Economics & Finance

Master in Economics

Economics

HEC Liège
Management School - University of Liège

Economics & Finance

Economics

Introduction

The recent financial crisis has highlighted the significant role played by financial markets in our modern economies. In particular it has shed light on our insufficient knowledge and control of the very intricate links between the financial sector and financial growth.

Objectives

The specialist orientation in economics and finance aims to offer student twofold training in economics and finance and so propose profiles having this twofold competence to the financial and other sectors (private and public). Students in the course of their training will have to do an internship, draw up an internship report and do a final work project (TFE) on the same topic. This specialized training in a particular area must enable students to use the knowledge they have acquired to develop valuable expertise. This expertise is to serve as a business card in the case of a job interview.

Job prospects

The specialization in economics and finance prepares students for managerial and executive positions in:

- Banks or non-banking financial institutions and banking regulatory institutions
- Large corporations
- Economic and monetary research departments
- National Bank of Belgium, Central European Bank
- International organizations (FMI, World Bank, BERD etc.)
- SPF finances
- Teaching and research in monetary and financial economics.

Strengths

This training aims to provide students with rigorous methods of analysis and synthesis founded on modelling and econometric techniques. In particular, students will have to take in-depth courses in:

- Growth and International economics;
- Information economics and game theory;
- Market finance, corporate finance and risk control;
- Time series and panel data econometrics.

Double Degrees

Provided they meet the set selection criteria, HEC Liege students enrolled in the Master in Economics (120 ECTS) can take a double degree program. To date there is a convention the University of Hohenheim (Germany) and ISM (University Management and Economics) of Vilnius (Lithuania). Students spend one year at the University of Liege and the other one in their host university. Courses are taught in English and the final work project must be written in English. Students must pass all examinations organized in their program's two institutions. Their successful completion of these examinations entitles them to the HEC Liege Master's degree and to the host university's Master degree.

Program

The specialization in Economics and Finance relies on compulsory courses in economic sciences (55 credits) following which students choose 10 specialized courses, skills portfolio workshops, a traineeship and a thesis (for a total of 65 credits), all of which are distributed over two years.

YEAR 1

Compulsory courses in Master in Economics (45 credits)

+

Economics and Finance (15 credits)

15 credits to be chosen among:

- Investments and Portfolio Management
- Banking and Insurance
- Financial derivatives
- Financial Mathematics and Stochastic Calculus

YEAR 2

Compulsory courses in Master in Economics (10 credits)

+

Economics and finance (50 credits)

- Monetary Economics
- Traineeship (10 credits)
- Final Work Project (20 crédits)
- Skills Portfolio (5 credits)

10 credits to be chosen among:

- Empirical Methods in Financial Markets
- Droit et fiscalité des institutions financières
- Advanced Corporate Finance and Modeling
- Financial Economics
- Financial Data Modeling and Analysis
- Financial Risk Modeling
- Fund Industry
- Financial Risk Management
- International Finance

The contents of the specialized courses are briefly described in the following pages. Full pedagogical mission statements are available on the ULg site (**http://progcours.ulg.ac.be/cocoon/programmes/G2UECO01_C.html#3015649**) and on the **Lol**@ platform used by HEC Liege(**http://lola.hec.ulg.ac.be/**).

As the courses are taught either in English or in French, each course will be described in its proper teaching language.

Master 1:

INVESTMENTS AND PORTFOLIO MANAGEMENT

The course is following the whole process of investment, from the investor profiling to the final investment portfolio recommendation and monitoring.
Course structure (following "Analysis of Investments &Management of Portfolios" (10th ed), by Keith C. Brown &; Frank K. Reilly.

Part I: THE INVESTMENT BACKGROUND: pre-reading

Part II: DEVELOPMENTS IN INVESTMENT THEORY.
6. Efficient Capital Markets.
7. An Introduction to Portfolio Management.
8. An Introduction to Asset Pricing Models.
9. Multifactor Models of Risk and Return.

Part IV: ANALYSIS AND MANAGEMENT OF COMMON STOCKS.
15. Equity Portfolio Management Strategies.
16. Technical Analysis.

Part V: ANALYSIS AND MANAGEMENT OF BONDS.
17. Bond Fundamentals.
18. The Analysis and Valuation of Bonds.
19. Bond Portfolio Management Strategies.

Part VII: SPECIFICATION AND EVALUATION OF ASSET MANAGEMENT.
24. Professional Money Management, Alternative Assets, and Industry Ethics.
25. Evaluation of Portfolio Performance.

BANKING AND INSURANCE

1. Partim Banking

The course introduces the general activities of a financial institution, with a focus on the bank's role as a financial intermediary. The Bank's balance sheet structure is analysed in detail, with the specificities of the bank's objectives and constraints. The recent crises of 2008 and 2010-11 will be analysed with their impact on the evolution of the banking industry. The first elements of bank risk management will be introduced.

