

A snapshot of mathematical finance

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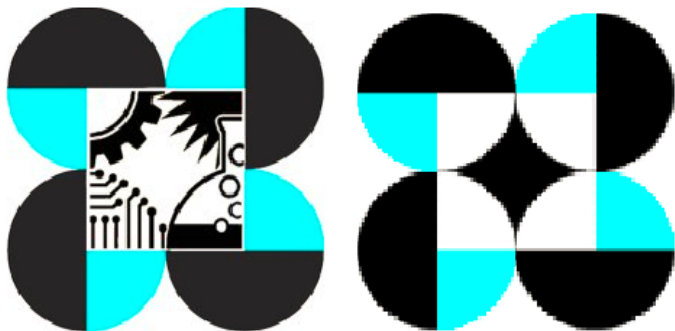
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Faculty of Science

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London, Ontario, CANADA

Special thanks to the **PCIEERD/DOST BALIK-SCIENTIST PROGRAMME**, which includes the creation & delivery of new Maths 190 (**Mathematical Models in Finance**).



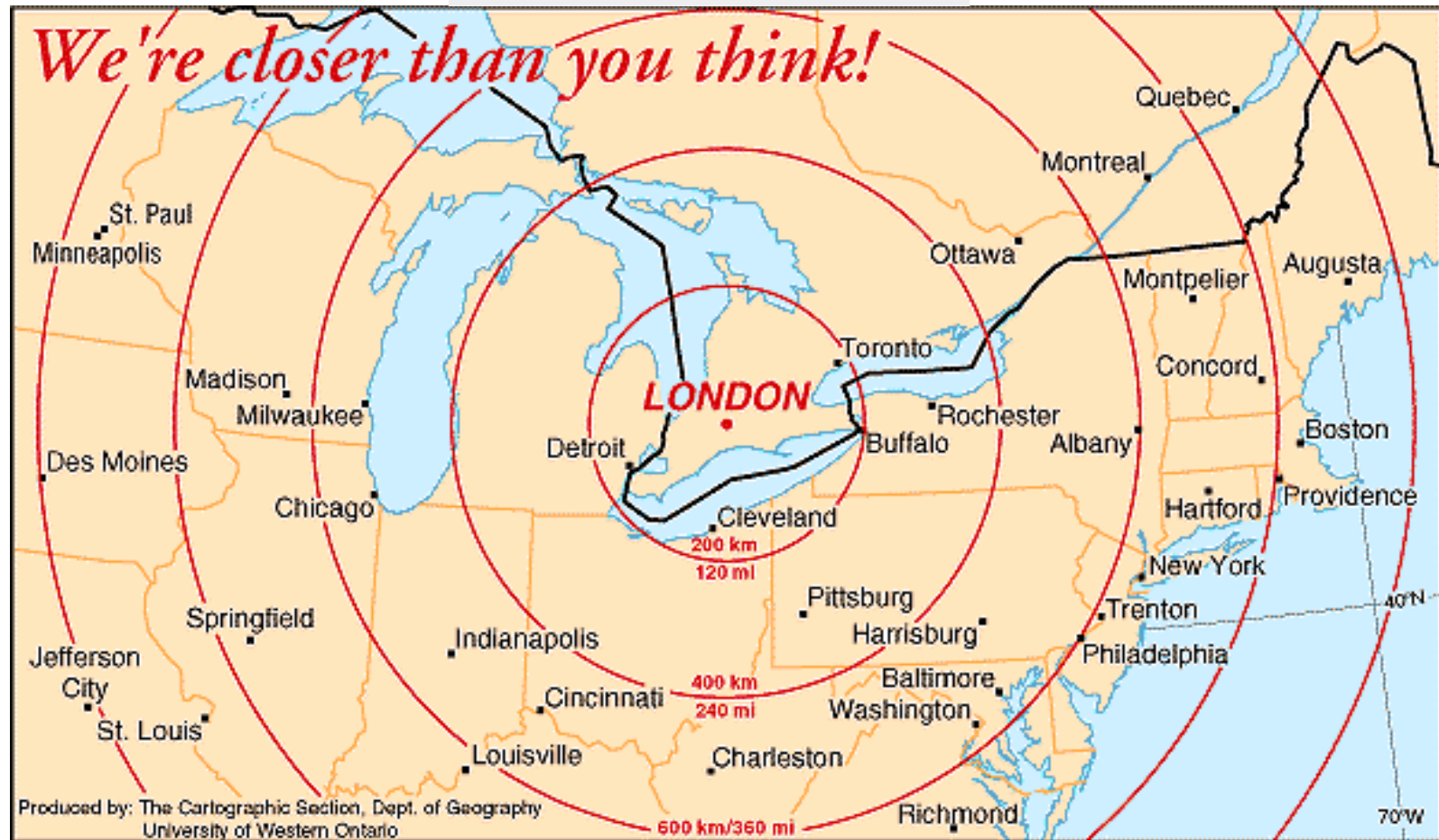
PHILIPPINE COUNCIL FOR
INDUSTRY, ENERGY AND
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DEPARTMENT OF SCIENCE
AND TECHNOLOGY

