Household Finance Analysis and Prediction

1. Introduction

The NMG survey provides a rich dataset for understanding household financial decisions in the UK over the period 2011–2023. This report focusses on household savings decisions, segmented by demographic groups, regional disparities, and housing tenures, while incorporating the impact of macroeconomic factors such as inflation and interest rates. The findings explore how demographic and financial factors interact with broader economic changes to influence savings patterns.

2. Macro-outlook

Average household annual savings grew consistently from 2012 to 2015 likely driven by low inflation and interest rates and post-recession recovery factors such as stabilising wage growth. These annual savings again rose sharply in 2020, coinciding with the start of the pandemic, likely due to reduced discretionary spending opportunities during lockdowns. However, this increase appears temporary, as savings levels decline post-2020. Inflation rates, which were relatively stable in the early 2010s, began to rise significantly post-2021, potentially influenced by pandemic-related supply chain disruptions and geopolitical events. Meanwhile, interest rates remained historically low for much of the period, with a sharp upward trend starting in 2022. (Figure 1).

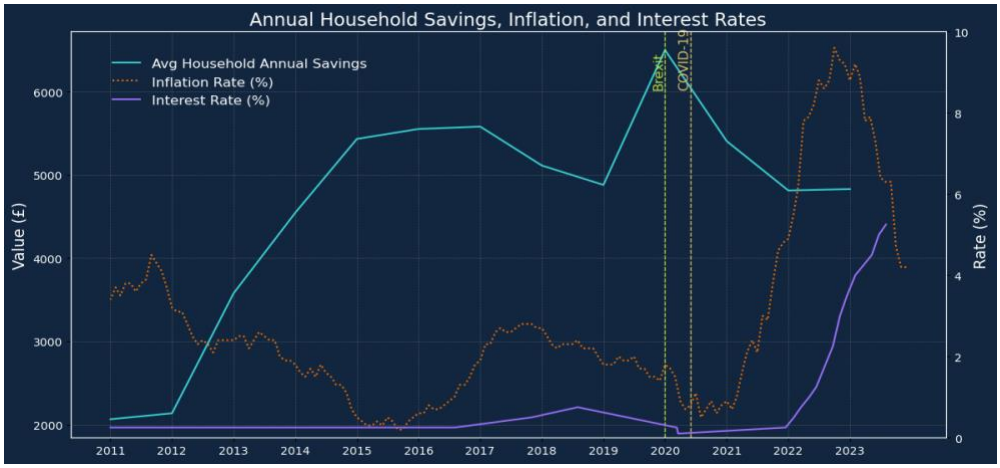

Figure 1: Macroeconomic overview – household saving, inflation and interest rates

Key events such as Brexit and the pandemic appear to have triggered substantial shifts in financial behaviours. The marked rise in household savings during the pandemic highlights a potential shift toward precautionary savings amidst economic uncertainty. Conversely, the post-2021 inflation surge, coupled with rising interest rates, may have eroded household purchasing power and constrained savings.

3. Household Savings Trends

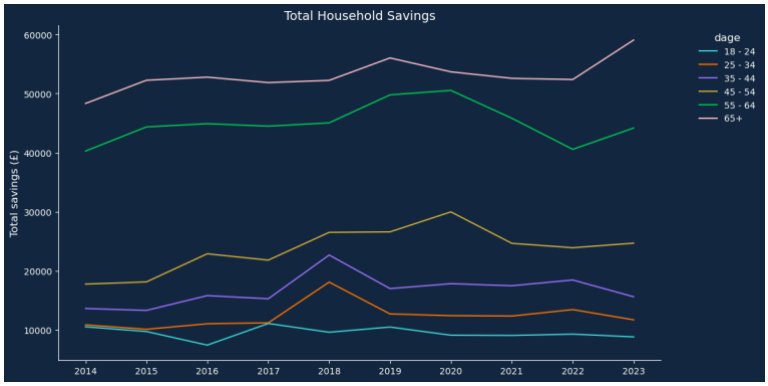

Figure 2: Total household savings by age

Older households (65+) consistently exhibit the highest total savings, with savings remaining stable or recovering quickly following economic shocks such as Brexit and the COVID-19 pandemic (Figure 2). In contrast, younger households (18-24 and 25-34) show significantly lower savings which may reflect their early life stage priorities such as education, housing, and starting families, as well as fewer years to accumulate. While younger groups have seen modest growth in savings over the years, the gap relative to older age groups remains stark and has grown since 2012. While older

households benefit from accumulated wealth and lower financial obligations, younger groups face challenges such as high housing costs and limited disposable income. This disparity is set to continue amplified by a period of high interest rates.

This analysis is consistent with annual savings by housing tenure (Figure 2). Annual savings have steadily grown for all housing tenures, including a surge during the pandemic, but households renting from a housing association or local authority have experienced significantly slower growth. Over the time period it can be seen that disparity has increased as renters, in particular in the private rental sector, are increasingly saving less than those with a mortgage or who own their home outright. This disparity underscores the systemic barriers renters face in achieving financial security. Those who own their home outright also enjoy significantly greater total savings and can earn an interest-based income with stored up capital (Figure 3).