Content:

A. LECTURE 1

i. Part A: Introduction to banking
ii. Part B: Financial structure

B. LECTURE 2

i. Part A: Neo-classic theory of banking
ii. Part B: The management of capital

C. LECTURE 3

i. Part A: Measuring and evaluating performance
ii. Part B: Risk management for changing interest rates. ALM and duration techniques

2. Partim Insurance

The course introduces the notion of insurance as it is considered by its different stakeholders: the consumer and society, the insurer himself, the surrounding economical actors and institutions. The inverted production cycle of the insurance business is emphasized, and basic actuarial mechanisms for pricing and provisioning are exposed. Finally, the new European supervision and regulation context, "Solvency II", is presented.

Content:

A. LECTURE 1

i. Risk: definitions, classification, cost
ii. Insurance: a form of risk management
iii. Key facts about the European insurance market
iv. Some remarks on insurance availability and behaviours

B. LECTURE 2

i. The inverted production cycle
ii. Cartography of an insurer activities and value creation
iii. Introduction to tariffs
iv. Introduction to reserves

C. LECTURE 3

i. The need for prudential supervision and regulation
ii. Solvency I
iii. Towards Solvency II
iv. Some institutional actors

FINANCIAL DERIVATIVES

Over the last decades, firms have been increasingly challenged by financial price risks due to unpredictable movements in exchange rates, interest rates and commodity prices. Financial markets have responded to this increase in volatility by developing a continuously growing range of financial instruments, called derivatives, as well as strategies combining these with other traditional financial instruments. As a result, derivative markets have been rapidly increasing in volume for the last decades and derivatives are today recognized as very useful corporate finance and investment tools. Not only the officially exchange traded instruments are very popular as hedging or speculative devices, but also privately arranged or Over the Counter contracts attract a wide variety of customers. Any student in Financial Economics should at least have some basic knowledge of the possible uses, users, and pricing of the most important derivative instruments. In this course we aim to provide such knowledge. At the end of the course students should feel more comfortable about this complex financial environment.

FINANCIAL MATHEMATICS AND STOCHASTIC CALCULUS

The bases of probability theory and stochastic processes are introduced. Then, two famiiles of applications are presented:

- Continuious time stochastic finance (stochastic calculus, option pricing models, interest rate models);
- Risk theory in non-life insurance (compound Poisson process, collective risk process, ruin probability, tarification principles).

Master 2:

EMPIRICAL METHODS IN FINANCIAL MARKETS

The financial world shows a deeper and deeper interest for quantitative forecasting methods. For the broker, having good approximations of future values of his equity portfolio is essential. A financial analyst should always anticipate as well as possible the behavior of firms in which his clients are likely to invest. In this framework, this course develops different existing methods to treat those problems. Its content heavily depends on students' interests and their professional expectations. Among others, topics in the sequel can be involved.

- Forecasting of seasonal data
- Risk management
- Causality
- Autoregressive moving average models (ARMA models)
- Generalized autoregressive conditional heteroscedasticity models (GARCH models)
- Kalman filter
- ...

DROIT ET FISCALITÉ DES INSTITUTIONS FINANCIÈRES

1. Sens du cours

Ce cours a pour objectif d'initier les étudiants à la législation et la fiscalité des banques et des compagnies d'assurance, dans une optique d'approche des problèmes que connaissent ces institutions au niveau juridique d'une part, et quant à la fiscalité de leurs produits d'autre part, l'analyse de ces produits étant limitée à ceux relevant de l'épargne et du placement.

2. Contenus abordés

a. Introduction. Banques et assurances. Bancassurance, assurfinance et bancassurfinance. Le contrôle prudentiel (CBFA). Le secret bancaire. La directive européenne sur la fiscalité de l'épargne. Les « mécanismes particuliers ». Le blanchiment.

b. L'univers bancaire. (i) Les produits bancaires pour les particuliers. Intérêts, dividendes, plus-values et placements collectifs. (ii) Les produits bancaires pour les entreprises. (iii) Le régime de taxation des OPC.

c. L'univers des assurances. Introduction. IARD et assurance-vie. (i) L'assurance-vie et l'impôt sur le revenu. Les trois piliers. (ii) L'assurance-vie et les droits de succession.

ADVANCED CORPORATE FINANCE AND MODELING

How to perform diagnostics on company's operating performance? How to lever on the key value drivers and improve its performance? How to design value creating investment, financing or distribution strategies? How to generate external growth inside the company and structure a buyout ?

The course provides students with a comprehensive understanding of these key capabilities CFOs need to acquire in order to create a successful finance function.

