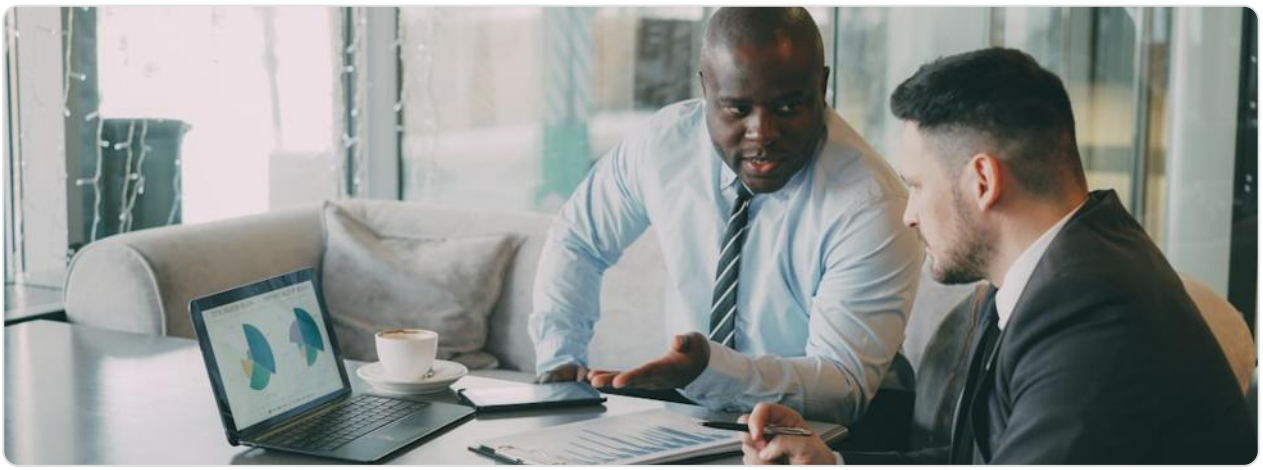
CAREERS THROUGH MATHS: POLICY ANALYST



JOB DESCRIPTION

A Policy Analyst is a professional who researches, analyses, and evaluates the effects of existing or proposed government policies. Their primary role is to provide robust, evidence-based recommendations to policymakers, helping to shape legislation and public services that affect millions of people across the UK. A typical day might involve scrutinising datasets from the Office for National Statistics (ONS), building a cost-benefit model for a new infrastructure project, drafting a briefing paper for a Minister, or liaising with stakeholders from organisations like the NHS Confederation or the Confederation of British Industry (CBI). The work environment is typically office-based within organisations such as UK government departments (e.g., HM Treasury, Department for Work and Pensions), devolved administrations (e.g., Scottish Government, Welsh Parliament), local authorities, think tanks (e.g., The Institute for Fiscal Studies, Nuffield Trust), or third-sector organisations.

The core duties of a Policy Analyst are deeply investigative. They must define complex policy problems, such as how to reduce childhood obesity in England or how to meet the UK's net-zero carbon emissions target by 2050. This requires gathering quantitative and qualitative data from a wide range of sources, including academic journals, government publications like Green and White Papers, and commissioned research. The analyst must then critically appraise this information, identifying biases, gaps in evidence, and potential unintended consequences of different policy options. The final output is often a clear, concise report or presentation that outlines the problem, analyses the evidence, and presents a set of

viable, costed recommendations for senior decision-makers.
Mathematics is central to this role, as it provides the objective foundation for policy decisions. It moves the debate from ideological opinions to evidence-based conclusions. For instance, an analyst at the Department for Education might use statistical regression analysis to determine the key factors influencing pupil attainment in GCSEs. At HM Treasury, an analyst might build a complex economic model to forecast the long-term fiscal impact of changing the state pension age. Without strong mathematical skills, an analyst cannot rigorously test assumptions, quantify impacts, or provide the credible analysis required to justify significant public spending or legislative change.

HOW MATHEMATICS IS USED

- **Statistics and Data Analysis:** This is the cornerstone of policy analysis. Analysts use descriptive statistics to summarise large datasets from the ONS or NHS Digital, and inferential statistics to draw conclusions about entire populations from samples. For example, to evaluate the effectiveness of a new policing strategy in London, an analyst would use hypothesis testing to see if a reduction in crime rates in pilot areas is statistically significant or likely due to random chance. Similarly, regression analysis is used to isolate the effect of a specific policy intervention from other influencing factors, such as analysing whether a job training programme genuinely led to higher employment rates, after controlling for broader economic growth.

- **Cost-Benefit Analysis (CBA) and Microeconomics:** Before any major public project is approved, a detailed CBA is required. This involves forecasting all the costs (e.g., construction, staffing) and monetising the benefits (e.g., time saved for commuters, health improvements) over the project's lifetime. A Policy Analyst at the Department for Transport might use CBA to compare the value-for-money of building the HS2 railway line against alternative investments in local rail networks. This requires calculating Net Present Value (NPV) to account for the time value of money, using a discount rate set by HM Treasury (the Green Book rate), to ensure future benefits are comparable to today's costs.

