Introduction to GARP
Risk management as a career
GARP’s resources
Our Core Vision
To build greater confidence in the global financial system.

Our Mission Statement
To be the leading professional association for risk managers, managed by and for its members dedicated to the advancement of the risk profession through education, training and the promotion of best practices globally.

• Not-for-profit independent association
• Over 69,000 members worldwide from more than 167 countries
• Members represent over 5,000 different companies, including banks, asset management firms, insurers, academic institutions, government regulatory bodies, and other financial institutions
• Developing standards around the world through our FRM® program and GARP Risk Academy
• Practice-oriented
• Offices in greater New York City and London
  – Expanding in Asia

Helping the financial risk management community make a difference in the world.
GARP AROUND THE WORLD

Our members are in 167 countries on six different continents.
## GARP BOARD OF TRUSTEES

Active involvement from some of the world’s most renowned financial risk management professionals in the academic and corporate sectors.

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard Apostolik</td>
<td>President and CEO</td>
<td>GARP</td>
</tr>
<tr>
<td>Kenneth Abbott</td>
<td>Managing Director</td>
<td>Morgan Stanley</td>
</tr>
<tr>
<td>Robert Ceske</td>
<td>Chief Risk Manager, Treasury &amp; Global Funding</td>
<td>GE Capital</td>
</tr>
<tr>
<td>Thomas Daula</td>
<td>Chief Risk Officer</td>
<td>Morgan Stanley</td>
</tr>
<tr>
<td>Sebastian Fritz</td>
<td>Global Head, Operational Risk</td>
<td>Deutsche Bank</td>
</tr>
<tr>
<td>Michael Hofmann</td>
<td>Chief Risk Officer</td>
<td>Koch industries, Inc.</td>
</tr>
<tr>
<td>Donna Howe</td>
<td>Managing Director</td>
<td>UBS Securities</td>
</tr>
<tr>
<td>Jaidev Iyer</td>
<td>MD, Global Head Operational Risk, Citi Markets &amp; Banking, Global Head Payments Systems Risk</td>
<td>Citigroup</td>
</tr>
<tr>
<td>Fredric Lau</td>
<td>Executive Director, Head of Group Risk Management</td>
<td>Dah Sing Bank</td>
</tr>
<tr>
<td>Jacques Longerstaey</td>
<td>Chief Risk Officer</td>
<td>Putnam Investments</td>
</tr>
<tr>
<td>Victor Makarov</td>
<td>Former Regional Head of Risk Management</td>
<td>Rabobank - Americas</td>
</tr>
<tr>
<td>William Martin (Chairman)</td>
<td>Chief Risk Officer</td>
<td>Columbia Management Group, Bank of America</td>
</tr>
<tr>
<td>Michelle McCarthy</td>
<td>SVP, Enterprise Market &amp; Operational Risk Management</td>
<td>Washington Mutual Bank</td>
</tr>
<tr>
<td>Avinash Persaud</td>
<td>Chairman &amp; Emeritus Professor of Gresham College</td>
<td>Intelligence Capital Ltd</td>
</tr>
<tr>
<td>Riccardo Rebonato</td>
<td>Head, Global Market Risk</td>
<td>Royal Bank of Scotland Group</td>
</tr>
<tr>
<td>Robert Scanlon</td>
<td>Chief Risk Officer, Wholesale Bank</td>
<td>Standard Chartered bank</td>
</tr>
<tr>
<td>David Shimko</td>
<td>Principal</td>
<td>Towers-Perrin Risk Capital</td>
</tr>
<tr>
<td>René Stulz</td>
<td>Everett D. Reese Chair, Banking and Monetary Economics</td>
<td>The Ohio State University</td>
</tr>
<tr>
<td>Peter Tufano</td>
<td>The Sylvan Coleman Professor of Financial Management</td>
<td>Harvard University</td>
</tr>
<tr>
<td>Mark Wallace</td>
<td>Managing Director, Global Strategic Projects</td>
<td>Credit Suisse</td>
</tr>
</tbody>
</table>
RISK MANAGEMENT FUNCTIONS

• **Measure risk**
  – Developing methods to measure risk
  – Position data and risk modeling

• **Monitor risk**
  – Developing systems to monitor risk
  – Timely risk reporting and dialogue

