



Government  
Actuary's  
Department

## **We are GAD**

### **Professional, reliable and trusted**

We're financial risk professionals and modelling experts. Our skills can help government in complex areas around long-term risk and uncertainty. We apply these specialist skills in insurance, investment, data science, modelling, quality assurance, pensions and social security.

We're proud to be accredited under the Institute and Faculty of Actuaries' Quality Assurance Scheme, a voluntary accreditation scheme which recognises organisations' commitment to quality actuarial work.

### **Data science**

The field of data science permeates the traditional actuarial sectors of insurance, pensions, investment and beyond. Advanced techniques (including machine learning to analyse large data sets and powerful visualisation packages) enable us to interrogate and interpret data in more ways than ever before.

### **How we can help you**

We can support in a wide variety of ways, across all our areas of expertise. This can range from complementing your existing expertise at different levels to providing new insights including:

- identifying how current and new data can help inform decisions and manage risk
- cleansing, processing, interpreting and visualising data
- developing dashboards to make further insights into data accessible
- streamlining data and modelling processes to obtain the most optimum insights
- building, refining and quality assuring data models using the latest specialist software, machine learning and deep learning techniques
- translating analytical output into communicable advice to aid with decision making



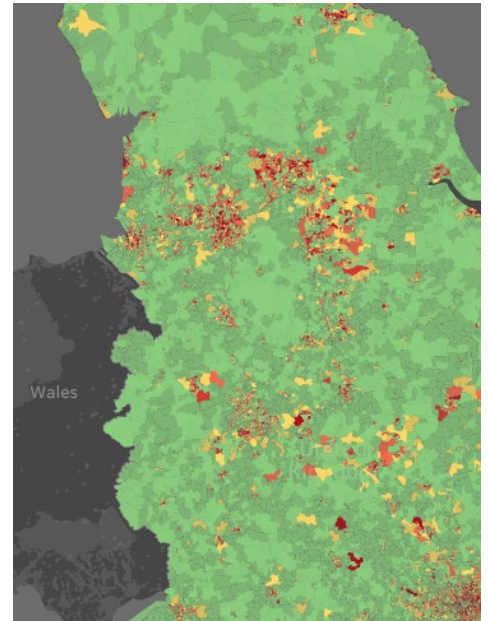
## Case study: Getting the full picture

### Interactive dashboards and summary statistics

We advise the Department for Education on the risk protection arrangement which provides an alternative to commercial insurance for academies. To support this work, we have developed interactive dashboards, maps and visualisations to help inform strategic and investment decisions.

Our data science experts design and deliver monthly dashboards which summarise insurance claim data into a collection of interactive graphs and summary statistics. The user-friendly dashboards allow trends to be easily identified and help decide which areas of claims management to focus on.

We also analyse various wider insurance risks and how they vary across England, representing these risks visually using interactive maps. Using a clear colour coding system, these maps identify areas of higher claim risk which can inform strategic decision making.



## Case study: Student loans book sale

### Machine learning – seeing the bigger picture

Machine learning is a branch of artificial intelligence which automates analytical model building and enables GAD to undertake more complex work. It helps us build linkages where in the past we would have built hypotheses.

We also use a visual representation program to complement the results produced by machine learning which identifies features and patterns in data.

#### Student loans book

GAD used machine learning to analyse the student loans book (repayments from future earnings) on behalf of UK Government Investments (UKGI).

This approach helped us gain a better understanding of what was driving graduate earnings. Once we had that information, we were able to make UKGI's model more robust, which means future sales of this asset could raise more money for the government.

#### Contact us

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