrics

A Network Optimization Problem:

- Simplified regional network optimization
- 55,000 ++ constraints
- Each optimization requires 25ms of computer time
- Software engineers are currently developing the production version



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Conclusion

Quantitative approaches seem to be on the correct side of technological progress. As the world continues to become more complex, more data-intensive, and more globally integrated, the need for Quantitative and IT intensive processes increases.

The future may belong to those who can master the technological aspects of finance/investing, and direct that technology with good judgment – precisely the mission of quantitative specialists.



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A large, centered version of the Deloitte logo, featuring the word "Deloitte" in a bold, blue, sans-serif font, followed by a small green dot.

Background & Profile

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Profile

Vincent is a Manager at Deloitte specializing in commodities valuation and risk management analytics in the mining and energy sectors. Vincent has worked on a wide variety of client assignments, including: margin and collateral margin requirements, risk driver identification and hedging strategies, risk quantification, real options and operational flexibility, derivative pricing, credit and market risk model reviews, and hedge accounting FAS 133.

- Provided risk advisory services to companies in the energy, chemical, mining and financial services industries.
- Extensive experience building complex pricing and risk models
- Risk quantification – Value at Risk, Cash Flow at Risk , Potential Future Exposure, Economic Capital, Gross Margin at Risk
- Risk identification and hedging strategies
- Developed risk management policies and procedures to support good corporate governance
- Valued assets and long term contracts with real option analysis

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Professional Experience

Deloitte & Touche LLP – Calgary, Canada

Global Energy Markets Group

2008 – Present

Risk Capital Management Partners LLC – New York, US

Enterprise Risk Management

2005 - 2008

AMEC Americas Limited, Mining and Metals Group - Oakville, Ontario

Financial Services

2005

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Educational & Professional Certification

2009 **Financial Risk Manager (FRM) Designation**

Global Association of Risk Professionals, NJ

2006 **Master of Quantitative Finance: Financial Engineering**

Laval University, Sainte-Foy, Québec

2004 **Master of Engineering: Mining Engineering - Mineral Economics**

Using real options to value and manage mining projects

Laval University, Sainte-Foy, Québec

2002 **Bachelor of Engineering: Mining Engineering**

Specialization area: Mining Extraction

Laval University, Sainte-Foy, Québec

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