• **Manage risk**
  – Developing strategies to manage risk
    • Applying financial risk management tools to reduce exposures
  – Risk budgeting and risk limits
  – Hedging and eliminating risks
Central Tenets of Risk Management

- Risk-taking is fundamental to financial intermediation and economic development
- Effectively managing risks associated with a business is a critical and intrinsic responsibility of management
- Objectives of risk-taking
  - Active
  - Prudent
  - Balanced (across asset classes, types, businesses, etc.)
  - Commensurate with potential rewards and firm’s risk appetite
- To be effective, risk managers must have credibility and access to senior management and all aspects of firm (front office, back office)
- Effective risk management requires an integrated approach
  - Spans all risk exposures
  - Culture of risk awareness throughout the organization
Central Tenets of Risk Management

• Risk management is not risk avoidance

• Risk management must ensure that management is fully informed about the risk profile of the firm

• Risk management must protect the firm against unacceptably large losses

NO SURPRISES!
Risk Management - Graphically

Risk Management Job 1
- Ensure firm is fully informed about its risk profile

Risk Management Job 2
- Protect firm against unacceptable large losses

95% Confidence Level

5% Probability

Loss
Gain

Distribution of returns
Measuring and Communicating Risk

• No one summary measure or statistic exists for any category of risk
  – “So far as the laws of mathematics refer to reality, they are not certain. And so far as they are certain, they do not refer to reality” – Einstein
  – Risk reports must include multiple measures to highlight risk profile

• Risk monitoring and reporting
  – Review positions and changes in risk profile
  – Measure exposure sensitivity to changing market conditions
    • Scenario analysis and stress testing
  – Identify risk limit under- and over-usages

• Risk dialogue and communication
  – Daily discussion with trading desk, daily risk reports
  – Weekly summary reports and risk committee meetings
  – Quarterly and annual risk reviews and regulatory reporting
Types of Risk

- **Credit Risk**
  - Possibility of losses due to default by a creditor or unexpected changes in credit quality of counterparty or issuer
  - Example: Loan default (mortgage, car loan, bond)

- **Market Risk**
  - Possibility of loss due to unexpected changes in market prices
  - Equity risk, interest rate risk, currency risk, commodity risk
  - Example: Interest rates rise → bond prices fall
  - Example: Aug-Sept 1998 – Russian ruble value dropped from 6:$1 to 16:$1

- **Operational Risk**
  - Possibility of losses due to inadequate or failed internal processes, people and systems, or from external events
  - System risk (technology, model), people risk (fraud, human error), terror risk
  - Example: System failure/fraud (Allied Irish Bank, Societe Generale)
Risk Oversight Framework

Credit Risk Department
- Credit risk from lending
- Counterparty credit risk
- Settlement risk

Market Risk Department
- Equity risk
- Interest rate risk
- Currency risk
- Commodity risk
- Market liquidity risk
- Correlation risk

Operational Risk Department
- System risk
- People risk
- Disaster risk
- Transaction risk

Risk Committees
- Credit risk
- Operational risk
- Market risk
- Funding risk
- Legal risk

Treasury
- Liquidity Risk

Law, Compliance, Government Affairs
- Legal risk
- Regulatory risk
- Enforceability risk
RISK MANAGEMENT IN THE ORGANIZATION

Top Management
CEO/CFO

Treasury & Trading
Front office
Positioning

Risk Management
Middle office
Market, credit, operational risk
Data capture
Documentation
P&L analysis

Operations
Back office
Trade processing
Cash and liquidity management

Audit & Compliance
Internal & External Regulatory information
THE ORGANIZATION OF RISK MANAGEMENT FUNCTION

- **Risk Management**
  - CRO
  - Market Risk
    - Trading room
  - Credit Risk
    - Trading and banking books
  - Operational Risk
    - Operations
  - Risk Analytics
    - MIS Analytics
    - RAROC
• Risk management as a profession barely existed 20 years ago
• Considerable growth in past 15 years
  – Notable risk management failures
    • U.S. Thrift/S&L crisis, 1990s
    • Barings Bank, 1995
    • Long Term Capital Management, Bankers Trust, 1998
    • Current credit crisis, 2007
    • Société Générale, 2008
  – Risk measurement techniques
    • Late 80’s – early 90’s – JP Morgan developed Value-at-Risk to quantify expected loss
  – International Banking Regulation
  – Buy-Side Pull
    • Growth of Hedge Funds
  – Development and growth of new sophisticated financial products
    • Credit derivatives
    • Energy markets
  – Computational Power
Considerable growth in past 15 years

