

CAREERS THROUGH MATHS: INVESTMENT ANALYST



JOB DESCRIPTION

An Investment Analyst is a finance professional who researches economic trends, evaluates financial data, and examines companies and investment instruments to provide well-supported recommendations for buying, holding, or selling assets. A typical day involves scrutinising company financial statements (e.g., those of FTSE 100 constituents like Unilever or BP), building complex financial models in Excel, and monitoring real-time market data on platforms like Bloomberg or Reuters. They work in fast-paced environments such as the City of London or Canary Wharf, employed by asset management firms (e.g., Legal & General Investment Management, Schroders), investment banks, pension funds (like the Universities Superannuation Scheme), or hedge funds.

The core duties are deeply quantitative. An analyst is responsible for performing valuation analyses to determine a company's intrinsic worth, assessing risk and return profiles of potential investments, and writing detailed research reports for portfolio managers or clients. For instance, they might be tasked with modelling the future cash flows of a UK renewable energy startup to advise a venture capital trust on a potential investment. The role requires meticulous attention to detail and the ability to synthesise vast amounts of numerical and qualitative data into actionable insights. Mathematics is the bedrock of this profession. Every decision is underpinned by mathematical reasoning, from calculating key financial ratios like the price-to-earnings (P/E) ratio of a listed UK company to employing advanced statistical models for forecasting. The ability to apply mathematical concepts to real-world financial

scenarios is what separates a good analyst from an exceptional one, directly influencing the performance of multi-million-pound investment portfolios and the financial security of clients.

HOW MATHEMATICS IS USED

- **Financial Mathematics & Valuation:** This is the primary mathematical discipline, used to determine the present value of future cash flows and thus the fair value of an investment. Key techniques include Discounted Cash Flow (DCF) analysis, which involves forecasting a company's free cash flows and discounting them back to today's value using a calculated Weighted Average Cost of Capital (WACC). For example, an analyst valuing Rolls-Royce Holdings plc would project its engine service revenues and apply a discount rate that reflects the company's specific risk profile and UK market conditions. Other critical calculations include Net Present Value (NPV) for project appraisal and Internal Rate of Return (IRR) to compare the profitability of different investments.
- **Statistics & Probability:** Analysts rely heavily on statistics to analyse historical data, identify trends, and quantify risk and uncertainty. They use descriptive statistics (mean, median, standard deviation) to summarise the performance of an asset, and inferential statistics to make predictions about broader markets. For instance, they might perform a regression analysis to understand how changes in the UK Bank Rate correlate with the share price performance of UK housebuilders like Barratt Developments. Probability theory is fundamental in building stochastic models to forecast various economic scenarios and their potential impact on a portfolio.
- **Calculus:** Calculus, particularly differential calculus, is used for sensitivity analysis within financial models. By calculating derivatives, an analyst can determine how the value of a complex security or a DCF model changes with small variations in a key input (a "Greek" in options pricing, or the growth rate assumption in a valuation). This helps in understanding the key value drivers and risks of an investment. Integral calculus is used in certain advanced pricing models for financial derivatives.
- **Linear Algebra:** This area is crucial for managing large datasets and modern portfolio theory. Analysts use matrices to calculate the variance and covariance

of asset returns, which is essential for optimising a portfolio to achieve the highest possible return for a given level of risk. Software packages that perform these calculations for a portfolio of FTSE 250 stocks are built upon principles of linear algebra.

- **Statistical and Analytical Methods:** Investment analysis is a data-driven field. Analysts employ advanced techniques like time-series analysis to forecast economic indicators such as UK GDP growth or inflation. They use monte carlo simulations to model the probability of different outcomes for an investment under thousands of randomised scenarios. Machine learning algorithms, built on statistical foundations, are increasingly used to identify non-obvious patterns in market data or to process large volumes of unstructured data, such as analysing sentiment from news articles about UK companies.

KEY SKILLS & TOOLS

Skill/Tool	Application
Microsoft Excel	The quintessential tool for building detailed, bespoke financial models. Analysts use advanced functions (XLOOKUP, INDEX(MATCH)), pivot tables, and macros to perform DCF valuations, merger models, and leveraged buyout (LBO) analyses for UK-listed companies.
Bloomberg Terminal / Refinitiv Eikon	Industry-standard platforms providing real-time market data, news, and analytics. Mathematically, analysts use their built-in functions (e.g., Bloomberg's WACC function) to pull financial data, screen for stocks based on quantitative criteria, and analyse historical trading patterns.
Python / R	These programming languages are used for sophisticated data analysis, quantitative research, and automating tasks. An analyst might write a Python script to scrape data from the London Stock Exchange website, perform a statistical analysis on a dataset of UK property prices, or back-test a new quantitative trading strategy.
SQL	

	Essential for querying large relational databases to extract specific financial and economic datasets needed for analysis, such as historical performance data from a fund's internal database.
Financial Modelling	The practical application of all mathematical skills to build dynamic models that forecast a company's financial performance. This involves structuring worksheets logically, applying accounting linkages, and conducting sensitivity analysis to test how outcomes change with different assumptions.
Written & Verbal Communication	The ability to distil complex mathematical findings into clear, concise reports and presentations for investment committees or clients. This involves explaining the assumptions behind a model, the statistical significance of a finding, and the ultimate investment recommendation in an accessible manner.
Attention to Detail & Analytical Rigour	A fundamental skill for ensuring the accuracy of all mathematical calculations. A single formula error in a large model can lead to a multi-million pound misvaluation. Rigorous sense-checking of outputs against industry benchmarks is a critical daily task.

Typical Pathway: The standard pathway begins with strong GCSEs and A-levels in Mathematics and Further Mathematics, providing a crucial foundation. Most entrants then complete a bachelor's degree (2:1 or higher) in a highly numerical subject such as Mathematics, Economics, Finance, or Physics from a UK university. Entry-level positions include Investment Analyst, Graduate Analyst, or Research Associate. Career progression typically leads to Senior Analyst, then to Portfolio Manager or Fund Manager. Obtaining professional qualifications is often mandatory; the Chartered Financial Analyst (CFA) designation, offered by the CFA Institute, is the gold standard. The Chartered Institute for Securities & Investment (CISI) also offers relevant qualifications. Many firms support graduates through these programmes, which are essential for career advancement in the UK market.

Industry Demand: Demand for skilled Investment Analysts in the UK remains strong, particularly in London, which is a global financial hub. According to reports from eFinancialCareers and Morgan McKinley, there is consistent hiring in asset and wealth management. Demand is driven by the need for sophisticated risk management, the growth of quantitative investing, and the complexity of financial markets. Analysts with strong mathematical and programming skills (quantitative analysts or "quants") are especially sought after.

Real-World Impact: Investment Analysts play a vital role in the UK economy by enabling the efficient allocation of capital. Their analysis directs investment towards

innovative companies and vital infrastructure projects, such as funding for new wind farms or biotech research. By ensuring pension funds and savings institutions make sound investment decisions, they directly contribute to the financial security of millions of UK citizens. The mathematical rigour they apply brings discipline and evidence-based decision-making to the financial markets.