Especially, the course provides

- students with modeling tools and advanced techniques for capital budgeting and firm valuation;
- for students an opportunity to develop a thorough understanding of how financing as well as the firm's dividend policy could affect the market value of the firm and distort investment decisions;
- students with tools to design sound corporate strategies at each point of the firm financing cycle (leveraged recapitalization, leveraged buyout, management buyout).

The course is organized around case studies where students are asked to apply, in real world situations, the advanced techniques and knowledge in corporate finance acquired throughout the course.

The course is structured as follows:

Introduction: Review of firm valuation techniques and capital budgeting

Part I: Advanced techniques in Valuation and Capital Budgeting (NPV and sensitivity analysis, Monte Carlo simulation, decision trees, real options, ...)

Part II: Corporate decisions and firm value (capital structure and inefficiency costs, dividend policy and stock repurchases, agency theory)

Part III: Firm financing cycle (LBO, MBO, LR, ...)

FINANCIAL ECONOMICS

This course provides insights into the economic modeling of financial markets, institutions and instruments. The course is divided in four parts:

1. Preferences for Risk and return. This part studies the main aspects of financial risk and returns at rational expectations equilibrium and the sources of deviation from this equilibrium. A particular focus is brought on the influence of the preference structure of economic agents on the notions of "expected utility", "risk" and "risk premium". Applications are provided in the field of asset pricing.
2. Financial economics and portfolio management. Building on the previous part, the course reviews the performance management and measurement framework consistent with investor's preferences. Sharpe's portfolio optimization model based on the maximization of expected utility is studied. Besides, another portfolio optimization approach, the Black-Litterman model which integrates the investor's anticipations, is also analyzed.
3. Arbitrage pricing theory and fund performance. APT has contributed to the development of other asset pricing models, the Factor models which are also studied within this course. Moreover, performance measures for investment funds are also analyzed with a focus on the Treynor-Mazuy model and some improvements to the model.
4. State prices and the pricing of contingent claims. We review the notion of state pricing and the applications in the fields of market completeness and interest rate modeling. The application features the development and parameterization of term structure models such as the Black-Derman-Toy model. Finally, the course prioritizes contacts with market professionals as selected guests intervene during some sessions on topics such as the valuation of options (notion of smiles,...) and the banking and financial regulation.

FINANCIAL DATA MODELING AND ANALYSIS

A. MATLAB, Excel... for financial modeling

B. Financial statement forecasting
1. Review of theory and concepts 2. Modeling examples

C. Time Value of Money

D. Bond models
3. Modeling the term structure 4. Duration 5. Bond pricing

E. Equity models
6. Simulating stock prices

F. Portfolio models
7. Efficient portfolios 8. Estimating betas (+Kalman filter) 9. Black-Litterman
10. Value-at-Risk

G. Option-pricing models
11. Binomial option pricing 12. Black-Scholes model 13. Option Greeks
14. Portfolio insurance

FINANCIAL RISK MODELING

Financial Risk Modeling is divided in two parts.

The first part of the course focuses on market risk. It provides a detailed introduction on how risk, return, and price behavior of securities may be analyzed in financial markets and how risk may be characterized. The course focuses moreover on how investors and fund managers monitor and manage their myriad risk exposures. The implementation of sound quantitative risk models is a vital concern for all financial institutions. This course provides a comprehensive treatment of the theoretical concepts and modeling techniques. A large part of the course will be devoted to volatility (univariate and multivariate) modeling and their use in financial practice. Volatilities are used for risk management, portfolio choice, Value at Risk, intraday trading analysis, and correlations and tail dependencies between asset's returns.

The first second part of the course reviews credit risk models as implemented in major financial institutions and discusses the improvements that have been made (or could be made) in light of the financial crisis. Particular emphasis is given on the mathematical development of these models as well as on the foundations required to build the models.

FUND INDUSTRY

Created in collaboration between HEC Liege and the companies KBL and PWC, the KBL-PWC Chair proposes this course on fund industry. Its goal is to provide Business and Law students (as well as anyone interested in making a career in the mutual fund industry) with an overview of the mutual fund industry regarding basic principles as well as the different sorts of jobs. This course is practice-oriented and is built around Luxembourg mutual fund industry standards. Luxembourg is by far the European leader (and second in the world behind the United States) in the mutual fund industry with more than 11 000 funds managing around 1 800 billion Euros. Financial services in Luxembourg represent more than 44 000 employees contributing to almost one third of Gross Domestic Product. The course is articulated around 11 main parts. All these parts are presented by experts in mutual funds from the academic as well professional world (KBL, EFA, Deloitte & Touche, Arendt & Medernach, la bourse de Luxembourg, Elvinger, Hoss & Prussen).