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Where on earth is *The University of Western Ontario*?

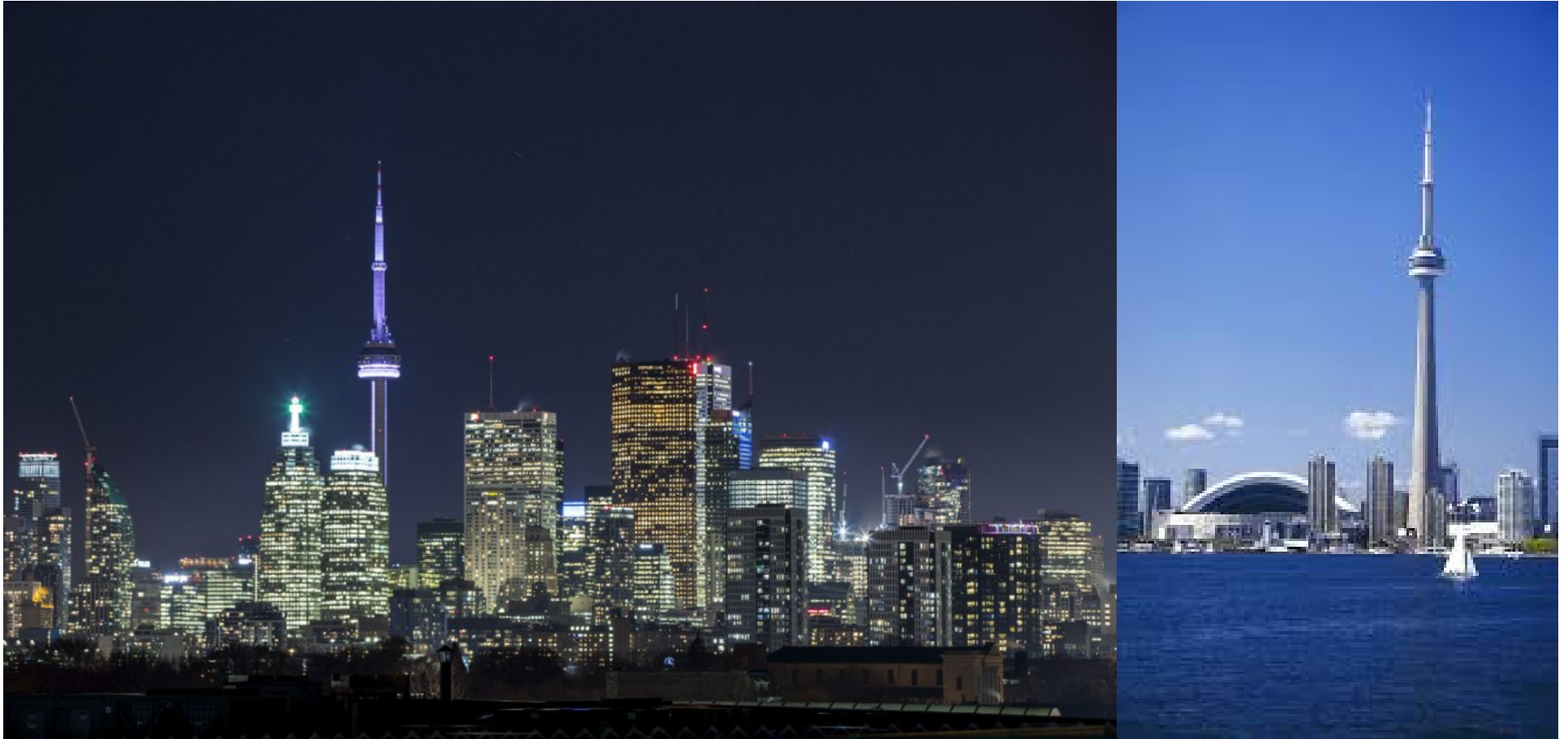


“It is better to see something once than to hear about it a thousand times.”



