Background pattern

Description automatically generated

M4 Project

Maheswar Raju Narasaiah

ALY 6000: Introduction to Analytics.

Professor: Chiluiza, Dee

CPS - Northeastern University

Shape

Description automatically generated

# Overview of Quantitative Analyst Career

## Definition

Quantitative analysts, also known as 'quants,' are professionals who specialize in the design, development, and implementation of algorithms and mathematical or statistical models to solve complex financial problems. Quantitative analysts use techniques and knowledge from a variety of disciplines, including finance, economics, mathematics, statistics, and computer science, in their work.

Quantitative techniques are developed by financial quantitative analysts to help with investing, pricing, or valuing financial instruments. To aid in risk management, asset optimization, pricing, and relative value analysis, create mathematical or statistical models.

## Responsibilities/Duties of Quantitative Analyst

* Employs mathematical or statistical techniques to solve practical financial issues such as risk management, securities trading, derivative valuation, or financial market regulation. Determines the efficacy of existing and new financial models, products, and analytics.
* Coordinates with financial analysts to analyze trading strategies, market conditions, and trading system performance to establish quantitative techniques.
* Works with product development teams to validate and implement quantitative solutions.
* Assists in the development and testing of new analytical software to ensure compliance with specifications or scope of work.

## Career Options as Quantitative Analyst

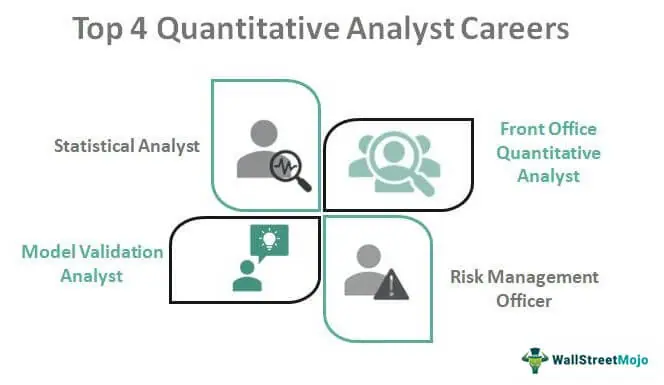


Figure 1 - Quantitative Analyst Career Paths

* Statistical Analyst: A statistical analyst uses statistical and mathematical methods to analyze large databases and produce the results the organization wants.
* Front office quantitative analysts are employed by businesses that make financial products.
* Risk Management Officer—By regularly reviewing the portfolio and identifying potential risk areas, the Risk Management Officer manages the overall risk of the organization.
* Model Validation Analyst: The Model Validation Analyst tests the current models that the company's analysts have created and alerts the department head daily to any deviations from the norm. “

# Type Of Data that Quantitative Analyst Deals With

## “The data on which QA works varies depending on the employer (for example, hedge fund vs. investment bank), product focus (for example, asset-backed securities vs. commodities), and level of expertise. "

## Conduct research and analysis on stock market trends and statistics before making modeling decisions.

## Develop and implement complex quantitative models (for example, stock trading models) as well as analytical software/tools.

## Perform daily statistical analyses and coding tasks (for example, risk analytics, loan pricing, and default risk modeling) (e.g., pattern recognition or machine learning).”

# Raw Data of Quantitative Analyst Jobs in USA from LinkedIn

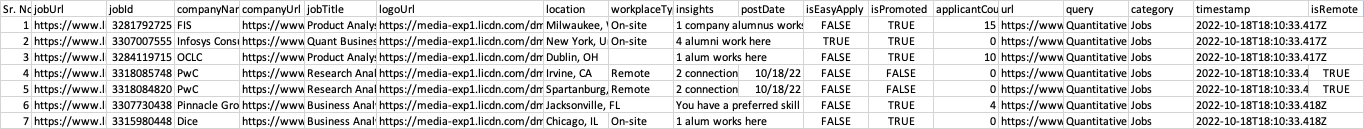
I have used [Phantom Buster](https://phantombuster.com/) tool to scrub the data for all the Quantitative Jobs available on LinkedIn, the tool was able to find 524 Jobs. Please find below the glimpse of first 7 rows of raw data I collected from the tool:  
  


Figure 2 - Raw Data of QA Jobs from LinkedIn

After collecting the raw data collected, and doing some data cleaning, I was able to generate following graphs based on data.

## Pie Chart for Workplace Preference by Employer

Figure 3 - Pie Chart: Work Place Preference (Employer)

## How much does a Quantitative Analyst make?

The estimated yearly total compensation for a quantitative analyst in the US is $142,553, with an average wage of $104,612. These numbers represent the median, which is the middle point between the pay ranges determined by our in-house Total Pay Estimate model and based on salaries provided by our users. The extra compensation is thought to be worth $37,941 a year.

Timeline

Description automatically generated

Figure 4 - Salary Range of Quantitative Analyst (Source: Glassdoor)

Additional compensation may include a cash bonus, a commission, tips, and profit sharing. The "Most Likely Range" represents values between the 25th and 75th percentiles of all available pay data for this role.

# Market Forecast on Demand for The Role

The financial industry is marked by constant change and innovation. Securities have become increasingly complex in recent years. Specialists who understand the mathematical models underlying security pricing in order to generate profits and reduce risks are in high demand in the market. Another trend that has boosted demand for quants is the growth of hedge funds and automated trading systems.