Financial risk management expertise is one of hottest skill sets to have in the financial services industry
  – Excellent visibility
  – Outstanding salary potential
## TYPICAL RISK MANAGEMENT FUNCTIONS

### Market Risk

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>JOB TITLES</th>
<th>EMPLOYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Optimize financial risks for a trading portfolio</td>
<td>Market Risk Modeler</td>
<td>Deutsche Bank</td>
</tr>
<tr>
<td>• Analyze trading models implemented by traders</td>
<td>Market Risk Specialist – Energy</td>
<td>Goldman Sachs</td>
</tr>
<tr>
<td>• Assess trades and the risks each trade assumes</td>
<td>Market Risk Model Validation</td>
<td>Morgan Stanley</td>
</tr>
<tr>
<td></td>
<td>Market Risk Manager</td>
<td>Dynergy</td>
</tr>
<tr>
<td></td>
<td>Market Risk Structurer – Exotics</td>
<td>Ernst &amp; Young</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Algorithmics</td>
</tr>
</tbody>
</table>
## TYPICAL RISK MANAGEMENT FUNCTIONS

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>JOB TITLES</th>
<th>EMPLOYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Develop and analyze default models</td>
<td>Credit Risk Modeler</td>
<td>Moody’s KMV</td>
</tr>
<tr>
<td>• Evaluate likelihood a counterparty defaults</td>
<td>Credit Risk Specialist</td>
<td>Wachovia</td>
</tr>
<tr>
<td>• Evaluate tradable credit risks</td>
<td>Credit Risk Model Validation</td>
<td>Federal Home Loan Banks</td>
</tr>
<tr>
<td>• Manage credit portfolio risks</td>
<td>Credit Risk Model Developer</td>
<td>Merrill Lynch</td>
</tr>
<tr>
<td></td>
<td>Credit Portfolio Manager</td>
<td>S&amp;P</td>
</tr>
</tbody>
</table>
## Typical Risk Management Functions

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>JOB TITLES</th>
<th>EMPLOYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Develop risk management systems and procedures to establish risk procedures on an individual and aggregate level</td>
<td>Operational Risk Modeler</td>
<td>Citigroup</td>
</tr>
<tr>
<td>• Allocate economic capital</td>
<td>Economic Capital Modeler</td>
<td>Morgan Stanley</td>
</tr>
<tr>
<td></td>
<td>Risk Management Model Validation</td>
<td>BNP Paribas</td>
</tr>
<tr>
<td></td>
<td>Operational Risk Analyst</td>
<td>MFS Investment Management</td>
</tr>
</tbody>
</table>
### COMPENSATION TRENDS – RISK MANAGEMENT

#### Analyst/Associate
- Total Comp: $111,000 (2005), $121,000 (2006)
- Salary: $90,000 (2005), $92,000 (2006)
- Bonus-Cash: $14,000 (2005), $20,000 (2006)
- Bonus-Non-Cash: $7,000 (2005), $9,000 (2006)

#### Sr Assoc/Manager
- Total Comp: $150,000 (2005), $166,000 (2006)
- Salary: $100,000 (2005), $108,000 (2006)
- Bonus-Cash: $25,000 (2005), $30,000 (2006)
- Bonus-Non-Cash: $25,000 (2005), $28,000 (2006)

#### Vice President
- Total Comp: $242,000 (2005), $264,000 (2006)
- Salary: $142,000 (2005), $146,000 (2006)
- Bonus-Cash: $64,000 (2005), $78,000 (2006)
- Bonus-Non-Cash: $36,000 (2005), $40,000 (2006)

#### Director
- Total Comp: $295,000 (2005), $334,000 (2006)
- Salary: $170,000 (2005), $180,000 (2006)
- Bonus-Cash: $80,000 (2005), $100,000 (2006)
- Bonus-Non-Cash: $45,000 (2005), $54,000 (2006)

#### Senior VP
- Total Comp: $420,000 (2005), $462,000 (2006)
- Salary: $200,000 (2005), $208,000 (2006)
- Bonus-Cash: $140,000 (2005), $160,000 (2006)
- Bonus-Non-Cash: $80,000 (2005), $94,000 (2006)