The Beautiful NIAGARA FALLS – 1.5 hours from London

We all deserve a little wanderlust.



Toronto is the New York of Canada! The CN Tower in Toronto used to be the world's tallest free-standing structure until 2007 – *2 hours from London*

THERE ARE 4 SEASONS IN CANADA.



Summer in Ontario

“It’s a smile, it’s a kiss, it’s a sip of wine, it’s summertime!”

Ontario FALL colours!



“How beautifully leaves grow old. How full of light and colour are their last days!”

“What good is the warmth of summer without the cold of winter
to give it sweetness.”



Winter in Northern Ontario

Spring is nature's way of saying "Let's party."



Tulip festival in Canada's capital (Ottawa)



Financial Modelling



Nikkei-225 Index

Source: Bloomberg period ending 06/23/13





Financial Modelling

Financial modelling is an interdisciplinary area concerned with the quantitative analysis of the financial markets.

Other similar names: Mathematical finance, quantitative finance, financial mathematics, computational finance, financial engineering (depending on emphasis).

Financial modelling combines solid quantitative grounding (mainly statistical sciences, probability and applied mathematics) with some actuarial science and a bit of economics.

Goals:

- Apply quantitative techniques in the pursuit of a business career.
- Prepare for graduate school in quantitative finance and allied areas.

**Some 5-year degrees in US/Canada have double/dual-degree feature (e.g., degree in Science+degree in Business or Engineering)*

What do “quants” (quantitative analysts/financial mathematicians) do?

- Manage financial risks; credit risk analysis
- Design and price new financial contracts and derivative securities on commodities, currencies, and other variables
- Asset allocation and portfolio optimisation
- Trading strategy development
- Research and teaching

All of the above involve (i) *mathematical/probabilistic modelling* of financial variables, and (ii) statistical analysis of *financial data*.