The US Bureau of Labor Statistics projects that overall employment of financial analysts will increase by 9% between 2021 and 2031, which is faster than the average for all occupations. Over the next ten years, financial analysts are expected to fill 32,000 jobs annually on average. As a result of the need to replace workers who change occupations or leave the labor force, such as to retire, many of those positions are anticipated to be filled.

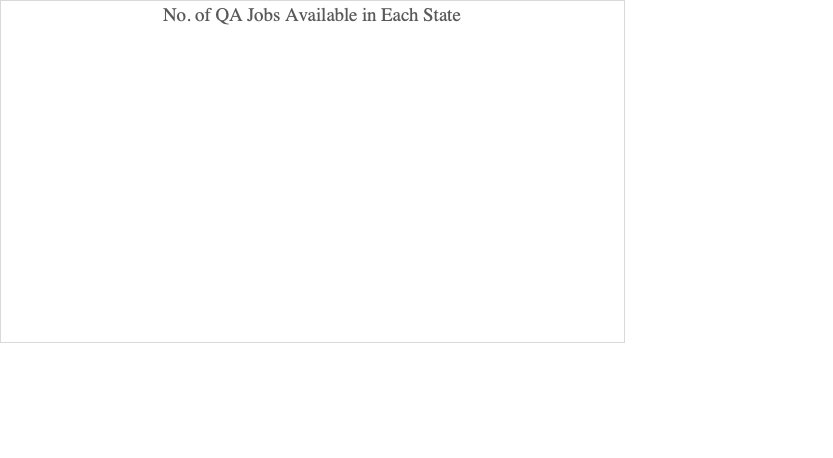
The 2008 financial crisis exposed some of the flaws in financial systems. Policymakers have implemented financial reforms to reduce risk and prevent future crises. Risk transparency reporting is now required at unprecedented levels by regulatory authorities, and investors are demanding improved risk infrastructure to protect their investments. The risk management industry has grown dramatically since the crisis, and it will continue to grow in order to meet increased regulatory standards. This is a genuine opportunity for quants who want to pursue a career in this field.

# Top Five Companies Where People Can Work in That Role.

Below are table which shows top five company based on anonymous survey done by Glassdoor.

|  |  |  |
| --- | --- | --- |
| Sr  No | Company  Name | Average Salary per Year |
| 1 | [Balyasny Asset Management](https://www.glassdoor.com/Salary/Balyasny-Asset-Management-quantitative-analyst-United-States-Salaries-EJI_IE262940.0,25_KO26,46_IL.47,60.htm) | $259,891 |
| 2 | [Two Sigma](https://www.glassdoor.com/Salary/Two-Sigma-quantitative-analyst-United-States-Salaries-EJI_IE241045.0,9_KO10,30_IL.31,44.htm) | $254,122 |
| 3 | [D. E. Shaw & Co. - Investment Firm](https://www.glassdoor.com/Salary/D-E-Shaw-and-Co-Investment-Firm-quantitative-analyst-United-States-Salaries-EJI_IE29290.0,31_KO32,52_IL.53,66.htm) | $248,831 |
| 4 | [Google](https://www.glassdoor.com/Salary/Google-quantitative-analyst-United-States-Salaries-EJI_IE9079.0,6_KO7,27_IL.28,41.htm) | $245,632 |
| 5 | [Quantifi](https://www.glassdoor.com/Salary/Quantifi-quantitative-analyst-United-States-Salaries-EJI_IE229717.0,8_KO9,29_IL.30,43.htm) | $239,359 |

# Map showing the Number of Jobs Per State in United States



# Key Skills Required for The Role.

The key skills required for quantitative analyst jobs; you will need:

* Strong mathematical and statistical abilities.
* Solid data mining and data analysis skills.
* Extensive financial knowledge.
* Programming abilities

# Using these abilities, you will be able to convert raw data into smart business strategies.

# Conclusions

Quantitative “analysis is essential in any company, but it is especially important in financials management firms, private equity funds, hedge funds, stock trading, and investment banking. It provides the prepared model's behavioral pattern and gives management a glimpse of the overall population's background and movement. Extensive data crunching and statistical knowledge are required to code and prepare the model that can be used to test the hypothesis on sample under the given population.

The industry's availability of statistical software that aids in high-level data analysis using cutting-edge techniques is increasing the demand for quantitative analysts daily. Many financial institutions are now focusing on quantitative data analysis software because stockbrokers and hedge fund managers need it to better analyze their existing portfolios.”

Simply put, it will become increasingly difficult to find the right talent due to the growing technical demands placed on quants. You need to compete with several the traditional top players in the computer science field for talent and ideas, according to Matthew Sargaison, Chief Investment Officer at AHL Partners LLP. "You're no longer in competition with Goldman Sachs, you're in competition with Facebook and Google," he says.

It does present a chance for businesses looking to develop their quantitative operations. While advancements in AI and machine learning are frequently covered in the media, some aspects of these topics are not at all new to the quant community.

# Bibliography

|  |
| --- |
|  |
| 1. Kashyap, R. (2013). Trading Strategies and Market Colour: The Benefits of Friendship with Quantitative Analysts and Financial Engineers. *Available at SSRN 2661949*. 2. Bouchaud, J. P., & Potters, M. (2003). *Theory of financial risk and derivative pricing: from statistical physics to risk management*. Cambridge university press 3. Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Financial Analysts, Retrieved at <https://www.bls.gov/ooh/business-and-financial/financial-analysts.htm>l |