#### Managing Director
- Total Comp: $900,000 (2005), $984,000 (2006)
- Salary: $250,000 (2005), $260,000 (2006)
- Bonus-Cash: $376,000 (2005), $446,000 (2006)
- Bonus-Non-Cash: $274,000 (2005), $278,000 (2006)

#### Chief Risk Officer
- Total Comp: $928,000 (2005), $1,022,000 (2006)
- Salary: $304,000 (2005), $310,000 (2006)
- Bonus-Cash: $280,000 (2005), $312,000 (2006)
- Bonus-Non-Cash: $344,000 (2005), $400,000 (2006)

• Knowledge and experience with range of financial products
  – “Risk management should not be separated from the activity of risk taking: you need to structure your positions according to the risks you understand. Risks you do not understand, should be avoided, period. Risk managers have difficult jobs.” (Nassim Nicholas Taleb)
• Quantitative ability
  – “Risk managers must integrate precise quantitative analysis of up-to-the-second data with quantitative wisdom derived from long-term history.”
• Intellectual curiosity
• Independence
  – “Risk management is about rocking the boat, asking questions, and challenging the establishment. No one can manage risk if they are not prepared to take and question risk.”
• Communication skills
• Problem solving ability
EDUCATIONAL BACKGROUND

• Education
  – Finance and general management
  – Economics, engineering, physics, mathematics, statistics
  – BS, MS, MBA or PhD

• Suggested coursework
  – Portfolio management, derivatives, banking, fixed income securities, econometrics
  – Quantitative methods
    • Probability theory, numerical methods, stochastic analysis, modeling
GARP OFFERINGS FOR STUDENTS AND PROFESSORS

- FRM® (Financial Risk Manager) Certification
- GARP Digital Library
- GARP Research Center
- GARP Career Center
- GARP Risk Academy/Professional Training
- Student Membership
The FRM is the certification for financial risk professionals worldwide

The FRM Committee works to ensure that the certification comprehensively measures a financial risk manager’s ability to manage risk in a real-world environment

- **Committee Chair:** Prof. René Stulz, Ohio State University

Practice-oriented examination

- Questions derived from a combination of theory and real-world work experience
- Test candidates understanding of risk management concepts and approaches and their application to a risk manager’s day-to-day activities

**FRM Requirements**

- Pass FRM Exam
- Two years relevant risk management experience
- Continuing professional development
Financial Risk Manager (FRM®)

- **Market Risk**
  - Weight: 30%

- **Credit Risk**
  - Weight: 25%

- **Operational and Integrated Risk Management, Legal**
  - Weight: 25%

- **Quantitative Analysis**
  - Weight: 10%

- **Risk Mgmt. for Investment Management**
  - Weight: 10%
OVERALL FRM® GROWTH
Objective evidence of FRM® as the benchmark for risk professionals worldwide

FRM Facts
- In 2007, the #1 source for FRM candidates was word-of-mouth – either a colleague or a current FRM holder

Top 10 firms with FRMs
- UBS
- Citigroup
- HSBC
- Price Waterhouse Coopers
- Bank of China
- Samsung
- BBVA
- ING
- Industrial & Commercial Bank of China
- Deloitte & Touche

FRM Registrants

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>108</td>
</tr>
<tr>
<td>1998</td>
<td>262</td>
</tr>
<tr>
<td>1999</td>
<td>769</td>
</tr>
<tr>
<td>2000</td>
<td>1,238</td>
</tr>
<tr>
<td>2001</td>
<td>2,958</td>
</tr>
<tr>
<td>2002</td>
<td>3,584</td>
</tr>
<tr>
<td>2003</td>
<td>4,369</td>
</tr>
<tr>
<td>2004</td>
<td>5,726</td>
</tr>
<tr>
<td>2005</td>
<td>6,760</td>
</tr>
<tr>
<td>2006</td>
<td>8,078</td>
</tr>
<tr>
<td>2007</td>
<td>10,135</td>
</tr>
</tbody>
</table>

6 year compound annual growth rate of 23%
ORGANIZATIONS REPRESENTED BY FIVE OR MORE 2007 FRM® CANDIDATES

*represents new organizations in 2007 with five or more FRM® Candidates
An American investor holds a portfolio of French stocks. The market value of the portfolio is €10 million, with a beta of 1.35 relative to the CAC index. In November, the spot value of the CAC index is 4,750. The exchange rate is USD 1.25/€. The dividend yield, euro interest rates, and dollar interest rates are all equal to 4%. Which of the following option strategies would be most appropriate to protect the portfolio against a decline of the euro that week?