Examples of what quants are modelling

The S&P/TSX Composite Index
As of 07 March 2014



Evolution of FX rates (USD-CAD)
As of 07 March 2014

USD-CAD Noon Rate - Past 3 months

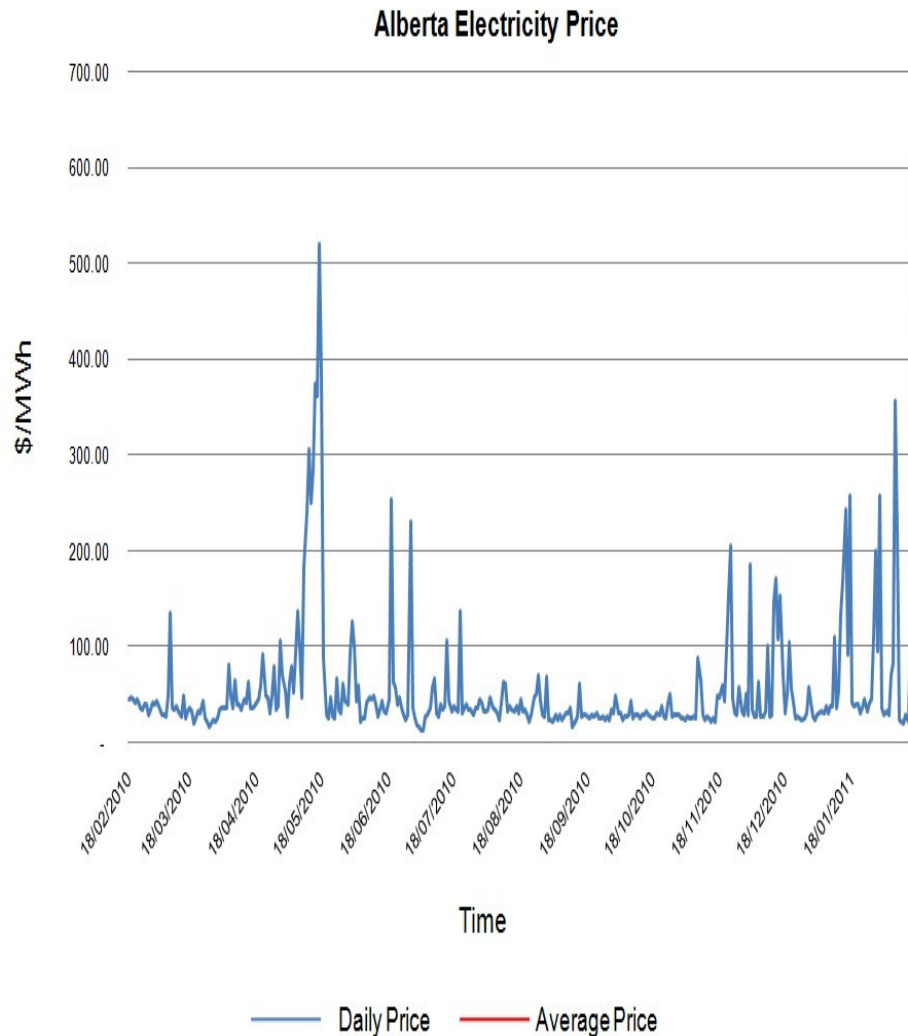


For the support of:

- *Valuation of contracts*
- *Risk management*
- *Calculation of regulatory capital requirements*
- *Investment portfolio management and optimisation*

More examples

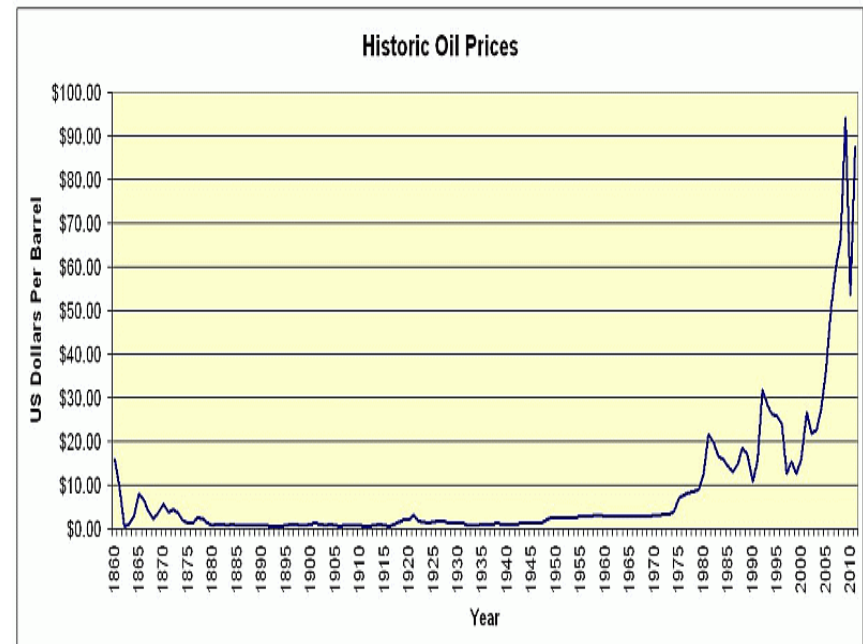
Electricity price dynamics



For the support of:

- *Valuation of contracts*
- *Risk management*
- *Calculation of regulatory capital requirements*
- *Investment portfolio management and optimisation*

Oil price dynamics



Where do quants work?



- Banks (commercial/investment banking, retail banking, capital markets)
- Pension fund management companies
- Hedge funds, algorithmic trading
- Commodity trading and energy companies
- Private consulting firms
- Regulatory institutions (Feds, central banks, OSFI, etc)
- Insurance firms
- Universities and research institutes
- Governments

All that from a BSc?

- It depends on the nature of the job and level of technical expertise required.
- Quantitative analysts usually have master's and some have doctoral degrees.
- Many universities in US, Canada, UK, Europe and Australia have a graduate programme in Financial Modelling. UP Diliman has MSAM (Math'l Fin) & PMAS and Ateneo has BS in Math'l Finance. UPLB has an act sci programme and Dela Salle has act sci offerings.
- The BSc (Hons) degree prepares students for graduate school (financial mathematics, financial economics, and other allied areas).
- ***Certain FM courses in some universities can be used for exemption from the Canadian Institute of Actuaries MFE exam and to obtain VEE credits for the Society of Actuaries.***

“We prefer to hire raw scientists to bring quant skills and strong intuition to marry the science with business.”

(Pierre Villeneuve, Managing Director, Mapleridge Capital, Toronto)