- **Economic Modelling:** Policy Analysts frequently build models to simulate the impact of policy changes. This can range from simple Excel-based forecasting models to complex computable general equilibrium (CGE) models used by the

Office for Budget Responsibility (OBR). For instance, to analyse the impact of a proposed sugar tax, an analyst would model the price elasticity of demand for sugary drinks to predict how consumption would change, and then model the secondary effects on public health outcomes and NHS costs.

- **Operational Research:** This area uses advanced mathematical and analytical methods to solve complex decision-making problems. In a policy context, this could involve using queuing theory to model patient wait times in A&E departments to inform NHS resource allocation, or using linear programming to optimise the logistics of a national vaccine rollout programme, ensuring doses are distributed to vaccination centres in the most efficient way possible.

- **Risk Analysis and Probability:** Policies are often implemented in situations of uncertainty. Policy Analysts use probability distributions and scenario analysis to quantify and manage risk. For example, when setting energy policy, the Department for Energy Security and Net Zero would model different future scenarios for gas prices and renewable energy capacity to assess the risks to the UK's energy security and to household bills. This allows policymakers to prepare contingency plans for a range of possible outcomes.

KEY SKILLS & TOOLS

Skill/Tool	Application
Microsoft Excel (Advanced)	The workhorse tool for most analysts. Used for data cleaning, creating pivot tables to summarise large datasets, performing statistical functions (e.g., T-Tests, CORREL), and building financial and forecasting models to appraise policy options, such as modelling the fiscal cost of a change to Universal Credit.
Statistical Software (R & Python)	Used for more advanced, reproducible statistical analysis and data visualisation. An analyst might use R to run a multivariate regression on ONS labour market data to understand the drivers of regional unemployment disparities. Python is used for scripting, automating data collection from APIs, and building more complex predictive models.

Stata/SPSS	Commonly used in government and academia for statistical analysis of social survey data, such as the UK Household Longitudinal Study (Understanding Society). Analysts use it to perform complex statistical tests and manage large datasets efficiently.
SQL	Essential for querying and extracting specific data from large, structured government databases, such as those held by NHS Digital or the Ministry of Justice, to answer specific research questions without needing to handle entire unwieldy datasets.
Economic Modelling Software (e.g., GAMS)	Used by specialist analysts in economic-focused roles, particularly in institutions like the Bank of England or HM Treasury, to build and run complex macroeconomic models that simulate the UK economy's response to different fiscal or monetary policies.
Data Visualisation (Power BI/ Tableau)	Used to create interactive dashboards and clear, compelling visualisations (charts, graphs, maps) to communicate complex quantitative findings to non-technical audiences, such as senior civil servants or Members of Parliament.
Stakeholder Engagement	The crucial soft skill of distilling complex mathematical findings into clear, accessible language for briefings, reports, and presentations. This involves explaining the methodology, limitations, and key takeaways from quantitative analysis to influence decision-making effectively.

Typical Pathway: A strong academic foundation in a quantitative or social science subject is essential. Most entrants hold at least a 2:1 undergraduate degree, with common subjects being Economics, Mathematics, Politics, or Social Policy. A master's degree in Public Policy (MPP), Economics, or a related field from an institution like the London School of Economics, University of Oxford (Blavatnik School), or University of Cambridge is highly advantageous and increasingly common. The flagship UK entry route is the Civil Service Fast Stream, which includes a specific Policy Fellow pathway and is intensely competitive. Alternatively, one can enter through direct entry-level roles (e.g., Policy Officer) in government departments, local authorities, or think tanks. Career progression typically moves from Analyst to Senior Analyst, then to Policy Manager or Head of Policy. Professional development can include gaining chartered status, such as becoming a Chartered Member of the Institute for Public Policy and Research (IPPR) or pursuing qualifications from the Government Analysis Function.

Industry Demand: Demand for Policy Analysts remains steady, with a particular

emphasis on those with strong quantitative and data science skills. The UK government's "Data Science Campus" and the push for evidence-based policy across all departments continue to drive this need. Growth areas include policy roles focused on technology regulation (e.g., at Ofcom), climate and net-zero strategy, and healthcare, especially following the COVID-19 pandemic which highlighted the critical need for robust modelling and data analysis in policymaking. Competition for roles in prestigious London-based think tanks and government departments is high.

Real-World Impact: Policy Analysts have a profound impact on British society and the economy. Their mathematical work underpinned the modelling used by SAGE (Scientific Advisory Group for Emergencies) to inform the UK's COVID-19 response, directly influencing lockdown and vaccination policies. Analysts at the Institute for Fiscal Studies provide critical, independent analysis of UK tax and spending policies that shapes public and political debate. The work of a Policy Analyst in the Department for Levelling Up, Housing and Communities directly influences the allocation of billions of pounds of funding to regenerate communities across the UK, using quantitative indices of deprivation to target resources effectively.