March Euro options (all prices in US dollars per €)

<table>
<thead>
<tr>
<th>Strike Call euro</th>
<th>Put euro</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.25</td>
<td>0.018</td>
</tr>
</tbody>
</table>

a) Buy calls with a premium of USD 180,000
b) Buy puts with a premium of USD 220,000
c) Sell calls with a premium of USD 180,000
d) Sell puts with a premium of USD 220,000
FRM® RESOURCES FOR STUDENTS

- **FRM® Study Guide**
  - Outlines FRM® topics/subtopics and core readings
  - Material covered by most Master’s level curriculum
  - Freely available from GARP website

- **FRM® Scholarship Program**
  - Registration fee waiver
  - Available for up to 2 students or faculty from each school annually
  - More information available at

- **FRM® Practice Exams**
  - Sign up to GARP Digital Library ([www.garpdigitallibrary.org](http://www.garpdigitallibrary.org))
  - Send me an email saying that you are an DePaul University student and I will have the 2007 Practice exams added to your account
• Start with the end in mind
  – Learn what the job possibilities are now
    • GARP Career Center
    • quantfinance.com, efinancialcareers.com, wilmott.com
    • SSRN – Financial Economics Network
    • Location, market, skill set

• Know the interview process
  – “Heard on the Street”, Crack
  – “My Life as a Quant”, Derman
  – “Frequently asked questions in Quantitative Finance”, Wilmott

• Know the markets
  – Know the lingo
  – Know the issues
  – Know the general trends
Publishers Participating
Addison-Wesley
Blackwell
Bloomberg Press
Euromoney Books
Longtail Publishing
McGraw-Hill
Princeton University Press
Risk Books
Thomson South-Western
Wiley & Sons, Inc.
World Scientific Press

Publishers

Research

Journals

Editorial Committee

Individual
Corporate subscriber
University course pack

- Provides users with the ability to locate the very best educational and research material available in an affordable, convenient format
- iReadings™ allow user to download individual chapters of books, saving both time and money
- Hub for risk management education and research material
The GARP Research Center serves as the driving force for practitioner-oriented research by illuminating future trends and opportunities, supporting and conducting research and, ultimately, sharing these activities with the financial risk management community.
• GARP Risk Management Research Program
  – Sponsored research
  – Awarded funding to 6 research projects in 2007
    • “Does Short-term Debt Cause Financial Distress and Crises?”
      – Efraim Benmelech, Harvard
    • “Developing an Early Warning System for Currency Crises: A Multivariate Extreme Value Approach”
      – Phornchanok Cumperayot, Chulalongkorn University, Thailand
      – Roy Kouwenberg, Mahidol University, Thailand
    • “Commodity Price Risk Management and Institutional Ownership Clienteles”
      – Phil Davies and Bernadette A. Minton, Ohio State University
      – Catherine Schrand, University of Pennsylvania
    • “Estimating the Feedback of Defaults”
      – Kay Giesecke, Stanford
    • “Firm Performance and the Implementation of Enterprise Risk Management Processes”
      – Don Pagach and Richard Warr, North Carolina State University
    • “Design, Takeup and Impact of Rainfall Insurance: Evidence from India”,
      – Robert Townsend, University of Chicago
      – Xavier Giné, World Bank
      – James Vickery, Federal Reserve Bank of New York
• Internship program (starting in 2008)
  – Build research connection between GARP’s strong practitioner connections and academic researchers
GARP CAREER CENTER
Ideal meeting place for job seekers and employers in financial risk management

- Over 1,000 job seekers registered
- Over 150 new jobs posted monthly
- Over 50 employers posting jobs

http://www.garp.com/careercenter/
STUDENT MEMBERSHIP

- GARP Membership
  - Student membership - $50 per year
  - Affiliate membership – Free
- Paid membership includes:
  - Discounts on events, courses, GDL readings
  - GARP Risk Review subscription

- New York Chapter meetings
Creating a culture of risk awareness.™

Global Association of Risk Professionals

111 Town Square Place
Suite 1215
Jersey City, New Jersey 07310
USA
+1 201.719.7210

Minster House, 1st Floor
42 Mincing Lane
London
EC3R 7AE
UK
+44 (0) 20 7397 9630