Figure 2: Annual household savings by housing tenure

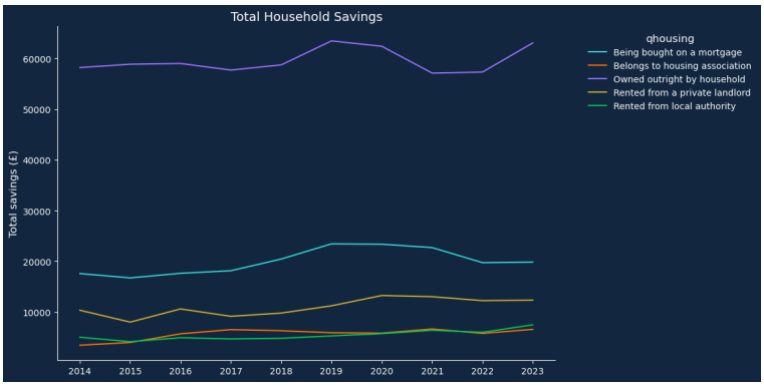

Figure 4: Total household savings by housing tenure

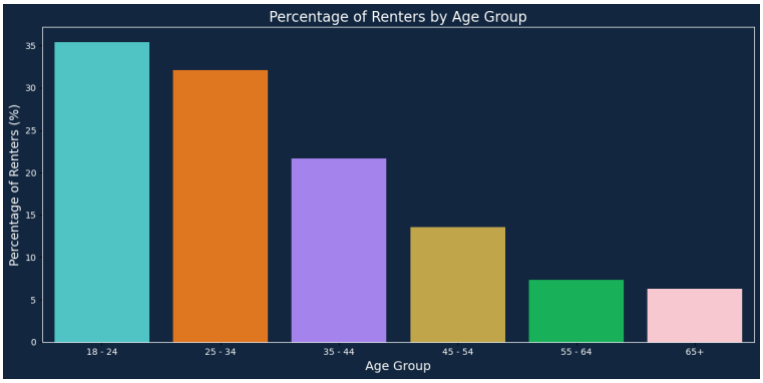

Figure 4: Private renters by age group

It is also true that those who are renting privately tend to be younger and the proportion of renters decreases consistently as age increases. (Figure 4).

Regional disparities are also evident in household savings rates (Figure 5). Households in Greater London tend to be able to save significantly more than households elsewhere in the UK. Higher incomes in wealthier regions enable greater savings in nominal terms despite elevated living costs. The rest of the UK, however, have a relatively similar savings ability.

Figure 5: Annual household savings by UK

4. Future application for Bank of England

This dataset offers rich opportunities for machine learning (ML) applications to uncover deep insights, such as the use of time series forecasting to predict the impact of inflation rates based on future household expectations, or using anomaly detection to identify regional hotspots of households at risk of financial instability. Another, which I have designed a proof of concept could be to predict future savings intentions, using information on and trends in current savings, future expectations and demographics. This would help the Bank understand the impact of future rate rises across different household groups when making policy decisions.

A random forest regressor was developed to predict annual savings based on demographic, financial, and macroeconomic variables. The results for initial test of model were not sufficiently robust to accurately determine meaningful trends for forecasting, but with further time and refinement, performance could be improved by tuning hyperparameters such as the number of trees, maximum depth, and minimum samples per split to better capture complex patterns in the data. Additionally, incorporating more relevant features, addressing missing values, and experimenting with feature engineering (e.g., interaction terms or lagged variables) could enhance the model's predictive accuracy.

Metric	Value
R^2 Score	0.16
Mean Squared Error	49857511.31

From this model attempt, influential features can be extracted to help inform future refinement. The most influential features were total savings, age, and inflation rates (Figure 6). Regional and gender differences also played a role, while the number of children in a household had minimal predictive value.

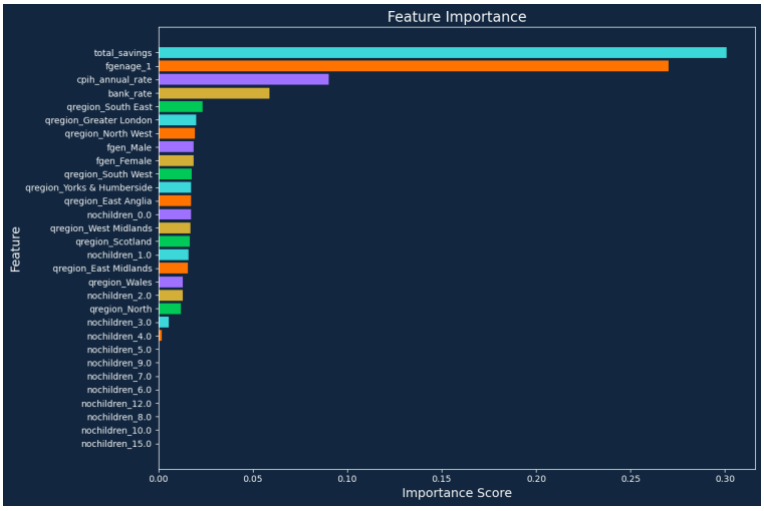

Figure 6: Feature importance – random forest regressor

5. Conclusion

This analysis underscores the complex interplay between individual financial behaviour, macroeconomic forces, and systemic inequalities. While the pandemic provided a temporary boost to household savings, rising inflation and interest rates have since eroded these gains. Targeted policies and interventions are essential to addressing disparities in savings behaviour, supporting vulnerable groups, and promoting financial resilience in an uncertain economic environment.

By integrating additional data and applying advanced analytical techniques, such as machine learning, further insights can be derived to inform policy and support households in achieving long-term financial stability.