> Part 1: Introduction to mutual fund markets
> Part 2: Plurality of products
> Part 3: The different investment vehicles
> Part 4: Creation of a mutual fund and organization of its social life
> Part 5: Fund administration
> Part 6: Custodian bank and trust company
> Part 7: Organization of mutual fund surveillance
> Part 8: Pension funds
> Part 9: Basic principles of fiscal law for mutual funds in Luxembourg
> Part 10: Admission to quotation (specialization: law)
> Part 11: Principles of fund commercialization (specialization: management)

FINANCIAL RISK MANAGEMENT

This advanced finance course provides an overview of the risk management function and scope in a financial institution, and review the main financial risks: Market Risk, Interest-Rate Risk, Credit Risk, Operational Risk... Basic risk management concepts will also be detailed (stochastic processes, hedging, dependence and copulae, Value-at-Risk...)
Contents:

A. Foundations of Financial Risk Management A. 1. The scope of financial risk management A. 2. Creating value with risk management A. 3. Principles of hedging

B. Derivatives and Risk Hedging B. 1. Derivative securities and markets B. 2. Hedging linear exposures/instruments B. 3. Hedging options

C. Hedging Fixed Income Instruments C. 1. Yield curve dynamics C. 2. Duration and convexity C. 3. Duration hedging C. 4. Interest rate derivatives

D. Regulation and risk management D. 1. The need for RM in financial institutions D. 2. The Basel regulatory process D. 3. Basel III

E. Quantitative market risk models E. 1. Value-at-Risk E. 2. VaR characteristics E. 3. Portfolio VaR E. 4. Historical VaR systems E. 5. Monte-Carlo VaR systems

Appendix 1: Modified VaR Appendix 2: EVT VaR

F. Credit, Operational and Liquidity risks, and Stress tests F. 1. Fundamentals of Credit Risk F. 2. Default Probabilities F. 3. The Copula model F. 4. Operational Risk F. 5. Liquidity Risk F. 6. Stress tests

Appendix 1: Leading credit risk models

An introductory lecture is organized at the beginning of the course with a guest speaker occupying a function of Chief Risk Officer (CRO) or equivalent in a prominent financial institution.
To illustrate and practise the concepts, a set of interactive exercise sessions will be organized in the computer and virtual trading room of HEC Liege. Furthermore, case studies representing virtual market situations will be analyzed during these exercises sessions.

INTERNATIONAL FINANCE

Financial operations performed in an environment of open and integrated markets entail a whole series of challenges linked to the macroeconomic and macro financial characteristics of the increasingly international environment. In today's globalized world managers, investors and policy-makers need a deep understanding of this environment and its underlying mechanisms to design sound financial and strategic decision-making.
Specifically, the course will examine the following issues: exchange rate basics and forecasting, identification, measurement, and management of exchange rates exposure; the corporate financial decision making of an internationally oriented firm; the evaluation of cross-border projects; financing and investing in global markets; and methods for evaluating the performance of foreign operations. While the course focuses on understanding the basic theory behind these issues, it also examines empirical evidence and examples of firms' real world activities with the goal of preparing a student for a career dealing with financial decision making in an international environment. The course is mostly lecture style with some discussion of topics through case studies as well as FT and The Economist readings.

Internship/Final Work Project

As part of their training received at HEC-Management School of the University of Liege, all students (120 credit program) accomplish an internship in a company or any other public or private institution as well as a final work project (TFE) in the 2nd year of the Master's program.

The 10-week internship

Students do an internship in a company during the first 10 weeks of the academic year (mid-Sept. to end-Nov.) and this can extended until mid-Dec. The 50-page or so internship report is due to be submitted by the beginning of Jan. The internship can be done in a private or public company, a public agency, an international or non-governmental organization. The internship occurs in Belgium or abroad and is generally non-remunerated.

For full details:
see the Lol@ intranet website devoted to internships and final work projects in economics: http://lola.hec.ulg.ac.be/claroline/course/index.php?cid=NTE010

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The Research Thesis

Students choose a thesis topic and a supervisor in their 1st year of the Master's program. Both the contents and the location of the internship must as far as possible relate to the thesis topic. The internship must be looked upon as an opportunity to take a more professional approach to the thesis topic and a chance to collect non-public data within the institution. The thesis topic must allow students to apply the methods of analysis and synthesis used by economists which they will have acquired in the course of their studies. The topic can be theoretical, empirical or both.

At HEC Liege there also exists a possible variant of the thesis called the "project-thesis". The latter's topic is proposed by an enterprise or a public organization welcoming the student on its premises, not only in the course of the internship period but also one day per week throughout the rest of the academic year. The project-thesis thus offers students a chance to work on a topic while being immersed in the host institution or enterprise.

For full details: see the Lol@ intranet website devoted to "project thesis".

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Economics

Notes

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