

Career Options

- Accountant
- Actuarial Analyst
- Atmospheric Scientist
- Benefits Specialist
- Biomathematician
- Broker
- Budget Analyst
- Chemist
- Chief Financial Officer
- Collateral Analyst
- Community Manager
- Cryptologist
- Data Analyst
- Demographer
- Financial Consultant
- Financial Planner
- Financial Services Manager
- Grant Administrator
- Health Consultant
- Investment Banker
- Lawyer
- Management Consultant
- Mathematician
- Medical Researcher
- Meteorologist
- Operations Manager
- Operations Researcher
- Pension Fund Administrator
- Programmer
- Public Policy Analyst
- Risk Management Officer
- Research Associate
- Research Scientist
- Simulation Modeler
- Social Security Administrator
- Software Engineer
- State Budget Director
- Systems Analyst

What is Financial Mathematics?

Financial mathematics is the application of mathematical methods to the solution of problems in finance. (Equivalent names sometimes used are financial engineering, mathematical finance, and computational finance.) It draws on tools from applied mathematics, computer science, statistics, and economic theory. Investment banks, commercial banks, hedge funds, insurance companies, corporate treasuries, and regulatory agencies apply the methods of financial mathematics to such problems as derivative securities valuation, portfolio structuring, risk management, and scenario simulation. Quantitative analysis has brought efficiency and rigor to financial markets and to the investment process and is becoming increasingly important in regulatory concerns. As the pace of financial innovation increases, the need for highly qualified people with specific training in financial mathematics intensifies. Currently, there are a limited number of undergraduate programs which makes Baruch's program that much more special.

Occupational Opportunities

Because Financial Mathematics is housed within the field of math, the demand for both financial mathematics students and math majors is steady and strong. Many employers will give preferential treatment to graduates with a degree in math. The study of mathematics is excellent preparation for a host of employment opportunities in business, finance, insurance, communications, electronics, scientific research of any type, and any field that has challenging problems to solve. With graduate degrees, one can have a career in actuarial science, medicine, law, college teaching, or mathematics research.

Skills & Abilities

The study of financial mathematics develops the ability to solve problems through careful logical analysis and the application of a succession of complex techniques. The mathematics student develops the skills to discover the essence of problems, synthesize general theories to address specific problems, and apply theories across a variety of situations. These skills characterize the mathematics graduate as a problem-solver, whether simulating telecommunications networks, planning a marketing strategy, or projecting outcomes of public policy choices. Although these examples represent different professions, in each case the same abilities would be used. Knowledge of options pricing, bond valuation, and risk management are important. A representative selection of skills developed through the study include:

Problem Solving

- Defines and clarifies problems
- Tests hypotheses
- Perceives patterns and structures
- Determines relevant or extraneous information
- Identifies relationships between problems/solutions

Communication

- Communicates abstract concepts
- Translates between written text and computations
- Describes processes in non-technical terms
- Explains theories/ideas
- Summarizes findings

Technical/Computational

- Computer modeling
- Numerical simulation
- Analyzes statistics
- Program design
- Visualizes abstract shapes/patterns
- Applies quantitative analysis

Analysis

- Models complex systems
- Develops theories
- Projects and forecasts results
- Assesses risks
- Analyzes results
- Compares information/data
- Evaluates ideas/analytical methods

Career Snapshot: Operations Financial Analyst

Opportunities for operations research analysts exist in almost every industry because of the diversity of applications for their work. Financial analysts provide guidance to businesses and individuals making investment decisions. They assess the performance of stocks, bonds, and other types of investments.

Employment of financial analysts is projected to grow 12 percent from 2014 to 2024, faster than the average for all occupations. A growing range of financial products and the need for in-depth knowledge of geographic regions are expected to lead to strong employment growth.

Financial analysts can be divided into two categories: buy-side and sell-side-analysts. Financial analysts generally focus on trends affecting a specific industry, geographical region, or type of product. For example, an analyst may focus on a subject area such as the energy industry, a world region such as Eastern Europe, or the foreign exchange market. They must understand how new regulations, policies, and political and economic trends may affect investments.

Financial analysts work primarily in offices, but travel frequently to visit companies or clients. Most financial analysts work full time and 33% reported working more than 40 hours. Because the majority of their days are filled with telephone calls and meetings, much of the research conducted occurs after the office has closed.

Additional Resources

U.S. Government's Occupational Outlook Handbook
<http://bls.gov/oco>

The Mathematical Association of America (MAA)
www.maa.org

The International Association of Quantitative Finance
<http://www.iaqf.org/>

Society for Industrial and Applied Mathematics
www.siam.org

Make the Difference
www.makingthedifference.org/federalcareers

American Mathematical Society
www.ams.org

American Statistical Association
www.amstat.org

Masters Program in Financial Engineering
<http://mfe.baruch.cuny.edu/>

IEEE Computer Society
www.computer.org

Math for America
www.mathforamerica.org